

Public Services and Procurement Canada

on behalf of

Department of National Defence

# LONG-TERM LANDFILL MONITORING AT THE PIN-4 FORMER DEW LINE SITE

Byron Bay, Nunavut

25 March 2020

Elliott Holden, B.Eng.

**Environmental Engineer in Training** 

Ryan Janzen, P.Eng. (ON, SK, NT/NU)

**Project Engineer** 

Prepared for:

PSPC - DND

Department of National Defence

ADM(IE)/DGESM/DCS

101 Colonel By Drive

Ottawa, ON K1A 0K2

Prepared by:

Arcadis Canada Inc.

1050 Morrison Drive

Suite 201

Ottawa, Ontario K2H 8K7

Tel 613 721 0555

Fax 613 721 0029

Troy Austrins, P.Eng. (ON), PME

Project Manager

Our Ref.:

0000251-006A-PIN-4

Date:

TOWN THE OF CITY

25 March 2020

Charles F. Gravelle, M.Sc.E., P.Eng.

Principal

# **VERSION CONTROL**

Issue	Revision No	Date Issued	Page No	Description	Reviewed by
1	0	10 Dec. 2019	all	Draft Report	CG/TA
2	1	10 Mar. 2020	all	2 <sup>nd</sup> Draft Report	TA/RJ/EH
2	2	25 Mar. 2020	all	Final Report	RJ/TA

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#### Separate Package:

CD ROM - Containing All Raw 2019 PIN-4 Site Photographs

# **ACRONYMS AND ABBREVIATIONS**

bgs below ground surface

BOC natural biogenic organic compound (peat)

CIRNAC Crown-Indigenous Relations and Northern Affairs Canada

DCC Defence Construction Canada

DEW Distant Early Warning

DGPS Differential Global Positioning System

DND Department of National Defence

GPS Global Positioning System

HDPE High Density Polyethylene

LRR Long Range Radar

masl metres above sea level

mbgs metres below ground surface

mtoc metres below top of casing

MDL Method Detection Limit

MW Monitoring Well

NWS North Warning System

PCB Polychlorinated Biphenyl

PHC Petroleum Hydrocarbon

PSPC Public Services and Procurement Canada

QA/QC Quality Assurance/Quality Control

RODI Reverse Osmosis Deionized

RPD Relative Percent Difference

SRR Short-Range Radar

TOR Terms of Reference

USAF United States Air Force

# **EXECUTIVE SUMMARY**

Public Services and Procurement Canada (PSPC) was engaged by Department of National Defence (DND) to procure environmental and geotechnical services for the monitoring of Distant Early Warning (DEW) Line sites in Canada. PSPC contracted the services of Arcadis Canada Inc. (Arcadis) to perform the work and the management of the monitoring of DND DEW Line Sites (PIN-2, PIN-3, PIN-4, CAM-1, CAM-2, CAM-3, CAM-4, and CAM-M) in the Kitikmeot Region, Nunavut Settlement Area, for the years 2016 to 2020. This report documents the findings of the field program for the 2019 monitoring year conducted at the former DEW Line Site PIN-4, located at Byron Bay, Nunavut.

The 2019 monitoring program took place between 20 and 25 August 2019 and included the inspection/monitoring of seven landfills including the Northwest Landfill, North Landfill, Non-Hazardous Waste (NHW) Landfill, Station Area Landfill - West, USAF Landfill, Tier II Soil Disposal Facility, and the Airstrip Landfill.

The objective of the landfill monitoring program was to assess the performance of these landfills from an environmental and geotechnical perspective. Activities conducted include visual inspection, soil sampling, groundwater sampling, and thermal monitoring (downloading data from thermistors installed in the Tier II Soil Disposal Facility) in accordance with the Logistics and Work Plan prepared for the PIN-4 site.

The main observations and required actions for future monitoring events at the PIN-4 site are shown below:

Landfill	Main Observations and Conclusions	Required Action for Future Monitoring Events
Northwest Landfill	Landfill performance is acceptable.  There are no current geotechnical concerns.  No environmental issues in soil were identified. However, a trend evaluation for the landfill was not completed as part of the 2019 program as less than seven sampling events worth of soil data has been collected to date.	Continue environmental and geotechnical monitoring as per existing monitoring schedule.
North Landfill	Landfill performance is acceptable.  There are no current geotechnical concerns.  No environmental issues in soil were identified. However, a trend evaluation for the landfill was not completed as part of the 2019 program as less than seven sampling events worth of soil data has been collected to date.	Continue environmental and geotechnical monitoring as per existing monitoring schedule.

Landfill	Main Observations and Conclusions	Required Action for Future Monitoring Events
Non- Hazardous Waste Landfill	Landfill performance is acceptable.  There are no current geotechnical concerns.  Arsenic was detected at one of the landfill's downgradient-sample stations at a concentration exceeding the 'baseline plus three standard deviations' value. This arsenic exceedance represents a new maximum for arsenic concentrations recorded at the landfill to date but is only slightly above (<2 times) the 'baseline plus three standard deviations' value. Based on the limited chemical data collected to date and observations made during the 2019 field program which otherwise suggest that the landfill is performing as intended, this arsenic result is only considered to be of limited concern at this time. Arcadis recommends close monitoring of arsenic concentrations during future monitoring events. No other environmental issues were identified.  It is of note that a trend evaluation for the landfill was not completed as part of the 2019 program as less than seven	Continue environmental and geotechnical monitoring as per existing monitoring schedule.
Station West Landfill	Landfill performance is acceptable.  There are no current geotechnical concerns.  No environmental issues in soil were identified. However, a trend evaluation for the landfill was not completed as part of the 2019 program as less than seven sampling events worth of soil data has been collected to date.	Continue environmental and geotechnical monitoring as per existing monitoring schedule.
USAF Landfill	Landfill performance is acceptable.  There are no current geotechnical concerns.  No environmental issues in soil were identified. However, a trend evaluation for the landfill was not completed as part of the 2019 program as less than seven sampling events worth of soil data has been collected to date.	Continue environmental and geotechnical monitoring as per existing monitoring schedule.

Landfill	Main Observations and Conclusions	Required Action for Future Monitoring Events
Tier II Soil Disposal Facility	Landfill performance is acceptable.  There are no current geotechnical concerns.  Copper was detected in both the surface and at depth samples at a concentration exceeding the 'baseline plus three standard deviations' value at one of the landfill's downgradient-sample stations. These copper exceedances represent new maximums for copper concentrations recorded at the landfill to date but are only slightly above (<2 times) the 'baseline plus three standard deviations' value. Based on the limited chemical data collected to date and observations made during the 2019 field program which otherwise suggest that the landfill is performing as intended, these copper results are only considered to be of limited concern at this time. Arcadis recommends close monitoring of copper concentrations during future monitoring events. No other environmental issues were identified.	Continue environmental and geotechnical monitoring as per existing monitoring schedule.
	It is of note that a trend evaluation for the landfill was not completed as part of the 2019 program as less than seven sampling events worth of soil data has been collected to date.	
Airstrip Landfill	Landfill performance is acceptable.  There are no current geotechnical concerns.  Copper and nickel concentrations were detected at two of the landfill's downgradient stations above the 'baseline plus three standard deviations' value. The magnitude of these copper and nickel exceedances are comparable to maximum concentrations for these two parameters previously recorded at the landfill. Based on the limited chemical data collected to date and observations made during the 2019 field program which otherwise suggest that the landfill is performing as intended, these copper and nickel results are only considered to be of limited concern at this time. Arcadis recommends close monitoring of copper and nickel concentrations during future monitoring events. No other environmental issues were identified.  It is of note that a trend evaluation for the landfill was not completed as part of the 2019 program as less than seven sampling events worth of soil data has been collected to date.	Continue environmental and geotechnical monitoring as per existing monitoring schedule.

# 1 BACKGROUND

# 1.1 Context and Mandate

Public Services and Procurement Canada (PSPC) was engaged by Department of National Defence (DND) to procure environmental services for the monitoring of Distant Early Warning (DEW) Line sites in Canada. PSPC contracted the services of Arcadis Canada Inc. (Arcadis) to perform the work which included the management of the monitoring of DND DEW Line Sites (PIN-2, PIN-3, PIN-4, CAM-1, CAM-2, CAM-3, CAM-4 and CAM-M) in the Kitikmeot Region, Nunavut Settlement Area, for the years 2016 to 2020. This report documents the findings of the field program for the 2019 monitoring year conducted at the former DEW Line Site PIN-4, located at Byron Bay, Nunavut.

Arcadis' 2019 monitoring field program took place between 20 and 25 August 2019 and entailed the inspection/monitoring of seven landfills including the Northwest Landfill, North Landfill, Non-Hazardous Waste (NHW) Landfill, Station Landfill West, USAF Landfill, Tier II Soil Disposal Facility, and Airstrip Landfill.

The objective of this monitoring program was to assess the performance of these landfills from an environmental and geotechnical perspective. Field activities conducted include a visual inspection, soil sampling, groundwater sampling, and thermal monitoring (downloading data from thermistors installed in the Tier II Soil Disposal Facility) in accordance with the Logistics and Work Plan prepared by Arcadis for the PIN-4 site.

#### 1.1.1 Site Location

The DEW Line site PIN-4, Byron Bay, Nunavut, is located on the south coast of Victoria Island, approximately 160 km west of Cambridge Bay, Nunavut at 68° 45' 30" N and 109° 04' 12" W. The site consists of a Station Area, an Airstrip Area and a Beach Area on Dease Strait. The Airstrip is located approximately 5 km inland from Dease Strait or 8 km along the access road. The Station Area is approximately 300 metres from the Airstrip or 1.4 km along the road from the Airstrip Apron.

The site is under the care, custody and control of Raytheon Canada Limited (Raytheon). At the time of the 2019 field program all site facilities had been removed.

PIN-4 is accessible via charter aircraft or helicopter. In 2019, the runway and access roads were found to be in good condition.

#### 1.1.2 Background

PIN-4 was an auxiliary site within the original DEW Line system. The station was constructed in the 1950s as part of the Distant Early Warning (DEW) Line and operated until the early 1990's, when the DEW Line system was replaced by the more modern North Warning System (NWS). The PIN-4 DEW Line station was decommissioned in August of 1993. No NWS facilities have been constructed at or near the former DEW Line station.

The environmental cleanup and demolition of facilities commenced in 2009 and was completed in the summer of 2012. The cleanup included the remediation and refurbishment of seven existing landfills as

well as the construction of two new engineered facilities: a non-hazardous waste landfill for the disposal of site debris and demolition waste, and a Tier II soil disposal facility.

# 1.1.3 Site Description and Site Features

The PIN-4 site is characterized by glacial till and glacial drift deposits forming a series of raised beaches and marine terraces. Typical tundra topography including numerous, unconnected shallow depressions and thaw lakes in flat areas and adjacent ridges can be observed in the area. Vegetation growth is present across the site.

Surficial soils are primarily coarse grained (i.e. varying cobble, gravels and sands) with minor proportions of silt and clay. Bedrock is shallow; outcrops and exposed bedrock features are frequently observed across the site and in former borrow and disturbed areas. The site is situated within a zone of continuous permafrost.

Figure PIN-4.1 shows the overall site plan including airstrip, landfill locations, and access road.

# 1.2 Logistics and Work Plan

Prior to mobilization, Arcadis prepared a Logistics and Work Plan, dated 4 July 2019, which was submitted and accepted by DND. The Logistics and Work Plan was used as a reference to guide the 2019 environmental sampling and monitoring work completed at the PIN-4 DEW Line site. A copy of the Work Plan was taken with the Arcadis field staff for on-site reference purposes. The Work Plan also included a copy of the Nunavut Water Board water use license due to the use of an on-site camp at PIN-4.

# 1.3 Objective

The objective of the DEW Line landfill monitoring program is to collect sufficient information to assess the performance, integrity, and stability of the landfills from an environmental and geotechnical perspective for human health and environmental protection. Furthermore, an additional objective of the program is to collect information, in accordance with the monitoring requirements outlined below in Section 1.4, in a thorough and consistent manner during each monitoring event.

PSPC has specified the requirements for the Landfill Monitoring Program in the document entitled, "Terms of Reference – DEW Line Landfill Monitoring Program – PIN-2 Cape Young, PIN-3 Lady Franklin Point, PIN-4 Byron Bay, CAM-M Cambridge Bay, CAM-1 Jenny Lind Island, CAM-2 Gladman Point, CAM-3 Shepherd Bay, and CAM-4 Pelly Bay – DEW Line Sites, Kitikmeot Region, Nunavut, DND Project # KITIK 16", dated November 2015. Specifically, Section 3 of the TOR outlined the project's objectives in detail. The monitoring schedule for PIN-4 is detailed in the following table.

Table 1-1 Monitoring Schedule – PIN-4 Byron Bay

No. of Years After Construction	Monitoring Event No.	Year of Monitoring Event
1	1	2013
2	2	2014
3	3	2015
4	4	2016

No. of Years After Construction	Monitoring Event No.	Year of Monitoring Event
5	5	2017
7*	6	2019
10	7	2022
15	8	2027
25	9	2037

<sup>\*</sup> monitoring event covered under the current contract.

# 1.4 Scope of Work

The scope of work for the Long-Term Landfill Monitoring Program at PIN-4 was defined in the Logistics and Work Plan, dated 4 July 2019, as accepted by DND. The scope of work includes the activities summarized in the following table.

Table 1-2: PIN-4 Byron Bay Scope of Work

Landfill	Туре	Visual Inspection (Y/N)	Soil Sampling (# of locations and depths)	Groundwater Sampling (# of MWs)	Thermal Monitoring (# of Thermistors
Northwest Landfill	Leachate Contained	Υ	5 x 2	none	none
North Landfill	Regraded	Y	7 x 2	none	none
Non-Hazardous Waste Landfill	NHWL	Y	4 x 2	4	none
Station Area Landfill - West	Regraded	Y	5 x 2	none	none
USAF Landfill	Regraded	Y	4 x 2	none	none
Tier II Soil Disposal Facility	Tier II	Y	4 x 2	4	4
Airstrip Landfill	Regraded	Υ	3 x 2	None	none
Total		7	64	8	4

Note: QA/QC duplicate samples were not included in totals listed above

# 1.5 Site Geology, Hydrogeology and Hydrology

The PIN-4 site is in a continuous permafrost zone with medium to high ground ice content. According to the map entitled, "Geology of Nunavut" by the Canada-Nunavut Geoscience Office, the bedrock geology

comprises Paleozoic undivided carbonate and siliciclastic rocks. Based on field observations, the surficial geology at the PIN-4 site consisted of areas of exposed, weathered bedrock or bedrock discontinuously overlain by coarse-grained material (primarily coarse sands, ranging to cobble deposits with some areas of silt and/or clay containing soils).

Groundwater flow is expected to be seasonal, occurring mainly in the summer period of maximum active layer permafrost thaw. Groundwater is located at shallow depths and is greatly influenced by local permafrost conditions. Surficial drainage at the site is localized to intermittent small ponded areas adjacent to the landfill features and varies between the respective landfill locations. Multiple small areas of standing surface water (ponding water) were observed immediately adjacent to various landfill structures during the 2019 field program.

# 1.6 Site Land-Use Description

The PIN-4 site is uninhabited; however, there is at least one cabin along the shoreline to the east of the facility location that is intermittently inhabited by residents of Kugluktuk and other communities in the area (reportedly for commercial fishing). The airstrip at the former PIN-4 site is also reportedly utilized occasionally by Canadian Armed Forces and Canadian Rangers for drills and operations within the region.

The PIN-4 site is known to be a habitat for Arctic Foxes, Arctic Loons, Canada Geese, Lesser Snow Geese, Ross's Geese, Muskoxen and Tundra Swans. A lone adult male muskox was observed at the site during the 2019 monitoring event.

# 1.7 Field Program Staff

The 2019 PIN-4 DEW Line monitoring event was conducted by qualified Arcadis personnel with extensive experience in remote northern environments and at other DEW line monitoring sites in Nunavut. The following personnel were present on site:

Arcadis Canada Scientific Team and Roles

- Elliott Holden, B.Eng. Environmental Field Staff Lead
- Ryan Janzen, P.Eng Geotechnical Field Staff Lead

Inuit Support Team and Roles

- Denis Kavanna (camp staff)
- Jimmy Evalik (wildlife monitor)
- Gary Maksagak (wildlife monitor)
- Dwayne Allukpik (environmental assistant)
- Joe Evetalegak Jr. (environmental assistant)
- Bradley Wingnek (environmental assistant)

#### 1.8 Weather Conditions

Historical weather conditions for the PIN-4 site are presented in the following table. The historical weather conditions for the site are expressed as the 1971-2000 Climate Normals (temperature and precipitation totals) prepared by Environment Canada. The closest location for which Climate Normal data exist is at Cambridge Bay, NU, located approximately 163 km east of Byron Bay, as presented in the following table.

Table 1-3: Summary of Historical Temperature and Precipitation Conditions

Climate Normals (1971- 2000)	Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Daily Maximum Temp (°C)	-29.3	-29.3	-25.7	-16.7	-5.3	5.6	12.3	9.4	1.9	-8.1	-19.3	-26.1
Daily Average Temp. (°C)	-32.8	-33	-29.7	-21.4	-9.2	2.4	8.4	6.4	-0.3	-11.5	-23	-29.6
Daily Minimum Temp. (°C)	-36.3	-36.6	-33.7	-26	-13	-0.8	4.6	3.4	-2.5	-14.9	-26.5	-33
Precipitation (mm)-rain	0	0	0	0.1	1.6	9.8	21.7	24.5	11.4	0.4	0	0
Precipitation (cm)-snow	5.6	6.4	7.4	7.5	9.3	2.8	0	2.2	8.9	16.2	9.3	6.3

An outline of the weather conditions encountered during the 2019 field work conducted by Arcadis is provided in Section 2.1.2. as well as on the individual Inspection Checklists for each inspected landfill.

#### 1.8.1 Additional Work in 2019

One additional work scope item was conducted as part of the 2019 work program at PIN-4, as requested by DND. Arcadis inspected the Former Hazardous Waste Temporary Storage Area and Beach Landing Area at PIN-4, as noted in Section 10 below.

### 1.8.2 Deviations from the TOR, Proposal, Work Plan, and/or Kick-off Meeting

Challenges were encountered collecting soil samples at the full depth as specified in the TOR (i.e., 40-50 cm) in some locations. Further detail is given in the relevant Landfill sections below. Attempts were made using a pickaxe to advance the test pits to the required depth, however, bedrock was encountered and the test pits met refusal at the depth noted in the field notes and on the soil sampling logs. Depth samples were collected from the bottom of the test pits at the maximum depth achievable. More details are provided in the relevant sections of the report, as applicable, to the respective landfills.

One minor groundwater sampling deviation occurred during the 2019 monitoring event. Monitoring well MW-05 (Non-Hazardous Waste Landfill) was observed to have frozen contents and therefore no groundwater sample was collected from this location.

One issue occurred while attempting to download the .lsf files from the thermistors on site. These issues are detailed below in the relevant Landfill sections and are thought to be software related. Data files from VT-3 were unable to be downloaded via standard procedures, and after consultation with Lakewood Systems Ltd. (Lakewood), a complete memory transfer was conducted. Following memory erasure and reprogramming, this logger appeared to be functional prior to departure from site.

Challenges were also encountered with regards to weather while on site. The weather was extremely windy (gusting to 80 km/hr) and there were no windbreaks on site (all former structures had been dismantled). This slowed the field program and caused deviations from the anticipated and proposed fieldwork schedule.

# 1.9 Project References

Project references include:

- A AECOM Canada Ltd. (March 2014). *PIN-4 Byron Bay, Nunavut: Baseline Landfill Monitoring*. Project Number 60290585. Edmonton, AB.
- B Biogénie, a division of Englobe Corp. (June 2015). The Collection of Landfill Monitoring Data at the Former PIN-4 DEW Line Site, Byron Bay, Nunavut. Final Report 2014 (O/Ref.: CD3654) (Y/Ref.: DLC MON (KITIK13), Quebec City, QC.
- C Biogénie, a division of Englobe Corp. (March 2016). *The Collection of Landfill Monitoring Data at the Former PIN-4 DEW Line Site, Byron Bay, Nunavut. Final Report 2015* (O/Ref.: CD3654) (Y/Ref.: DLC MON (KITIK13), Quebec City, QC.
- D Biogénie, a division of Englobe Corp. (February 2017). The Collection of Landfill Monitoring Data at the Former PIN-4 DEW Line Site, Byron Bay, Nunavut. Revised Final Report 2016 (O/Ref.: CD3654) (Y/Ref.: DLC MON (KITIK13), Quebec City, QC.
- E Biogénie, a division of Englobe Corp. (February 2018). *The Collection of Landfill Monitoring Data at the Former PIN-4 DEW Line Site, Byron Bay, Nunavut. Final Report 2017 Season* (O/Ref.: CD3654) (Y/Ref.: DLC MON (KITIK13), Quebec City, QC.
- F Arcadis Canada Inc. (June 4, 2019). *Meeting Minutes, Kitikmeot DEW Line Sites Monitoring May 2019 Kickoff Meeting*. Ottawa, ON.
- G Arcadis Canada Inc. (July 4, 2019). Logistics and Work Plan, 2019 Kitik 16 DEW Line Site Monitoring, PIN-4, PIN-4, CAM-1, CAM-M sites. Ottawa, ON.
- H Arcadis Canada Inc. (March 8, 2016). *Proposal for Kitik 16 DEW Line Sites Monitoring, Response to Solicitation No. W6837-151003/B.* Ottawa, ON.
- Public Works & Government Services Canada. (November 2015). Terms of Reference, DEW Line Landfill Monitoring Program – PIN-2 Cape Young, PIN-3 Lady Franklin Point, PIN-4 Byron Bay, CAM-M Cambridge Bay, CAM-1 Jenny Lind Island, CAM-2 Gladman Point, CAM-3 Shepherd Bay and CAM-4 Pelly Bay – DEW Line Sites, Kitikmeot Region, Nunavut, DND Project # KITIK 16, (Specifically, Annex B and Annex S). Edmonton, AB.
- J Canada-Nunavut Geoscience Office. (2006). Geology of Nunavut. Map. Iqaluit, NU.
- K Department of Energy, Mines and Resources Canada. (1995). Permafrost. Map. Ottawa, ON.
- L Indian and Northern Affairs Canada. (December 2008). *Abandoned Military Site Remediation Protocol*, Volume I Main Report. Northern Affairs Organization. Contaminated Sites Program

# 1.10 Report Structure

This report describes the work completed in August 2019 at the following PIN-4 landfill locations:

Northwest Landfill;

- North Landfill;
- Non-Hazardous Waste Landfill;
- Station Area Landfill West;
- USAF Landfill:
- Tier II Soil Disposal Facility; and,
- Airstrip Landfill.

Results from soil and groundwater sampling, and visual inspection of the respective landfills on site are presented in the formats described in the TOR (Reference A).

The report has been organized such that the results for each landfill are presented within a separate section as presented below.

Table 1-4: Report Structure by Landfill at PIN-4

Landfill Identification	Section Number	Analytical Tables	Associated Figure Numbers
Northwest Landfill	3	Table 1 (Soil)	PIN-4.2A (Visual) PIN-4.2B (Soil)
North Landfill	4	Table 2 (Soil)	PIN-4.3A (Visual) PIN-4.3B (Soil)
Non-Hazardous Waste Landfill	5	Table 3A (Soil) Table 3B (Groundwater)	PIN-4.4A (Visual) PIN-4.4B (Soil) PIN-4.4C (Groundwater)
Station Area Landfill – West	6	Table 4 (Soil)	PIN-4.5A (Visual) PIN-4.5B (Soil)
USAF Landfill	7	Table 5 (Soil)	PIN-4.6A (Visual) PIN-4.6B (Soil)
Tier II Soil Disposal Facility	8	Table 6A (Soil) Table 6B (Groundwater)	PIN-4.7A (Visual) PIN-4.7B (Soil) PIN-4.7C (Groundwater)
Airstrip Landfill	9	Table 7 (Soil)	PIN-4.8A (Visual) PIN-4.8B (Soil)

Note: Analytical tables are provided at the rear of the report.

Results from soil sampling, groundwater sampling, and visual inspection of the respective landfills on site are presented in the format described in the TOR.

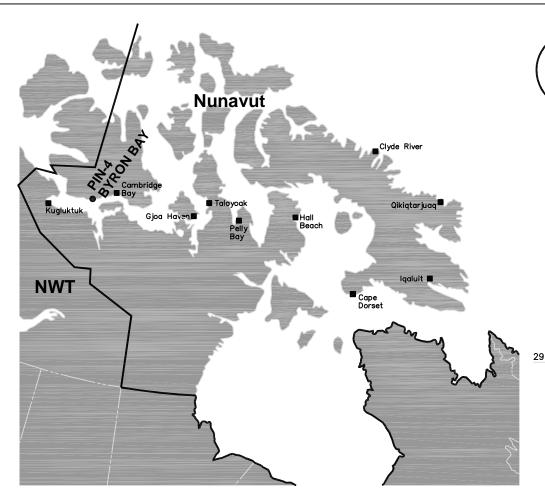
Each section details all the relevant information for the respective landfill areas included as part of the current 2019 Landfill Monitoring Program. Each of the individual landfill sections include:

- A brief description of the landfill;
- Completed Visual Inspection Checklist;
- A Preliminary Stability Assessment;

- A discussion of all the visual inspection issues assessed;
- The overall performance rating of the landfill;
- A photo log sheet (as **Appendix H** at the rear of this report);
- Annotated drawings of each landfill (figures follow each landfill section);
- · Soil sampling logs and analytical data;
- Monitoring well sampling logs and analytical data (if applicable);
- A discussion and comparison of chemical data to background and previous years monitoring events;
- Graphed chemical data for soil and groundwater (as **Appendix D** at the rear of this report);
- Completed thermistor inspection forms (if applicable);
- Analysis of overall performance of the landfill; and
- Any recommendations for further action and conclusions.

The photographic record for all landfills is presented in **Appendix H**. The original photos are included in electronic format (.jpg) and are attached as a separate addendum CD/DVD-ROM to the report. An electronic version of the report and its component tables, figures and data files is included as a separate CD/DVD-ROM submittal to this report.

A copy of the field notes acquired during the long-term landfill monitoring at PIN-4 have been included in **Appendix G**. Certificates of Analysis, QA/QC analytical results have been included in **Appendix B**.

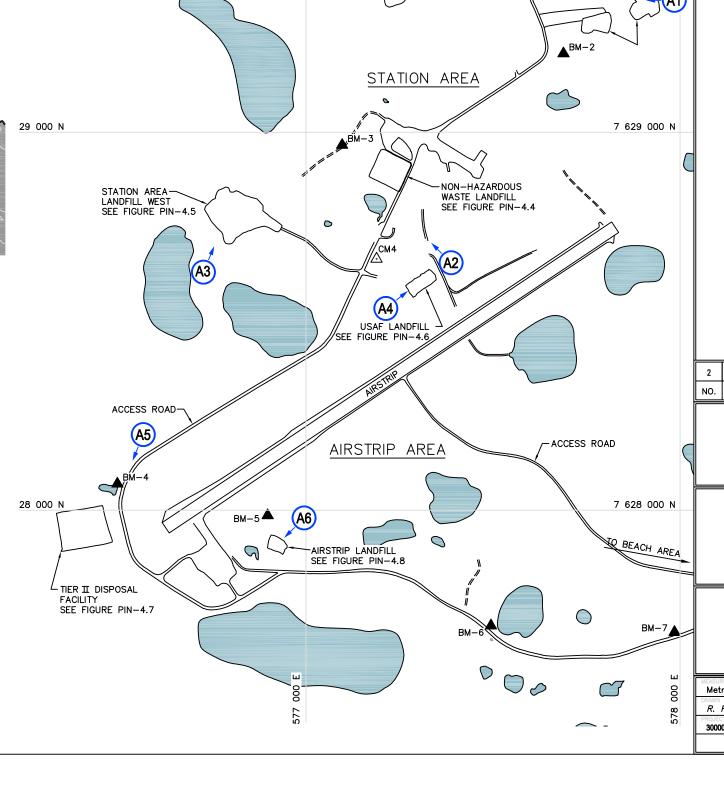


TO NINE MILE LAKE

LOCATION OF BYRON BAY WITHIN NUNAVUT TERRITORY

SURVEY CONTROL MONUMENTS					
SORVET CONTINUE MONOMENTS					
NO.	UTM COORDINATES		ELEV.	DESCRIPTION	
140.	NORTHING	NG EASTING		DESCRIF HON	
CM4	7 628 665.138	577 197.194	106.968	GEODETIC MONUMENT 649020	

	PERMANENT BENCHMARK (AS-BUILT)				
NO.	UTM COOR	DINATES	FLEV.	DESCRIPTION	
NO.	NORTHING	EASTING	ELEV.	DESCRIPTION	
BM-1	7 629 402.938	577 573.748	105.711	25mm DIA. STEEL PIPE	
BM-2	7 629 208.381	577 691.650	106.895	25mm DIA. STEEL PIPE	
BM-3	7 628 966.171	577 106.215	102.610	25mm DIA. STEEL PIPE	
BM-4	7 628 070.119	576 511.803	90.608	25mm DIA. STEEL PIPE	
BM-5	7 627 986.564	576 909.188	87.778	25mm DIA. STEEL PIPE	
ВМ-6	7 627 694.789	577 499.858	88.479	25mm DIA. STEEL PIPE	
BM-7	7 627 677.411	577 985.417	88.710	25mm DIA. STEEL PIPE	



# **LEGEND**

△<sup>CM4</sup>

FORMER WATER SUPPLY LAKE

NORTH LANDFILL
SEE FIGURE PIN-4.3

ACCESS ROAD-

NORTHWEST LANDFILL SEE FIGURE PIN-4.2

SURVEY CONTROL MONUMENT



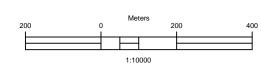
PERMANENT BENCHMARK LOCATION



BODY OF WATER



AERIAL PHOTOGRAPH LOCATION AND DIRECTION



1	2	FINAL	2020.03.10	RF	RJ	CG
1	NO.	VERSION	DATE	PAR	VERIF.	APPR



Construction de Défense Canada Defence Construction Canada

COLLECTION OF LANDFILL MONITORING DATA PIN-4, BYRON BAY, NUNAVUT

**OVERALL SITE PLAN** 



1050 Morrison Drive, Suite 201, Ottawa, Ontario, K2H 8K7 Office General +1 613 721 0555

MEASUREMENT UNIT Metre	1 : 10,000	MARCH 2020
R. FLETCHER	VERIFIED BY:  R. JANZEN	C. GRAVELLE, P.ENG
PROJECT NO: 30000251	30000251-PIN-4.1	PAGE PL

FIGURE PIN-4.1

# 2 APPROACH AND METHODOLOGY

# 2.1 Summary of Work

#### 2.1.1 Health and Safety

Prior to mobilization to the site, a site-specific health and safety plan (SSHASP) was submitted and accepted by DND. The plan outlined the general safety rules and procedures that were adhered to while working at the site. It also presented additional precautions and procedures in the event of an emergency. All project staff participating in the monitoring and assessment activities were required to familiarize themselves with the contents of the SSHASP and sign the Statement of Compliance document prior to commencing field work.

Field crews carried appropriate emergency gear and took every precaution to keep the crew safe. This included the following, where appropriate:

- Obtaining maps to assist in identifying/characterizing the dominant physical features near the site (e.g., topographic maps and aerial photographs);
- Carrying and knowing how to use emergency communication devices such as satellite phones, which
  were tested for functionality and sufficient airtime prior to mobilization;
- Checking the weather prior to travel to the field;
- Compilation of a site-specific Emergency Contact List that included numbers for emergency services, office contacts, and individual emergency contacts;
- Carrying a Global Positioning System (GPS) unit for navigation as well as for relaying accurate location coordinates in case of emergency;
- Possession of a Level 1 First Aid kit appropriate to the scope of work and number of personnel;
- Possession of an Emergency Field kit containing provisions necessary to survive (e.g. food, tarps, flares) should transport, or rescue services, not be possible for a number of days; and
- Knowing how to use all emergency equipment and testing it prior to mobilization to the field.

The remote nature of the PIN-4 Byron Bay site required that a comprehensive Emergency Field kit be mobilized to the site for the duration of the field work.

Arcadis staff received all relevant health and safety training in preparation for undertaking the work activities on-site prior to mobilization to the site. Arcadis ensured that all staff on site received a site safety orientation and field-specific training on contaminated sites, which was performed on Day 1 of the field program. The site safety orientation included specific details of the health and safety plan that were relevant for each job, and relevant training for each position.

# 2.1.2 Field Program

Arcadis staff mobilized to Cambridge Bay from Yellowknife on a commercial flight, then chartered a flight to the PIN-4 site via a Dornier 328 aircraft operated by Kingaunmiut Air. On-site transportation consisted of an ATV and foot travel. Accommodations while in Cambridge Bay were provided by Inns North Arctic Islands Lodge (IFR0194). On-site accommodations were required for this contract in the form of a tent camp supplied by Kitnuna Corporation (IFR0378). The following table outlines the field schedule for PIN-4.

Table 2-1: 2019 Field Schedule for PIN-4 Byron Bay

August 2019	August 2019					
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
18	19	20	21	22	23	24
		PIN-4 Logistics in Cambridge Bay	Mobilized to PIN-4	Site Work at PIN-4	Site Work at PIN-4	Site Work at PIN-4 Demobilized to Cambridge Bay
25	26	27	28	29	30	31
PIN-4 Sample Shipment Travelled to Yellowknife	Travelled to Ottawa					

Weather during the field inspection and monitoring event was a mix of sun, clouds, and rain with high winds. Temperatures ranged from -2 to 8 degrees Celsius.

# 2.1.3 Visual Inspection

Visual inspection of each landfill was conducted by Mr. Ryan Janzen, P.Eng. and based on the guidelines presented in Section 5.2 of the TOR. A visual inspection checklist (provided in Annex J1 of the TOR and reproduced herein for each individual landfill section) was completed for each landfill site inspected. Inspection information recorded for each landfill included its designation, type, date, monitoring event number, weather conditions, and the name of the inspector. Observations related to the following potential site conditions were recorded for each landfill:

- Settlement;
- Erosion;
- Lateral movement:
- Frost action;
- Sloughing;
- Cracking;
- Animal burrows;

- · Vegetation establishment;
- Staining;
- Vegetation stress;
- Seepage points or ponded water;
- Debris or liner exposure;
- · Condition of monitoring points; and
- Other relevant observations.

The presence of the above conditions was recorded on field notes as well as referenced with electronic DGPS coordinates for purposes of evaluating their location, dimensions, and extent. A DGPS survey of each landfill was performed (including elements such as the toe and crest, site features, above-listed geotechnical conditions, etc.), with the data later transcribed into AutoCAD to create the site figures.

Photographic records were taken to document the general condition of the landfill. Photographs were taken to substantiate recorded observations including where no concerns were identified. All photographs were referenced to existing monuments where possible and a 1 metre long pickaxe (with 10 cm marked intervals) was used as an indication of scale in the visual inspection photographs. Red cones were also used to denote the shape and orientation of features (cones in the photographs are 20 cm in diameter). Photographs were taken using a Fuji XP70 digital camera (Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 megapixels).

Historical features and conditions have been noted from previous monitoring events. Existing features were compared to these features noted in previous monitoring reports and a comparative analysis is included in each landfill section within this report.

All monitoring equipment was visually inspected (wells and thermistors) with any damages noted along with repair requirements. Photographic records of each monitoring station were also collected and are provided in **Appendix H** and on the DVD/CD-ROM provided separately.

#### 2.1.3.1 Stability Assessment

Arcadis used the following Performance/Severity rating reference guide for purposes of assessing the geotechnical performance of the landfill sites inspected and the extent of any features noted.

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 or 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.

Performance / Severity Rating	Description
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/or  Slope failure.
Extent	Description
Isolated	Singular feature.
Occasional	Features of note occurring at irregular intervals/locations.
Numerous	Many features of note impacting less than 50% of the surface area of the landfill.
Extensive	Impacting greater than 50% of the surface area of the landfill.

# 2.1.4 Soil Sampling

Soil sampling at each landfill site was completed concurrently with the other monitoring activities. A Soil Sampling Log (as was provided in Annex J2 of the TOR) was completed at each soil sampling logation. Soil sampling logs for each monitoring station are provided in the individual landfill sections of this report.

Two samples were collected from each sampling location: one sample from 0-15 cm depth, and one sample from 40-50 cm depth wherever possible. Test pits were manually excavated with hand tools (pickaxe and stainless-steel shovel). All hand tools used for sample excavation were decontaminated between locations using Alconox and distilled water. Soil samples were placed in the laboratory supplied containers by hand. A clean pair of nitrile gloves was donned prior to the collection of each sample. The laboratory supplied containers used for each sample included one zip-top plastic bag, two 125 mL glass jars, and two 40 mL clear glass vials with methanol for preservation. All sample containers were pre-sterilized as supplied by Bureau Veritas Laboratories (BV Labs, formerly Maxxam Analytics).

All soil sampling locations were backfilled after the collection of soil samples. In addition, all locations were photographed during sampling and after backfilling was complete. A list of these photographs is included in **Appendix H** for each landfill.

Soil samples were collected at the locations as specified in Annex C of the TOR. The number of locations at each landfill is shown in the following table.

Table 2-2: Summary of Soil Sampling Locations at PIN-4

DEW Line Site	Landfill	Proposed # of Soil Sampling Locations	Actual # of Soil Sampling Locations	Total # of Samples Submitted for Analysis
	Northwest Landfill	5 x 2	10	10
	North Landfill	7 x 2	14	14
	Station Area Landfill – West	4 x 2	8	8
PIN-4	USAF Landfill	5 x 2	10	10
Byron Bay	Non-Hazardous Waste Landfill	4 x 2	8	8
	Tier II Soil Disposal Facility	4 x 2	8	8
	Airstrip Landfill	3 x 2	6	6
PIN-4 Total		64	64	64

<sup>\*</sup>Total does not include duplicates.

Limited depth was achieved at multiple soil sampling stations as outlined in the following table.

Table 2-3: Summary of Soil Sample Depth Limitations at PIN-4

DEW Line Site	Landfill	Soil Sampling Station ID	Sampling Depth of Lower Sample (cm)	Reasoning for limitation
PIN-4 Byron Bay	North Landfill	P4-6B	20-30	Refusal on bedrock
		P4-9B	25-35	Refusal on bedrock
		P4-11B	20-30	Refusal on bedrock

Soil samples were analyzed for the following parameters:

- Petroleum Hydrocarbons (PHCs) F1-F4 fractions;
- Inorganic elements: arsenic, cadmium, chromium, cobalt, copper, lead, nickel and zinc; and,
- Polychlorinated Biphenyls (PCBs): Total Aroclors.

Soil analyses were carried out by Bureau Veritas Laboratories (BV Labs, formerly Maxxam Analytics). The analysis of PHC and inorganic soil parameters listed above were conducted at BV Labs' facility in Edmonton, Alberta, while the analysis of PCB soil parameters were conducted at BV Labs' facility in Calgary, Alberta. Both facilities are ISO 17025 certified.

Quality assurance and quality control (QA/QC) were to be carried out in accordance to the procedures outlined in Annex K of the TOR with alterations as specified by DND during the 2019 project kick off meeting (i.e., elimination of the inter-laboratory analysis requirements). QA/QC protocols were implemented for the soil sampling program.

As requested by DND, no samples for inter-laboratory analyses were collected as part of this monitoring program. The specific locations where blind duplicates were collected were determined in the field and noted in the field notes. In addition, one equipment blank was obtained by running laboratory supplied water over the stainless-steel shovel and then collecting it in laboratory supplied sample containers.

#### 2.1.4.1 Soil Sample Analysis

During the site assessment stage of the DEW Line Clean-Up project, background concentrations of inorganic elements and PCBs in soil were determined using samples collected from areas not impacted by site activities. No PHC testing was conducted during the site assessment stage. As such, there are no background datasets available for PHCs. The background soil conditions can inform if there are naturally elevated concentrations of inorganic elements present at the site that could be influencing the landfill monitoring results.

Baseline conditions refer to the soil and groundwater chemistry around the perimeters of the landfills during the site investigation and/or remediation stages of the DEW Line Clean-Up project, generally based on sampling results collected over a period of one to three years. These values are used to determine the conditions at each landfill around the time of remediation, and create a baseline mean that can be used for comparison to data collected over time, following completion of the remediation program.

Monitoring data can be considered within baseline conditions when it is within three standard deviations (SD) of the baseline mean, to account for natural variability in soil and groundwater conditions. For simplicity in this report, the term 'baseline plus three standard deviations' is represented by 'BL+3SD'. Furthermore, the term 'exceedance' will refer to a parameter concentration that exceeds the BL+3SD value.

For some parameters, there were insufficient detectable results during the investigation and remediation of the site (greater than 50% non-detects); consequently, the baseline mean was set to the detection limit and no standard deviation was calculated. In these cases, results are still compared to the BL+3SD; however, additional evaluation may be warranted to explain that the baseline results were below detection and a SD was not calculated, therefore a certain amount of natural variability (within three times the baseline mean) is expected.

Analytical results of soil samples collected downgradient of landfills are compared to those of samples collected upgradient of landfills. If concentrations upgradient of the landfill are similar to concentrations downgradient, it suggests that the landfill is performing as intended and any elevated results are an indication of natural variability or natural conditions. Upgradient and downgradient results are also compared to the BL+3SD. Results above the BL+3SD could potentially indicate results outside of the natural variability in the area and should be further examined.

Trend evaluations are completed when there are more than seven monitoring events worth of data available for a landfill. Trend lines are provided on the graphs for each parameter for the upgradient locations combined (represented by a blue line on the graphs) and for all of the downgradient locations combined (represented by a black line on the graphs). The trend evaluation involves a visual review of the data points and associated trend lines. No statistical analysis is completed at this time. The visual review results in a conclusion of no apparent trend, a decreasing trend or an increasing trend.

The visual trend analysis for each parameter at upgradient and downgradient sampling locations should result in an observation that falls into one of three categories detailed below:

- No apparent trend, or a decreasing trend for both upgradient and downgradient locations; these
  outcomes suggest that the landfill is performing as expected and there is likely no contaminant
  migration from the landfill.
- An increasing trend upgradient and either a similar increasing trend downgradient, or no trend/a
  decreasing trend downgradient; these outcomes could indicate contaminant migration towards the
  landfill from an upgradient source, or it could represent contamination that was not remediated
  upgradient of the landfill during the site remediation phase.
- 3. A decreasing or no apparent trend upgradient, but an increasing trend downgradient could indicate potential contaminant migration from the landfill.

It should also be noted that the method detection limits in the TOR for the DEW Line sites for PHCs in soil are far lower than the typical laboratory MDLs reported. The low MDLs combined with the approach used to determine the comparison value created very low comparison reference values for PHCs (fractions F1 through F4). It should also be noted that the action level for petroleum hydrocarbon remediation at DEW Line sites is typically 2500 mg/kg; therefore, detectible hydrocarbon contamination below this concentration is not uncommon in the vicinity of the landfills.

Another factor considered in the evaluation of PHCs was the presence of natural organic peat. Such natural biogenic organic compounds (BOCs) can contain PHC F3 concentrations ranging from 150 mg/kg up to 1430 mg/kg along with PHC F4 concentrations varying from 150 mg/kg up to 1580 mg/kg. BOCs often have low (<30 mg/kg) PHC F2 concentrations and high PHC F3b (C22-C34) concentrations (i.e., PHC F3b range >85% of total PHC F3 range). Arcadis reviewed F2 and F3b concentrations in order to differentiate between a natural organic peat versus a refined petroleum product.

# 2.1.5 Groundwater Sampling

Groundwater sampling at each monitoring well installed around the Non-Hazardous Waste Landfill and the Tier II Soil Disposal Facility was completed concurrently with the other monitoring activities.

It should be noted that monitoring wells were not installed during the initial PIN-4 site assessment stage. As such, there are no background datasets available for groundwater. Analytical results of groundwater samples collected downgradient of landfills are compared to those of samples collected upgradient of landfills to assess for potential leachate migration.

A Monitoring Well Sampling Report (updated groundwater monitoring log provided by DND in 2018) was completed at each groundwater sampling location. These sampling reports note:

- Condition of the monitoring well;
- Any ponding water at the monitoring well location;
- Lock details;
- Monitoring well installation details;
- Water elevation(s);
- Depth to bottom of well;
- Height of well stick-up;

- Colour, odour, presence and thickness of free product if applicable;
- Purge volume and sampling equipment used; and
- pH, conductivity and in-situ temperature after each well volume purged and before sampling.

Monitoring wells were purged prior to sampling, with pH, conductivity, turbidity and temperature being measured continually during purging using the Horiba U-52 multi-parameter meter. These parameters were recorded every five minutes and groundwater sampling did not begin until the difference between measurements was <10% for all parameters. The purging and sampling of each monitoring well was completed using dedicated sampling equipment consisting of 6 mm diameter high density polyethylene (HDPE) tubing connected to a low flow peristaltic pump. Each well was purged and sampled using dedicated tubing supplies which were removed upon completion of the sampling to prevent damage due to freezing. Other sampling equipment, such as the interface probe and the Horiba U-52 multi-parameter meter, were decontaminated between monitoring events using Alconox and distilled water.

Groundwater samples were collected at the locations specified in Annex C of the TOR. The number of locations at each landfill is shown in the following table.

Table 2-4: Summary of	Groundwater	Sampling	Locations at PIN-4
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Monitoring Well ID	Observations	# of Groundwater Samples Collected			
Tier II Disposal F	Tier II Disposal Facility				
MW-1	Good condition	1 Parent +1 Duplicate			
MW-2	Good condition - ponded water approximately 0.1 m deep was observed around the well.	1			
MW-3	Good condition	1			
MW-4	Good condition	1			
Non-Hazardous Waste Landfill					
MW-5	Good condition – water was frozen	none			
MW-6	Locking ring for the casing's cap has split, for more information refer to Section 5.2.3	1			
MW-7	Good condition	1			
MW-8	Good condition	1			

Groundwater samples were collected at seven of the eight monitoring well locations using the low-flow method. No sample was obtained from MW-05 as the groundwater was frozen

Groundwater samples were analyzed for the following parameters:

- Inorganic elements total concentrations: arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc. (groundwater samples were not field filtered or preserved, as per DND instructions); and,
- Petroleum Hydrocarbons (PHCs): F1-F4 fractions.

Groundwater analyses was carried out by Bureau Veritas Laboratories of Edmonton, Alberta, an ISO 17025 certified laboratory.

Quality assurance and quality control (QA/QC) was to be carried out in accordance to the procedures outlined in Annex K of the TOR (with deviations as noted below) along with alterations, as specified by DND during the project kick off meeting (i.e., the elimination of the inter-laboratory analysis requirements). QA/QC protocols were implemented for the groundwater sampling program. Blind duplicate samples and quality control and assurance measures were applied as appropriate.

As requested by DND, no samples for inter-laboratory analyses were collected as part of this monitoring program. The specific locations where blind duplicates were collected were determined in the field, as it was dependent on the amount of water available at each location. One trip blank, one field blank, and one equipment blank were also collected as part of the sampling program.

Arcadis conducted a chemical analysis review on the results of the groundwater samples collected and present these results in Section 5.3.3 and Section 8.3.3 of this report. When discussing the analytical results throughout the report the term 'exceedance' is used to describe a concentration for any given analyte that is above its 'baseline +3x standard deviations' (BL+3SD) value.

#### 2.1.6 Thermal Monitoring

Thermal monitoring at the Tier II Soil Disposal Facility was completed concurrently with the other monitoring requirements. At each thermistor installation location, an updated (2019) Thermistor Annual Maintenance Report form (provided by DND via email) was completed. Monitoring consisted of the following steps:

- Inspecting the condition of thermistor installations, noting their condition, damage if applicable, and any specific repair requirements. Batteries and desiccants were replaced for all thermistors;
- Retrieving ground temperature data from the thermistor installations. A personal computer
  equipped with the appropriate software and datalogger programming files was used to retrieve
  the data;
- Collecting manual readings of thermistors using a digital multi-meter and switch box;
- Resetting the datalogger memory to zero and restarting readings;
- Confirm the datalogger was programmed to take readings every 12 hrs at noon and midnight; and
- Monitoring the system using the personal computer to ensure that the dataloggers were functioning.

A total of four thermistors were inspected and the memory of each thermistor datalogger was downloaded. Thermal monitoring data was retrieved from the thermistor installations as specified in the TOR.

#### 2.2 Field Notes and Data Collection

#### 2.2.1 Field Notes

Field notes were collected using the field forms provided in the TOR, namely the Visual Inspection Checklist, Soil Sampling Log and Monitoring Well Sampling Log (TOR annexes J1, J2 and J3), as updated by DND in 2018. In addition, field notes regarding thermistor inspections were recorded on the field form

provided as Annex M – Thermistor Inspection Template, with updates provided by DND in 2018. A copy of the field notes is provided in **Appendix G**.

#### 2.2.2 Data Collection

The visual inspection was conducted with the aid of a Trimble R2 Differential Global Positioning System (DGPS) unit to locate features of note and to collect GIS information to be used in report preparation. The horizontal accuracy of the measurements taken with the DGPS unit ranged between 0.05 and 0.8 m, with most results falling within the 0.1 to 0.3 m accuracy range. DGPS data was tied into local site controls, including existing monitoring wells, thermistor installations and control monuments where found. A detailed data dictionary (Trimble file) was created prior to the site visit to capture all required information as outlined in the long-term monitoring plan. An SSF file and the data dictionary (Trimble files) are included on the appended CD/DVD ROM to be used in future site investigations.

Placement of features of note on the figures for each landfill was completed using the DGPS information, supplemented by visual observations and field measurements. During the previous monitoring event in 2017, placement of features of note on Figures was done primarily through visual observations. Given the use of the DGPS unit, the locations of features reported in this 2019 monitoring report are considered to be more accurate than those previously reported. Small differences in feature locations are, unless otherwise noted, a result of the use of the more accurate DGPS data.

Thermistor data was downloaded onto a personal computer from dedicated dataloggers on the site. Raw thermistor data is provided, as well as in Excel format on the appended CD/DVD ROM.

# 2.3 Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) was carried out in accordance with the procedures outlined in Annex K of the TOR with alterations as specified by DND during the project kick off meeting (i.e., the elimination of the inter-laboratory analysis requirements). QA/QC protocols were implemented for the soil and groundwater sampling programs. Blind duplicates were obtained for both soil and groundwater samples. One trip blank, one field blank, and one equipment blank were also collected as part of the groundwater sampling program.

Field personnel employed Arcadis' QA/QC protocols, including appropriate techniques for soil and groundwater sampling, sample storage, shipping and handling, as well as collection of duplicates.

#### 2.3.1 Field

Soil samples collected for potential laboratory analysis were placed in polyethylene bags, laboratory prepared 125 mL glass jars fitted with screw-tight Teflon-lined lids, and 40 mL vials with methanol preservative (for PHC F1 analysis only). Groundwater samples were collected from monitoring wells and placed in a variety of appropriately sized and prepared laboratory supplied vessels. Sample numbers were clearly marked on the containers. The soil jars and water bottles were filled to capacity with zero headspace and stored in coolers with cold packs to moderate temperature fluctuations during transport to the laboratory. To prevent cross contamination field staff wore new nitrile gloves at each sample location.

The samples were transported to the project laboratory accompanied by a Chain of Custody form. Soil samples for PHC F1 were preserved in the field using methanol. No preservative is required for F2 to F4 fraction PHCs in soil. Groundwater samples for PHC F1 and PHC F2 to F4 were preserved with sodium bisulfate. No preservatives for groundwater were used in laboratory-supplied sampling containers (metals) and no field filtering was conducted by Arcadis, as specified in the TOR. Upon sample receipt, the laboratory added a preservative to the groundwater samples submitted for metals analyses, as is required under their standard protocols.

# 2.3.2 Laboratory

Field (i.e., blind) duplicate samples and quality control and assurance measures were applied as appropriate. The specific locations where blind duplicates were collected was determined in the field, as it was dependent on the amount of groundwater and/or soil available at each location. At the request of DND, no inter-laboratory analysis was completed as part of the 2019 monitoring.

Travel blanks for groundwater were part of the sampling program. Laboratory prepared travel blanks were included in the sample bottle shipment and remained in the cooler with the collected groundwater samples throughout the duration of the project.

Field blanks for groundwater were collected by transferring laboratory supplied water, guaranteed to be free of any organics and inorganics (based on analysis), into the appropriate laboratory supplied sampling containers. The field blanks were collected in the field at the same time as the groundwater sample collection.

Two sets of equipment blanks were collected. The first set was collected by running laboratory supplied water, guaranteed to be free of any organics and inorganics (based on analysis), over the stainless-steel shovel that was used to dig the test pits and allowing the water to drain into laboratory supplied sample containers. The second set was collected by pumping laboratory supplied water, guaranteed to be free of any organics and inorganics (based on analysis), through new tubing from the same batch that was used to sample the groundwater wells and into laboratory supplied sample containers.

A discussion and analysis of QA/QC results is presented in Appendix C.

# 3 PIN-4: NORTHWEST LANDFILL

# 3.1 Landfill Description

The Northwest Landfill is located approximately 300 m directly north of the Station Area. Access to the landfill is via the main station road heading north beyond the Station Area and then west along the secondary access road (Chisholm Trail), which extends to 9-Mile Lake. The landfill consists of three lobes located along a former beach ridge.

Soil throughout the landfill area is generally course-grained, consisting primarily of gravel and cobbles, with sand in low-lying areas to the south. The downgradient area, off the former beach ridge to the south and east, consists of fine-grained sand and silt underlying a surficial organic mat.

The remediation of this landfill consisted of the removal of all scattered surface debris, the removal of contaminated soil (exceeding the Tier II criteria) and regrading/ capping of the remaining areas with 0.4 m of Type 2 granular fill followed by a final cap of 0.6 m of Type 1 granular fill.

The long-term monitoring plan for the Northwest Landfill comprises visual monitoring and periodic collection of soil samples. The landfill layout, visual observations and photographic locations are presented on **Figure PIN-4.2A** located at the end of this landfill section

# 3.2 Summary of Work Conducted

### 3.2.1 Visual Inspection

A visual inspection was completed on the Northwest Landfill on 22 August 2019. The inspection was completed with no deviations from the visual inspection work plan.

#### 3.2.2 Soil Sampling

Soil sampling at the Northwest Landfill was conducted on 22 August 2019 and included the collection of ten soil samples from five soil sample stations (P4-1, P4-2, P4-3, P4-4 and P4-5). In addition, one blind field duplicate sample (P4-26B) was collected at depth from station P4-2. The soil sampling activities conducted at the Northwest Landfill are detailed in the following table.

Table 3-1: Summary of Work Conducted by Soil Sampling Location - Northwest Landfill

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
P4-1 (upgradient)	P4-1A	0 - 0.15	Loamy sand and gravel, trace organics, some cobble, greyish brown, moist
	P4-1B	0.4 – 0.5	Gravel and cobble, some loamy sand, greyish brown, moist
P4-2 (downgradient)	P4-2A	0 - 0.15	Loamy sand and organics, some gravel and cobble, rootlets, dark brown, moist

	P4-2B	0.4 – 0.5	Loamy sand and gravel, trace organics, greyish brown, moist
P4-3	P4-3A	0 - 0.15	Loamy sand and organics, some gravel and cobble, rootlets, dark brown, moist
(downgradient)	P4-3B	0.4 – 0.5	Loamy sand and gravel, trace organics, greyish brown, moist
P4-4	P4-4A	0 - 0.15	Loamy sand and organics, some gravel and cobble, rootlets, dark brown, moist
(downgradient)	P4-4B	0.4 – 0.5	Gravel and cobbles, some loamy sand, trace organics, greyish brown, moist
P4-5 (downgradient)	P4-5A	0 - 0.15	Loamy sand and gravel, some cobbles, trace organics, rootlets, greyish brown, wet
(aomigradiom)	P4-5B	0.4 – 0.5	Gravel and cobble, trace loamy sand, greyish brown, moist

Note: mbgs = metres below ground surface

### 3.2.3 Groundwater Sampling

No groundwater monitoring wells are present at the Northwest Landfill; therefore, no groundwater sampling or analysis was performed as part of the 2019 monitoring program.

## 3.2.4 Thermal Monitoring

No thermistors are present at the Northwest Landfill; therefore, no thermal monitoring or analysis was performed as part of the 2019 monitoring program.

# 3.3 Results of the Monitoring Program

### 3.3.1 Visual Inspection

The visual inspection was conducted in compliance with Section 5.2 of the TOR, and details are provided in Sections 3.3.1.1 through 3.3.1.5. **Figure PIN-4.2A** presents the visual inspection findings and photographic locations for the Northwest Landfill.

#### 3.3.1.1 Inspection Checklist

The visual inspection was completed as per the TOR and the visual inspection checklist is included below.

Table 3-2: Visual Inspection Checklist – Northwest Landfill

SITE NAME: PIN-4 Byron Bay

LANDFILL DESIGNATION: Northwest Landfill

LANDFILL TYPE: Regraded

DATE OF INSPECTION: 22 August 2019

WEATHER CONDITIONS: Overcast, breezy and cool. Intermittent precipitation.

DATE OF PREVIOUS INSPECTION: 14 August 2017

INSPECTED BY: Ryan Janzen

REPORT PREPARED BY: Ryan Janzen

The inspector represents to the best of their 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.

### LONG-TERM LANDFILL MONITORING - PIN-4 FORMER DEW LINE SITE

					Table :	3-2: Vis <u>u</u> a	al Inspec <u>ti</u>	on Checklist	t – Northwest Landfill			
Checklist Item	Present (Yes/No)	Feature Number	Feature Location	GPS Coordinates  Northing/Easting  (Taken from Centre of Feature)	Length (m)		Depth (m)	Extent Relative to Landfill Surface	Description	Comparison with Historical Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)
Settlement	Υ	A1 A2	Lobe B, NW slope.	7629370.317, 577228.397 7629369.532, 577227.562	0.1 0.2	0.1 0.1	0.05 0.05	<1%	Minor depression.	Consistent.	Acceptable.	NWLF_13, 14
Settlement	Υ	B1 B2	Lobe D, N slope.	7629443.798, 577231.088 7629443.609, 577232.692	0.1 0.1	0.1 0.1	0.05 0.05	<1%	Minor depression.	Consistent.	Acceptable. Appear to be fines infiltration.	NWLF_30, 31
Erosion	Υ	С	Lobe B, NW slope	7629374.256, 577228.861	14.0	0.15	0.05	<1%	Minor linear erosion.	Appears smaller than previous noted.	Acceptable.	NWLF_11, 12
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N	NA	Not observed.	NA	NA	NA	NA	NA	Feature not observed.	Consistent – noted in 2013 but not observed in 2014 or 2017.	Not observed.	NA
Animal Burrows	N											
Vegetation Establishment	Υ	D1 D2 D3 D4	Lobe B, all sloped surfaces.  Lobe B, central cap.  Lobe C (entire).  Lobe D (entire).	7629352.583, 577221.622 7629365.580, 577247.140 7629408.439, 577279.002 7629429.630, 577224.006	53 105	'0m <sup>2</sup> 5m <sup>2</sup> 50m <sup>2</sup> 50m <sup>2</sup>	NA	~15% ~2% ~12% ~12%	Sparse vegetation.	Appears larger than previously noted.	Acceptable.	NWLF_4, 6, 7, 10 NWLF_5 NWLF_17, 22 NWLF_34
Staining	N											
Vegetation Stress	N											
Seepage Points (or) Ponded Water	N											
Debris and/or Liner Exposed	N											
Presence & Condition of Monitoring Instruments	N											
Features of Note/Other Relevant Observations (e.g., signs of activity, ruts)	N											

Notes: UTM Zone is 12 North for all GPS co-ordinates.

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#### 3.3.1.2 Preliminary Stability Assessment

The Preliminary Stability Assessment for the Northwest Landfill was conducted on 22 August 2019 as per the TOR and the results are provided below.

Table 3-3: Preliminary Stability Assessment - Northwest Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Isolated
Lateral Movement	Not Observed	None
Frost Action	Not Observed	None
Sloughing	Not Observed	None
Cracking	Not Observed	None
Animal Burrows	Not Observed	None
Vegetation Establishment	Acceptable	Numerous
Staining	Not Observed	None
Vegetation Stress	Not Observed	None
Seepage / Ponded Water	Not Observed	None
Debris and/or Liner Exposure	Not Observed	None
Other	Not Observed	None
Overall Landfill Performance	Ассер	otable

Note: please refer to Performance/Severity rating reference guide in Section 2.1.3.1 above.

#### 3.3.1.3 Photographic Records

The detailed photographic record for the Northwest Landfill has been completed as per Section 5.5 of the TOR and is included as **Appendix H**. The Photographic Record contains an index of photographs collected; full sized photographs are contained in the appended CD/DVD-ROM. **Figure PIN-4.2A** illustrates the photograph locations and viewpoint directions.

#### 3.3.1.4 Trend Analysis

A trend analysis was conducted with regards to observations made during the visual inspection of the Northwest Landfill. The following table outlines the results of the visual trend analysis. Features where no significant change was observed have not been listed here.

Table 3-4: Visual Inspection Trends – Northwest Landfill

Checklist Item	Feature ID	Comparison with Historical Observations
Erosion	С	Observed length has decreased from 18.0 m in 2017 to 14.0 m in 2019.
Vegetation Establishment	D	Coverage appears to have expanded significantly since 2017 (no measurements given previously).

#### 3.3.1.5 Discussion of Results/Trends

A comparison of the visual inspection results of the 2017 and 2019 monitoring events at the Northwest Landfill indicates that previously observed settlement and erosion features generally decreased in size. This could potentially be attributed to erosive infill during meltwater events, or to increased accuracy in measurements due to use of the DGPS. Vegetated areas appear to be expanding; though there were no dimensions given from the 2017 program a comparison of observed areas against previous figures indicates larger areas in 2019. The results of the visual inspection and the observed trends indicate that the performance of the landfill is acceptable.

# 3.3.2 Soil Sampling

Soil sampling of the Northwest Landfill was conducted on 22 August 2019. The soil sampling was conducted in compliance with Section 5.3.1 and 5.3.2 of the TOR. Details are provided below in the following sections.

## 3.3.2.1 Laboratory Analytical Results

A total of 11 soil samples (including one duplicate sample) were collected from ten soil sampling stations at the Northwest Landfill and analyzed for inorganic elements (arsenic, cadmium, chromium, cobalt, copper, nickel, and zinc), total PCBs, and Petroleum Hydrocarbons (PHC F1, F2, F3, and F4).

Current and historical analytical results are presented in Table 1 in the tables section of this report immediately following the main text. The laboratory certificates of analysis and chains of custody are presented in **Appendix B** of this report. **Figure PIN-4.2B**, located at the end of this landfill section, presents a summary of current and historical soil analytical results.

#### 3.3.2.2 Summary of Soil Results

The soil results for 2019 are presented in the following table. The background and baseline mean are presented for information purposes. The discussions are focused on the comparison of the results to the BL+3SD.

Table 3-5: Evaluation of Results by Parameter – Northwest Landfill

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
Arsenic (As)	1.5	2.7	6.5	All soil sample results were below the BL+3SD
				at upgradient and downgradient locations.
Cadmium (Cd)	1.0	1.0	1.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Chromium (Cr)	20.0	20.0	20.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cobalt (Co)	5.0	5.0	5.0	The downgradient sample from station P4-2 at depth along with duplicate sample P4-26B exceeded the BL+3SD at 5.3 and 5.7 mg/kg, respectively, but were within 3 times the baseline mean. All upgradient and remaining downgradient results were below the BL+3SD
Copper (Cu)	19.0	10.5	22.9	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Lead (Pb)	10.0	10.0	22.6	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Nickel (Ni)	9.2	8.4	16.8	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Zinc (Zn)	16.1	15.0	15.0	The downgradient duplicate sample P4-26B from station P4-2 at depth exceeded the BL+3SD at 17 mg/kg but was within 3 times the baseline mean. All upgradient and remaining downgradient results were below the BL+3SD
PCBs (Total)	0.10	0.10	0.10	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F1 (C <sub>6</sub> -C <sub>10</sub> )	N/A	10.0	10.0	The downgradient sample from station P4-4 at surface exceeded the BL+3SD at 11 mg/kg but was within 3 times the baseline mean. All upgradient and remaining downgradient results were below the BL+3SD.
F2 (C <sub>10</sub> -C <sub>16</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F3 (C <sub>16</sub> -C <sub>34</sub> )	N/A	28.5	125.7	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F4 (C <sub>34</sub> -C <sub>50</sub> )	N/A	28.5	131.5	All soil sample results were below the BL+3SD at upgradient and downgradient locations.

The results discussed in the previous table are presented on a series of graphs for each parameter in **Appendix D1**.

### 3.3.1 Discussion of Soil Results and Trends

Upgradient samples at surface and depth were below the BL+3SD for all parameters.

Overall, downgradient concentrations were comparable to upgradient concentrations with some downgradient results falling below and above upgradient results based on visual comparison of the 2019 data on the graphs presented in **Appendix D1**. Downgradient soil results were below the BL+3SD for all analytes with the exception of cobalt, zinc and PHC F1. However, the cobalt and zinc exceedances were within 3 times the baseline means for these parameters, which could represent natural variability. This is worth noting because the baseline mean for these parameters were set to the analytical detection limit at the time of the site investigations and no standard deviation was calculated. As the action level for petroleum hydrocarbon remediation at DEW Line sites is typically 2500 mg/kg, it is also not uncommon to find detectible hydrocarbon contamination, such as the above noted PHC F1 exceedance, in the vicinity of the landfills. In addition, the PHC F1 exceedance (11 mg/kg) was only slightly above the PHC F1 BL+3SD value and analytical detection limit of 10 mg/kg. Accordingly, these downgradient exceedances are of limited concern at this time.

A trend evaluation for the Northwest Landfill was not completed as part of the 2019 monitoring program as less than seven sampling events of soil data has been collected to date.

Overall, the landfill seems to be performing well and there is no indication of contaminant migration from the landfill at this time based on the existing soil data.

# 3.3.2 Groundwater Sampling

No groundwater monitoring wells are present at the Northwest Landfill; therefore, no groundwater sampling or analysis was conducted.

### 3.3.3 Thermal Monitoring

No groundwater monitoring wells are present at the Northwest Landfill; therefore, no thermal monitoring or analysis was conducted.

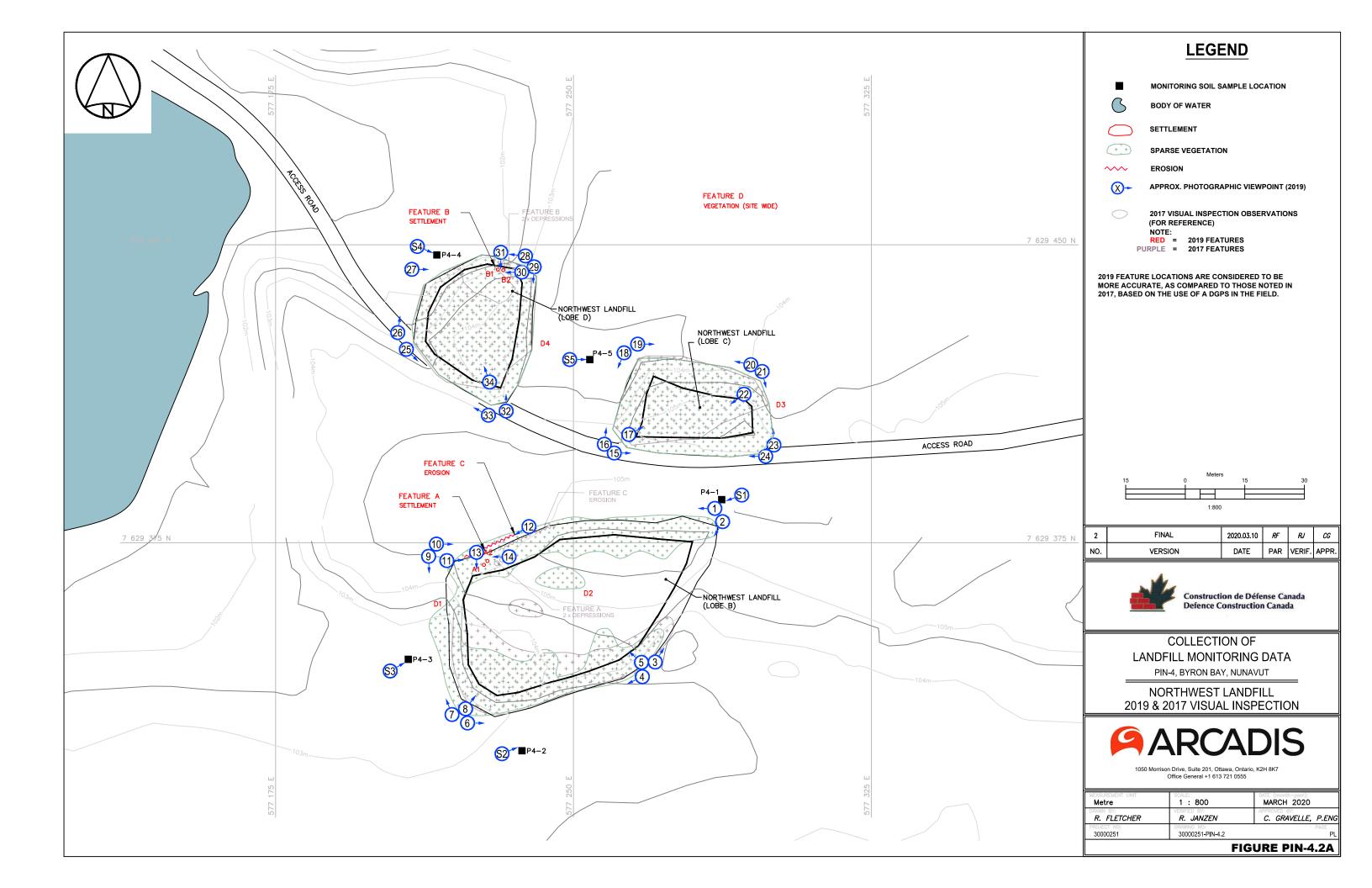
# 3.4 Overall Landfill Performance, Conclusions and Recommendations

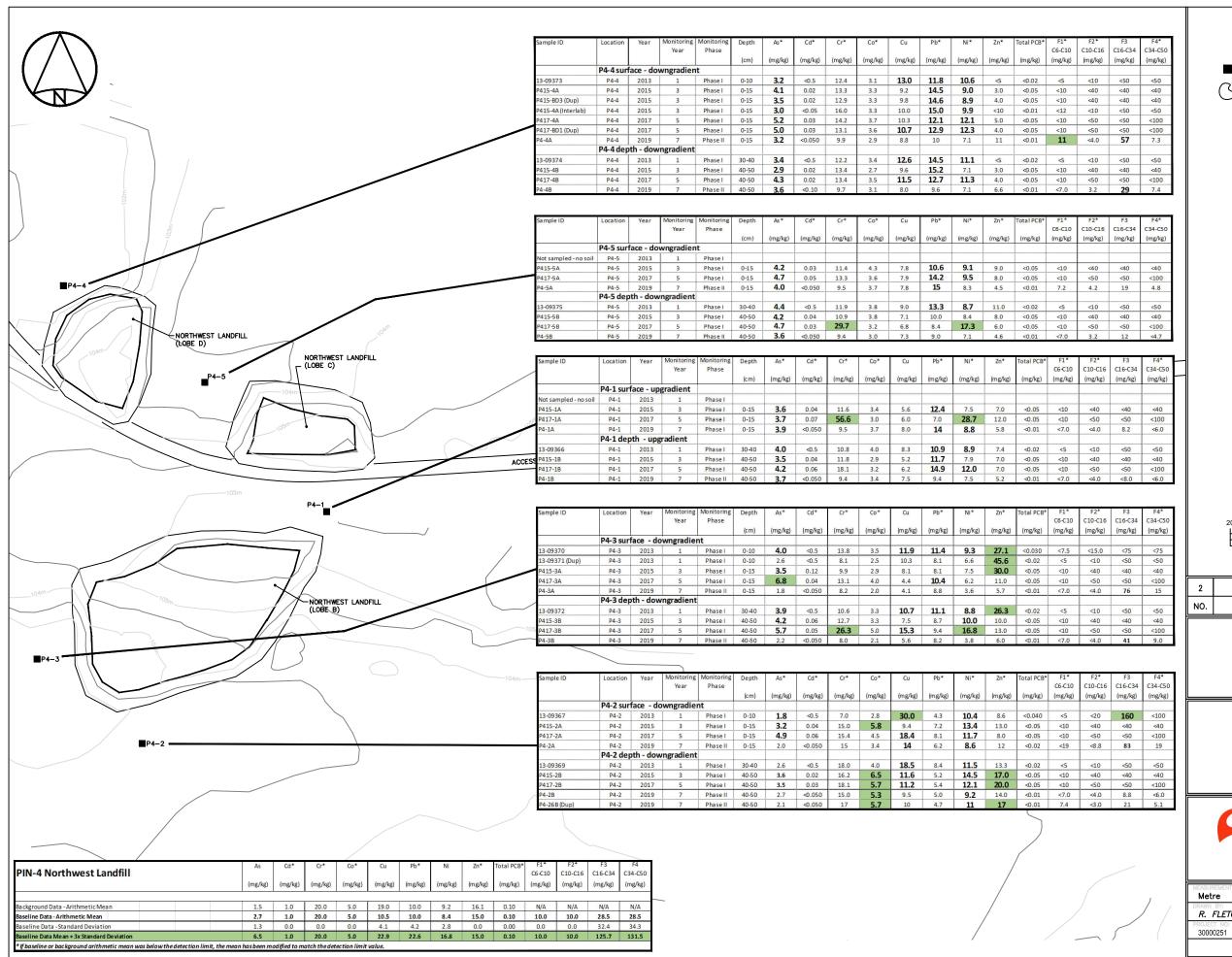
As the 2019 monitoring program is only the fourth monitoring program to have been conducted at the Northwest Landfill, trends in soil concentrations have not been evaluated. However, based on the limited chemical data collected to date and observations made during the 2019 field program, the landfill appears to be performing as intended with no indications of potential contaminant migration.

Based on this review, it is recommended to continue the long-term monitoring of soils as planned and the performance of the landfill be re-evaluated once seven monitoring events worth of data are available.

Based on the results of the visual inspection, the landfill performance is acceptable. No remedial work or deviations from the monitoring plan are recommended at this time.

Based on the results of the 2019 monitoring program, the overall performance of the Northwest Landfill is acceptable.





## LEGEND

MONITORING SOIL SAMPLE LOCATION

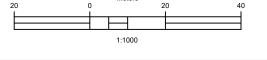
BODY OF WATER

Legend for Tables

XX sample exceeds baseline mean

XX sample exceeds baseline mean + 3x SD

N/A not analyzed



2	FINAL	2020.03.10	RF	RJ	CG
NO.	VERSION	DATE	PAR	VERIF.	APPR.



COLLECTION OF LANDFILL MONITORING DATA

PIN-4, BYRON BAY, NUNAVUT

NORTHWEST LANDFILL 2019 SOIL ANALYTICAL RESULTS



1050 Morrison Drive, Suite 201, Ottawa, Ontario, K2H 8K7 Office General +1 613 721 0555

MEASUREMENT UNIT Metre	SCALE: 1 : 1000	DATE (month-year): MARCH 2020
R. FLETCHER	VERIFIED BY: R. JANZEN	C. GRAVELLE, P.ENG
PROJECT NO:	DRAWING NO: 20000251 DIN 4.2	PAGE

**FIGURE PIN-4.2B** 

# 4 PIN-4: NORTH LANDFILL

# 4.1 Landfill Description

The North Landfill covers a broad area approximately 500 m northeast of the Station Area, along the main station access road south of the junction with Chisolm Trail. The landfill consists of three lobes (A, B and C).

Soil is primarily coarse-grained on the bedrock ridge, with some finer grained material present to the south and at the toe of the bedrock ridge to the east. There are bedrock outcrops along the east side of the ridge, with a gentler slope of gravel and cobbles along the ridge slope to the north. Drainage from the landfill area is radially off the ridge to the north, east, or south.

There is little to no vegetation on the surface of the bedrock ridge and moderate to dense vegetation at the base of the ridge downgradient of Lobes A and B. There is a thick stand of willows downgradient of Lobe A.

Based on findings from the initial site investigation and assessment of the landfill, Lobe A was covered with 0.75 m of Type 1 and Type 2 granular fill on the slope and 0.75m Type 2 granular fill on the top. Lobe B was regraded with 0.5 m Type 1 granular material over 0.75 m of Type 2 granular material. Lobe C was covered with 0.75 m of Type 2 granular material.

The long-term monitoring plan for the North landfill consists of visual monitoring and the periodic collection of soil samples. The landfill layout, visual observations and photographic locations are presented on **Figure PIN-4.3A** located at the end of this landfill section.

# 4.2 Summary of Work Conducted

### 4.2.1 Visual Inspection

Visual inspection of the North Landfill was conducted on 22 August 2019. The visual inspection of the landfill was completed with no deviations from the accepted work plan.

### 4.2.2 Soil Sampling

Soil sampling at the North Landfill was conducted on 22 August 2019 and consisted of the collection of 14 soil samples from seven soil sample stations (P4-6, P4-7, P4-8, P4-9, P4-10, P4-11 and P4-12). In addition, one blind field duplicate sample (P4-25A) was collected at surface from station P4-12. Depth limitations were encountered at the following soil sampling stations:

- Station P4-6, where refusal on bedrock limited the depth sample from 0.2 to 0.3 mbgs;
- Station P4-9, where refusal on bedrock limited the depth of sample from 0.25 to 0.35 mbgs; and,
- Station P4-11, where refusal on bedrock limited the depth of sample from 0.2 to 0.3 mbgs.

The following table outlines the soil sampling activities conducted at the North Landfill.

Table 4-1: Summary of Work Conducted by Soil Sampling Location – North Landfill

Sample Location	Sample ID	Sample Depth (mbgs)	Notes		
P4-6	P4-6A	0 – 0.15	Loamy sand and gravel, few cobbles, rootlets, greyish brown, moist		
(downgradient)	P4-6B	0.2 – 0.3	Sand and gravel, trace silt and cobbles, greyish brown, moist, refusal on bedrock		
P4-7	P4-7A	0 – 0.15	Loamy sand and gravel, some cobbles, rootlets, greyish brown, moist		
(downgradient)	P4-7B	0.4 – 0.5	Loamy sand and cobbles, some gravel, greyish brown, moist		
P4-8	P4-8A	0 – 0.15	Gravel and loamy sand, few cobbles, rootlets, greyish brown, moist		
(downgradient)	P4-8B	0.4 – 0.5	Gravel and cobble, some loamy sand, greyish brown, moist		
P4-9	P4-9A	0 - 0.15	Loamy sand with organics, some gravel, dark brown, rootlets, moist		
(downgradient)	P4-9B	0.25 - 0.35	Loamy sand with organics, some gravel and cobbles, dark brown, moist, refusal on bedrock		
P4-10	P4-10A	0 – 0.15	Loamy sand with organics, some gravel and cobbles, rootlets, dark brown, moist		
(downgradient)	P4-10B	0.4 – 0.5	Gravel and cobble, some loamy sand with organics, greyish brown, moist		
P4-11	P4-11A	0 - 0.15	Loamy sand with organics, some gravel, rootlets, brown, moist		
(downgradient)	P4-11B	0.2 – 0.3	Loamy sand and gravel, some cobble, trace organics, brown, moist, refusal on bedrock		
P4-12	P4-12A	0 – 0.15	Loamy sand with organics, some gravel and cobble, rootlets, dark brown, moist		
(upgradient)	P4-12B	0.4 – 0.5	Loamy sand and gravel, few cobbles, trace organics, brown, moist		

# 4.2.3 Groundwater Sampling

No groundwater monitoring wells are present at the North Landfill; therefore, no groundwater sampling or analysis was performed as part of the 2019 monitoring program.

### 4.2.4 Thermal Monitoring

No thermistors are present at the North Landfill; therefore, no thermal monitoring or analysis was performed as part of the 2019 monitoring program.

# 4.3 Results of the Monitoring Program

## 4.3.1 Visual Inspection

The visual inspection was conducted in compliance with Section 5.2 of the TOR and details are provided below in the following Sections 4.3.1.1 through 4.3.1.5. **Figure PIN-4.3A** presents the visual inspection findings and photographic locations.

#### 4.3.1.1 Inspection Checklist

The visual inspection was completed as per the TOR and the visual inspection checklist is included below.

Table 4-2: Visual Inspection Checklist - North Landfill

SITE NAME: PIN-4 Byron Bay

LANDFILL DESIGNATION: North Landfill

LANDFILL TYPE: Regraded

DATE OF INSPECTION: 22 August 2019

WEATHER CONDITIONS: Overcast, cool and windy. Intermittent precipitation.

DATE OF PREVIOUS INSPECTION: 14 August 2017

INSPECTED BY: Ryan Janzen

REPORT PREPARED BY: Ryan Janzen

The inspector represents to the best of their 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.

### LONG-TERM LANDFILL MONITORING - PIN-4 FORMER DEW LINE SITE

					T.11.			dan Okaal	Park Naville Law 1891			
					Table 4	1-2: Visu	al inspec	llon Check ■	list – North Landfill			
Checklist Item	Present (Yes/No)	Feature Number	Feature Location	GPS Coordinates Northing/Easting (Taken from Centre of Feature)	Length (m)	Width (m)	Depth (m)	Extent Relative to Landfill Surface	Description	Comparison with Historical Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)
Settlement	Y	А	Lobe A, E slope.	7629317.724, 577942.010	2.5	1.5	0.1	<1%	Minor depression in rip rap material.	Consistent.	Acceptable. Not technically in landfill footprint. Not landfill cover material.	NLF_8
Settlement	Υ	1	Lobe A, secondary crest.	7629338.077, 577909.686	3.0	0.6	0.1	<1%	Minor depression.	Consistent.	Acceptable.	NFL_14, 15
Settlement	Υ	J	Lobe B, on slope at NW point.	7629411.423, 577783.855	1.8	0.7	0.1	<1%	Minor settlement.	Consistent.	Acceptable.	NLF_33
Settlement	Υ	K	Lobe B, E slope.	7629407.266, 577840.561	1.1	0.8	0.05	<1%	Minor depression.	Consistent.	Acceptable.	NLF_41, 42
Erosion	Υ	В	Lobe A cap, SE crest. Across crest towards toe.	7629314.932, 577898.128	8.5	0.1	0.02	<1%	Minor linear erosion.	Slightly smaller than previously noted.	Acceptable.	NLF_16, 17
Erosion	Υ	C1 C2	Lobe B, crest at SE point.	7629370.645, 577830.971 7629372.761, 577831.655	3.5 4.5	0.3 0.3	0.15 0.10	<1%	Minor linear erosion (potentially equipment track marks).	Slightly smaller than previously noted.	Acceptable.	NLF_29, 30
Erosion	Υ	D	Lobe C, NW corner. From crest to toe.	7629302.604, 577748.194	2.8	0.2	0.05	<1%	Minor linear erosion.	Slightly longer than previously noted.	Acceptable.	NLF_58, 59
Erosion	Υ	Е	Lobe C, NE area on slope.	7629302.268, 577805.251	4.0	0.1	0.02	<1%	Minor linear erosion.	Consistent.	Acceptable.	NLF_50, 51
Erosion	Υ	F	Lobe C, NE area on slope.	7629305.717, 577811.690	3.0	0.1	0.02	<1%	Minor linear erosion.	Slightly smaller than previously noted.	Acceptable.	NLF_52 through 54
Erosion	N	G	Not observed.	NA	NA	NA	NA	NA	Feature not observed.	Feature not observed.	Not observed.	NLF_43, 44 (of noted area)
Erosion	N	Н	Lobe B, west slope.	7629427.941, 577790.507	7.2	0.15	0.05	<1%	Linear feature – possibly an equipment track mark.	Erosive feature not observed in 2017, the construction relic noted here was perhaps originally misidentified.	Acceptable.	NLF_35, 36
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation Establishment	Y	L	Lobe A, organic material cover area.	7629341.580, 577930.055	180	00m²	NA	~8%	Vegetation cover.	Consistent.	Acceptable.	NLF_7, 12
Staining	N											
Vegetation Stress	N											
Seepage Points (or) Ponded Water	N											

### LONG-TERM LANDFILL MONITORING - PIN-4 FORMER DEW LINE SITE

	Table 4-2: Visual Inspection Checklist – North Landfill											
Checklist Item	Present (Yes/No)	Feature Number	Feature Location	GPS Coordinates Northing/Easting (Taken from Centre of Feature)	Length (m)	Width (m)	Depth (m)	Extent Relative to Landfill Surface	Description	Comparison with Historical Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)
Debris and/or Liner Exposed	N											
Presence & Condition of Monitoring Instruments	N											
Features of Note/Other Relevant Observations (e.g., signs of activity, ruts)	N											

#### Notes:

- UTM Zone is 12 North for all GPS co-ordinates.

#### 4.3.1.2 Preliminary Stability Assessment

The Preliminary Stability Assessment for the North Landfill was conducted on 22 August 2019 as per the TOR and the results are provided below.

Table 4-3: Preliminary Stability Assessment - North Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Occasional
Lateral Movement	Not Observed	None
Frost Action	Not Observed	None
Sloughing	Not Observed	None
Cracking	Not Observed	None
Animal Burrows	Not Observed	None
Vegetation Establishment	Acceptable	Isolated
Staining	Not Observed	None
Vegetation Stress	Not Observed	None
Seepage / Ponded Water	Not Observed	None
Debris and/or Liner Exposure	Not Observed	None
Other	Not Observed	None
Overall Landfill Performance	Ассер	otable

Note: please refer to Performance/Severity rating reference guide in Section 2.1.3.1 above.

#### 4.3.1.3 Photographic Records

The detailed photographic record for the North Landfill has been completed as per Section 5.5 of the TOR and is included as **Appendix H**. The Photographic Record contains an index of photographs collected; full sized photographs are contained in the separately appended CD/DVD-ROM. **Figure PIN-4.3A** illustrates the photograph locations and directions.

### 4.3.1.4 Trend Analysis

A trend analysis was conducted with regards to observations made during the visual inspection of the North Landfill. The following table outlines the results of the visual trend analysis. Features where no significant change was observed are not noted here.

Table 4-4: Visual Inspection Trends - North Landfill

Checklist Item	Feature Number	Comparison with Historical Observations
	В	Observed length has decreased from 12.0 m in 2017 to 8.5 m in 2019.
	C1	Observed length has decreased from 5.0 m in 2017 to 3.5 m in 2019.
	C2	Observed length has decreased from 6.0 m in 2017 to 4.5 m in 2019.
Frosion	D	Observed length has increased from 2.0 m in 2017 to 2.8 m in 2019.
LIUSIUII	F	Observed length has decreased from 4.0 m in 2017 to 3.0 m in 2019.
	G	Not observed.
	Н	Erosive feature not observed – a construction relic (equipment track mark) was observed in the same area with similar measurements.

#### 4.3.1.5 Discussion of Results/Trends

A comparison of the visual inspection results of the 2017 and 2019 monitoring events at the North Landfill indicates that previously observed settlement features saw no significant change in size, while the majority of erosive features were smaller than previously noted, or unobserved entirely. This could potentially be attributed to erosive infill on this landfill's relatively steep surface grades. Specifically, regarding Feature H (which was not observed in 2017 either), it is suspected that the equipment track mark noted in 2019 was originally misidentified as an erosive feature, then discounted in later reports. Vegetated areas remain confined to the areas of organic material cover. The results of the visual inspection and the observed trends indicate that the performance of the landfill is acceptable.

#### 4.3.2 Soil Sampling

Soil sampling of the North Landfill was conducted on 22 August 2019. The soil sampling was conducted in compliance with Section 5.3.1 and 5.3.2 of the TOR and details are provided below in the following sections.

#### 4.3.2.1 Laboratory Analytical Results

A total of 15 soil samples (including one duplicate sample) were collected from seven soil sampling stations at the North Landfill and analysed for inorganic elements (arsenic, cadmium, chromium, cobalt, copper, nickel, and zinc), total PCBs, and Petroleum Hydrocarbons (PHC F1, F2, F3, and F4).

Current and historical analytical results are presented in **Table 2** in the tables section of this report immediately following the main text. The laboratory certificates of analysis and chain of custody forms are presented in **Appendix B** of this report. **Figure PIN-4.3B**, located at the end of this landfill section, presents a summary of current and historical soil analytical results.

# 4.3.2.2 Summary of Soil Results

The soil results for 2019 are presented in the following table. The background and baseline mean are presented for information purposes. The discussions are focused on the comparison of the results to the BL+3SD

Table 4-5: Evaluation of Results by Parameter – North Landfill

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
Arsenic (As)	1.5	2.5	5.5	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cadmium (Cd)	1.0	1.0	1.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Chromium (Cr)	20.0	20.0	20.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cobalt (Co)	5.0	5.0	5.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Copper (Cu)	19.0	12.9	41.5	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Lead (Pb)	10.0	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Nickel (Ni)	9.2	8.3	25.5	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Zinc (Zn)	16.1	15.0	15.0	The downgradient sample from station P4-10 at surface exceeded the BL+3SD at 26 mg/kg but was within 3 times the baseline mean. All upgradient and remaining downgradient results were below the BL+3SD.
PCBs (Total)	0.10	0.10	0.10	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F1 (C <sub>6</sub> -C <sub>10</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F2 (C <sub>10</sub> -C <sub>16</sub> )	N/A	10.0	10.0	The downgradient sample from station P4-10 at surface exceeded the BL+3SD at 11 mg/kg. This PHC F2 exceedance is suspected to be caused by natural BOCs. All upgradient and remaining downgradient results were below the BL+3SD

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
F3 (C <sub>16</sub> -C <sub>34</sub> )	N/A	50.0	50.0	Upgradient surface sample P4-12A and duplicate sample P4-25A along with at depth sample P4-12B exceeded the BL+3SD at 90 mg/kg, 130 mg/kg, and 51 mg/kg respectively. In addition, downgradient sample P4-9A, P4-9B, and P4-10A exceeded the BL+3SD at 93 mg/kg, 69 mg/kg, and 360 mg/kg respectively. It should be noted that all PHC F3 exceedances are suspected to be caused by natural BOCs. All remaining downgradient results were below the BL+3SD.
F4 (C <sub>34</sub> -C <sub>50</sub> )	N/A	50.0	50.0	The downgradient sample from station P4-10 at surface exceeded the BL+3SD at 100 mg/kg. This PHC F4 exceedances is suspected to be caused by natural BOCs. All upgradient and remaining downgradient results were below the BL+3SD.

The results discussed in the previous table are presented on a series of graphs for each parameter in **Appendix D2**.

#### 4.3.2.3 Discussion of Soil Results

Upgradient samples at surface and depth were below the BL+3SD for all parameters except PHC F3. Both at surface and depth samples collected from upgradient station P4-12 exceeded the BL+3SD value for PHC F3, but were within three times the baseline mean. Based on the organic material (peat) observed in both samples and a review of the sample's PHC F2 and F3b concentrations, the PHC F3 exceedances detected are likely due to natural biogenic organic compounds. Accordingly, these PHC F3 exceedances are not suspected to be an indication of contaminant migration from an upgradient source.

Downgradient soil results were below the BL+3SD for all analytes with the exception of zinc and PHC F2 to F4 parameters. The zinc exceedance in downgradient soil sample P4-10A was within 3 times the baseline mean and likely represents natural variability given that the baseline mean for zinc was set to equal the analytical detection limit at the time of the site investigations and no standard deviation was calculated. The PHC F2 to F4 exceedances detected in downgradient samples from stations P4-9 and P4-10 appear to be caused by natural biogenic organic compounds based on the organic material observed in the samples and a review of the sample's PHC F2, F3b and F4 concentrations. Soils with biogenic organic compounds typically have PHC F2 concentrations less than 30 mg/kg and can have PHC F3 concentrations ranging up to 1430 mg/kg (predominantly in the PHC F3b range) and PHC F4 concentrations ranging up to 1580 mg/kg. As such, the zinc and PHC F2 to F4 exceedances at downgradient-sample stations are not suspected to be an indication of contaminant migration from the landfill.

A trend evaluation for the North Landfill was not completed as part of the 2019 monitoring program as less than seven sampling events of soil data has been collected to date.

Overall, the landfill seems to be performing well and there is no indication of contaminant migration from the landfill at this time based on the existing soil data.

### 4.3.3 Groundwater Sampling

No groundwater monitoring wells are present at the North Landfill; therefore, no groundwater sampling or analysis was conducted during the 2019 monitoring program.

## 4.3.4 Thermal Monitoring

No thermistors are present at the North Landfill; therefore, no thermal monitoring was conducted during the 2019 monitoring program.

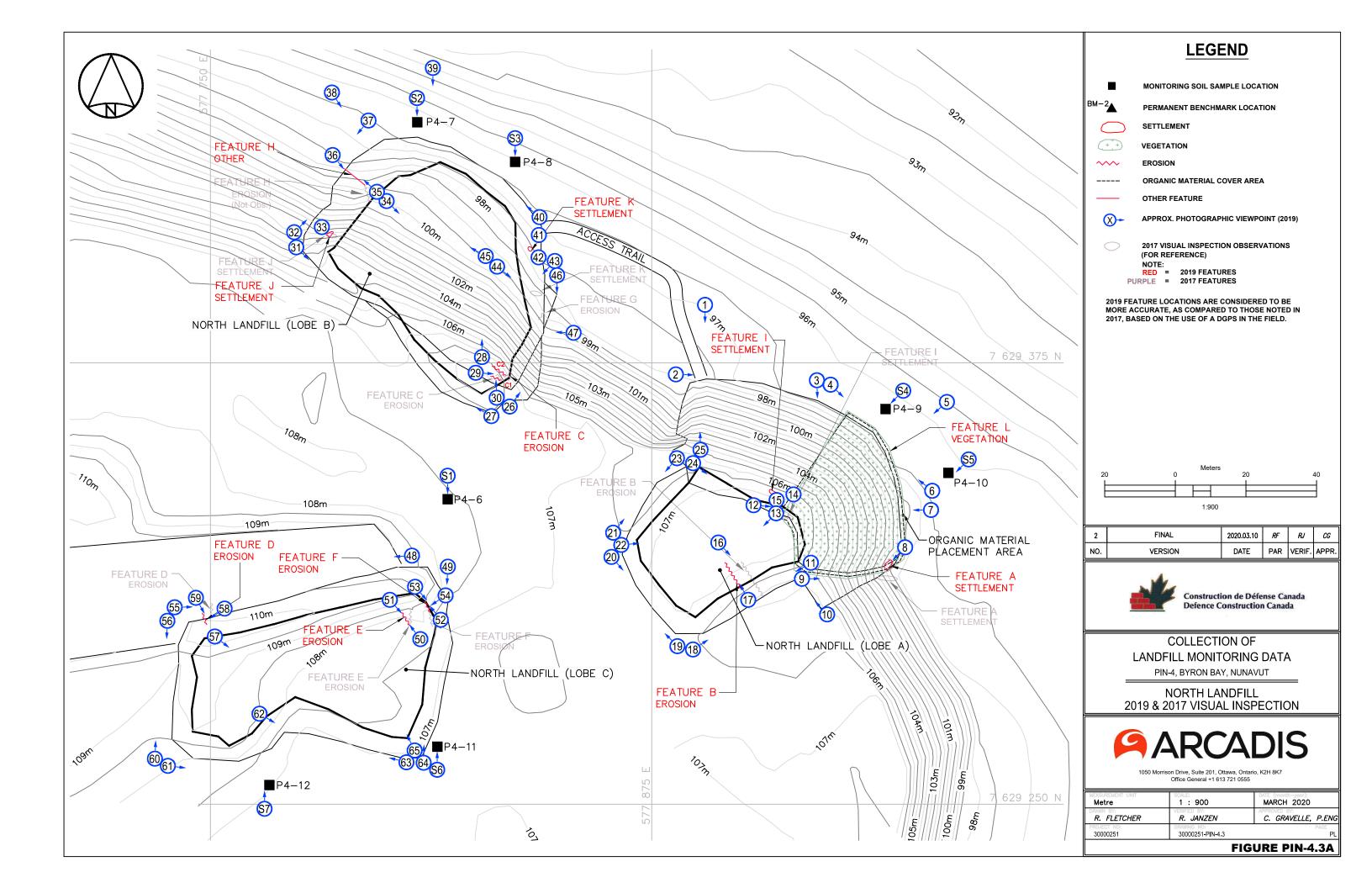
# 4.4 Overall Landfill Performance, Conclusions and Recommendations

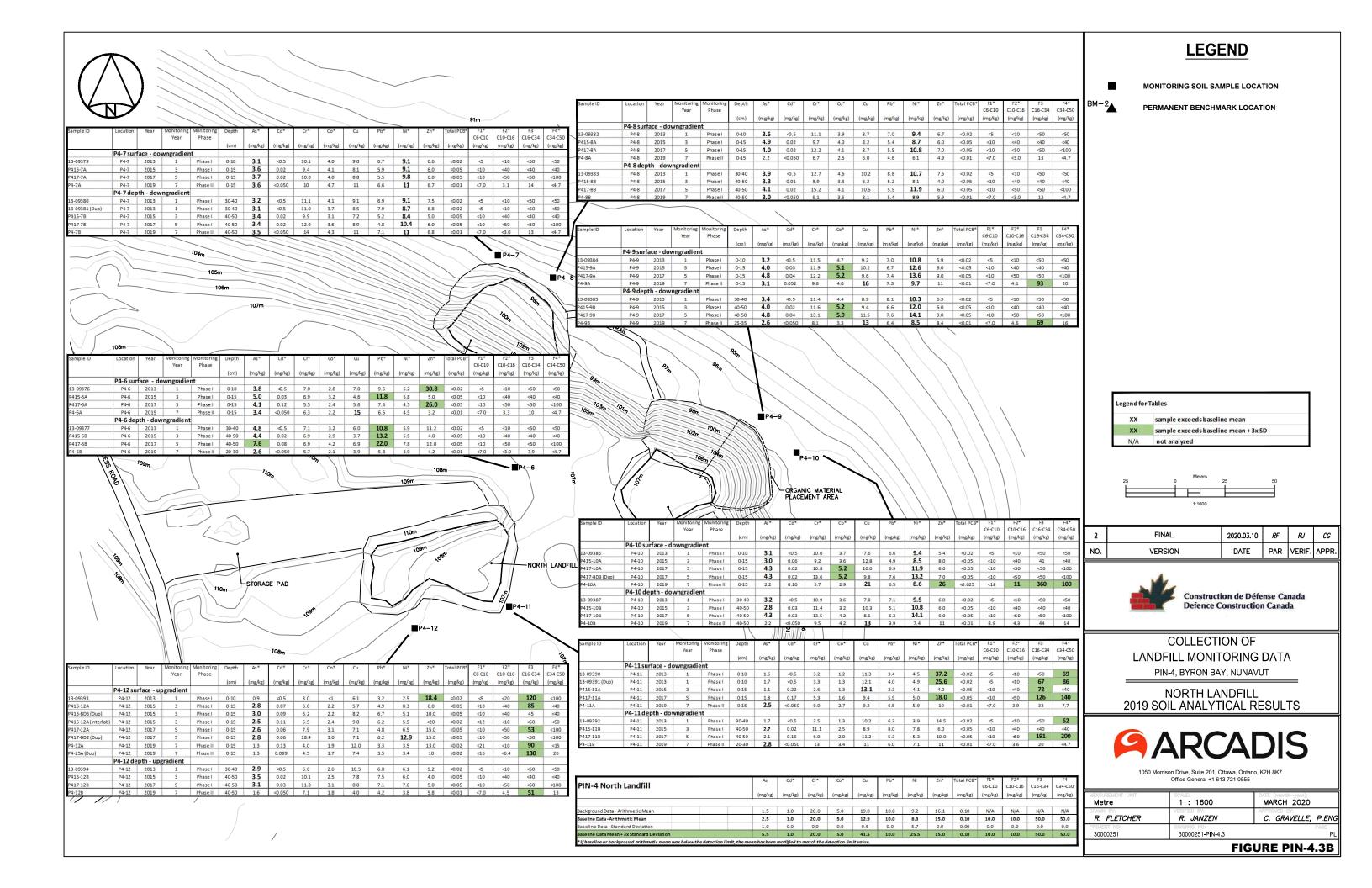
As the 2019 monitoring program is only the fourth monitoring program to have been conducted at the North Landfill, trends in soil concentrations have not been evaluated. However, based on the limited chemical data collected to date and observations made during the 2019 field program, the landfill appears to be performing as intended with no indications of potential contaminant migration.

Based on this review, it is recommended to continue the long-term monitoring of soils as planned and the performance of the landfill be re-evaluated once seven monitoring events worth of data are available.

Based on the results of the visual inspection, the North landfill performance is acceptable. No remedial work or deviations from the monitoring plan are recommended at this time.

Based on the results of the 2019 monitoring program, the overall performance of the North Landfill is acceptable.





# 5 PIN-4: NON-HAZARDOUS WASTE LANDFILL

# 5.1 Landfill Description

The Non-Hazardous Waste Landfill is a relatively new landfill constructed for the disposal of non-hazardous wastes and debris generated and collected during clean-up activities. The landfill is located in the Station Area, adjacent to the main station access road.

The design of this landfill includes perimeter berms and placement of a cover of compacted granular fill over the landfilled material. Four groundwater monitoring wells were installed around the perimeter of the landfill.

The long-term monitoring plan for the Non-Hazardous Waste Landfill consists of visual monitoring and periodic collection of soil and groundwater samples. The landfill layout, visual observations and photographic locations are presented on **Figure PIN-4.4A** located at the end of this landfill section.

# 5.2 Summary of Work Conducted

# 5.2.1 Visual Inspection

A visual inspection was conducted on the Non-Hazardous Waste Landfill on 23 August 2019. The visual inspection of the landfill was completed with no deviations from the visual inspection work plan.

# 5.2.2 Soil Sampling

Soil sampling at the Non-Hazardous Waste Landfill was conducted on 23 August 2019 and consisted of the collection of eight soil samples from four soil sample stations (MW-05, MW-06, MW-07 and MW-08). In addition, one blind field duplicate sample (MW-11A) was collected at surface from at station MW-05. The following table outlines the soil sampling activities conducted at the Non-Hazardous Waste Landfill.

Table 5-1: Summary of Work Conducted by Soil Sampling Location - Non-Hazardous Waste Landfill

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
MW-05 (upgradient)	MW-05A	0 – 0.15	Gravel, some sand and cobbles, trace rootlets and organics, greyish brown, moist,
	MW-05B	0.4 – 0.5	Gravel, some sand and cobbles, trace silt, greyish brown, moist
MW-06 (downgradient)	MW-06A	0 – 0.15	Loamy sand, some gravel and organics, rootlets, brown, moist
	MW-06B	0.4 – 0.5	Loamy sand, some gravel, brown, moist
MW-07 (downgradient)	MW-07A	0 – 0.15	Loamy sand and gravel, some organics, rootlets, dark brown, moist
	MW-07B	0.4 – 0.5	Gravel, some loamy sand, greyish brown, moist

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
MW-08 (downgradient)	MW-08A	0 – 0.15	Loamy sand, some gravel and cobble, brownish grey, rootlets, moist
	MW-08B	0.4 – 0.5	Loamy sand and gravel, some cobble, brownish grey, moist

# 5.2.3 Groundwater Sampling

Groundwater monitoring at the Non-Hazardous Waste Landfill was conducted on 23 August 2019 and consisted of the inspection and groundwater monitoring of four monitoring wells (MW-05, MW-06, MW-07, and MW-08). One well, MW-05, was observed to be frozen at the time of the field program. Monitoring wells MW-06, MW-07, and MW-08 contained water and groundwater samples were collected for analysis. Monitoring well sampling logs are presented in **Appendix F**. The following table outlines the groundwater sampling activities conducted at the Non-Hazardous Waste Landfill.

Table 5-2: Summary of Work Conducted by Monitoring Well – Non-Hazardous Waste Landfill

Monitoring Well ID	Observations	Number of Groundwater Samples Collected
MW-05 (upgradient)	Good condition – water was frozen	none
MW-06 (downgradient)	Locking ring for the well casing's cap has split (see photo 5-1 below). However, the locking ring is still functional and will not need replacement.	1
MW-07 (downgradient)	Good condition	1
MW-08 (downgradient)	Good condition	1



Photo 5-1: Casing of well MW-06. Locking ring on well casing has split.

# 5.2.4 Thermal Monitoring

No thermistors are present at the Non-Hazardous Waste Landfill; therefore, no thermal monitoring was performed as part of the 2019 monitoring program.

# **5.3** Results of the Monitoring Program

# 5.3.1 Visual Inspection

The visual inspection of the Non-Hazardous Waste Landfill was conducted on 23 August 2019. The visual inspection was conducted in compliance with Section 5.2 of the TOR and details are provided below in the following Sections 5.3.1.1 through 5.3.1.5. **Figure PIN-4.4A** presents the visual inspection findings and photographic locations.

### 5.3.1.1 Inspection Checklist

The visual inspection was completed as per the TOR and the visual inspection checklist is included below.

Table 5-3: Visual Inspection Checklist - Non-Hazardous Waste Landfill

SITE NAME: PIN-4 Byron Bay

LANDFILL DESIGNATION: Non-Hazardous Waste Landfill

LANDFILL TYPE: Non-Hazardous
DATE OF INSPECTION: 23 August 2019

WEATHER CONDITIONS: Overcast, raining, cloudy and foggy.

DATE OF PREVIOUS INSPECTION: 14 August 2017

INSPECTED BY: Ryan Janzen

REPORT PREPARED BY: Ryan Janzen

The inspector represents to the best of their 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.

### LONG-TERM LANDFILL MONITORING - PIN-4 FORMER DEW LINE SITE

	Table 5-3: Visual Inspection Checklist – Non-Hazardous Waste Landfill											
Checklist Item	Present (Yes/No)	Feature Number	Feature Location	GPS Coordinates  Northing/Easting  (Taken from Centre of Feature)	Length	Width (m)		Extent Relative to Landfill Surface	Description	Comparison with Historical Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)
Settlement	Υ	Α	NE slope, midpoint.	7628927.037, 577258.265	1.5	0.7	0.3	<1%	Minor depression.	Slightly larger than previously noted.	Acceptable.	NHWLF_9, 10
Settlement	Υ	В	NE slope, towards E corner.	7628921.043, 577274.204	1.2	0.2	0.05	<1%	Minor depression.	Consistent.	Acceptable.	NHWLF_7, 8
Settlement	N	С	Not observed.	NA	NA	NA	NA	NA	Feature not observed.	Feature not observed.	Not observed.	NHWLF_ 19, 20 (noted area)
Erosion	Υ	D	N corner, crest to midpoint of slope.	7628944.923, 577215.634	4.5	0.15	0.05	<1%	Minor linear erosion.	Larger than previously noted.	Acceptable.	NHWLF_17, 18
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation Establishment	Υ	F	Entire landfill cap.	7628901.165, 577236.027	435	0m²	NA	<1%	Vegetation cover.	Consistent.	Acceptable.	NHWLF_13, 22, 31
Staining	N											
Vegetation Stress	N											
Seepage Points (or) Ponded Water	N											
Debris and/or Liner Exposed	N											
Presence & Condition of Monitoring Instruments	Y	MW-05 MW-06 MW-07 MW-08	Monitoring wells outside landfill footprint.	7628915.802, 577294.701 7628826.703, 577229.259 7628875.284, 577161.641 7628955.006, 577189.818					Monuments.	Consistent.	Good exterior condition.	None (see Sampling Photos)
Features of Note/Other Relevant Observations (e.g., signs of activity, ruts)	Υ	E	Landfill cap, S corner.	7628858.034, 577250.547	54	m²	NA	~1%	Rough grading. Construction relic; tread/blade marks.	Consistent.	Acceptable.	NHWLF_40

#### Notes:

<sup>-</sup> UTM Zone is 12 North for all GPS co-ordinates.

#### 5.3.1.2 Preliminary Stability Assessment

The Preliminary Stability Assessment for the Non-Hazardous Waste Landfill was conducted on 23 August 2019 as per the TOR and the results are provided below.

Table 5-4: Preliminary Stability Assessment - Non-Hazardous Waste Landfill

Feature	Severity Rating	Extent	
Settlement	Acceptable	Isolated	
Erosion	Acceptable	Isolated	
Lateral Movement	Not Observed	None	
Frost Action	Not Observed	None	
Sloughing	Not Observed	None	
Cracking	Not Observed	None	
Animal Burrows	Not Observed	None	
Vegetation Establishment	Acceptable	Extensive	
Staining	Not Observed	None	
Vegetation Stress	Not Observed	None	
Seepage / Ponded Water	Not Observed	None	
Debris and/or Liner Exposure	Not Observed	None	
Other	Acceptable	Isolated	
Overall Landfill Performance	Acceptable		

Note: please refer to Performance/Severity rating reference guide in Section 2.1.3.1 above.

#### 5.3.1.3 Photographic Records

The detailed photographic record for the Non-Hazardous Waste Landfill has been completed as per Section 5.5 of the TOR and is included as **Appendix H**. The photographic record contains an index of photographs collected; full sized photographs are contained in an Appended CD/DVD-ROM, separate to this report. **Figure PIN-4.4A** illustrates the photograph locations and directions.

#### 5.3.1.4 Trend Analysis

A trend analysis was conducted with regards to observations made during the visual inspection of the Non-Hazardous Waste Landfill. The following table outlines the results of the visual trend analysis. Features where there was no significant change observed are not listed here.

Table 5-5: Visual Inspection Trends – Non-Hazardous Waste Landfill

Checklist Item	Feature Number	Comparison with Historical Observations
Sattlement	Α	Observed size has increased from 0.3 m <sup>2</sup> in 2017 to 1.0 m <sup>2</sup> in 2019.
Settlement	С	Feature not observed in 2019.
Erosion	D	Observed length has increased from 2.0 m in 2017 to 4.5 m in 2019.

#### 5.3.1.5 Discussion of Results/Trends

A comparison of the visual inspection results of the 2017 and 2019 monitoring events at the Non-Hazardous Waste Landfill indicates that one settlement feature and one erosive feature have increased in size – the erosive feature (D) having more than doubled in length. Despite the measurements for Feature E increasing relative to those previously noted, this feature is a construction relic and it is considered unlikely that it has changed in size. Different dimensions are attributed to more accurate delineation using the DGPS. None of the noted features are considered a concern at the present time. Vegetated areas appear to be consistent. The results of the visual inspection and the observed trends indicate that the performance of the landfill is acceptable.

# 5.3.2 Soil Sampling

Soil sampling of the Non-Hazardous Waste Landfill was conducted on 23 August 2019. The soil sampling was conducted in compliance with Section 5.3.1 and 5.3.2 of the TOR and details are provided below in the following sections.

#### 5.3.2.1 Laboratory Analytical Results

A total of nine soil samples (including one field duplicate) were collected from four soil sampling stations at the Non-Hazardous Waste Landfill and analysed for inorganic elements (arsenic, cadmium, chromium, cobalt, copper, nickel, and zinc), total PCBs, and Petroleum Hydrocarbons (PHC F1, F2, F3, and F4).

Current and historical analytical results are presented in **Table 3A** in the tables section of this report immediately following the main text. The laboratory certificates of analysis and chain of custody forms are presented in **Appendix B** of this report. **Figure PIN-4.4B**, located at the end of this landfill section, presents a summary of current and historical soil analytical results.

#### 5.3.2.2 Summary of Soil Results

The soil results for 2019 are presented in the following table. The background and baseline mean are presented for information purposes. The discussions are focused on the comparison of the results to the BL+3SD.

### LONG-TERM LANDFILL MONITORING - PIN-4 FORMER DEW LINE SITE

Table 5-6: Evaluation of Results by Parameter – Non-Hazardous Waste Landfill

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
Arsenic (As)	1.5	2.8	6.1 The downgradient sample from station MV depth exceeded the BL+3SD at 7.0 mg/kg arsenic concentration represents a new market for the landfill. All upgradient and redowngradient results were below the BL+3SD at 7.0 mg/kg arsenic concentration represents a new market for the landfill.	
Cadmium (Cd)	1.0	1.0	1.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Chromium (Cr)	20.0	20.0	20.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cobalt (Co)	5.0	5.0	5.0 Downgradient samples from station M depth and MW-08 at surface and depth e the BL+3SD at 5.9 mg/kg, 5.7mg/kg and 5. respectively, but were within 3 times the mean. All upgradient and remaining down results were below the BL+3SD	
Copper (Cu)	19.0	14.1	28.6	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Lead (Pb)	10.0	10.0	25.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Nickel (Ni)	9.2	10.1	20.4	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Zinc (Zn)	16.1	15.2	56.6	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
PCBs (Total)	0.10	0.10	0.10	The upgradient samples from station MW-05 at surface exceeded the BL+3SD at 0.15 mg/kg but was within 3 times the baseline mean. All downgradient and remaining upgradient results were below the BL+3SD.
F1 (C <sub>6</sub> -C <sub>10</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F2 (C <sub>10</sub> -C <sub>16</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F3 (C <sub>16</sub> -C <sub>34</sub> )	N/A	50.0	50.0	Downgradient samples MW-06A, MW-07A and MW-07B exceeded the BL+3SD at 55 mg/kg, 55 mg/kg and 56 mg/kg respectively. It should be noted that these PHC F3 exceedances are suspected to be caused by natural BOCs. All remaining downgradient results were below the BL+3SD.
F4 (C <sub>34</sub> -C <sub>50</sub> )	N/A	50.0	50.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.

The results discussed in the previous table are presented on a series of graphs for each parameter in **Appendix D3**.

### 5.3.2.3 Discussion of Soil Results

Upgradient samples at surface and depth were below the BL+3SD for all parameters except total PCBs. The surface sample collected from upgradient station P4-12 exceeded the BL+3SD value for total PCBs but was within three times the baseline mean, which could represent natural variability. This is worth noting because the baseline mean for total PCBs was set to equal the analytical detection limit at the time of the site investigations and no standard deviation was calculated. Therefore, this total PCB exceedance is not suspected to be an indication of contaminant migration from an upgradient source.

Downgradient soil results were below the BL+3SD for all analytes with the exception of arsenic, cobalt and PHC F3 parameters. The arsenic concentration detected in downgradient sample MW-07A was 7.0 mg/kg and exceeded the landfill's BL+3SD value for arsenic of 6.1 mg/kg. This arsenic exceedance represents a new maximum, but it is only slightly above the BL+3SD value. All other arsenic results collected at the landfill to date have been below the BL+3SD value and the vast majority of these arsenic results are also below the baseline maximum for arsenic of 4.94 mg/kg. As such, the arsenic exceedance at station MW-07 is not suspected to be an indication of contaminant migration from the landfill.

The cobalt exceedances detected in downgradient samples from stations MW-06 and MW-08 were within 3 times the baseline means and likely represent natural variability given that the baseline mean for cobalt was set to equal the analytical detection limit at the time of the site investigations and no standard deviation was calculated. Therefore, these cobalt exceedances are not suspected to be an indication of contaminant migration from the landfill.

The PHC F3 exceedances detected in downgradient samples from stations MW-06 and MW-07 are likely caused by natural biogenic organic compounds based on the organic material observed in the samples and a review of the sample's PHC F2 and F3b concentrations. As such, these PHC F3 exceedances are not suspected to be an indication of contaminant migration from the landfill.

A trend evaluation for the Non-Hazardous Waste Landfill was not completed as part of the 2019 monitoring program as less than seven sampling events of soil data has been collected to date.

Overall, the landfill seems to be performing well. However, arsenic results should be examined again in the next monitoring event to determine if concentrations are continuing to increase.

#### 5.3.3 Groundwater Sampling

#### 5.3.3.1 Monitoring Well Sampling/Inspection Logs

As per Section 5.3.3.2 of the TOR, groundwater monitoring logs were filled out for each monitoring well. Monitoring well sampling logs are presented in **Appendix F.** 

#### 5.3.3.2 Water Levels/Groundwater Flow

Groundwater levels were measured and are presented in the following table.

Table 5-7: Summary of Groundwater Levels – Non-Hazardous Waste Landfill

Monitoring Well ID	Monitoring Well Elevation (masl)	Water Level (mbtoc)	Well Stick up (m)	Water Level (mbgs)	Groundwater Elevation (masl)
MW-05	107.9	*	0.51	*	*
MW-06	104.7	1.460	0.52	0.70	103.2
MW-07	103.7	1.120	0.42	1.25	102.6
MW-08	103.9	1.694	0.44	0.94	102.2

Note: masl = metres above sea level, mbtoc = metre below top of casing, mbgs = metres below ground surface

The groundwater in the upgradient monitoring well MW-05 was frozen at the time of the field program. Based on the groundwater elevations measured at the three remaining wells, groundwater is interpreted to flow northwest within the vicinity of the landfill. Groundwater elevations and contours are presented on **Figure PIN-4.4C**, located at the end of this landfill section.

#### 5.3.3.3 Groundwater Laboratory Analytical Results

A total of three groundwater samples were collected from the Non-Hazardous Waste Landfill and analysed for total inorganic elements (arsenic, cadmium, chromium, cobalt, copper, nickel, and zinc) and Petroleum Hydrocarbons (PHC F1, F2, F3, and F4).

Current and historical analytical results are presented in **Table 3B** in the tables section of this report immediately following the main text. The laboratory certificates of analysis and chain of custody forms are presented in **Appendix B** of this report. **Figure PIN-4.4C**, located at the end of this landfill section, presents a summary of current and historical groundwater analytical results.

#### 5.3.3.4 Summary of Groundwater Results

Groundwater results could only be obtained for the three downgradient wells at the landfill in 2019 as the groundwater in the upgradient monitoring well was frozen at the time of the field program. As such, the 2019 groundwater results presented in the following table are limited to the three downgradient wells. The baseline mean is presented for information purposes. The discussions are focused on the comparison of the results to the BL+3SD.

Table 5-8: Evaluation of Groundwater Analytical Results - Non-Hazardous Waste Landfill

Parameter	Baseline Mean (mg/L)	Baseline Mean+3SD (mg/L)	Discussion of Results
Arsenic (As)	0.0030	0.0030	All groundwater sample results were below the BL+3SD at all four sample locations.
Cadmium (Cd)	0.0010	0.0010	All groundwater sample results were below the BL+3SD at all four sample locations.
Chromium (Cr)	0.0257	0.1077	All groundwater sample results were below the BL+3SD at all four sample locations.

<sup>\*</sup> Groundwater in well MW-05 was frozen at the time of the field program

Parameter	Baseline Mean (mg/L)	Baseline Mean+3SD (mg/L)	Discussion of Results
Cobalt (Co)	0.0030	0.0030	All groundwater sample results were below the BL+3SD at all four sample locations.
Copper (Cu)	0.0050	0.0050	The downgradient samples from MW-08 exceeded the BL+3SD at 0.0052 mg/L but was within 3 times the baseline mean. All remaining downgradient results were below the BL+3SD.
Lead (Pb)	0.0100	0.0100	All groundwater sample results were below the BL+3SD at all four sample locations.
Nickel (Ni)	0.0050	0.0050	The downgradient samples from MW-08 exceeded the BL+3SD at 0.0054 mg/L but was within 3 times the baseline mean. All remaining downgradient results were below the BL+3SD.
Zinc (Zn)	0.0100	0.0100	All groundwater sample results were below the BL+3SD at all four sample locations.
F1 (C <sub>6</sub> -C <sub>10</sub> )	0.05	0.05	All groundwater sample results were below the BL+3SD at all four sample locations.
F2 (C <sub>10</sub> -C <sub>16</sub> )	0.5	0.5	All groundwater sample results were below the BL+3SD at all four sample locations.
F3 (C <sub>16</sub> -C <sub>34</sub> )	1.0	1.0	All groundwater sample results were below the BL+3SD at all four sample locations.
F4 (C <sub>34</sub> -C <sub>50</sub> )	1.0	1.0	All groundwater sample results were below the BL+3SD at all four sample locations.

The results discussed in the previous table are presented on a series of graphs for each parameter in **Appendix D4**.

#### 5.3.3.5 Discussion of Groundwater Results

No upgradient groundwater results are available for the Non-Hazardous Waste Landfill as this landfill's upgradient well (MW-05) has been dry or frozen during all monitoring events since 2013. As such, there are no upgradient groundwater results to reference at this landfill.

Downgradient groundwater results were below the BL+3SD for all analytes with the exception of copper and nickel. The copper and nickel exceedances were both detected in the groundwater sample collected from downgradient well MW-08. However, these exceedances were within 3 times the baseline means for copper and nickel and represents natural variability. This is likely the case given that the baseline mean for both parameters were set to the analytical detection limit and no standard deviation was calculated. Therefore, these copper and nickel exceedances are not suspected to be an indication of contaminant migration from the landfill.

A trend evaluation for the Non-Hazardous Waste Landfill was not completed as part of the 2019 monitoring program as less than seven sampling events worth of groundwater data has been collected to date. The performance of the landfill should be re-evaluated once seven sampling events worth of data are available.

# 5.3.4 Thermal Monitoring

No thermistors are present at the Non-Hazardous Waste Landfill; therefore, no thermal monitoring was conducted as part of the 2019 monitoring program.

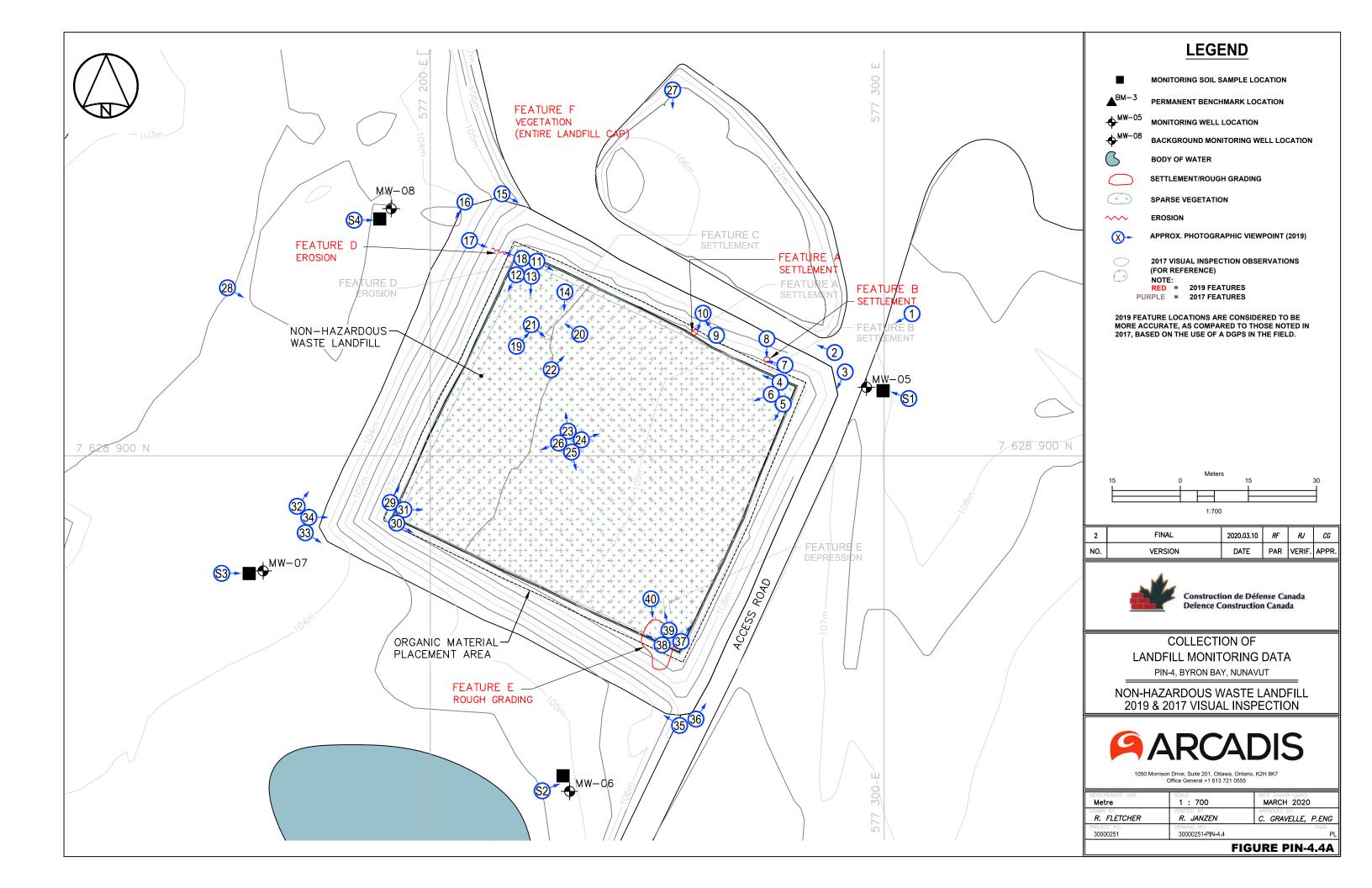
# 5.4 Overall Landfill Performance, Conclusions and Recommendations

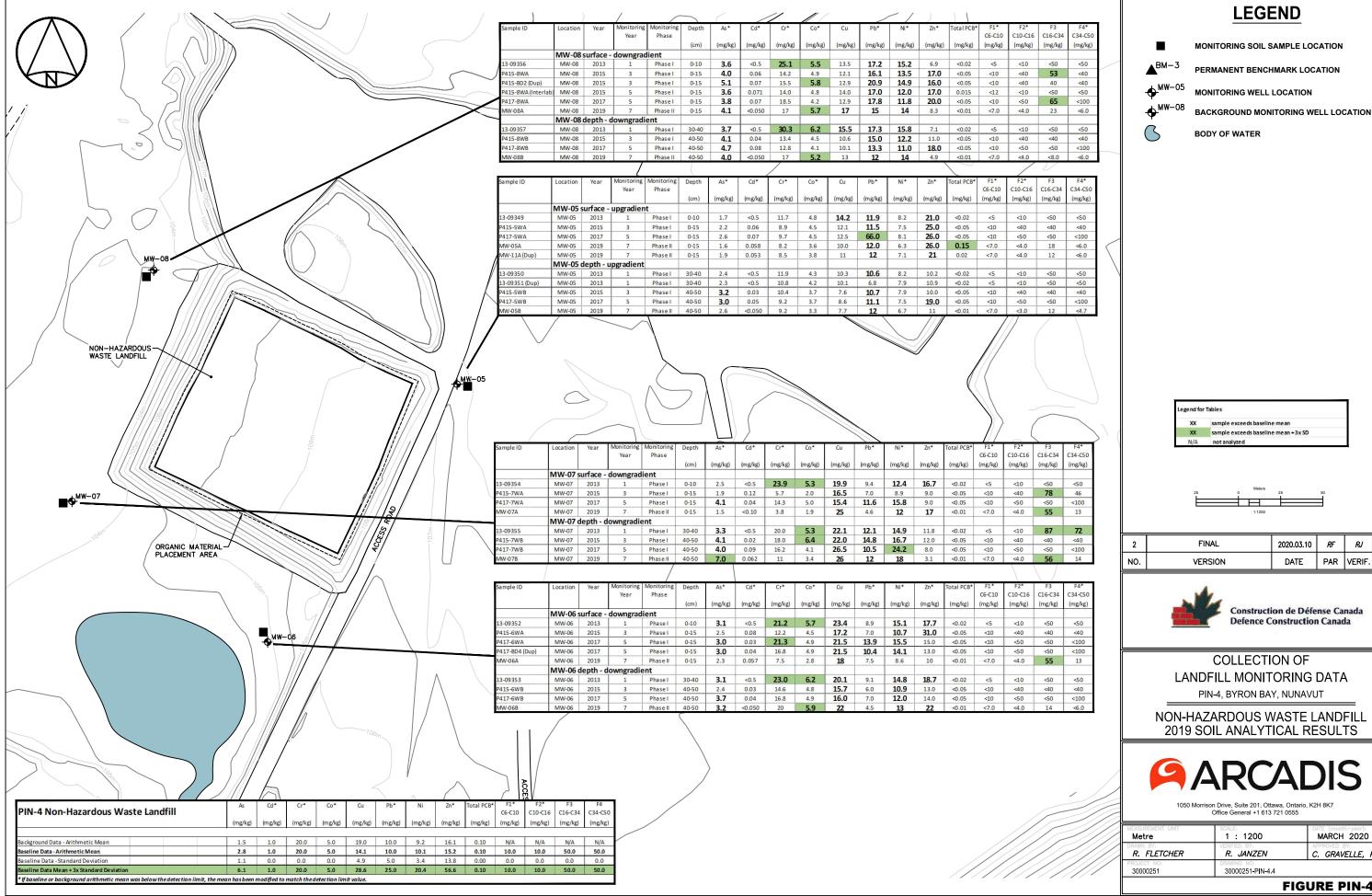
As the 2019 monitoring program is only the fourth monitoring program to have been conducted at the Non-Hazardous Waste Landfill, trends in soil and groundwater concentrations have not been evaluated. However, based on the limited chemical data collected to date and observations made during the 2019 field program, the landfill appears to be performing as intended with no apparent indications of contaminant migration.

Based on this review, it is recommended to continue the long-term monitoring of soils as planned and the performance of the landfill be re-evaluated once the results from seven monitoring events of data are available. In addition, arsenic results should be examined closely in the next monitoring event to determine if concentrations are increasing at downgradient soil sampling stations.

Based on the results of the visual inspection, the Non-Hazardous Landfill performance is acceptable. No remedial work or deviations from the monitoring plan are recommended at this time, though the subsequent monitoring events should be sure to note the measurements of Feature D, which has doubled in size since 2017.

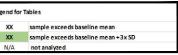
Based on the results of the 2019 monitoring program, the overall performance of the Non-Hazardous Waste Landfill is acceptable.

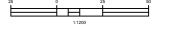




## **LEGEND**

MONITORING SOIL SAMPLE LOCATION





2	FINAL	2020.03.10	RF	RJ	CG
NO.	VERSION	DATE	PAR	VERIF.	APPR

Construction de Défense Canada Defence Construction Canada

**COLLECTION OF** LANDFILL MONITORING DATA

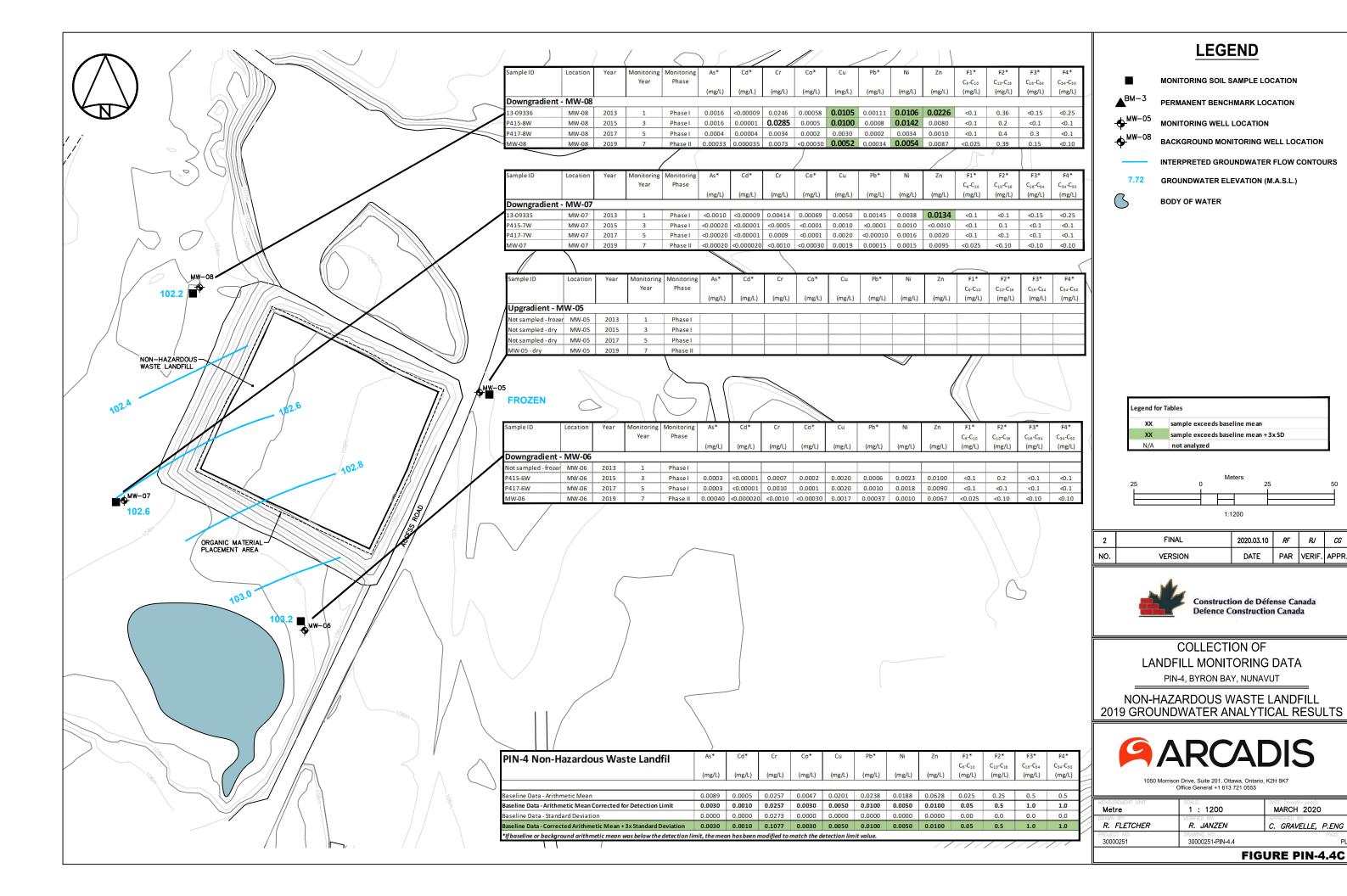
PIN-4, BYRON BAY, NUNAVUT

NON-HAZARDOUS WASTE LANDFILL 2019 SOIL ANALYTICAL RESULTS



MEASUREMENT UNIT Metre	SCALE: 1 : 1200	DATE (month-year): MARCH 2020			
R. FLETCHER	VERIFIED BY: R. JANZEN	APPROVED BY: C. GRAVELLE, P.ENG			
PROJECT NO: 30000251	30000251-PIN-4.4	PAGE PL			

FIGURE PIN-4.4B



## 6 PIN-4: STATION AREA LANDFILL – WEST

## 6.1 Landfill Description

The Station Area Landfill - West is located southwest of the Station Area, approximately 600 m by the road. Access is via the main road from the station and by a secondary access road into the landfill area to the west of the main road. The landfill consists of one large lobe.

The soil throughout the landfill is coarse-grained and consists, in general, of gravel with some sand or cobbles and occasional minor silt. Drainage from the landfill is to the west/southwest. The greatest relief in this area occurs on the west side of the landfill where the ground gently slopes at a grade of about 5%.

The remedial plan for this landfill consisted of the placement of 0.4 m of Type 1 granular cover over 0.35 m Type 2 granular cover on the side slope and 0.75 m Type 2 granular cover on the top of the landfill.

The long-term monitoring plan for the Station Area Landfill – West consists of visual inspection and the periodic collection of soil samples to monitor for the presence of leachate. The landfill layout, visual observations and photographic locations are presented on **Figure PIN-4.5A** located at the end of this landfill section.

## 6.2 Summary of Work Conducted

## 6.2.1 Visual Inspection

A visual inspection was completed at the Station Area Landfill – West on 23 August 2019. The visual inspection of the landfill was completed with no deviations from the accepted work plan.

## 6.2.2 Soil Sampling

Soil sampling at the Station Area Landfill – West was conducted on 23 August 2019 and consisted of the collection of ten soil samples from five soil sample stations (P4-13, P4-14, P4-15, P4-16 and P4-17). The following table outlines the soil sampling activities conducted at the Station Area Landfill - West

Table 6-1: Summary of Work Conducted by Soil Sampling Location – Station Area Landfill – West

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
P4-13 (upgradient)	P4-13A	0 - 0.15	Loamy sand and organics, some gravel and cobbles, rootlets, brown, moist
	P4-13B	0.4 – 0.5	Loamy sand, some gravel and cobble, trace organics, greyish brown, moist
P4-14 (downgradient)			Gravel and cobble, some loamy sand with organics, rootlets, dark brown, moist
	P4-14B	0.4 – 0.5	Gravel and loamy sand with organics, rootlets, dark brown, moist

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
P4-15 (downgradient)	P4-15A	0 - 0.15	Gravel and loamy sand with organics, rootlets, dark brown, moist
	P4-15B	0.4 – 0.5	Gravel and sandy loam, some cobble, trace organics, greyish brown, moist
P4-16 (downgradient)	P4-16A	0 - 0.15	Gravel and loamy sand with organics, rootlets, dark brown, moist
	P4-16B	0.4 – 0.5	Gravel and loamy sand, some cobble, trace organics, greyish brown, moist
P4-17 (downgradient)	P4-17A	0 – 0.15	Loamy sand and gravel, some cobble, rootlets, greyish brown, moist
	P4-17B	0.4 – 0.5	Loamy sand and gravel, some cobble, greyish brown, moist

## 6.2.3 Groundwater Sampling

No groundwater monitoring wells are present at the Station Area Landfill – West; therefore, no groundwater sampling or analysis was conducted as part of the 2019 monitoring program.

## 6.2.4 Thermal Monitoring

No thermistors are present at the Station Area Landfill – West; therefore, no thermal monitoring was conducted as part of the 2019 monitoring program.

# 6.3 Results of the Monitoring Program

## 6.3.1 Visual Inspection

The visual inspection was conducted in compliance with Section 5.2 of the TOR and details are provided below in the following Sections 6.3.1.1 through 6.3.1.5. **Figure PIN-4.5A** presents the visual inspection findings and photographic locations.

#### 6.3.1.1 Inspection Checklist

The visual inspection was completed as per the TOR and the visual inspection checklist is included below.

Table 6-2: Visual Inspection Checklist – Station Area Landfill – West

SITE NAME: PIN-4 Byron Bay

LANDFILL DESIGNATION: Station Area Landfill - West

LANDFILL TYPE: Regraded

DATE OF INSPECTION: 23 August 2019

WEATHER CONDITIONS: Windy, cool with mixed sun and cloud. Intermittent precipitation.

DATE OF PREVIOUS INSPECTION: 14 August 2017

INSPECTED BY: Ryan Janzen

REPORT PREPARED BY: Ryan Janzen

The inspector represents to the best of their 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.

				Tab	le 6-2: Vis	ual Inspe	ection Ch	ecklist – S	tation Area Landfill – West			
Checklist Item	Present (Yes/No)	Feature Number	Feature Location	GPS Coordinates Northing/Easting (Taken from Centre of Feature)	Length (m)	Width (m)	Depth (m)	Extent Relative to Landfill Surface	Description	Comparison with Historical Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)
Settlement	Y	A1 A2	N crest, near centre of structure.	7628822.190, 576849.139 7628837.976, 576808.325	1.8 2.2	0.8 1.8	0.2	<1%	Minor depression. Appears to be fines infiltration.  Minor linear depression.	Consistent.	Acceptable.	SWLF_19, 20 SWLF_17, 18
Settlement	Υ	В	S point, at crest.	7628715.296, 576799.709	1.8	0.7	0.1	<1%	Minor depression.	Consistent.	Acceptable.	SWLF_34, 35
Settlement	Υ	С	Landfill cap, along access ramp.	7628777.780, 576878.939	0.6	0.5	0.1	<1%	Minor depression.	Consistent.	Acceptable.	SWLF_3, 4
Settlement	Υ	G	W point, on W slope near crest.	7628806.275, 576755.875	1.5	0.7	0.05	<1%	Minor depression.	Consistent.	Acceptable.	SWLF_23, 24
Settlement	Υ	Н	SW crest, near centre of structure.	7628763.627, 576765.846	1.0	1.0	0.1	<1%	Minor depression.	Consistent.	Acceptable.	SWLF_28, 29
Settlement	Υ	l1 l2	Cap surface, on sloped area near material transition.	7628761.851, 576819.326 7628763.419, 576818.229	4.4 4.6	0.2 0.2	0.1 0.1	<1%	Minor linear depression.	Consistent.	Acceptable.	SWLF_38 through 40
Settlement	Υ	J	Access ramp surface.	7628769.228, 576893.363	1.0	0.6	0.1	<1%	Minor depression.	Consistent.	Acceptable.	SWLF_9, 10
Settlement	Υ	K	North slope.	7628825.195, 576863.847	1.4	0.55	0.1	<1%	Minor depression.	Larger than previously noted.	Acceptable.	SWLF_14, 15
	N	D1	Not observed.	NA	NA	NA	NA	NA	Feature not observed.	Feature not observed.	Not observed.	SWLF_7, 8 (noted area)
Erosion	Υ	D2	N slope, central.	7628823.005, 576881.106	16	0.15	0.05	<1%	Minor linear erosion.	Consistent.	Acceptable.	SWLF_12, 13
Erosion	N	Е	Not observed.	NA	NA	NA	NA	NA	Feature not observed.	Feature not observed.	Not observed.	SWLF_37 (noted area)
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation Establishment	Υ	L	Landfill cap, on Type I material (E side).	7628782.781, 576878.453	630	00m²	NA	~50%	Sparse vegetation.	Appears larger than previously noted.	Acceptable.	SWLF_1, 2, 12
Staining	N	F	Not observed.	NA	NA	NA	NA	NA	Feature not observed.	Feature not observed.	Not observed.	SWLF_16 (noted area)
Vegetation Stress	N											
Seepage Points (or) Ponded Water	N											
Debris and/or Liner Exposed	N											

	Table 6-2: Visual Inspection Checklist – Station Area Landfill – West											
Checklist Item	Present (Yes/No)	Feature Number	Feature Location	GPS Coordinates Northing/Easting (Taken from Centre of Feature)		Width (m)	Depth (m)	Extent Relative to Landfill Surface	Description	Comparison with Historica Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)
Presence & Condition of Monitoring Instruments	N											
Features of Note/Other Relevant Observations (e.g., signs of activity, ruts)	N											

#### Notes:

- UTM Zone is 12 North for all GPS co-ordinates.

## 6.3.1.2 Preliminary Stability Assessment

The Preliminary Stability Assessment for the Station Area Landfill – West was conducted on 23 August 2019 as per the TOR and the results are provided below.

Table 6-3: Preliminary Stability Assessment – Station Area Landfill – West

Feature	Severity Rating	Extent	
Settlement	Acceptable	Occasional	
Erosion	Acceptable	Isolated	
Lateral Movement	Not Observed	None	
Frost Action	Not Observed	None	
Sloughing	Not Observed	None	
Cracking	Not Observed	None	
Animal Burrows	Not Observed	None	
Vegetation Establishment	Acceptable	Numerous	
Staining	Not Observed	None	
Vegetation Stress	Not Observed	None	
Seepage / Ponded Water	Not Observed	None	
Debris and/or Liner Exposure	Not Observed	None	
Other	Not Observed	None	
Overall Landfill Performance	Acceptable		

**Note:** please refer to Performance/Severity rating reference guide in Section 2.1.3.1 above.

## 6.3.1.3 Photographic Records

The detailed photographic record for the Station Area Landfill – West has been completed as per Section 5.5 of the TOR and is included as **Appendix H**. The Photographic Record contains an index of photographs collected; full sized photographs are contained in the separately appended CD/DVD-ROM. **Figure PIN-4.5A** illustrates the photograph locations and directions.

## 6.3.1.4 Trend Analysis

A trend analysis was conducted with regards to observations made during the visual inspection of the Station Area Landfill – West. The following table outlines the results of the visual trend analysis. Features where no significant change was observed have not been listed here.

Table 6-4: Visual Inspection Trends - Station Area Landfill - West

Checklist Item	Feature Number	Comparison with Historical Observations
Settlement	K	Observed size has increased from 0.2 m <sup>2</sup> in 2017 to 0.8 m <sup>2</sup> in 2019.
D1 Erosion		Not observed.
LIOSIOII	E	Not observed. Was noted to have decreased in size between 2016 and 2017.
Staining	F	Not observed.
Vegetation Establishment	L	Coverage appears to have expanded since 2017 (no measurements given previously).

#### 6.3.1.5 Discussion of Results/Trends

A comparison of the visual inspection results of the 2017 and 2019 monitoring events at the Station Area Landfill – West indicates that one settlement feature has expanded while three erosive features were not observed. This could be attributed to erosive infill during meltwater events. Vegetated areas appear to have expanded; though there were no dimensions given from the 2017 program, a comparison of observed areas against previous figures indicates larger vegetated areas in 2019. The results of the visual inspection and the observed trends indicate that the performance of the landfill is acceptable.

### 6.3.2 Soil Sampling

Soil sampling of the Station Area Landfill - West was conducted on 23 August 2019. The soil sampling was conducted in compliance with Section 5.3.1 and 5.3.2 of the TOR and details are provided below in the following sections.

#### 6.3.2.1 Laboratory Analytical Results

A total of ten soil samples were collected from five soil sampling stations at Station Area Landfill - West and analysed for inorganic elements (arsenic, cadmium, chromium, cobalt, copper, nickel, and zinc), total PCBs, and Petroleum Hydrocarbons (PHC F1, F2, F3, and F4).

Current and historical analytical results are presented in **Table 4** in the tables section of this report immediately following the main text. The laboratory certificates of analysis and chain of custody forms are presented in **Appendix B** of this report. **Figure PIN-4.5B**, located at the end of this landfill section, presents a summary of significant soil analytical results.

# 6.3.2.2 Summary of Soil Results

The soil results for 2019 are presented in the following table. The background and baseline mean are presented for information purposes. The discussions are focused on the comparison of the results to the BL+3SD.

Table 6-5: Evaluation of Results by Parameter – Station Area Landfill – West

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
Arsenic (As)	1.5	2.5	5.4	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cadmium (Cd)	1.0	1.0	1.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Chromium (Cr)	20.0	20.0	20.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cobalt (Co)	5.0	5.0	5.0	The upgradient sample from station P4-13 at surface exceeded the BL+3SD at 5.3 mg/kg. In addition, the downgradient sample from station P4-14 at depth exceeded the BL+3SD at 5.7 mg/kg. Both exceedances were within 3 times the baseline mean. All remaining upgradient and downgradient results were below the BL+3SD
Copper (Cu)	19.0	13.2	25.4	The upgradient sample from station P4-13 at surface exceeded the BL+3SD at 28.0 mg/kg but was below the baseline maximum of 28.3 mg/kg detected in 2011. All downgradient and remaining upgradient results were below the BL+3SD
Lead (Pb)	10.0	10.0	26.1	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Nickel (Ni)	9.2	9.4	18.5	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Zinc (Zn)	16.1	15.0	15.0	The upgradient sample from station P4-13 at surface exceeded the BL+3SD at 16 mg/kg. In addition, downgradient samples from stations P4-14 and P4-15 at surface exceeded the BL+3SD at 22 and 24 mg/kg respectively. All three exceedances were within 3 times the baseline mean. All upgradient and remaining downgradient results were below the BL+3SD
PCBs (Total)	0.10	0.10	0.10	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F1 (C <sub>6</sub> -C <sub>10</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
F2 (C <sub>10</sub> -C <sub>16</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F3 (C <sub>16</sub> -C <sub>34</sub> )	N/A	18.5	60.2	The downgradient sample from stations P4-14 and P4-16 at surface exceeded the BL+3SD at 200 and 67 mg/kg. respectively. It should be noted that the PHC F3 exceedances are suspected to be caused by natural BOCs. All upgradient and remaining downgradient results were below the BL+3SD
F4 (C <sub>34</sub> -C <sub>50</sub> )	N/A	50.0	50.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.

The results discussed in the previous table are presented on a series of graphs for each parameter in **Appendix D5**.

#### 6.3.2.3 Discussion of Soil Results and Trends

Upgradient samples at surface and depth were below the BL+3SD for all parameters with the exception of cobalt, copper and zinc. The cobalt and zinc exceedances were detected in the surface sample collected from upgradient station P4-13 but were both within three times the baseline mean, which could represent natural variability. This is worth noting because the baseline mean for cobalt and zinc were set to the analytical detection limit at the time of the site investigations and no standard deviation was calculated. Furthermore, the 2019 cobalt and zinc exceedances are equal to and less than the concentrations detected in 2015 and 2017. As such, the cobalt and zinc exceedances are not suspected to be an indication of contaminant migration from an upgradient source.

The copper exceedance was also detected in the surface sample collected from upgradient station P4-13. The copper concentration detected was 28.0 mg/kg and slightly exceeded the landfill's BL+3SD value for copper of 25.4 mg/kg. However, the 2019 copper exceedance is below the baseline maximum for copper of 28.3 mg/kg measured in 2011 at soil station P4-13. As such, the copper exceedance is also not suspected to be an indication of contaminant migration from the landfill.

Downgradient soil results were below the BL+3SD for all analytes with the exception of cobalt, zinc and PHC F3 parameters. The cobalt and zinc exceedances detected in downgradient samples were within 3 times the baseline means for both parameters and likely represent natural variability given that the baseline mean for cobalt and zinc were set to the analytical detection limit at the time of the site investigations and no standard deviation was calculated. The PHC F3 exceedances detected in downgradient samples from stations P4-14 and P4-16 are likely caused by natural biogenic organic compounds based on the organic material observed in the samples and a review of the sample's PHC F2 and F3b concentrations. As such, these cobalt, zinc and PHC F3 exceedances are not suspected to be an indication of contaminant migration from the landfill.

A trend evaluation for the Station Area Landfill -West was not completed as part of the 2019 monitoring program as less than seven sampling events worth of soil data has been collected to date.

Overall, the landfill seems to be performing well and there is no indication of contaminant migration from the landfill at this time based on the existing soil data

#### 6.3.3 Groundwater Sampling

No groundwater monitoring wells are present at the Station Area Landfill – West; therefore, no groundwater sampling or analysis was conducted as part of the 2019 monitoring program.

## 6.3.4 Thermal Monitoring

No thermistors are present at the Station Area Landfill – West; therefore, no thermal monitoring was conducted as part of the 2019 monitoring program.

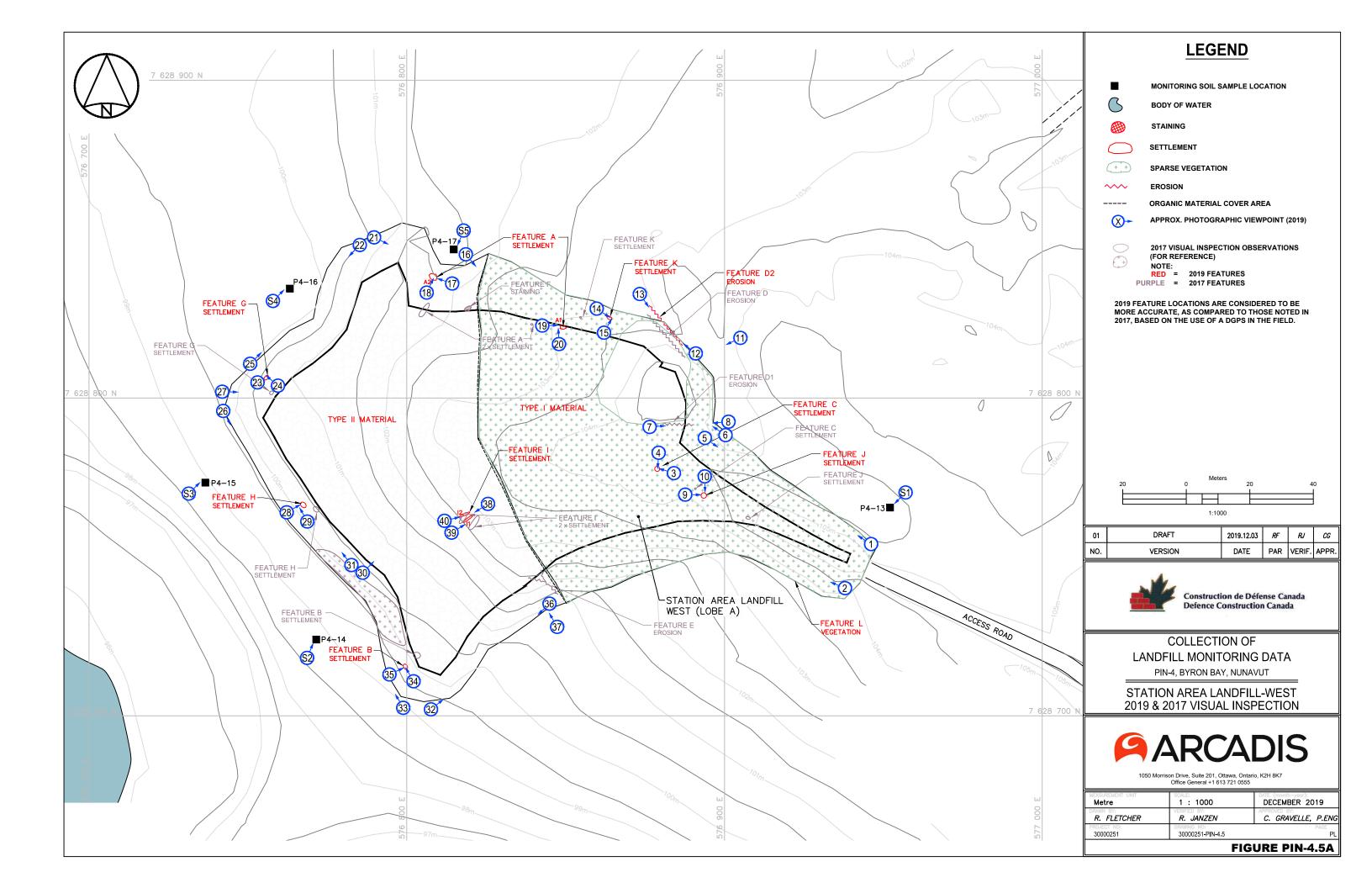
# 6.4 Overall Landfill Performance, Conclusions and Recommendations

As the 2019 monitoring program is only the fourth monitoring program to have been conducted at the Station Area Landfill - West, trends in soil concentrations have not been evaluated. However, based on the limited chemical data collected to date and observations made during the 2019 field program, the landfill appears to be performing as intended with no indications of potential contaminant migration.

Based on this review, it is recommended to continue the long-term monitoring of soils as planned and the performance of the landfill be re-evaluated once seven monitoring events worth of data are available.

Based on the results of the visual inspection, the Station Area Landfill – West performance is acceptable. No remedial work or deviations from the monitoring plan are recommended at this time.

Based on the results of the 2019 monitoring program, the overall performance of the Station Area Landfill – West is acceptable.

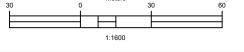




## **LEGEND**

MONITORING SOIL SAMPLE LOCATION

sample exceeds baseline mean XX sample exceeds baseline mean + 3x SD N/A not analyzed



2	FINAL	2020.03.10	RF	RJ	CG
NO.	VERSION	DATE	PAR	VERIF.	APPR.

Construction de Défense Canada **Defence Construction Canada** 

**COLLECTION OF** LANDFILL MONITORING DATA

PIN-4, BYRON BAY, NUNAVUT

STATION AREA LANDFILL-WEST 2019 SOIL ANALYTICAL RESULTS



on Drive, Suite 201, Ottawa, Ontario, K2H 8K7 Office General +1 613 721 0555

MEASUREMENT UNIT Metre	SCALE: 1 : 1600	MARCH 2020
R. FLETCHER	VERIFIED BY: R. JANZEN	C. GRAVELLE, P.ENG
PROJECT NO: 30000251	DRAWING NO: 30000251-PIN-4.5	PAGE PL

**FIGURE PIN-4.5B** 

## 7 PIN-4: USAF LANDFILL

# 7.1 Landfill Description

The USAF Landfill is located about 300 m south of the Station Area at the base of a bedrock ridge. An access road has been built over the bedrock ridge from the Station Area northeast of the landfill, however, the landfill is most easily accessed from the south by the airstrip. The landfill was constructed during site closure and was in use during the 1993 assessment visit. Upgradient of the USAF Landfill along the bedrock ridge, the slope is very steep, with some bedrock exposure. At the base of the ridge and throughout the landfill, the grade is subdued.

The remediation of this landfill involved the removal of all surface debris and the placement of an additional 0.5 m of clean fill over top.

The long-term monitoring plan for the USAF landfill consists of visual monitoring and periodic collection of soil samples. The landfill layout, visual observations and photographic locations are presented on **Figure PIN-4.6A** located at the end of this landfill section.

# 7.2 Summary of Work Conducted

## 7.2.1 Visual Inspection

A visual inspection was completed at the USAF Landfill on 23 August 2019. The visual inspection of the landfill was completed with no deviations from the accepted work plan.

## 7.2.2 Soil Sampling

Soil sampling at the USAF was conducted on 23 August 2019 and consisted of the collection of eight soil samples from four soil sample stations (P4-18, P4-19, P4-20 and P4-21). The following table outlines the soil sampling activities conducted at the USAF Landfill.

Table 7-1: Summary of Work Conducted by Soil Sampling Location – USAF Landfill

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
P4-18 (upgradient)	P4-18A	0 - 0.15	Loamy sand and gravel, some cobble, greyish brown, moist
	P4-18B	0.4 - 0.5	Loamy sand and gravel, some cobble, greyish brown, moist
P4-19 (downgradient)	P4-19A	0 - 0.15	Loamy sand and gravel, some cobble, trace organics, rootlets, greyish brown, moist
	P4-19B	0.4 - 0.5	Gravel, some cobbles, trace sandy loam, greyish brown, moist

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
P4-20 (downgradient)	P4-20A	0 - 0.15	Loamy sand, some gravel and cobbles, trace organics, rootlets, greyish brown, moist
	P4-20B	0.4 - 0.5	Loamy sand, trace gravel and cobble, greyish brown, moist
P4-21 (downgradient)	0 - 0.15		Loamy sand, some gravel and cobbles, organics, rootlets, greyish brown, moist
	P4-21B	0.4 - 0.5	Loamy sand and gravel, some cobble, greyish brown, moist

## 7.2.3 Groundwater Sampling

No groundwater monitoring wells are present at the USAF Landfill; therefore, no groundwater sampling was performed as part of the 2019 monitoring program.

## 7.2.4 Thermal Monitoring

No thermistors are present at the USAF Landfill; therefore, no thermal monitoring was performed as part of the 2019 monitoring program.

# 7.3 Results of the Monitoring Program

## 7.3.1 Visual Inspection

The visual inspection was conducted in compliance with Section 5.2 of the TOR and details are provided below in the following Sections 7.3.1.1 through 7.3.1.5. **Figure PIN-4.6A** presents the visual inspection findings and photographic locations.

Of note are the modified dimensions of the toe of the landfill. During the current monitoring event, a new line denoting the toe of this landfill was recorded using the DGPS on-site. This line is considered to more accurately reflect the structural toe of the landfill – the actual base of the slope which begins at the landfill crest. The toe denoted on previous figures extends some distance past this inflection point, into the flat terrain surrounding the landfill. Though this extended area appears to be borrow material placed during landfill construction, its grade and gradient are very similar to the surrounding undeveloped area.

## 7.3.1.1 Inspection Checklist

The visual was completed as per the TOR and the visual inspection checklist is included below.

Table 7-2: Visual Inspection Checklist – USAF Landfill

SITE NAME: PIN-4 Byron Bay

LANDFILL DESIGNATION: USAF Landfill

LANDFILL TYPE: Regraded

DATE OF INSPECTION: 23 August 2019

WEATHER CONDITIONS: Intermittent sun. Windy and cool..

DATE OF PREVIOUS INSPECTION: 14 August 2017

INSPECTED BY: Ryan Janzen

REPORT PREPARED BY: Ryan Janzen

The inspector represents to the best of their 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.

	Table 7-2: Visual Inspection Checklist – USAF Landfill												
Checklist Item	Present (Yes/No)	Feature Number	Feature Location	GPS Coordinates Northing/Easting (Taken from Centre of Feature)	Length (m)	Width (m)	Depth (m)	Extent Relative to Landfill Surface	Description	Comparison with Historical Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)	
Settlement	Υ	С	NE crest, towards E corner.	7628618.768, 577347.561	1.9	1.3	0.1	<1%	Minor depression.	Consistent.	Acceptable.	USAF_12, 13	
Erosion	N												
Lateral Movement	N												
Frost Action	N												
Sloughing	N												
Cracking	Υ	В	Across main body.	7628611.716, 577327.649	12.5	0.05	Unknown	<1%	Tension crack orthogonal to structure long axis.	Consistent.	Acceptable.	USAF_7, through 9	
Cracking	Υ	D	SW slope, parallel to SW crest.	7628585.401, 577289.003	12.5	0.05	Unknown	<1%	Tension crack orthogonal to structure long axis.	NEW OBSERVATION.	Acceptable.	USAF_21 through 23	
Animal Burrows	N												
Vegetation Establishment	N												
Staining	N												
Vegetation Stress	N												
Seepage Points (or) Ponded Water	N	А	SE slope, S quadrant.	7628588.023, 577305.589	NA	NA	NA	<1%	Dry 'seepage channels'. These are not considered an observable feature and are only included for consistency with previous reports.	Feature not observed.	Feature not observed.	USAF_17 through 20 (noted area)	
Debris and/or Liner Exposed	N												
Presence & Condition of Monitoring Instruments	N												
Features of Note/Other Relevant Observations (e.g., signs of activity, ruts)	N												

## Notes:

- UTM Zone is 12 North for all GPS co-ordinates.

## 7.3.1.2 Preliminary Stability Assessment

The Preliminary Stability Assessment for the USAF Landfill was conducted on 23 August 2019 as per the TOR and the results are provided below.

Table 7-3: Preliminary Stability Assessment – USAF Landfill

Feature	Severity Rating	Extent		
Settlement	Acceptable	Isolated		
Erosion	Not Observed	None		
Lateral Movement	Not Observed	None		
Frost Action	Not Observed	None		
Sloughing	Not Observed	None		
Cracking	Acceptable	Occasional		
Animal Burrows	Not Observed	None		
Vegetation Establishment	Not Observed	None		
Staining	Not Observed	None		
Vegetation Stress	Not Observed	None		
Seepage / Ponded Water	Not Observed	None		
Debris and/or Liner Exposure	Not Observed	None		
Other	Not Observed	None		
Overall Landfill Performance	Acceptable			

Note: please refer to Performance/Severity rating reference guide in Section 2.1.3.1 above.

## 7.3.1.3 Photographic Records

The detailed photographic record for the USAF Landfill has been completed as per Section 5.5 of the TOR and is included as **Appendix H**. The Photographic Record contains an index of photographs collected; full sized photographs are contained as a separately appended CD/DVD-ROM. **Figure PIN-4.6A** illustrates the photograph locations and directions.

## 7.3.1.4 Trend Analysis

A trend analysis was conducted with regards to observations made during the visual inspection of the USAF Landfill. The following outlines the results of the visual trend analysis. Features where no significant change was observed are not included here.

Table 7-4: Visual Inspection Trends - USAF Landfill

Checklist Item	Feature Number	Comparison with Historical Observations
Cracking	D	New observation.
Seepage Points	А	Some minor colour variations in the pattern of the previously noted features are visible in the cover material, but these are not considered to constitute an observable landfill feature. Feature not observed.

#### 7.3.1.5 Discussion of Results/Trends

A comparison of the visual inspection results of the 2017 and 2019 monitoring events at the USAF Landfill indicates that previously noted features remain consistent in size and that a new tension crack has developed. The width of the tension cracking precludes it from being considered a structural concern at the current time, but care to record accurate measurements of these features should be taken in future monitoring events. The former seepage area (Feature A) exhibits minor colour variations in the cover material consistent with the patterns previously noted, however, there are no grade disruptions, no visible evidence of current or historic water accumulation or erosive action, no structural impacts, and no notable aspects with regards to this feature – as such, it is considered not observed during this monitoring event. The results of the visual inspection and the observed trends indicate that the performance of the landfill is acceptable.

## 7.3.2 Soil Sampling

Soil sampling of the USAF Landfill was conducted on 23 August 2019. The soil sampling was conducted in compliance with Section 5.3.1 and 5.3.2 of the TOR and details are provided below in the following sections.

## 7.3.2.1 Laboratory Analytical Results

A total of eight soil samples were collected from four soil sampling stations at the USAF Landfill and analysed for inorganic elements (arsenic, cadmium, chromium, cobalt, copper, nickel, and zinc), total PCBs, and Petroleum Hydrocarbons (PHC F1, F2, F3, and F4).

Current and historical analytical results are presented in **Table 5** in the tables section of this report immediately following the main text. The laboratory certificates of analysis and chain of custody forms are presented in **Appendix B** of this report. **Figure PIN-4.6B**, located at the end of this landfill section, presents a summary of current and historical soil analytical results.

## 7.3.2.2 Summary of Soil Results

The soil results for 2019 are presented in the following table. The background and baseline mean are presented for information purposes. The discussions are focused on the comparison of the results to the BL+3SD.

Table 7-5: Evaluation of Results by Parameter – USAF Landfill

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
Arsenic (As)	1.5	2.9	5.6	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cadmium (Cd)	1.0	1.0	1.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Chromium (Cr)	20.0	20.0	20.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cobalt (Co)	5.0	5.0	5.0	The downgradient sample from station P4-21 at depth exceeded the BL+3SD at 5.3 mg/kg but was within 3 times the baseline mean. All upgradient and remaining downgradient results were below the BL+3SD
Copper (Cu)	19.0	12.5	29.4	All soil sample results were below the BL+3SD at upgradient and downgradient locations
Lead (Pb)	10.0	10.0	10.0	The upgradient sample from station P4-18 at surface exceeded the BL+3SD at 11 mg/kg but was within 3 times the baseline mean. All upgradient and remaining downgradient results were below the BL+3SD
Nickel (Ni)	9.2	12.3	19.5	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Zinc (Zn)	16.1	15.0	15.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
PCBs (Total)	0.10	0.10	0.10	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F1 (C <sub>6</sub> -C <sub>10</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F2 (C <sub>10</sub> -C <sub>16</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F3 (C <sub>16</sub> -C <sub>34</sub> )	N/A	50.0	50.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F4 (C <sub>34</sub> -C <sub>50</sub> )	N/A	50.0	50.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.

The results discussed in the previous table are presented on a series of graphs for each parameter in **Appendix D6**.

#### 7.3.2.3 Discussion of Soil Results

Upgradient samples at surface and depth were below the BL+3SD for all parameters except lead. The lead exceedance was detected in the surface sample collected from upgradient station P4-18 but was within three times the baseline mean. This is worth noting because the baseline mean for lead was set to the analytical detection limit at the time of the site investigations and no standard deviation was calculated. Furthermore, the concentration of lead detected in the surface sample collected from station P4-18 in 2019 is less than both the maximum baseline and background concentration for lead at this landfill. As such, the lead exceedances likely represent natural variability and is not suspected to be an indication of contaminant migration from an upgradient source.

Downgradient soil results were below the BL+3SD for all analytes except cobalt. Similar to the lead exceedance, the cobalt concentration detected was below the maximum baseline and background concentration for cobalt at this landfill. In addition, the cobalt exceedance was within 3 times the baseline means for the parameter which was also set to the analytical detection limit at the time of the site investigations and no standard deviation was calculated. As such, the cobalt concentration likely represents natural variability and is not suspected to be an indication of contaminant migration from the landfill.

A trend evaluation for the USAF Landfill was not completed as part of the 2019 monitoring program as less than seven sampling events worth of soil data has been collected to date.

Overall, the landfill seems to be performing well and there is no indication of contaminant migration from the landfill at this time based on the existing soil data.

### 7.3.3 Groundwater Sampling

No groundwater monitoring wells are present at the USAF Landfill; therefore, no groundwater sampling or analysis was conducted as part of the 2019 monitoring program.

#### 7.3.4 Thermal Monitoring

No thermistors are present at the USAF Landfill; therefore, no thermal monitoring was conducted as part of the 2019 monitoring program.

# 7.4 Overall Landfill Performance, Conclusions and Recommendations

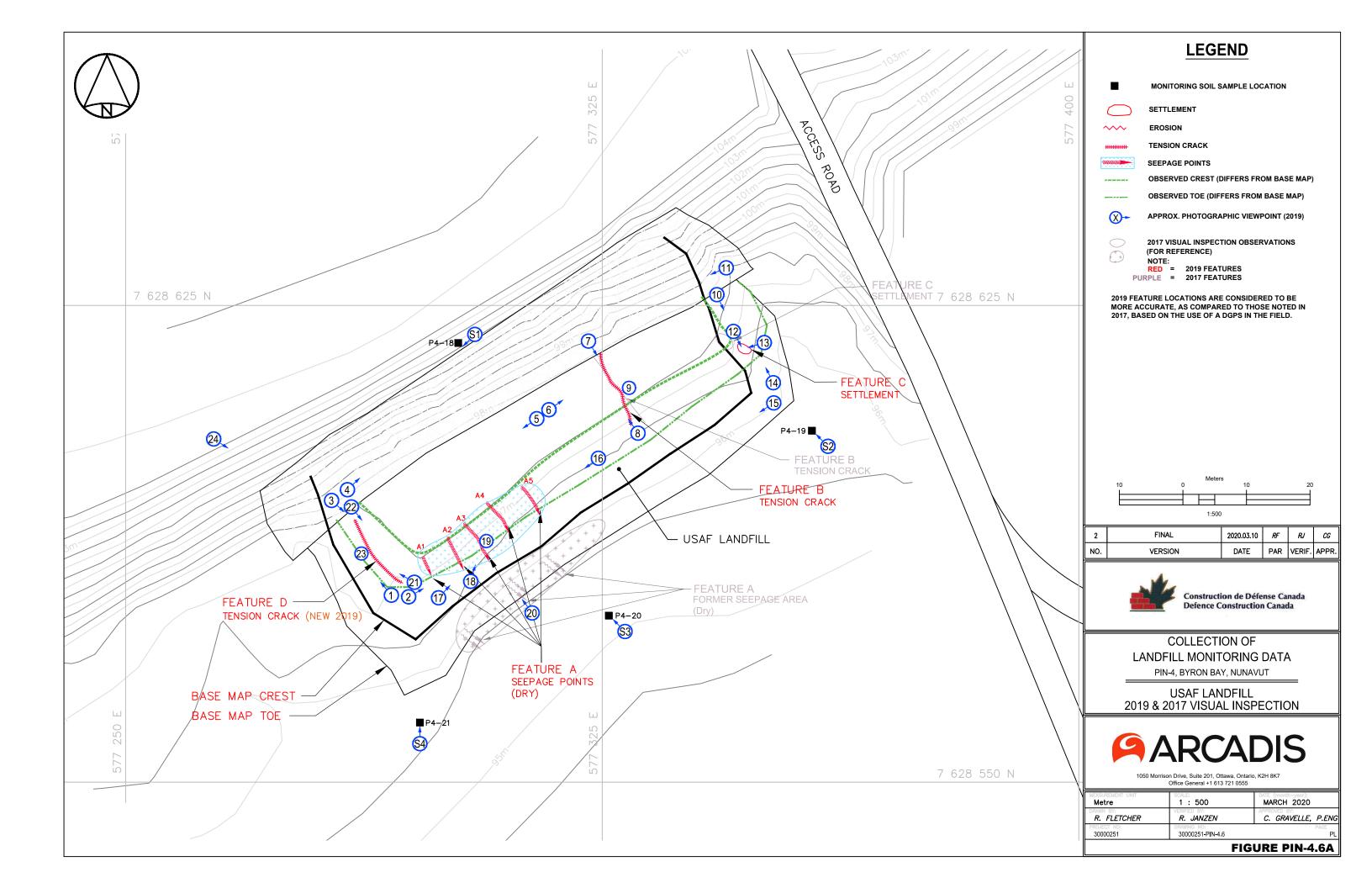
As the 2019 monitoring program is only the fourth monitoring program to have been conducted at the USAF Landfill, trends in soil concentrations have not been evaluated. However, based on the limited chemical data collected to date and observations made during the 2019 field program, the landfill appears to be performing as intended with no indications of potential contaminant migration.

Based on this review, it is recommended to continue the long-term monitoring of soils as planned and the performance of the landfill be re-evaluated once seven monitoring events worth of data are available.

Based on the results of the visual inspection, the USAF Landfill performance is acceptable. Care should be taken during future monitoring events to record accurate measurements of the noted tension cracking,

however, in their current state (i.e. narrow cracks) these features are not considered a structural concern at this time. No remedial work or deviations from the monitoring plan are recommended at this time.

Based on the results of the 2019 monitoring program, the overall performance of the USAF Landfill is acceptable.

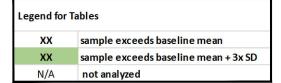


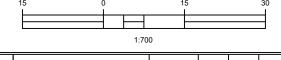


As	Cd*	Cr*	Co*	Cu	Pb*	Ni	Zn*	Total PCB*			F3 C16-C34	F4 C34-C50
(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
2.9	1.0	20.0	5.0	12.5	10.0	12.3	15.0	0.10	10.0	10.0	50.0	50.0
0.9	0.0	0.0	0.0	5.6	0.0	2.4	0.0	0.00	0.0	0.0	0.0	0.0
5.6	1.0	20.0	5.0	29.4	10.0	19.5	15.0	0.10	10.0	10.0	50.0	50.0
If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.												
	1.5 2.9 0.9 5.6	(mg/kg) (mg/kg)  1.5 1.0  2.9 1.0  0.9 0.0  5.6 1.0	(mg/kg)         (mg/kg)         (mg/kg)           1.5         1.0         20.0           2.9         1.0         20.0           0.9         0.0         0.0           5.6         1.0         20.0	(mg/kg)         (mg/kg)         (mg/kg)         (mg/kg)           1.5         1.0         20.0         5.0           2.9         1.0         20.0         5.0           0.9         0.0         0.0         0.0           5.6         1.0         20.0         5.0	(mg/kg)         (mg/kg)         (mg/kg)         (mg/kg)         (mg/kg)         (mg/kg)           1.5         1.0         20.0         5.0         19.0           2.9         1.0         20.0         5.0         12.5           0.9         0.0         0.0         0.0         5.6           5.6         1.0         20.0         5.0         29.4	(mg/kg)         (mg/kg)         (mg/kg)         (mg/kg)         (mg/kg)         (mg/kg)         (mg/kg)           1.5         1.0         20.0         5.0         19.0         10.0           2.9         1.0         20.0         5.0         12.5         10.0           0.9         0.0         0.0         0.0         5.6         0.0           5.6         1.0         20.0         5.0         29.4         10.0	(mg/kg)         (mg/kg) <t< th=""><th>(mg/kg)         (mg/kg)         <t< th=""><th>(mg/kg)         (mg/kg)         <t< th=""><th>  1.5   1.0   20.0   5.0   19.0   10.0   9.2   16.1   0.10   N/A     2.9   1.0   20.0   5.0   12.5   10.0   12.3   15.0   0.10   10.0     0.9   0.0   0.0   0.0   5.6   0.0   2.4   0.0   0.00   0.0     5.6   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.5   1.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   1.5   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   1.5   20.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   20.0   2</th><th>  1.5   1.0   20.0   5.0   19.0   10.0   9.2   16.1   0.10   10.0   10.0   0.9   0.0   0.0   0.0   5.6   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0   10.0   10.0  </th><th>(mg/kg)         (mg/kg)         <t< th=""></t<></th></t<></th></t<></th></t<>	(mg/kg)         (mg/kg) <t< th=""><th>(mg/kg)         (mg/kg)         <t< th=""><th>  1.5   1.0   20.0   5.0   19.0   10.0   9.2   16.1   0.10   N/A     2.9   1.0   20.0   5.0   12.5   10.0   12.3   15.0   0.10   10.0     0.9   0.0   0.0   0.0   5.6   0.0   2.4   0.0   0.00   0.0     5.6   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.5   1.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   1.5   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   1.5   20.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   20.0   2</th><th>  1.5   1.0   20.0   5.0   19.0   10.0   9.2   16.1   0.10   10.0   10.0   0.9   0.0   0.0   0.0   5.6   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0   10.0   10.0  </th><th>(mg/kg)         (mg/kg)         <t< th=""></t<></th></t<></th></t<>	(mg/kg)         (mg/kg) <t< th=""><th>  1.5   1.0   20.0   5.0   19.0   10.0   9.2   16.1   0.10   N/A     2.9   1.0   20.0   5.0   12.5   10.0   12.3   15.0   0.10   10.0     0.9   0.0   0.0   0.0   5.6   0.0   2.4   0.0   0.00   0.0     5.6   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.5   1.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   1.5   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   1.5   20.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   20.0   2</th><th>  1.5   1.0   20.0   5.0   19.0   10.0   9.2   16.1   0.10   10.0   10.0   0.9   0.0   0.0   0.0   5.6   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0   10.0   10.0  </th><th>(mg/kg)         (mg/kg)         <t< th=""></t<></th></t<>	1.5   1.0   20.0   5.0   19.0   10.0   9.2   16.1   0.10   N/A     2.9   1.0   20.0   5.0   12.5   10.0   12.3   15.0   0.10   10.0     0.9   0.0   0.0   0.0   5.6   0.0   2.4   0.0   0.00   0.0     5.6   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0     1.5   1.5   1.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   1.5   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   1.5   20.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0   20.0     1.5   1.5   20.0   2	1.5   1.0   20.0   5.0   19.0   10.0   9.2   16.1   0.10   10.0   10.0   0.9   0.0   0.0   0.0   5.6   1.0   20.0   5.0   29.4   10.0   19.5   15.0   0.10   10.0   10.0   10.0	(mg/kg)         (mg/kg) <t< th=""></t<>

## **LEGEND**

MONITORING SOIL SAMPLE LOCATION





2	FINAL	2020.03.10	RF	RJ	CG
NO.	VERSION	DATE	PAR	VERIF.	APPR.



Construction de Défense Canada Defence Construction Canada

COLLECTION OF
LANDFILL MONITORING DATA
PIN-4, BYRON BAY, NUNAVUT

USAF LANDFILL 2019 SOIL ANALYTICAL RESULTS



1050 Morrison Drive, Suite 201, Ottawa, Ontario, K2H 8K7 Office General +1 613 721 0555

MEASUREMENT UNIT Metre	SCALE: 1:700	DATE (month-year): MARCH 2020
R. FLETCHER	VERIFIED BY: R. JANZEN	C. GRAVELLE, P.ENG
30000251	30000251-PIN-4.6	PAGE PL

**FIGURE PIN-4.6B** 

## 8 PIN-4: TIER II SOIL DISPOSAL FACILITY

# 8.1 Landfill Description

The Tier II Soil Disposal Facility is located west of the airstrip and is bound to the east by the access road between the airstrip and the Station Area. The landfill cell was constructed with the placement of low permeability, saturated borrow material placed into compacted berms, followed by the installation of a liner system over the berms, along the landfill base, and over the landfill contents, and finished with the placement of sufficient overlying site derived granular fill to promote the freezing of the landfill waste contents. Four groundwater monitoring wells were installed at the landfill perimeter, and four thermistors were installed within the landfill footprint.

The long-term monitoring plan consists of periodic visual monitoring, collection of soil and groundwater samples and monitoring of subsurface ground temperatures of the landfill.

The Tier II Soil Disposal Facility layout, visual observations and photographic locations are presented on **Figure PIN-4.7A** located at the end of this landfill section.

## 8.2 Summary of Work Conducted

## 8.2.1 Visual Inspection

A visual inspection was completed at the Tier II Soil Disposal Facility on 21 August 2019. The visual inspection of the landfill was completed with no deviations from the visual inspection work plan.

## 8.2.2 Soil Sampling

Soil sampling at the Tier II Soil Disposal Facility was conducted on 21 August 2019 and consisted of the collection of eight soil samples from four soil sampling stations (MW-01, MW-02, MW-03 and MW-04). In addition, two blind field duplicate samples (MW-09A and MW-10A) were collected at surface from stations MW-01 and MW-04 respectively. The following table outlines the soil sampling activities conducted at the Tier II Soil Disposal Facility.

Table 8-1: Summary of Work Conducted by Soil Sampling Location - Tier II Soil Disposal Facility

Sample Location	Sample ID	Sample Depth (mbgs)	Notes				
MW-01 (upgradient)	0-015		Loamy sand, some gravel, organics and rootlets, brown, moist				
	MW-01B	0.4 – 0.5	Sandy loam, some gravel, trace cobble and organics, brown, moist				
MW-02 (downgradient)	MW-02A	0 - 0.15	Organics and rootlets, some sand and silt, blackish brown, saturated (water at surface)				
	MW-02B	0.4 – 0.5	Organics, sandy loam, some gravel, blackish brown, saturated				
MW-03 (downgradient)	MW-03A	0 - 0.15	Loamy sand, some angular gravel, trace organics, rootlets, brown, moist				

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
	MW-03B	0.4 – 0.5	Loamy sand, some gravel, trace organics, brown, saturated (water at 0.2 mbgs)
MW-04 (downgradient)	MW-04A	0 - 0.15	Loamy sand, some gravel, trace organics, brown, moist, rootlets
	MW-04B	0.4 – 0.5	Sandy loam, some gravel, trace organics, brown, saturated (water ay 0.46 mbgs)

## 8.2.3 Groundwater Sampling

Groundwater monitoring at the Tier II Soil Disposal Facility was conducted on 21 August 2019 and consisted of the inspection and groundwater sampling of four monitoring wells (MW-01, MW-02, MW-03 and MW-04). One field duplicate sample (MW-09) was collected from well MW-01. The following table outlines the groundwater sampling activities conducted at the Tier II Soil Disposal Facility.

Table 8-2: Summary of Work Conducted by Monitoring Well - Tier II Soil Disposal Facility

Monitoring Well ID	Observations	Number of Groundwater Samples Collected
MW-01 (upgradient)	Good condition	1 Parent +1 Duplicate
MW-02 (downgradient)	Ponded water approximately 0.1 m deep was observed around the well.	1
MW-03 (downgradient)	Good condition	1
MW-04 (downgradient)	Good condition	1

Monitoring well sampling logs are presented in **Appendix F**.

# 8.2.4 Thermal Monitoring

Four thermistors (VT-1, VT-2, VT-3 and VT-4) are present at the Tier II Soil Disposal Facility. Each of the thermistor installations was inspected and the data on each datalogger was downloaded. All four thermistor dataloggers were reinstalled at the site with new batteries and desiccants. The following table summarizes the 2019 thermal monitoring at the Tier II Soil Disposal Facility.

Table 8-3 Summary of 2019 Thermal Monitoring at Tier II Soil Disposal Facility

Thermistor ID	Observations/Notes
VT-1	No issues observed.
VT-2	No issues observed.
VT-3	An error was encountered when logger was connected to the field laptop. The cause of the error was suspected to be software related. Complete Memory Transfer was completed. Logger memory was then cleared and reprogrammed. Logger appeared functional upon departure.
VT-4	No issues observed.

Thermistor inspection reports were filled out for each of the installations and are presented in Appendix E.

## 8.3 Results of the Monitoring Program

The following Sections 8.3.1 through 8.3.4 summarize the results of the PIN-4 monitoring program at the Tier II Disposal Facility.

## 8.3.1 Visual Inspection

The visual inspection was conducted in compliance with Section 5.2 of the TOR and details are provided below in the following Sections 8.3.1.1 through 8.3.1.5. **Figure PIN-4.7A** presents the visual inspection findings and photographic locations.

## 8.3.1.1 Inspection Checklist

The visual inspection was completed as per the TOR and the checklist is included below.

Table 8-4: Visual Inspection Checklist - Tier II Soil Disposal Facility

SITE NAME: PIN-4 Byron Bay

LANDFILL DESIGNATION: Tier II Soil Disposal Facility

LANDFILL TYPE: Tier II

DATE OF INSPECTION: 21 August 2019 WEATHER CONDITIONS: Breezy and sunny.

DATE OF PREVIOUS INSPECTION: 14 August 2017

INSPECTED BY: Ryan Janzen

REPORT PREPARED BY: Ryan Janzen

The inspector represents to the best of their 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.

	Table 8-4: Visual Inspection Checklist – Tier II Soil Disposal Facility											
Checklist Item	Present (Yes/No)	Feature Number	Feature Location	GPS Coordinates  Northing/Easting  (Taken from Centre of Feature)	Length (m)	Width (m)	Depth (m)	Extent Relative to Landfill Surface	Description	Comparison with Historical Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)
Settlement	Υ	Α	SE corner, on slope.	7627931.270, 576471.485	3.2	1.3	0.1	<1%	Minor depression.	Consistent.	Acceptable.	TIILF_25, 26
Settlement	Υ	В	W crest.	7627958.732, 576374.198	1.5	1.0	0.1	<1%	Minor depression.	Larger than previously noted.	Acceptable.	TIILF_48, 49
Settlement	Υ	E1 E2	E crest, close to NE corner.	7627989.190, 576457.683 7627985.047, 576459.152	1.6 1.0	0.9 0.8	0.1 0.1	<1%	Minor depression. Potentially construction relics (grading).	Larger than previously noted.	Acceptable.	TIILF_13, 14 TIILF_15
Settlement	Υ	G	S crest, close to VT-4	7627923.089, 576404.197	1.8	0.9	0.1	<1%	Minor depression.	Larger than previously noted.	Acceptable.	TIILF_27, 28
Settlement	N	Н	Not observed.	NA	N	IA	NA	NA	Feature not observed.	Feature not observed.	Not observed.	TIILF_16, 17 (noted area)
Settlement	Y	L	W slope, midslope towards NW corner.	7627967.802, 576363.646	1.5	0.15	0.1	<1%	Minor linear depression. Appears to be fines infiltration.	NEW OBSERVATION.	Acceptable.	TIILF_57, 58
Erosion	Υ	С	E slope, towards SE corner.	7627960.739, 576462.831	2	0.05	0.05	<1%	Minor erosion.	Consistent.	Acceptable.	TIILF_19
Erosion	Υ	ı	E slope, towards SE corner.	7627953.814, 576466.520	5.5	0.05	0.05	<1%	Minor erosion.	Consistent.	Acceptable.	TIILF_20, 21
Lateral Movement	N											
Frost Action	N											
Sloughing	N											
Cracking	N											
Animal Burrows	N											
Vegetation Establishment	Υ	L	Landfill cap (entire surface).	7627957.551, 576418.068	525	50m²	NA	~45%	Vegetation cover.	Consistent.	Acceptable.	TIILF_3, 12, 16, 24
Staining	Υ	F	SE corner at toe of landfill, inside ponded water footprint.	7627921.326, 576497.649	15.	5m <sup>2</sup>	NA	<1%	Orange staining.	Larger than previously noted.	Acceptable.	TIILF_43, 44
Vegetation Stress	N											
Seepage Points (or) Ponded Water	Υ	D	SE corner, beside toe of landfill.	7627896.269, 576495.040	292	20m²	0.3	~25%	continuous body in the	Larger than previously noted. It is considered likely that this is due to the field observer's interpretation of what constitutes a 'water body' than any real change in size.	Acceptable.	TIILF_39, 47
Debris and/or Liner Exposed	N											

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	Table 8-4: Visual Inspection Checklist – Tier II Soil Disposal Facility											
Checklist Item	Present (Yes/No)	Feature Number	Feature Location	GPS Coordinates Northing/Easting (Taken from Centre of Feature)		Width (m)	Depth (m)	Extent Relative to Landfill Surface	Description	Comparison with Historical Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)
Presence &	Υ	MW-01 MW-02 MW-03	Monitoring wells outside landfill footprint.	7628015.951, 576447.513 7627906.329, 576508.331 7627879.436, 576435.366							Good exterior condition.	See Sampling Photos.
Condition of Monitoring Instruments		MW-04 VT-1 VT-2 VT-3 VT-4	N crest, towards NE corner. Landfill cap, towards E side. Landfill cap, towards W side. S crest, towards SW corner.	7627929.335, 576344.450 7627991.660, 576438.331 7627961.962, 576440.177 7627953.651, 576397.546 7627923.184, 576399.967					Monuments.	Consistent.		TIILF_1 TIILF_2 TIILF_3 TIILF_4
Features of Note/Other Relevant Observations (e.g., signs of activity, ruts)	Y	J	Landfill cap (entire surface).	7627957.551, 576418.068	525	0m²	NA	~45%	Rough grading – equipment track/blade marks, ridges and depression <10cm in height.	Consistent.	Acceptable.	TIILF_2, 3, 12, 24, 31, 52
Features of Note/Other Relevant Observations (e.g., signs of activity, ruts)	Y	К	Landfill cap, SW corner.	7627921.673, 576385.124	132	2m²	NA	~1%	Rough grading – equipment track/blade marks, ridges and depression >10cm in height.	NEW OBSERVATION.	Acceptable.	TIILF_4, 32

#### Notes:

<sup>-</sup> UTM Zone is 12 North for all GPS co-ordinates.

## 8.3.1.2 Preliminary Stability Assessment

The Preliminary Stability Assessment for the Tier II Soil Disposal Facility was conducted on 21 August 2019 as per the TOR and the results are provided below.

Table 8-5: Preliminary Stability Assessment – Tier II Soil Disposal Facility.

Feature	Severity Rating	Extent	
Settlement	Acceptable	Numerous	
Erosion	Acceptable	Isolated	
Lateral Movement	Not Observed	None	
Frost Action	Not Observed	None	
Sloughing	Not Observed	None	
Cracking	Not Observed	None	
Animal Burrows	Not Observed	None	
Vegetation Establishment	Acceptable	Extensive	
Staining	Acceptable	Isolated	
Vegetation Stress	Not Observed	None	
Seepage / Ponded Water	Acceptable	Isolated	
Debris and/or Liner Exposure	Not Observed	None	
Other	Acceptable	Extensive	
Overall Landfill Performance	Ассер	otable	

Note: please refer to Performance/Severity rating reference guide in Section 2.1.3.1 above.

# 8.3.1.3 Photographic Records

The detailed photographic record for the Tier II Soil Disposal Facility has been completed as per Section 5.5 of the TOR and is included as **Appendix H**. The Photographic Record contains an index of photographs collected; full sized photographs are contained in the separately appended CD/DVD-ROM. **Figure PIN-4.7A** illustrates the photograph locations and directions.

#### 8.3.1.4 Trend Analysis

A trend analysis was conducted with regards to observations made during the visual inspection of the Tier II Soil Disposal Facility. The following table outlines the results of the visual trend analysis. Features where no significant change was noted are not listed here.

Table 8-6: Visual Inspection Trends - Tier II Soil Disposal Facility

Checklist Item	Feature ID	Comparison with Historical Observations				
	В	Observed area has increased from 0.2 m <sup>2</sup> in 2017 to 1.5 m <sup>2</sup> in 2019.				
	E1	Observed area has increased from 0.8 m <sup>2</sup> in 2017 to 1.6 m <sup>2</sup> in 2019.				
Settlement	E2	Observed area has increased from 0.1 m <sup>2</sup> in 2017 to 0.8 m <sup>2</sup> in 2019.				
Settlement	G	Observed area has increased from 0.6 m <sup>2</sup> in 2014 to 1.5 m <sup>2</sup> in 2019.				
	Н	Not observed.				
	L	New observation.				
Staining F Observed area has increased from 0.45 m² in 2017 to 15.5 m² in 2019.		Observed area has increased from 0.45 m <sup>2</sup> in 2017 to 15.5 m <sup>2</sup> in 2019.				
Other	K	New observation.				

#### 8.3.1.5 Discussion of Results/Trends

A comparison of the visual inspection results of the 2017 and 2019 monitoring events at the Tier II Soil Disposal Facility indicates that most existing settlement features increased in size with one new feature (Feature L) of this type observed. Erosive features remain consistent, while staining at the SE corner of the landfill (Feature F) has increased significantly. The area of ponded water (Feature D) is shown to be larger than previously noted, though this is considered to be due to differences in the on-site interpretation of a 'water body', and not to any actual physical change (the surrounding area to the south of the landfill is marshy terrain, where individual 'water bodies' can be difficult to effectively define). Feature D is considered part of the landscape, not a feature of the landfill, but has been included as it directly abuts the landfill toe and to provide consistency with previous reporting. Feature J (ridges and depressions) was previously noted as a single feature; it has been expanded as these features occur across the entirety of the organic cover material. As this feature is a construction relic, it is considered unlikely that it has changed in size. Feature K is associated with previously noted Feature J but calls attention to the area immediately around VT-4/SW corner where the poor grading is rougher (ridges/depressions >10 cm in magnitude) than the rest of the cap area. The results of the visual inspection and the observed trends indicate that the performance of the landfill is acceptable.

## 8.3.2 Soil Sampling

Soil sampling of the Tier II Soil Disposal Facility was conducted on August 21, 2019. The soil sampling was conducted in compliance with Section 5.3.1 and 5.3.2 of the TOR and details are provided below in the following sections.

## 8.3.2.1 Laboratory Analytical Results

A total of nine soil samples (including one duplicate) were analysed from four soil sample locations at the Tier II Soil Disposal Facility and analysed for inorganic elements (arsenic, cadmium, chromium, cobalt, copper, nickel, and zinc), total PCBs, and Petroleum Hydrocarbons (PHC F1, F2, F3, and F4).

Current and historical analytical results are presented in **Table 6A** in the Tables section of this report immediately following the main text. The laboratory certificates of analysis and chain of custody forms are presented in **Appendix B** of this report. **Figure PIN-4.7B**, located at the end of this landfill section, presents a summary of current and historical soil analytical results

## 8.3.2.2 Summary of Soil Results

The soil results for 2019 are presented in the following table. The background and baseline mean are presented for information purposes. The discussions are focused on the comparison of the results to the BL+3SD.

Table 8-7: Evaluation of Results by Parameter – Tier II Soil Disposal Facility

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
Arsenic (As)	1.5	1.8	4.8	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cadmium (Cd)	1.0	1.0	1.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Chromium (Cr)	20.0	20.0	20.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cobalt (Co)	5.0	7.2	11.9	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Copper (Cu)	19.0	32.4	64.7	Downgradient samples from station MW-02 at surface and depth exceeded the BL+3SD at 96 and 110 mg/kg respectively. All upgradient and remaining downgradient results were below the BL+3SD
Lead (Pb)	10.0	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Nickel (Ni)	9.2	12.8	26.4	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Zinc (Zn)	16.1	26.5	54.7	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
PCBs (Total)	0.10	0.10	0.10	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F1 (C <sub>6</sub> -C <sub>10</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
F2 (C <sub>10</sub> -C <sub>16</sub> )	N/A	10.0	10.0	Downgradient samples from station MW-02 at surface and depth exceeded the BL+3SD at 14 and 25 mg/kg respectively. It should be noted that these PHC F2 exceedances are suspected to be caused by natural BOCs. All upgradient and remaining downgradient results were below the BL+3SD.
F3 (C <sub>16</sub> -C <sub>34</sub> )	N/A	50.0	50.0	Downgradient samples from station MW-02 at surface and depth exceeded the BL+3SD at 450 and 850 mg/kg respectively. It should be noted that all PHC F3 exceedances are suspected to be caused by natural BOCs. All upgradient and remaining downgradient results were below the BL+3SD.
F4 (C <sub>34</sub> -C <sub>50</sub> )	N/A	50.0	50.0	Downgradient samples from station MW-02 at surface and depth exceeded the BL+3SD at 130 and 230 mg/kg respectively. It should be noted that all PHC F4 exceedances are suspected to be caused by natural BOCs. All upgradient and remaining downgradient results were below the BL+3SD.

The results discussed in the previous table are presented on a series of graphs for each parameter in **Appendix D7**.

#### 8.3.2.3 Discussion of Soil Results

Upgradient samples at surface and depth were below the BL+3SD for all parameters.

Downgradient soil results were below the BL+3SD for all analytes with the exception of copper and PHC F2-F4 parameters. All copper exceedances at the downgradient stations were detected at station MW-02. The copper concentrations in the surface and at depth samples from station MW-02 exceeded the BL+3SD value of 64.7 at 96 mg/kg and 110 mg/kg respectively. Both concentrations represent new maximums for the landfill. However, baseline and background copper concentrations have been detected as high as 63 mg/kg and 74 mg/kg. As such, these copper exceedances may represent natural variability. Copper results should be examined again in the next monitoring event to determine if concentrations are continuing to increase.

Based on the organic material observed in the samples and a review of the sample's PHC F2, F3b and F4 concentrations, the PHC F2-F4 exceedances detected at the landfill are likely caused by natural biogenic organic compounds. Soils with biogenic organic compounds typically have PHC F2 concentrations less than 30 mg/kg and can have PHC F3 concentrations ranging up to 1430 mg/kg (predominantly in the PHC F3b range) and PHC F4 concentrations ranging up to 1580 mg/kg. As such, the PHC F2-F4 exceedances are not suspected to be an indication of contaminant migration from the landfill.

A trend evaluation for the Tier II Soil Disposal Landfill was not completed as part of the 2019 monitoring program as less than seven sampling events worth of soil data has been collected to date.

Overall, the landfill seems to be performing well. However, copper results should be examined again in the next monitoring event to determine if concentrations are continuing to increase.

## 8.3.3 Groundwater Sampling

## 8.3.3.1 Monitoring Well Sampling/Inspection Logs

As per Section 5.3.3.2 of the TOR, groundwater monitoring logs were filled out for each monitoring well. Monitoring well sampling logs are presented in **Appendix F**.

#### 8.3.3.2 Water Levels/Grounder Flow

Groundwater levels were measured and are presented in the following table.

Table 8-8: Summary of Groundwater Levels - Tier II Soil Disposal Facility

Monitoring Well ID	Monitoring Well Elevation (masl)	Water Level (mbtoc)	Well Stick up (m)	Water Level (mbgs)	Groundwater Elevation (masl)
MW-01	89.8	1.317	0.67	0.65	88.5
MW-02	85.2	0.525	0.64	-0.12	84.7
MW-03	84.7	0.726	0.55	0.18	84.0
MW-04	86.8	0.823	0.49	0.33	86.0

Note: masl = metres above sea level, mbtoc = metre below top of casing, mbgs = metres below ground surface

Based on the available groundwater and land elevation data, groundwater flow is generally assumed to flow in the south and southwesterly direction in the vicinity of the landfill. Groundwater elevations and contours are presented on **Figure PIN-4.7C** located at the end of this landfill section.

## 8.3.3.3 Groundwater Laboratory Analytical Results

A total of five groundwater samples (including one field duplicate) were collected at the Tier II Soil Disposal Facility and analysed for total inorganic elements (arsenic, cadmium, chromium, cobalt, copper, nickel, and zinc) and Petroleum Hydrocarbons (PHC F1, F2, F3, and F4).

Current and historical analytical results are presented in **Table 6B** in the tables section of this report immediately following the main text. The laboratory certificates of analysis and chain of custody forms are presented in **Appendix B** of this report. **Figure PIN-4.7C**, located at the end of this landfill section, presents a summary of current and historical groundwater analytical results.

#### 8.3.3.4 Summary of Groundwater Results

The groundwater results for 2019 are presented in the following table. The baseline mean is presented for information purposes. The discussions are focused on the comparison of the results to the BL+3SD.

Table 8-9: Evaluation of Groundwater Analytical Results - Tier II Soil Disposal Facility

Parameter	Baseline Mean	Baseline Mean+3SD	Discussion of Results
	(mg/L)	(mg/L)	
Arsenic (As)	0.0030	0.0030	All groundwater sample results were below the BL+3SD at downgradient locations.
Cadmium (Cd)	0.0010	0.0010	All groundwater sample results were below the BL+3SD at downgradient locations.
Chromium (Cr)	0.0050	0.0050	Upgradient parent and duplicate sample from MW-01 exceeded the BL+3SD at 0.0210 and 0.0180 mg/L respectively. In addition, the downgradient sample from MW-04 exceeded the BL+3SD at 0.0120 mg/L. All remaining downgradient results were below the BL+3SD.
Cobalt (Co)	0.0199	0.0855	All groundwater sample results were below the BL+3SD at downgradient locations.
Copper (Cu)	0.0141	0.0502	All groundwater sample results were below the BL+3SD at downgradient locations.
Lead (Pb)	0.0100	0.0100	All groundwater sample results were below the BL+3SD at downgradient locations.
Nickel (Ni)	0.0928	0.4423	All groundwater sample results were below the BL+3SD at downgradient locations.
Zinc (Zn)	1.28	6.41	All groundwater sample results were below the BL+3SD at downgradient locations.
F1 (C <sub>6</sub> -C <sub>10</sub> )	0.05	0.05	All groundwater sample results were below the BL+3SD at downgradient locations.
F2 (C <sub>10</sub> -C <sub>16</sub> )	0.5	0.5	All groundwater sample results were below the BL+3SD at downgradient locations.
F3 (C <sub>16</sub> -C <sub>34</sub> )	1.0	1.0	All groundwater sample results were below the BL+3SD at downgradient locations.
F4 (C <sub>34</sub> -C <sub>50</sub> )	1.0	1.0	All groundwater sample results were below the BL+3SD at downgradient locations.

The results discussed in the previous table are presented on a series of graphs for each parameter in **Appendix D8**.

#### 8.3.3.5 Discussion of Groundwater Results

All upgradient and downgradient groundwater results were below the BL+3SD for all parameters except chromium. The chromium concentrations detected in both the parent sample and duplicate sample collected from upgradient well MW-01 (0.0210 mg/L and 0.0180 mg/L respectively) exceeded the BL+3SD value (0.0050 mg/L) and were greater than three times the baseline mean (0.0150 mg/L). However, the 2019 chromium results at upgradient well MW-01 are among the lowest result measured at the well since the first sample was collected in 2014. The maximum upgradient chromium concentration recorded at upgradient well MW-01 was 0.5520 mg/L in 2016. In addition, exceedances of chromium have occurred

frequently at both the upgradient and downgradient wells since the wells were first installed. The high frequency of these exceedances is due in part to the fact that the baseline mean for chromium at this landfill was set to the analytical detection limit and no standard deviation was calculated. Based on this and the historical chromium exceedances at upgradient well MW-01, the concentration of chromium detected at downgradient well MW-04 (0.0120 mg/L) is not suspected to be an indication of contaminant migration from the landfill.

A trend evaluation for the Tier II Soil Disposal Facility was not completed as part of the 2019 monitoring program as less than seven sampling events worth of groundwater data has been collected to date.

Overall, the landfill seems to be performing well at this time based on the existing groundwater data.

## 8.3.4 Thermal Monitoring

#### 8.3.4.1 Thermistor Annual Maintenance Reports

As per Section 5.4.3 of the TOR, thermistor inspection logs were filled out for thermistors as provided in **Appendix E**.

## 8.3.4.2 Summary of Findings from Annual DEW Line Thermal Reports

Raw thermistor data from our 2019 monitoring session was sent to DND for reference and review as part of the PIN-4 draft Field Progress report. No analysed thermistor data was provided to Arcadis for inclusion into the 2019 monitoring report.

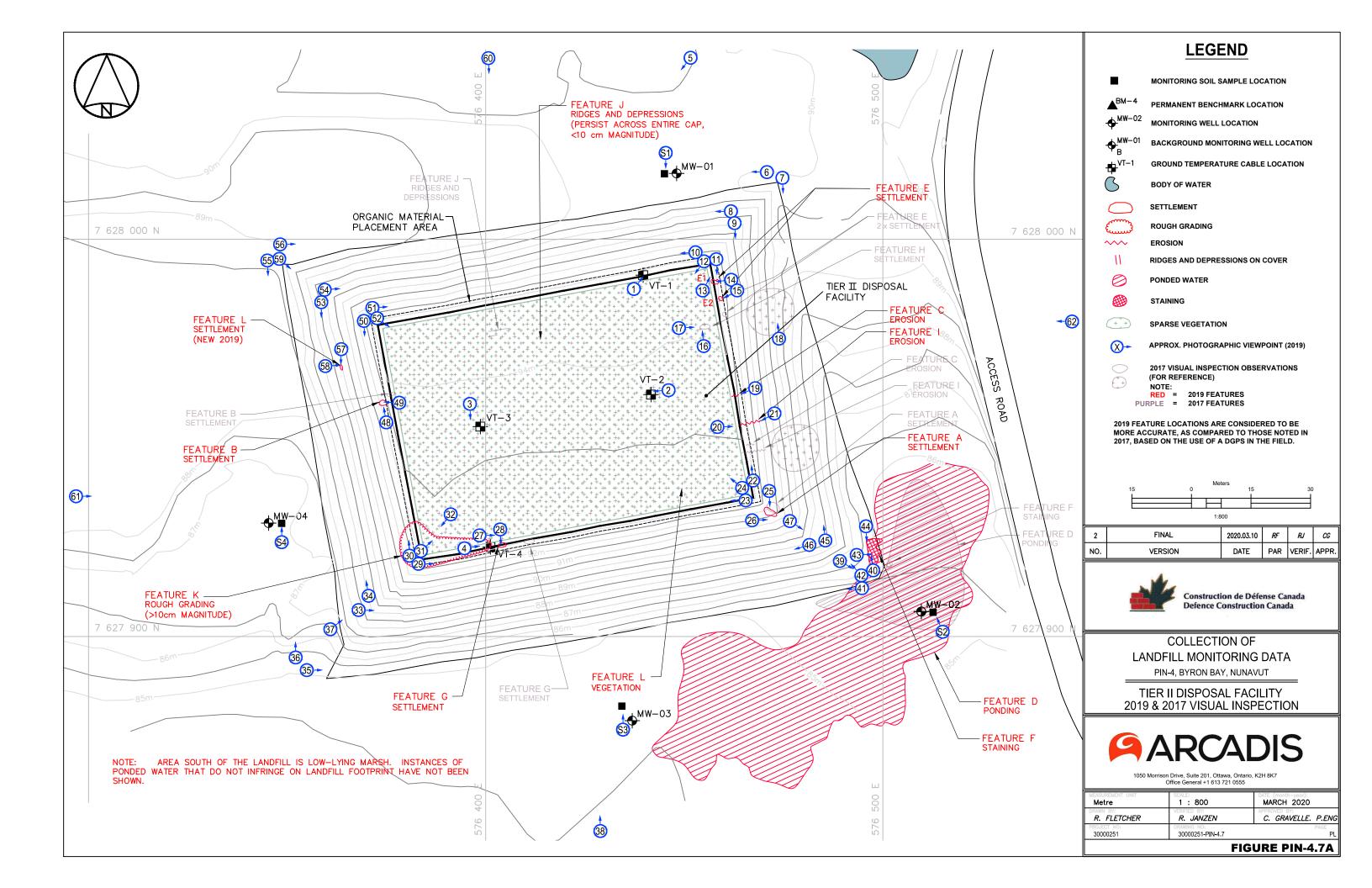
# 8.4 Overall Landfill Performance, Conclusions and Recommendations

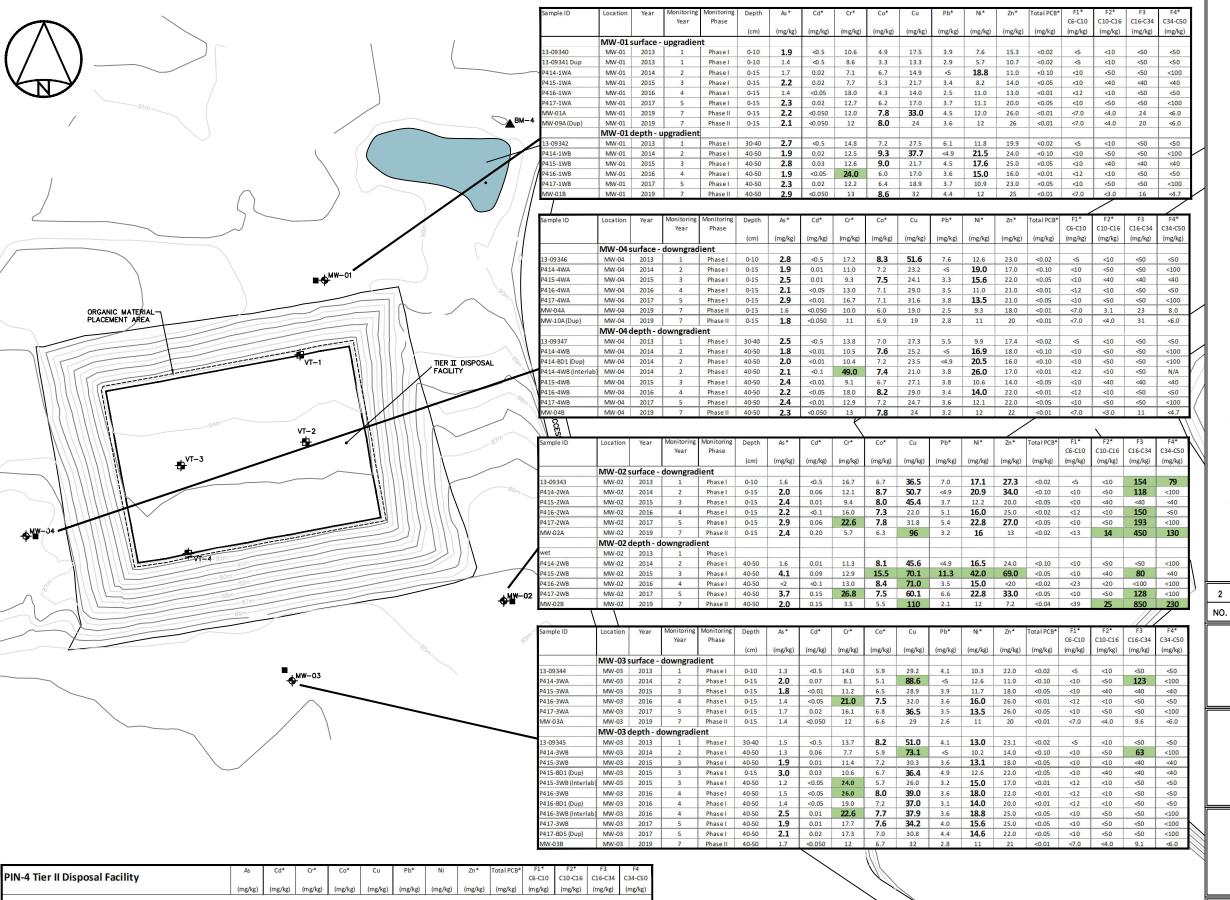
As the 2019 monitoring program is only the sixth monitoring program to have been conducted at the Tier II Disposal Facility, trends in soil and groundwater concentrations have not been evaluated. However, based on the limited chemical data collected to date and observations made during the 2019 field program, the landfill appears to be performing as intended with no apparent indications of contaminant migration.

Based on this review, it is recommended to continue the long-term monitoring of soils and groundwater as planned and the performance of the landfill be re-evaluated once the results from seven monitoring events of data are available. In addition, copper results should be examined closely in the next monitoring event to determine if concentrations are increasing at downgradient soil sampling stations.

Based on the results of the visual inspection, the Tier II Soil Disposal Facility performance is acceptable. No remedial work or deviations from the monitoring plan are recommended at this time.

Based on the results of the 2019 monitoring program, the overall performance of the Tier II Soil Disposal Facility is acceptable.





1.5 | 1.0 | 20.0 | 5.0 | 19.0 | 10.0 | 9.2 | 16.1 | 0.10 | N/A | N/A | N/A | N/A

4.8 1.0 20.0 11.9 64.7 10.0 26.4 54.7 0.10 10.0 10.0 50.0 50.0

 
 1.0
 20.0
 7.2
 32.4
 10.0
 12.8
 26.5
 0.10
 10.0
 10.0
 50.0
 50.0
 1.0 0.0 0.0 1.6 10.8 0.0 4.5 9.4 0.00 0.0 0.0 0.0 0.0

1.8

f baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.

Background Data - Arithmetic Mean

eline Data - Arithmetic Mean

seline Data - Standard Deviation

### **LEGEND**

MONITORING SOIL SAMPLE LOCATION

PERMANENT BENCHMARK LOCATION

MONITORING WELL LOCATION

BACKGROUND MONITORING WELL LOCATION

GROUND TEMPERATURE CABLE LOCATION

**BODY OF WATER** 

Legend for Tables

sample exceeds baseline mean sample exceeds baseline mean + 3x SD not analyzed



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Construction de Défense Canada **Defence Construction Canada** 

**COLLECTION OF** LANDFILL MONITORING DATA

PIN-4, BYRON BAY, NUNAVUT

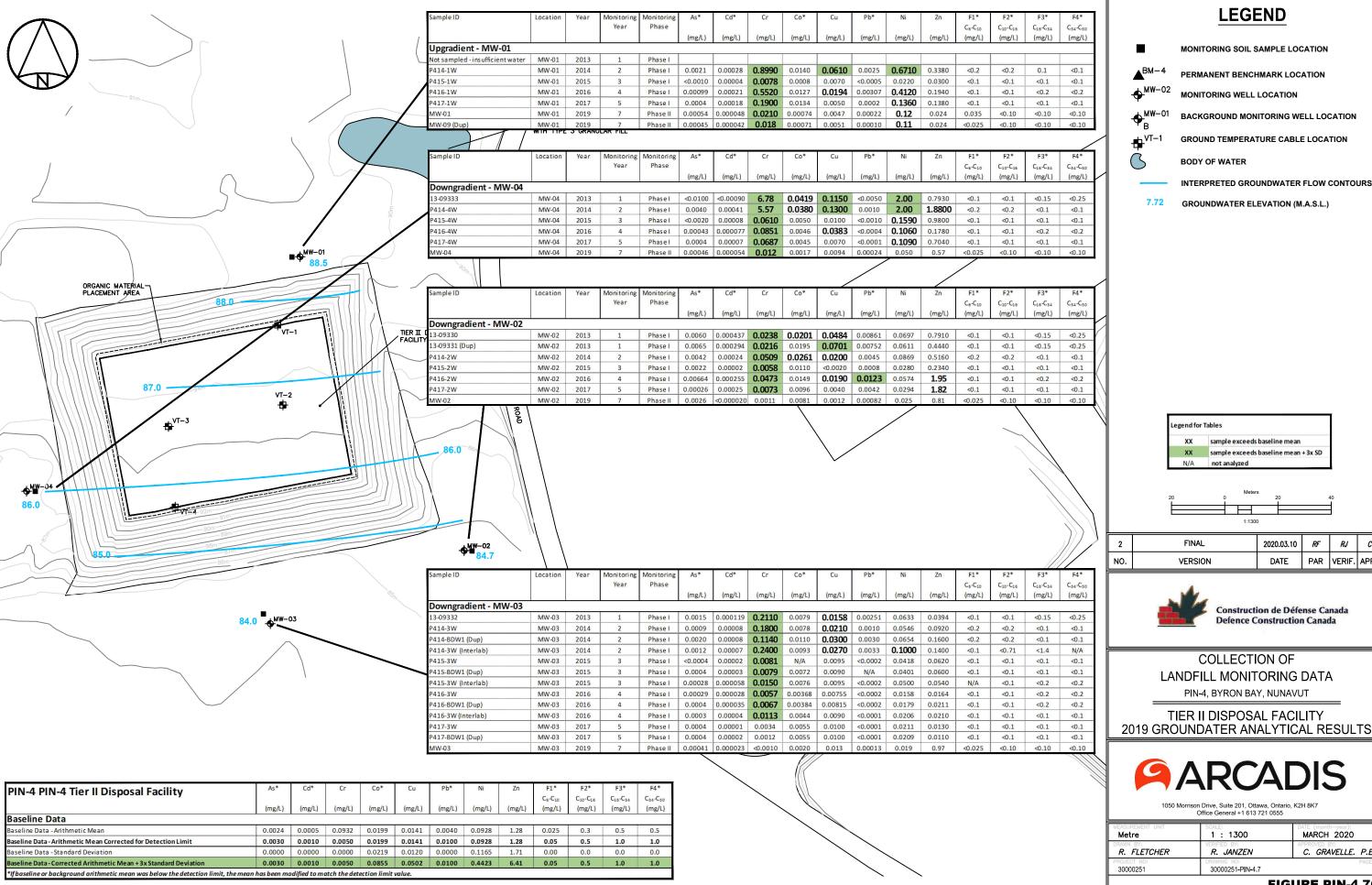
TIER II DISPOSAL FACILITY 2019 SOIL ANALYTICAL RESULTS



on Drive, Suite 201, Ottawa, Ontario, K2H 8K7 Office General +1 613 721 0555

MEASUREMENT UNIT Metre	SCALE: 1 : 1300	DATE (month-year): MARCH 2020
R. FLETCHER	VERIFIED BY: R. JANZEN	C. GRAVELLE. P.ENG
PROJECT NO:	DRAWING NO: 20000264 DIN 4.7	PAGE

**FIGURE PIN-4.7B** 

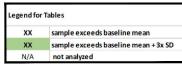


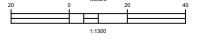
MONITORING SOIL SAMPLE LOCATION

BACKGROUND MONITORING WELL LOCATION

GROUND TEMPERATURE CABLE LOCATION

GROUNDWATER ELEVATION (M.A.S.L.)





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NO.	VERSION	DATE	PAR	VERIF.	APPR.

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LANDFILL MONITORING DATA

TIER II DISPOSAL FACILITY 2019 GROUNDATER ANALYTICAL RESULTS



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FIGURE PIN-4.7C

## 9 PIN-4: AIRSTRIP LANDFILL

# 9.1 Landfill Description

The Airstrip Landfill is located south of the airstrip, north of the access road to the beach. The landfill consists of one lobe and was used only briefly during the 1960's. As a consequence of its older age and limited use, the landfill area was overgrown and densely vegetated with willows, grass, and moss. Overall drainage from the Airstrip Landfill area is to the south and southeast and limited by the road and the former hangar pad.

The remediation of this landfill involved the removal of surface debris, the excavation of surface contaminated soil, and the placement of an additional 0.75 m of clean fill over the landfill surface.

The long-term monitoring plan for the Airstrip Landfill consists of visual monitoring and periodic collection of soil samples. The landfill layout, visual observations and photographic locations are presented on **Figures PIN-4.8A** located at the end of this section.

## 9.2 Summary of Work Conducted

## 9.2.1 Visual Inspection

A visual inspection was completed at the Airstrip Landfill on 21 August 2019. The visual inspection of the landfill was completed with no deviations from the accepted work plan.

### 9.2.2 Soil Sampling

Soil sampling at the Airstrip Landfill was conducted on 23 August 2019 and consisted of the collection of six soil samples from three soil sample stations (P4-22, P4-23 and P4-24). In addition, one blind field duplicate sample (P4-27A) was collected at surface from station P4-22A. The following table outlines the soil sampling activities conducted at the Airstrip Landfill.

Table 9-1: Summary of Work Conducted by Soil Sampling Location – Airstrip Landfill

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
P4-22 (upgradient)	P4-22A	0 - 0.15	Loamy sand, some gravel and cobble, trace organics, rootlets, greyish brown, moist
	P4-22B	0.4 - 0.5	Loamy sand, some gravel and cobble, greyish brown, moist
P4-23 (downgradient)	P4-23A	0 - 0.15	Organics, some sandy Loam and gravel, rootlets, dark brown, saturated (water at surface)
	P4-23B	0.4 - 0.5	Loamy sand, some gravel, trace organics, grey, saturated

Sample Location	Sample ID	Sample Depth (mbgs)	Notes
P4-24 (downgradient)	P4-24A	0 - 0.15	Organics, some sandy loam and gravel, rootlets, dark brown, saturated (water at surface)
	P4-24B	0.4 - 0.5	Loamy sand, some organics and cobbles, trace gravel, grey, saturated

## 9.2.3 Groundwater Sampling

No groundwater monitoring wells are present at the Airstrip Landfill; therefore, no groundwater sampling was performed as part of the 2019 monitoring program.

### 9.2.4 Thermal Monitoring

No thermistors are present at the Airstrip Landfill; therefore, no thermal monitoring was performed as part of the 2019 monitoring program.

# 9.3 Results of the Monitoring Program

### 9.3.1 Visual Inspection

The visual inspection was conducted in compliance with Section 5.2 of the TOR and details are provided below in the following Sections 9.3.1.1 through 9.3.1.5. **Figure PIN-4.8A** presents the visual inspection findings and photographic locations.

### 9.3.1.1 Inspection Checklist

The visual was completed as per the TOR and the visual inspection checklist is included below.

Table 9-2: Visual Inspection Checklist - Airstrip Landfill

SITE NAME: PIN-4 Byron Bay

LANDFILL DESIGNATION: Airstrip Landfill

LANDFILL TYPE: Regraded

DATE OF INSPECTION: 21 August 2019

WEATHER CONDITIONS: Calm, overcast and cool.

DATE OF PREVIOUS INSPECTION: 14 August 2017

INSPECTED BY: Ryan Janzen

REPORT PREPARED BY: Ryan Janzen

The inspector represents to the best of their 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.

### LONG-TERM LANDFILL MONITORING - PIN-4 FORMER DEW LINE SITE

	Table 9-2: Visual Inspection Checklist – Airstrip Landfill													
Checklist Item	Present (Yes/No)	Feature Number		Feature Location	GPS Coordinates Northing/Easting (Taken from Centre of Feature)	Length (m)	Width (m)	Depth (m)	Extent Relative to Landfill Surface	Description	Comparison with Historical Observations	Severity Rating/ Additional Comments	Photographic Records (photo reference, location, view point & direction, feature of note, scale)	
Settlement	Υ	Α	Landfill cap, SE area.	7627907.811, 576942.616	2.1	1.1	0.15	<1%	Minor depression.	Larger than previously noted.	Acceptable.	ALF_15, 16		
Erosion	N	В	Not observed.	NA	NA	NA	NA	NA	Feature not observed.	Feature not observed.	Not observed.	ALF_19, 20 (noted area)		
Lateral Movement	N													
Frost Action	N													
Sloughing	N													
Cracking	Υ	С	E side crest, at midpoint.	7627901.069, 576948.118	2.6	0.01	0.0	<1%	Infilled crack.	Consistent.	Acceptable.	ALF_17, 18		
Cracking	N	F	Not observed.	NA	NA	NA	NA	NA	Feature not observed.	Feature not observed.	Not observed.	ALF_21 (area noted)		
Animal Burrows	N													
Vegetation Establishment	Υ	G	Entire structure.	7627911.020, 576932.641	Entire	lobe.	NA	100%	Sparse vegetation.	Larger than previously noted.	Acceptable.	ALF_12, 19		
Staining	Υ	Е	SW corner, at toe.	7627907.136, 576909.045	1.2	0.3	NA	<1%	Orange staining.	Larger than previously noted.	Acceptable.	ALF_13, 14		
Vegetation Stress	N													
Seepage Points (or) Ponded Water	Y	D1 D2	Adjacent SE corner of landfill.  Adjacent SW corner of landfill.	7627878.940, 576945.851 7627899.344, 576906.340		m² Dm²	0.3 0.3	~5% ~15%	Ponded water.	Larger than previously noted.	Acceptable.	ALF_5 ALF_11, 13		
Debris and/or Liner Exposed	N													
Presence & Condition of Monitoring Instruments	N													
Features of Note/Other Relevant Observations (e.g., signs of activity, ruts)	N													

### Notes:

- UTM Zone is 12 North for all GPS co-ordinates.

## 9.3.1.2 Preliminary Stability Assessment

The Preliminary Stability Assessment for the Airstrip Landfill was conducted on 23 August 2019 as per the TOR and the results are provided below.

Table 9-3: Preliminary Stability Assessment - Airstrip Landfill

Feature	Severity Rating	Extent			
Settlement	Acceptable	Isolated			
Erosion	Not Observed	None			
Lateral Movement	Not Observed	None			
Frost Action	Not Observed	None			
Sloughing	Not Observed	None			
Cracking	Acceptable	Isolated			
Animal Burrows	Not Observed	None			
Vegetation Establishment	Acceptable	Extensive			
Staining	Acceptable	Isolated			
Vegetation Stress	Not Observed	None			
Seepage / Ponded Water	Acceptable	Occasional			
Debris and/or Liner Exposure	Not Observed	None			
Other	Not Observed	None			
Overall Landfill Performance	Ассер	otable			

Note: please refer to Performance/Severity rating reference guide in Section 2.1.3.1 above.

### 9.3.1.3 Photographic Records

The detailed photographic record for the Airstrip Landfill has been completed as per Section 5.5 of the TOR and is included as **Appendix H**. The Photographic Record contains an index of photographs collected; full sized photographs are contained as a separately appended CD/DVD-ROM. **Figure PIN-4.8A** illustrates the photograph locations and directions.

### 9.3.1.4 Trend Analysis

A trend analysis was conducted with regards to observations made during the visual inspection of the Airstrip Landfill. The following outlines the results of the visual trend analysis. Features where no significant change was observed are not included here.

Table 9-4: Visual Inspection Trends – Airstrip Landfill

Checklist Item	Feature Number	Comparison with Historical Observations
Settlement	А	Observed area has increased from 0.28 m <sup>2</sup> in 2017 to 1.9 m <sup>2</sup> in 2019.
Erosion	В	Not observed.
Cracking	F	Not observed.
Vegetation Establishment	G	Coverage appears to have increased since 2017 (no measurements previously given).
Staining	E	Observed area has increased from 0.2 m <sup>2</sup> in 2017 to 0.4 m <sup>2</sup> in 2019.
Ponded Water	D1 D2	Size appears to have increased since 2017 (no measurements previously given).

### 9.3.1.5 Discussion of Results/Trends

A comparison of the visual inspection results of the 2017 and 2019 monitoring events at the Airstrip Landfill indicates that the single settlement feature (Feature A) has expanded. The erosive feature (Feature B) and tension crack (Feature F) were not observed in 2019. The entire landfill structure is now vegetated sparsely; though there were no dimensions given from the 2017 program a comparison of observed areas against previous figures indicate a larger area in 2019. Both the ponded water features (Features D1 and D2) and the accompanying staining (Feature E) have increased in size. The ponded water features are considered part of the landscape (marshy terrain in the area), not features of the landfill, but have been included as they directly abut the landfill toe and to provide consistency with previous reporting. The results of the visual inspection and the observed trends indicate that the performance of the landfill is acceptable.

### 9.3.2 Soil Sampling

Soil sampling of the Airstrip Landfill was conducted on 23 August 2019. The soil sampling was conducted in compliance with Section 5.3.1 and 5.3.2 of the TOR and details are provided below in the following sections.

### 9.3.2.1 Laboratory Analytical Results

A total of seven soil samples (including one field duplicate) were collected from three soil sample stations at the Airstrip Landfill and analysed for inorganic elements (arsenic, cadmium, chromium, cobalt, copper, nickel, and zinc), total PCBs, and Petroleum Hydrocarbons (PHC F1, F2, F3, and F4).

Current and historical analytical results are presented in **Table 7** in the tables section of this report immediately following the main text. The laboratory certificates of analysis and chain of custody forms are presented in **Appendix B** of this report. **Figure PIN-4.8B**, located at the end of this landfill section, presents a summary of current and historical soil analytical results.

# 9.3.2.2 Summary of Soil Results

The soil results for 2019 are presented in the following table. The background and baseline mean are presented for information purposes. The discussions are focused on the comparison of the results to the BL+3SD.

Table 9-5: Evaluation of Results by Parameter – Airstrip Landfill

Parameter	Background	Baseline	Baseline	Discussion of Results
	(mg/kg)	Mean (mg/kg)	Mean+3SD (mg/kg)	
Arsenic (As)	1.5	1.6	4.1	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cadmium (Cd)	1.0	1.0	1.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Chromium (Cr)	20.0	20.0	20.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Cobalt (Co)	5.0	5.3	11.5	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Copper (Cu)	19.0	24.2	42.1	Downgradient sample from station P4-23 at surface and P4-24 at depth exceeded the BL+3SD at 46 and 49 mg/kg respectively. All remaining upgradient and downgradient results were below the BL+3SD
Lead (Pb)	10.0	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
Nickel (Ni)	9.2	12.7	23.3	Downgradient sample from station P4-24 at depth exceeded the BL+3SD at 26 mg/kg. All upgradient and remaining downgradient results were below the BL+3SD.
Zinc (Zn)	16.1	21.7	55.6	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
PCBs (Total)	0.10	0.10	0.10	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F1 (C <sub>6</sub> -C <sub>10</sub> )	N/A	10.0	10.0	All soil sample results were below the BL+3SD at upgradient and downgradient locations.
F2 (C <sub>10</sub> -C <sub>16</sub> )	N/A	10.0	10.0	The downgradient sample from station P4-23 at surface exceeded the BL+3SD at 12 mg/kg but is suspected to be caused by natural BOCs. All upgradient and remaining downgradient results were below the BL+3SD
F3 (C <sub>16</sub> -C <sub>34</sub> )	N/A	50.0	50.0	Downgradient samples from sample from P4-23 at surface and P4-24 at surface and depth exceeded the BL+3SD at 570 mg/kg, 120 mg/kg and 120 mg/kg. respectively. It should be noted that these three PHC F3 exceedances are suspected to be caused by natural BOCs. All upgradient and remaining downgradient results were below the BL+3SD

Parameter	Background (mg/kg)	Baseline Mean (mg/kg)	Baseline Mean+3SD (mg/kg)	Discussion of Results
F4 (C <sub>34</sub> -C <sub>50</sub> )	N/A	50.0	50.0	The downgradient sample from P4-23 at surface exceeded the BL+3SD at 150 mg/kg but is suspected to be caused by natural BOCs. All upgradient and remaining downgradient results were below the BL+3SD

The results discussed in the previous table are presented on a series of graphs for each parameter in **Appendix D9**.

### 9.3.2.3 Discussion of Soil Results

Upgradient samples at surface and depth were below the BL+3SD for all parameters.

Downgradient soil results were below the BL+3SD for all analytes with the exception of copper, nickel, and PHC F2-F4 parameters. The copper concentrations in the surface sample from station P4-23 (46 mg/kg) and the at depth sample from station P4-24 (49 mg/kg) exceeded the BL+3SD value of 42.1 mg/kg. However, baseline and background copper concentrations at the landfill have been detected as high as 40 mg/kg and 74 mg/kg respectively. As such, these copper exceedances likely represent natural variability are not suspected to be an indication of contaminant migration from the landfill.

The nickel concentration in the at depth sample from station P4-24 (26 mg/kg) slightly exceeded the BL+3SD value of 23.3 mg/kg. In addition, this exceedance represents a new maximum for nickel concentrations at the landfill. Historically, nickel concentrations at the landfill have only been detected as high as 23 mg/kg. However, based on the low magnitude of the nickel exceedance, the concentration detected at station P4-24 could represent natural variability. As such, the nickel concentration is not suspected to be an indication of contaminant migration from the landfill.

Based on the organic material observed in the samples and a review of the sample's PHC F2, F3b and F4 concentrations, the PHC F2-F4 exceedances detected at the landfill are likely caused by natural biogenic organic compounds. Soils with biogenic organic compounds typically have PHC F2 concentrations less than 30 mg/kg and can have PHC F3 concentrations ranging up to 1430 mg/kg (predominantly in the PHC F3b range) and PHC F4 concentrations ranging up to 1580 mg/kg. As such, the PHC F2-F4 exceedances are not suspected to be an indication of contaminant migration from the landfill.

A trend evaluation for the Airstrip Landfill was not completed as part of the 2019 monitoring program as less than seven sampling events worth of soil data has been collected to date.

Overall, the landfill seems to be performing well. However, copper and nickel results should be examined again in the next monitoring event to determine if concentrations are continuing to increase

### 9.3.3 Groundwater Sampling

No groundwater monitoring wells are present at the Airstrip Landfill; therefore, no groundwater sampling or analysis was conducted as part of the 2019 monitoring program.

### 9.3.4 Thermal Monitoring

No thermistors are present at the Airstrip Landfill; therefore, no thermal monitoring was conducted as part of the 2019 monitoring program.

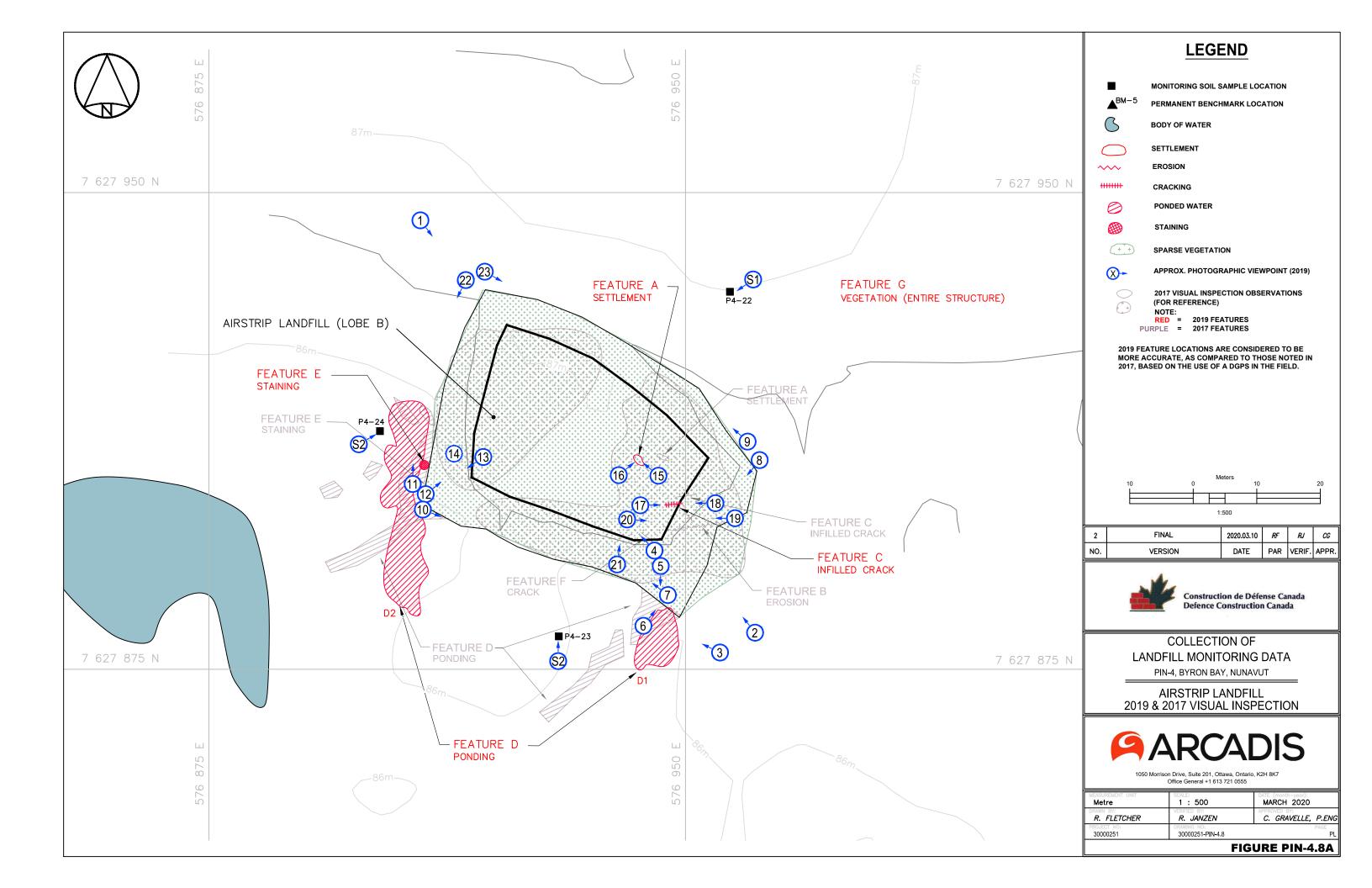
# 9.4 Overall Landfill Performance, Conclusions and Recommendations

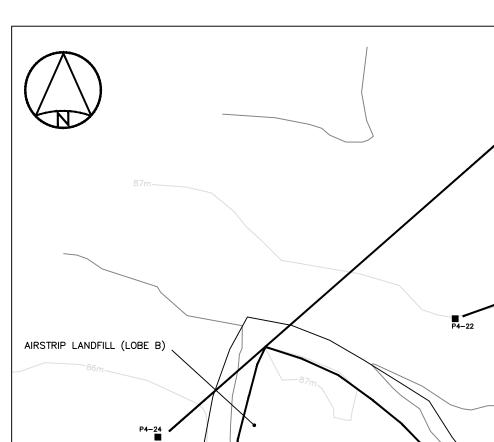
As the 2019 monitoring program is only the fourth monitoring program to have been conducted at the Airstrip Landfill, trends in soil and groundwater concentrations have not been evaluated. However, based on the limited chemical data collected to date and observations made during the 2019 field program, the landfill appears to be performing as intended with no apparent indications of contaminant migration.

Based on this review, it is recommended to continue the long-term monitoring of soils as planned and the performance of the landfill be re-evaluated once the results from seven monitoring events of data are available. In addition, copper and nickel results should be examined closely in the next monitoring event to determine if concentrations are increasing at downgradient soil sampling stations.

Based on the results of the visual inspection, the Airstrip Landfill performance is acceptable. No remedial work or deviations from the monitoring plan are recommended at this time.

Based on the results of the 2019 monitoring program, the overall performance of the Airstrip Landfill is acceptable.





Sample ID	Location	Year	Monitoring	Monitoring	Depth	As*	Cd*	Cr*	Co*	Cu	Pb*	Ni *	Zn*	Total PCB*	F1*	F2*	F3	F4*
			Year	Phase											C6-C10	C10-C16	C16-C34	C34-C50
					(cm)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)								
	P4-22 su	rface - u	pgradient															
13-09359	P4-22	2013	1	Phasel	0-10	1.4	<0.5	8.1	3.1	21.9	3.8	6.5	32.1	<0.02	<5	<10	140	113
P415-22A	P4-22	2015	3	Phasel	0-15	1.5	0.35	5.4	3.0	25.2	3.6	6.4	31.0	<0.05	<10	<40	49	<40
P417-22A	P4-22	2017	5	Phasel	0-15	3.1	0.05	11.9	6.0	14.1	3.5	9.5	22.0	<0.05	<10	<50	<50	<100
P4-22A	P4-22	2019	7	Phase II	0-15	1.7	<0.050	10.0	5.9	13.0	2.7	8.7	15.0	<0.01	<7.0	<3.0	11	<4.7
P4-27A (Dup)	P4-22	2019	7	Phase II	0-15	1.7	<0.050	10	6.4	14	3.0	9.2	16	<0.01	<7.0	<4.0	16	<6.0
	P4-22 de	pth - up	gradient															
13-09360	P4-22	2013	1	PhaseI	30-40	2.8	<0.5	11.8	4.7	15.0	4.8	8.3	17.6	<0.02	<5	<10	<50	<50
13-09361	P4-22	2013	1	Phasel	30-40	2.6	<0.5	11.0	4.4	17.1	4.5	7.9	16.5	<0.02	<5	<10	<50	<50
P415-22B	P4-22	2015	3	Phasel	40-50	3.0	0.05	10.4	5.8	18.2	4.6	10.1	13.0	<0.05	<10	<40	<40	<40
P417-22B	P4-22	2017	5	Phasel	40-50	2.8	0.11	9.8	5.0	21.6	3.3	8.6	23.0	<0.05	<10	<50	67	<100
P4-22B	P4-22	2019	7	Phase II	40-50	1.7	<0.050	10	6.2	12	2.9	9.3	15	<0.01	<7.0	<4.0	9.2	<6.0

													,			-		
Sample ID	Location	Year	Monitoring	Monitoring	Depth	As*	Cd*	Cr*	Co*	Cu	Pb*	Ni*	Zn*	Total PCB*	F1*	F2*	F3	F4*
			Year	Phase											C6-C10	C10-C16	C16-C34	C34-C50
					(cm)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)								
	P4-24 su	rface - d	owngradie	nt														
13-09364	P4-24	2013	1	Pha se I	0-10	1.7	<0.5	16.7	7.5	20.7	3.9	14.1	20.9	<0.02	<5	<10	<50	<50
P415-24A	P4-24	2015	3	Pha se I	0-15	1.9	0.01	12.2	7.2	16.8	3.8	12.7	16.0	<0.05	<10	<40	<40	<40
P417-24A	P4-24	2017	5	Pha se I	0-15	2.3	0.03	20.3	6.9	24.1	3.4	17.7	21.0	<0.05	<10	<50	<50	<100
P4-24A	P4-24	2019	7	Phase II	0-15	1.6	<0.10	3.8	2.2	19	3.8	9.9	21	<0.04	<37	<12	120	<19
	P4-24 de	pth - do	wngradier	ıt														
13-09365	P4-24	2013	1	Pha se I	30-40	1.6	<0.5	14.6	6.7	20.6	3.7	13.1	20.5	<0.02	<5	<10	<50	<50
P415-24B	P4-24	2015	3	Phase I	40-50	2.3	0.02	12.9	7.2	21.0	4.1	13.3	18.0	<0.05	<10	<40	<40	<40
P417-24B	P4-24	2017	5	Phase I	40-50	2.0	0.02	16.6	5.1	18.3	3.6	15.0	17.0	<0.05	<10	<50	<50	<100
P4-24B	P4-24	2019	7	Phase II	40-50	1.8	0.15	4.8	3.6	49	3.8	26	22	<0.03	<34	<15	120	26

Sample ID	Location	Year	Monitoring	Monitoring	Depth	As*	Cd*	Cr*	Co*	Cu	Pb*	Ni*	Zn*	Total PCB*	F1*	F2*	F3	F4 *
			Year	Phase											C6-C10	C10-C16	C16-C34	C34-C50
					(cm)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)								
	P4-23 su	rface - d	owngradie	nt														
13-09362	P4-23	2013	1	PhaseI	0-10	1.4	<0.5	14.9	5.2	19.0	4.5	11.4	16.3	<0.02	<5	<10	<50	<50
P415-23A	P4-23	2015	3	PhaseI	0-15	1.1	0.20	3.2	3.0	21.9	1.8	11.0	7.0	<0.05	<10	<40	133	46
P417-23A	P4-23	2017	5	PhaseI	0-15	1.8	0.03	14.1	5.7	22.6	3.5	12.4	19.0	<0.05	<10	<50	<50	<100
P4-23A	P4-23	2019	7	Pha se II	0-15	<1.0	0.28	4.7	2.6	46	1.2	18	6.4	<0.04	<39	12	570	150
	P4-23 de	pth - do	wngradien	t														
13-09363	P4-23	2013	1	PhaseI	30-40	1.3	<0.5	14.9	5.2	20.9	4.4	12.2	16.8	<0.02	<5	<10	<50	<50
P415-23B	P4-23	2015	3	PhaseI	40-50	1.6	0.05	12.6	5.0	25.3	4.0	12.6	14.0	<0.05	<10	<40	45	<40
P415-BD7 (Dup)	P4-23	2015	3	PhaseI	40-50	1.6	0.07	11.7	4.7	29.0	3.7	14.0	14.0	<0.05	<10	<40	42	<40
P415-23B (Interlab)	P4-23	2015	3	PhaseI	40-50	<1	0.051	12.0	4.5	26.0	3.5	11.0	15.0	<0.01	<12	<10	66	<50
P417-23B	P4-23	2017	5	Phasel	40-50	1.6	0.05	13.5	5.0	25.0	3.5	13.8	17.0	<0.05	<10	<50	<50	<100
P417-23B (Dup)	P4-23	2017	5	Phasel	40-50	1.7	0.05	17.2	5.2	23.7	3.8	15.2	17.0	<0.05	<10	<50	<50	<100
P4-23B	P4-23	2019	7	Pha se II	40-50	1.3	<0.050	12	4.9	15	2.8	9.7	16	<0.01	<7.0	<4.0	21	<6.0

# Legend for Tables XX sample exceeds baseline mean XX sample exceeds baseline mean + 3x SD

**LEGEND** 

MONITORING SOIL SAMPLE LOCATION

BODY OF WATER



2	FINAL	2020.03.10	RF	RJ	CG
NO.	VERSION	DATE	PAR	VERIF.	APPR



# COLLECTION OF LANDFILL MONITORING DATA

PIN-4, BYRON BAY, NUNAVUT

AIRSTRIP LANDFILL 2019 SOIL ANALYTICAL RESULTS



	Office General +1 613 721 0	555
IIT	SCALE: 1:700	DATE (month—year MARCH 20

Metre	1 : 700	MARCH 2020
R. FLETCHER	VERIFIED BY: R. JANZEN	C. GRAVELLE, P.ENG
PROJECT NO: 30000251	30000251-PIN-4.8	PAGE PL
	FI	GURE PIN-4.8B

ACCESS ROAD

		-											
	As	Cd*	Cr*	Co*	Cu	Pb*	Ni	Zn*	Total PCB*	F1*	F2*	F3	F4
PIN-4 PIN-4 Airstrip Landfill										C6-C10	C10-C16	C16-C34	C34-C50
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Background Data - Arithmetic Mean	1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mean	1.6	1.0	20.0	5.3	24.2	10.0	12.7	21.7	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviation	0.8	0.0	0.0	2.1	6.0	0.0	3.5	11.3	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standard Deviation	4.1	1.0	20.0	11.5	42.1	10.0	23.3	55.6	0.10	10.0	10.0	50.0	50.0
* If baseline or background arithmetic mean was below the detection limit, the me	an has been	modified to	match thed	letection lim	it value.								

## 10 ADDED WORK SCOPE ITEMS- 2019

As an additional work scope in 2019, Arcadis was asked to complete an inspection of the former Hazardous Waste Storage Area and Beach Landing Area at PIN-4. As such, Arcadis staff inspected the former hazardous waste temporary storage area and the beach landing area at PIN-4 provide the following documentation:

- a) Collected photographs of each area to show the extent and exact status and condition
  of the locations photographed (four photos showing the four corners and four in the
  center of the area);
- b) Include an appropriately sized reference item in all photos to give a relevant indication of scale;
- c) Collected GPS coordinates and view directions for all photos in a photo log;
- d) recorded any evidence of residual waste (i.e., soil/waste bags, parts of sea cans, garbage, etc.); and,
- e) Removed the remaining hazardous waste storage warning sign near the former temporary storage area at the PIN-4 beach landing area. Warning signage was disposed of at the Cambridge Bay landfill. Photos were taken before and after sign removal.

The summary letter report included a figure and a photo log and is found attached as Appendix I.

# **TABLES**

TABLE 1
PIN-4 Northwest Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents	<u>.</u>	-		_	-													
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3 C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4 C <sub>34</sub> -C <sub>50</sub> (mg/kg)
	·	•	•		-'			-	-		•	-		•				
Background Data - Arithmetic M	lean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mea	n					2.7	1.0	20.0	5.0	10.5	10.0	8.4	15.0	0.10	10.0	10.0	28.5	28.5
Baseline Data - Standard Deviati	ion					1.3	0.0	0.0	0.0	4.1	4.2	2.8	0.0	0.00	0.0	0.0	32.4	34.3
Baseline Data Mean + 3x Stand	ard Deviation	<u> </u>				6.5	1.0	20.0	5.0	22.9	22.6	16.8	15.0	0.10	10.0	10.0	125.7	131.5
****																		

\* If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.

DEW Line Cleanup Tier I Criteria						200			1		
DEW Line Cleanup Tier II Criteria	30	5	250	50	100	500	100	500	5		

Upgradient																		
	P4-1 surface																	
Not sampled - no soil	P4-1	2013	1	Phase I														
P415-1A	P4-1	2015	3	Phase I	0-15	3.6	0.04	11.6	3.4	5.6	12.4	7.5	7.0	<0.05	<10	<40	<40	<40
P417-1A	P4-1	2017	5	Phase I	0-15	3.7	0.07	56.6	3.0	6.0	7.0	28.7	12.0	<0.05	<10	<50	<50	<100
P4-1A	P4-1	2019	7	Phase I	0-15	3.9	<0.050	9.5	3.7	8.0	14.0	8.8	5.8	<0.01	<7.0	<4.0	8.2	<6.0
	P4-1 depth																	
13-09366	P4-1	2013	1	Phase I	30-40	4.0	<0.5	10.8	4.0	8.3	10.9	8.9	7.4	<0.02	<5	<10	<50	<50
P415-1B	P4-1	2015	3	Phase I	40-50	3.5	0.04	11.8	2.9	5.2	11.7	7.9	7.0	<0.05	<10	<40	<40	<40
P417-1B	P4-1	2017	5	Phase I	40-50	4.2	0.06	18.1	3.2	6.2	14.9	12.0	7.0	<0.05	<10	<50	<50	<100
P4-1B	P4-1	2019	7	Phase II	40-50	3.7	<0.050	9.4	3.4	7.5	9.4	7.5	5.2	<0.01	<7.0	<4.0	<8.0	<6.0

TABLE 1
PIN-4 Northwest Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Conte	<u>ents</u>																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3 C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4 C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmet	ic Mean	•	•	•		1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic N						2.7	1.0	20.0	5.0	10.5	10.0	8.4	15.0	0.10	10.0	10.0	28.5	28.5
Baseline Data - Standard De						1.3	0.0	0.0	0.0	4.1	4.2	2.8	0.0	0.00	0.0	0.0	32.4	34.3
Baseline Data Mean + 3x Sta						6.5	1.0	20.0	5.0	22.9	22.6	16.8	15.0	0.10	10.0	10.0	125.7	131.5
Downgradient															1			1
	P4-2 surface																	
13-09367	P4-2	2013	1	Phase I	0-10	1.8	<0.5	7.0	2.8	30.0	4.3	10.4	8.6	<0.040	<5	<20	160	<100
P415-2A	P4-2	2015	3	Phase I	0-15	3.2	0.04	15.0	5.8	9.4	7.2	13.4	13.0	<0.05	<10	<40	<40	<40
P417-2A	P4-2	2017	5	Phase I	0-15	4.9	0.06	15.4	4.5	18.4	8.1	11.7	8.0	<0.05	<10	<50	<50	<100
P4-2A	P4-2	2019	7	Phase II	0-15	2.0	<0.050	15.0	3.4	14.0	6.2	8.6	12.0	<0.02	<19	<8.8	83	19
	P4-2 depth																	
13-09369	P4-2	2013	1	Phase I	30-40	2.6	<0.5	18.0	4.0	18.5	8.4	11.5	13.3	<0.02	<5	<10	<50	<50
P415-2B	P4-2	2015	3	Phase I	40-50	3.6	0.02	16.2	6.5	11.6	5.2	14.5	17.0	<0.05	<10	<40	<40	<40
P417-2B	P4-2	2017	5	Phase I	40-50	3.5	0.03	18.1	5.7	11.2	5.4	12.1	20.0	<0.05	<10	<50	<50	<100
P4-2B P4-26B (Dup)	P4-2	2019 2019	7	Phase II Phase II	40-50 40-50	2.7	<0.050 <0.050	15.0 17.0	5.3 5.7	9.5 10.0	5.0 4.7	9.2 11.0	14.0 17.0	<0.01 <0.01	<7.0 7.4	<4.0 <3.0	8.8 21	<6.0 5.1
P4-266 (Dup)	P4-2	2019	,	Pilase II	40-30	2.1	<0.050	17.0	5.7	10.0	4.7	11.0	17.0	V0.01	7.4	<5.0	21	5.1

TABLE 1
PIN-4 Northwest Landfill - Summary of Soil Monitoring Analytical Data

Ample D  Location  Date  Very Place  Place  Place  Depth As  Cot Cot Cot Cot Cot Cot Cot Cot Cot Co	Link To: Table of Contents					-													
Part	Sample ID	Location	Date	_	_	1										C <sub>6</sub> -C <sub>10</sub>	C <sub>10</sub> -C <sub>16</sub>	C <sub>16</sub> -C <sub>34</sub>	C <sub>34</sub> -C <sub>50</sub>
Part	Deller delle Addression	•	•	•	•	•	4.5	1.0	20.0	F 0	10.0	10.0	0.2	46.4	0.10	21/2	21/2	21/2	11/0
Asseline Data - Standard Deviation							_												
PA-3 surface   PA-3																			
P4-3 surface   P4-3																			
P4-3 surface   P4-3   2013   1   Phase   0-10   4.0   0-15   1.8   0-15   3.5   1.9   1.4   9.3   27.1   0-003   0-7.5   0-15   0-75		ara Deviation					0.5	1.0	20.0	3.0	22.3	22.0	10.0	13.0	0.10	10.0	10.0	123.7	131.3
3-09370	Downgradient	D/ 2 curface																	
P4-3   2013   1   Phase   0-10   2.6   <0.5   8.1   2.5   10.3   8.1   6.6   <0.6   <0.02   <5   <10   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05   <0.05	12 00270		2012	1	Dhasail	0.10	4.0	40 F	12.0	2.5	11.0	11.4	0.2	27.4	40.020	-7 F	-15.0	-75	-75
P4-3																			
P4-3																			
P4-3A P4-3 2019 7 Phase II 0-15 1.8 < 0.050 8.2 2.0 4.1 8.8 3.6 5.7 < 0.01 < 7.0 < 4.0 76 15    P5 15 15 15 15 15 15 15 15 15 15 15 15 15																			
P4-3 depth P4-3 2013 1 Phasel 30-40 3.9 <0.5 10.6 3.3 10.7 11.1 8.8 26.3 <0.02 <5 <10 <50 <50 <40 <40 <40 <40 <40 <40 <40 <40 <40 <4																			
13-09372 P4-3 2013 1 Phase I 30-40 3.9 <0.5 10.6 3.3 10.7 11.1 8.8 26.3 <0.02 <5 <10 <50 <50 <415-3B P4-3 2015 3 Phase I 40-50 4.2 0.06 12.7 3.3 7.5 8.7 10.0 10.0 <0.05 <10 <40 <40 <40 <40 <417-3B P4-3 2017 5 Phase I 40-50 5.7 0.05 26.3 5.0 15.3 9.4 16.8 13.0 <0.05 <10 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <40 <40 <40 <40 <40 <40 <40 <40 <40 <4	14 3/1	14-5	2013	,	T Huse II	0 13	1.0	10.030	0.2	2.0	4.1	0.0	3.0	3.7	10.01	17.0	14.0	70	15
13-09372 P4-3 2013 1 Phase I 30-40 3.9 <0.5 10.6 3.3 10.7 11.1 8.8 26.3 <0.02 <5 <10 <50 <50 <415-3B P4-3 2015 3 Phase I 40-50 4.2 0.06 12.7 3.3 7.5 8.7 10.0 10.0 <0.05 <10 <40 <40 <40 <40 <417-3B P4-3 2017 5 Phase I 40-50 5.7 0.05 26.3 5.0 15.3 9.4 16.8 13.0 <0.05 <10 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <40 <40 <40 <40 <40 <40 <40 <40 <40 <4																			
13-09372 P4-3 2013 1 Phase I 30-40 3.9 <0.5 10.6 3.3 10.7 11.1 8.8 26.3 <0.02 <5 <10 <50 <50 <415-3B P4-3 2015 3 Phase I 40-50 4.2 0.06 12.7 3.3 7.5 8.7 10.0 10.0 <0.05 <10 <40 <40 <40 <40 <417-3B P4-3 2017 5 Phase I 40-50 5.7 0.05 26.3 5.0 15.3 9.4 16.8 13.0 <0.05 <10 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <40 <40 <40 <40 <40 <40 <40 <40 <40 <4																			
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13-09372 P4-3 2013 1 Phase I 30-40 3.9 <0.5 10.6 3.3 10.7 11.1 8.8 26.3 <0.02 <5 <10 <50 <50 <415-3B P4-3 2015 3 Phase I 40-50 4.2 0.06 12.7 3.3 7.5 8.7 10.0 10.0 <0.05 <10 <40 <40 <40 <40 <417-3B P4-3 2017 5 Phase I 40-50 5.7 0.05 26.3 5.0 15.3 9.4 16.8 13.0 <0.05 <10 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <40 <40 <40 <40 <40 <40 <40 <40 <40 <4																			
13-09372 P4-3 2013 1 Phase I 30-40 3.9 <0.5 10.6 3.3 10.7 11.1 8.8 26.3 <0.02 <5 <10 <50 <50 <415-3B P4-3 2015 3 Phase I 40-50 4.2 0.06 12.7 3.3 7.5 8.7 10.0 10.0 <0.05 <10 <40 <40 <40 <40 <417-3B P4-3 2017 5 Phase I 40-50 5.7 0.05 26.3 5.0 15.3 9.4 16.8 13.0 <0.05 <10 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <40 <40 <40 <40 <40 <40 <40 <40 <40 <4																			
13-09372 P4-3 2013 1 Phase I 30-40 3.9 <0.5 10.6 3.3 10.7 11.1 8.8 26.3 <0.02 <5 <10 <50 <50 <415-3B P4-3 2015 3 Phase I 40-50 4.2 0.06 12.7 3.3 7.5 8.7 10.0 10.0 <0.05 <10 <40 <40 <40 <40 <417-3B P4-3 2017 5 Phase I 40-50 5.7 0.05 26.3 5.0 15.3 9.4 16.8 13.0 <0.05 <10 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <100 <50 <50 <40 <40 <40 <40 <40 <40 <40 <40 <40 <4		P4-3 denth																	
P415-3B P4-3 2015 3 Phase I 40-50 4.2 0.06 12.7 3.3 7.5 8.7 10.0 10.0 <0.05 <10 <40 <40 <40 <417-3B P4-3 2017 5 Phase I 40-50 5.7 0.05 26.3 5.0 15.3 9.4 16.8 13.0 <0.05 <10 <50 <50 <100	13-09372		2013	1	Phase I	30-40	3.9	<0.5	10.6	3 3	10.7	11.1	8.8	26.3	<0.02	<5	<10	<50	<50
2417-3B P4-3 2017 5 Phase I 40-50 <b>5.7</b> 0.05 <b>26.3</b> 5.0 <b>15.3</b> 9.4 <b>16.8</b> 13.0 <0.05 <10 <50 <50 <100						_													
			-																

TABLE 1
PIN-4 Northwest Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents																		
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3 C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4 C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic Mo	-				•	1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mear						2.7	1.0	20.0	5.0 5.0	19.0	10.0	8.4	15.0	0.10	10.0	10.0	28.5	28.5
Baseline Data - Standard Deviation						1.3	0.0	0.0	0.0	4.1	4.2	2.8	0.0	0.00	0.0	0.0	32.4	34.3
Baseline Data Mean + 3x Standa						6.5	1.0	20.0	5.0	22.9	22.6	16.8	15.0	0.10	10.0	10.0	125.7	131.5
Downgradient	TO DEVIACION					0.5	1.0	20.0	3.0	LLIJ	22.0	10.0	13.0	0.10	10.0	10.0	123.7	151.5
	P4-4 surface																	
13-09373	P4-4	2013	1	Phase I	0-10	3.2	<0.5	12.4	3.1	13.0	11.8	10.6	<5	<0.02	<5	<10	<50	<50
P415-4A	P4-4	2015	3	Phase I	0-15	4.1	0.02	13.3	3.3	9.2	14.5	9.0	3.0	<0.05	<10	<40	<40	<40
P415-BD3 (Dup)	P4-4	2015	3	Phase I	0-15	3.5	0.02	12.9	3.3	9.8	14.6	8.9	4.0	<0.05	<10	<40	<40	<40
P415-4A (Interlab)	P4-4	2015	3	Phase I	0-15	3.0	<0.05	16.0	3.3	10.0	15.0	9.9	<10	<0.01	<12	<10	<50	<50
P417-4A	P4-4	2017	5	Phase I	0-15	5.2	0.03	14.2	3.7	10.3	12.1	12.1	5.0	<0.05	<10	<50	<50	<100
P417-BD1 (Dup)	P4-4	2017	5	Phase I	0-15	5.0	0.03	13.1	3.6	10.7	12.9	12.3	4.0	<0.05	<10	<50	<50	<100
P4-4A	P4-4	2019	7	Phase II	0-15	3.2	<0.050	9.9	2.9	8.8	10.0	7.1	11.0	<0.01	11	<4.0	57	7.3
	P4-4 depth																	
13-09374	P4-4	2013	1	Phase I	30-40	3.4	<0.5	12.2	3.4	12.6	14.5	11.1	<5	<0.02	<5	<10	<50	<50
P415-4B	P4-4	2015	3	Phase I	40-50	2.9	0.02	13.4	2.7	9.6	15.2	7.1	3.0	<0.05	<10	<40	<40	<40
P417-4B P4-4B	P4-4	2017 2019	5 7	Phase I Phase II	40-50 40-50	4.3 3.6	0.02 <0.10	13.4 9.7	3.5	<b>11.5</b> 8.0	<b>12.7</b> 9.6	<b>11.3</b> 7.1	4.0 6.6	<0.05 <0.01	<10 <7.0	<50 3.2	<50 <b>29</b>	<100 7.4
	P4-4	2013		11103011	40-50	3.0	70.10	5.7	5.1	0.0	5.0	7.1	0.0	NO.01	77.0	J.£		

# TABLE 1 PIN-4 Northwest Landfill - Summary of Soil Monitoring Analytical Data

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Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3 C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4 C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Badiana ad Data - Avith matic NA		•	•	•	-	1.5	1.0	20.0	F.0	10.0	10.0	0.2	16.1	0.10	N/A	N/A	N/A	N1/A
Background Data - Arithmetic M						1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mea						<b>2.7</b> 1.3	1.0 0.0	20.0	5.0	<b>10.5</b> 4.1	10.0	<b>8.4</b> 2.8	<b>15.0</b> 0.0	0.10	10.0	<b>10.0</b> 0.0	28.5	28.5
Baseline Data - Standard Deviation  Baseline Data Mean + 3x Standard						6.5	1.0	0.0 <b>20.0</b>	0.0 <b>5.0</b>	22.9	4.2 <b>22.6</b>	16.8	15.0	0.00	0.0 <b>10.0</b>	10.0	32.4 125.7	34.3 131.5
Downgradient	ard Deviation					0.5	1.0	20.0	5.0	22.9	22.0	10.0	15.0	0.10	10.0	10.0	125.7	131.5
Downgraulent	P4-5 surface																	
Not sampled - no soil	P4-5 Surface	2013	1	Phase I														
P415-5A	P4-5	2015	3	Phase I	0-15	4.2	0.03	11.4	4.3	7.8	10.6	9.1	9.0	<0.05	<10	<40	<40	<40
P417-5A	P4-5	2017	5	Phase I	0-15	4.7	0.05	13.3	3.6	7.9	14.2	9.5	8.0	<0.05	<10	<50	<50	<100
P4-5A	P4-5	2019	7	Phase II	0-15	4.0	<0.050	9.5	3.7	7.8	15.0	8.3	4.5	<0.01	7.2	4.2	19	4.8
	P4-5 depth																	
13-09375	P4-5	2013	1	Phase I	30-40	4.4	<0.5	11.9	3.8	9.0	13.3	8.7	11.0	<0.02	<5	<10	<50	<50
P415-5B	P4-5	2015	3	Phase I	40-50	4.2	0.04	10.9	3.8	7.1	10.0	8.4	8.0	<0.05	<10	<40	<40	<40
P417-5B	P4-5	2017	5	Phase I	40-50	4.7	0.03	29.7	3.2	6.8	8.4	17.3	6.0	<0.05	<10	<50	<50	<100
P4-5B	P4-5	2019	7	Phase II	40-50	3.6	<0.050	9.4	3.0	7.3	9.0	7.1	4.6	<0.01	<7.0	3.2	12	<4.7
							-											
	1	1	1	<u>I</u>	l .	1	1	<u>I</u>		<u> </u>	<u>I</u>	<u>I</u>		<u>I</u>	Legend	1	<u>I</u>	

N/A = not analyzed

Legend
XX Sample exceeds baseline mean
XX Sample exceeds baseline mean + 3x SD

TABLE 2
PIN-4 North Landfill - Summary of Soil Monitoring Soil Data

Link To: Table of Contents	<u> </u>																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
	•	•				•									•			
Background Data - Arithmetic M	lean .					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mea	n					2.5	1.0	20.0	5.0	12.9	10.0	8.3	15.0	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviati	ion			1.0	0.0	0.0	0.0	9.5	0.0	5.7	0.0	0.00	0.0	0.0	0.0	0.0		
Baseline Data Mean + 3x Stand	ard Deviation			5.5	1.0	20.0	5.0	41.5	10.0	25.5	15.0	0.10	10.0	10.0	50.0	50.0		

\* If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.

DEW	Line Cleanup Tier I Criteria						200			1		
DEW	Line Cleanup Tier II Criteria	30	5	250	50	100	500	100	500	5		

Upgradient																		
	P4-12 surface																	
13-09393	P4-12	2013	1	Phase I	0-10	0.9	<0.5	3.0	<1	6.1	3.2	2.5	18.4	<0.02	<5	<20	120	<100
P415-12A	P4-12	2015	3	Phase I	0-15	2.8	0.07	6.0	2.2	5.7	4.9	8.3	6.0	<0.05	<10	<40	85	<40
P415-BD6 (Dup)	P4-12	2015	3	Phase I	0-15	3.0	0.09	6.2	2.2	8.2	6.7	5.1	10.0	<0.05	<10	<40	45	<40
P415-12A (Interlab)	P4-12	2015	3	Phase I	0-15	2.5	0.11	5.5	2.4	9.8	6.2	5.5	<20	<0.02	<12	<10	<50	<50
P417-12A	P4-12	2017	5	Phase I	0-15	2.6	0.06	7.9	3.1	7.1	4.8	6.5	15.0	<0.05	<10	<50	53	<100
P417-BD2 (Dup)	P4-12	2017	5	Phase I	0-15	2.8	0.06	18.4	3.0	7.1	6.2	12.9	15.0	<0.05	<10	<50	<50	<100
P4-12A	P4-12	2019	7	Phase II	0-15	1.3	0.13	4.0	1.9	12.0	3.3	3.5	13.0	<0.02	<21	<10	90	<15
P4-25A (Dup)	P4-12	2019	7	Phase II	0-15	1.3	0.099	4.5	1.7	7.4	3.5	3.4	10.0	<0.02	<16	<6.4	130	26
	P4-12 depth																	
13-09394	P4-12	2013	1	Phase I	30-40	2.9	<0.5	6.6	2.6	10.5	6.8	6.1	9.2	<0.02	<5	<10	<50	<50
P415-12B	P4-12	2015	3	Phase I	40-50	3.5	0.02	10.1	2.5	7.8	7.5	6.0	4.0	<0.05	<10	<40	<40	<40
P417-12B	P4-12	2017	5	Phase I	40-50	3.1	0.03	11.8	3.1	8.0	7.1	7.6	9.0	<0.05	<10	<50	<50	<100
P4-12B	P4-12	2019	7	Phase II	40-50	1.6	<0.050	7.1	1.8	4.0	4.2	3.8	5.8	<0.01	<7.0	4.5	51	13

TABLE 2
PIN-4 North Landfill - Summary of Soil Monitoring Soil Data

Link To: Table of Content	<u>ts</u>			_														
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic	Moan					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Me						2.5	1.0	20.0	5.0	12.9	10.0	8.3	15.0	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Devia						1.0	0.0	0.0	0.0	9.5	0.0	5.7	0.0	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Stand						5.5	1.0	20.0	5.0	41.5	10.0	25.5	15.0	0.10	10.0	10.0	50.0	50.0
Downgradient						0.0				12.0								
	P4-6 surface																	
13-09376	P4-6	2013	1	Phase I	0-10	3.8	<0.5	7.0	2.8	7.0	9.5	5.2	30.8	<0.02	<5	<10	<50	<50
P415-6A	P4-6	2015	3	Phase I	0-15	5.0	0.03	6.9	3.2	4.6	11.8	5.8	5.0	<0.05	<10	<40	<40	<40
P417-6A	P4-6	2017	5	Phase I	0-15	4.1	0.12	5.5	2.4	5.6	7.4	4.5	26.0	<0.05	<10	<50	<50	<100
P4-6A	P4-6	2019	7	Phase II	0-15	3.4	<0.050	6.3	2.2	15.0	6.5	4.5	3.2	<0.01	<7.0	3.3	10	<4.7
13-09377	P4-6 depth	2013	1	Phase I	30-40	4.8	<0.5	7.1	3.2	6.0	10.8	5.9	11.2	<0.02	<5	<10	<50	<50
P415-6B	P4-6	2015	3	Phase I	40-50	4.4	0.02	6.9	2.9	3.7	13.2	5.5	4.0	<0.05	<10	<40	<40	<40
P417-6B	P4-6	2017	5	Phase I	40-50	7.6	0.08	6.9	4.2	6.9	22.0	7.8	12.0	<0.05	<10	<50	<50	<100
P4-6B	P4-6	2019	7	Phase II	20-30	2.6	<0.050	5.7	2.1	3.9	5.8	3.9	4.2	<0.01	<7.0	<3.0	7.9	<4.7
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TABLE 2
PIN-4 North Landfill - Summary of Soil Monitoring Soil Data

Link To: Table of Contents	<u>s</u>																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic N	loan					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N1/A	N/A
Baseline Data - Arithmetic Mea						2.5	1.0	20.0	5.0	12.9	10.0	8.3	15.0	0.10	10.0	10.0	N/A <b>50.0</b>	50.0
Baseline Data - Standard Deviat						1.0	0.0	0.0	0.0	9.5	0.0	5.7	0.0	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Stand						5.5	1.0	20.0	5.0	41.5	10.0	25.5	15.0	0.10	10.0	10.0	50.0	50.0
Downgradient															I			
	P4-7 surface																	
13-09379	P4-7	2013	1	Phase I	0-10	3.1	<0.5	10.1	4.0	9.0	6.7	9.1	6.6	<0.02	<5	<10	<50	<50
P415-7A	P4-7	2015	3	Phase I	0-15	3.6	0.02	9.4	4.1	8.1	5.9	9.1	6.0	<0.05	<10	<40	<40	<40
P417-7A	P4-7	2017	5	Phase I	0-15	3.7	0.02	10.0	4.0	8.8	5.5	9.8	6.0	<0.05	<10	<50	<50	<100
P4-7A	P4-7	2019	7	Phase II	0-15	3.6	<0.050	10.0	4.7	11.0	6.6	11.0	6.7	<0.01	<7.0	3.1	14	<4.7
	P4-7 depth																	
13-09380	P4-7	2013	1	Phase I	30-40	3.2	<0.5	11.1	4.1	9.1	6.9	9.1	7.5	<0.02	<5	<10	<50	<50
13-09381 (Dup)	P4-7	2013	1	Phase I	30-40	3.1	<0.5	11.0	3.7	8.5	7.9	8.7	6.8	<0.02	<5	<10	<50	<50
P415-7B	P4-7	2015	3	Phase I	40-50	3.4	0.02	9.9	3.1	7.2	5.2	8.4	5.0	<0.05	<10	<40	<40	<40
P417-7B	P4-7	2017	5	Phase I	40-50	3.4	0.02	12.9	3.6	8.9	4.8	10.4	6.0	<0.05	<10	<50	<50	<100
P4-7B	P4-7	2019	7	Phase II	40-50	3.5	<0.050	14.0	4.3	11.0	7.1	11.0	6.8	<0.01	<7.0	<3.0	13	<4.7
																		-

TABLE 2
PIN-4 North Landfill - Summary of Soil Monitoring Soil Data

Link To: Table of Content	<u>s</u>																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic N	/ean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mea						2.5	1.0	20.0	5.0	12.9	10.0	8.3	15.0	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviat						1.0	0.0	0.0	0.0	9.5	0.0	5.7	0.0	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Stand						5.5	1.0	20.0	5.0	41.5	10.0	25.5	15.0	0.10	10.0	10.0	50.0	50.0
Downgradient																	I	
3	P4-8 surface																	
13-09382	P4-8	2013	1	Phase I	0-10	3.5	<0.5	11.1	3.9	8.7	7.0	9.4	6.7	<0.02	<5	<10	<50	<50
P415-8A	P4-8	2015	3	Phase I	0-15	4.9	0.02	9.7	4.0	8.2	5.4	8.7	6.0	<0.05	<10	<40	<40	<40
P417-8A	P4-8	2017	5	Phase I	0-15	4.0	0.02	12.2	4.1	8.7	5.5	10.8	7.0	<0.05	<10	<50	<50	<100
P4-8A	P4-8	2019	7	Phase II	0-15	2.2	<0.050	6.7	2.5	6.0	4.6	6.1	4.9	<0.01	<7.0	<3.0	13	<4.7
	P4-8 depth																	
13-09383	P4-8	2013	1	Phase I	30-40	3.9	<0.5	12.7	4.6	10.2	8.8	10.7	7.5	<0.02	<5	<10	<50	<50
P415-8B	P4-8	2015	3	Phase I	40-50	3.3	0.01	8.9	3.3	6.2	5.2	8.1	4.0	<0.05	<10	<40	<40	<40
P417-8B	P4-8	2017	5	Phase I	40-50	4.1	0.02	15.2	4.1	10.5	5.5	11.9	6.0	<0.05	<10	<50	<50	<100
P4-8B	P4-8	2019	7	Phase II	40-50	3.0	<0.050	9.1	3.5	8.1	5.4	8.9	5.9	<0.01	<7.0	<3.0	12	<4.7

TABLE 2
PIN-4 North Landfill - Summary of Soil Monitoring Soil Data

<u>Link To: Table of Contents</u>																		
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic Mo	ean	•	•	•	•	1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mear						2.5	1.0	20.0	5.0	12.9	10.0	8.3	15.0	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviation						1.0	0.0	0.0	0.0	9.5	0.0	5.7	0.0	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standa						5.5	1.0	20.0	5.0	41.5	10.0	25.5	15.0	0.10	10.0	10.0	50.0	50.0
Downgradient																		
	P4-9 surface																	
13-09384	P4-9	2013	1	Phase I	0-10	3.2	<0.5	11.5	4.7	9.2	7.0	10.8	5.9	<0.02	<5	<10	<50	<50
P415-9A	P4-9	2015	3	Phase I	0-15	4.0	0.03	11.9	5.1	10.2	6.7	12.6	6.0	<0.05	<10	<40	<40	<40
P417-9A	P4-9	2017	5	Phase I	0-15	4.8	0.04	12.2	5.2	9.6	7.4	13.6	9.0	<0.05	<10	<50	<50	<100
P4-9A	P4-9	2019	7	Phase II	0-15	3.1	0.052	9.6	4.0	16.0	7.3	9.7	11.0	<0.01	<7.0	4.1	93	20
	P4-9 depth																	
13-09385	P4-9	2013	1	Phase I	30-40	3.4	<0.5	11.4	4.4	8.9	8.1	10.3	6.3	<0.02	<5	<10	<50	<50
P415-9B	P4-9	2015	3	Phase I	40-50	4.0	0.02	11.6	5.2	9.4	6.6	12.0	6.0	<0.05	<10	<40	<40	<40
P417-9B	P4-9	2017	5	Phase I	40-50	4.8	0.04	13.1	5.9	11.5	7.6	14.1	9.0	<0.05	<10	<50	<50	<100
P4-9B	P4-9	2019	7	Phase II	25-35	2.6	<0.050	8.1	3.3	13.0	6.4	8.5	8.4	<0.01	<7.0	4.6	69	16
		+																

TABLE 2
PIN-4 North Landfill - Summary of Soil Monitoring Soil Data

Link To: Table of Contents	, ,																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Declination of Date Arithmetic NA		•	•		•	1.5	1.0	20.0	F.0	10.0	10.0	0.3	16.1	0.10	NI/A			
Background Data - Arithmetic M						1.5 2.5	1.0	20.0	5.0	19.0 <b>12.9</b>	10.0 10.0	9.2 <b>8.3</b>	16.1	0.10	N/A 10.0	N/A 10.0	N/A	N/A
Baseline Data - Arithmetic Mear Baseline Data - Standard Deviation						1.0	<b>1.0</b> 0.0	<b>20.0</b> 0.0	<b>5.0</b> 0.0	9.5	0.0	5.7	<b>15.0</b> 0.0	0.10	0.0	0.0	<b>50.0</b> 0.0	<b>50.0</b> 0.0
Baseline Data Mean + 3x Standard						5.5	1.0	20.0	5.0	41.5	10.0	25.5	15.0	0.00	10.0	10.0	50.0	50.0
Downgradient	nd Deviation					3.3	1.0	20.0	3.0	41.3	10.0	23.3	13.0	0.10	10.0	10.0	30.0	30.0
Downgrautent	P4-10 surface																	
13-09386	P4-10	2013	1	Phase I	0-10	3.1	<0.5	10.0	3.7	7.6	6.6	9.4	5.4	<0.02	<5	<10	<50	<50
P415-10A	P4-10	2015	3	Phase I	0-10	3.0	0.06	9.2	3.6	12.8	4.9	8.5	8.0	<0.02	<10	<40	41	<40
P417-10A	P4-10	2017	5	Phase I	0-15	4.3	0.02	10.8	5.2	10.0	6.9	11.9	6.0	<0.05	<10	<50	<50	<100
P417-BD3 (Dup)	P4-10	2017	5	Phase I	0-15	4.3	0.02	13.6	5.2	9.8	7.6	13.2	7.0	<0.05	<10	<50	<50	<100
P4-10A	P4-10	2019	7	Phase II	0-15	2.2	0.10	5.7	2.9	21.0	6.5	8.6	26.0	<0.025	<18	11	360	100
	P4-10 depth																	
13-09387	P4-10	2013	1	Phase I	30-40	3.2	<0.5	10.9	3.6	7.8	7.1	9.5	6.0	<0.02	<5	<10	<50	<50
P415-10B	P4-10	2015	3	Phase I	40-50	2.8	0.03	11.4	3.2	10.3	5.1	10.8	6.0	<0.05	<10	<40	<40	<40
P417-10B P4-10B	P4-10 P4-10	2017	7	Phase II	40-50	2.2	0.03	9.5	4.2	8.1 13.0	6.3 3.9	7.4	6.0 11.0	<0.05 <0.01	<10 8.9	<50 4.3	<50 44	<100

# TABLE 2 PIN-4 North Landfill - Summary of Soil Monitoring Soil Data

Link To: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth	As	Cd*	Cr*	Co*	Cu	Pb*	Ni	Zn*	Total PCB*	F1* C <sub>6</sub> -C <sub>10</sub>	F2* C <sub>10</sub> -C <sub>16</sub>	F3* C <sub>16</sub> -C <sub>34</sub>	F4* C <sub>34</sub> -C <sub>50</sub>
					(cm)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)								
Background Data - Arithmetic	Mean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Me						2.5	1.0	20.0	5.0	12.9	10.0	8.3	15.0	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Devia						1.0	0.0	0.0	0.0	9.5	0.0	5.7	0.0	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Stan						5.5	1.0	20.0	5.0	41.5	10.0	25.5	15.0	0.10	10.0	10.0	50.0	50.0
Downgradient																		
	P4-11 surface																	
13-09390	P4-11	2013	1	Phase I	0-10	1.6	<0.5	3.2	1.2	11.3	3.4	4.5	37.2	<0.02	<5	<10	<50	69
13-09391 (Dup)	P4-11	2013	1	Phase I	0-10	1.7	<0.5	3.3	1.3	12.1	4.0	4.9	25.6	<0.02	<5	<10	67	86
P415-11A	P4-11	2015	3	Phase I	0-15	1.1	0.22	2.6	1.3	13.1	2.3	4.1	4.0	<0.05	<10	<40	72	<40
P417-11A	P4-11	2017	5	Phase I	0-15	1.8	0.17	5.3	1.6	9.4	5.9	5.0	18.0	<0.05	<10	<50	126	140
P4-11A	P4-11	2019	7	Phase II	0-15	2.5	<0.050	9.0	2.7	9.2	6.5	5.9	10.0	<0.01	<7.0	3.9	33	7.7
<del></del>																		
	P4-11 depth																	
13-09392	P4-11	2013	1	Phase I	30-40	1.7	<0.5	3.5	1.3	10.2	6.3	3.9	14.5	<0.02	<5	<10	<50	62
P415-11B	P4-11	2015	3	Phase I	40-50	2.7	0.02	11.1	2.5	8.9	8.0	7.8	6.0	<0.05	<10	<40	<40	<40
P417-11B	P4-11	2017	5	Phase I	40-50	2.1	0.16	6.0	2.0	11.2	5.3	5.3	10.0	<0.05	<10	<50	191	200
P4-11B	P4-11	2019	7	Phase II	20-30	2.8	<0.050	13.0	3.4	11.0	6.0	7.1	11.0	<0.01	<7.0	3.6	20	<4.7
																		-
				1	<u> </u>					1					Legend			

N/A = not analyzed

Legend
XX Sample exceeds baseline mean
XX Sample exceeds baseline mean + 3x SD

TABLE 3A
PIN-4 Non-Hazardous Waste Landfill - Summary of Soil Monitoring Analytical Data

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Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic M	ean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mean	1					2.8	1.0	20.0	5.0	14.1	10.0	10.1	15.2	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviation	on		•		•	1.1	0.0	0.0	0.0	4.9	5.0	3.4	13.8	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standa	rd Deviation					6.1	1.0	20.0	5.0	28.6	25.0	20.4	56.6	0.10	10.0	10.0	50.0	50.0

\* If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.

DEW Line Cleanup Tier I Criteria						200			1	
DEW Line Cleanup Tier II Criteria	30	5	250	50	100	500	100	500	5	

U	p	g	ra	d	ie	nt	
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Opgradient	MW-05 surface																	
13-09349	MW-05	2013	1	Phase I	0-10	1.7	<0.5	11.7	4.8	14.2	11.9	8.2	21.0	<0.02	<5	<10	<50	<50
P415-5WA	MW-05	2015	3	Phase I	0-15	2.2	0.06	8.9	4.5	12.1	11.5	7.5	25.0	<0.05	<10	<40	<40	<40
P417-5WA	MW-05	2017	5	Phase I	0-15	2.6	0.07	9.7	4.5	12.5	66.0	8.1	26.0	<0.05	<10	<50	<50	<100
MW-05A	MW-05	2019	7	Phase II	0-15	1.6	0.058	8.2	3.6	10.0	12.0	6.3	26.0	0.15	<7.0	<4.0	18	<6.0
MW-11A (Dup)	MW-05	2019	7	Phase II	0-15	1.9	0.053	8.5	3.8	11.0	12.0	7.1	21.0	0.02	<7.0	<4.0	12	<6.0
																		<del>                                     </del>
																		<del>                                     </del>
																		<del> </del>
	MW-05 depth																	+
13-09350	MW-05	2013	1	Phase I	30-40	2.4	<0.5	11.9	4.3	10.3	10.6	8.2	10.2	<0.02	<5	<10	<50	<50
13-09351 (Dup)	MW-05	2013	1	Phase I	30-40	2.4	<0.5	10.8	4.3	10.3	6.8	7.9	10.2	<0.02	<5	<10	<50	<50
P415-5WB	MW-05	2015	3	Phase I	40-50	3.2	0.03	10.4	3.7	7.6	10.7	7.9	10.0	<0.05	<10	<40	<40	<40
P417-5WB	MW-05	2017	5	Phase I	40-50	3.0	0.05	9.2	3.7	8.6	11.1	7.5	19.0	<0.05	<10	<50	<50	<100
MW-05B	MW-05	2019	7	Phase II	40-50	2.6	<0.050	9.2	3.3	7.7	12.0	6.7	11.0	<0.01	<7.0	<3.0	12	<4.7
																		<b>†</b>

TABLE 3A
PIN-4 Non-Hazardous Waste Landfill - Summary of Soil Monitoring Analytical Data

<b>Link To: Table of Contents</b>																		
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data Arithmetic Mc	· ·		•	•	-	1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	21/2	21/2	**/*	21/2
Background Data - Arithmetic Mean  Baseline Data - Arithmetic Mean						2.8	1.0	20.0	5.0	19.0	10.0	10.1	15.2	0.10	N/A 10.0	N/A 10.0	N/A <b>50.0</b>	N/A <b>50.0</b>
Baseline Data - Standard Deviation						1.1	0.0	0.0	0.0	4.9	5.0	3.4	13.8	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standar						6.1	1.0	20.0	5.0	28.6	25.0	20.4	56.6	0.10	10.0	10.0	50.0	50.0
Downgradient	a beviation					0.1	1.0	20.0	3.0	20.0	23.0	20.4	30.0	0.10	10.0	10.0	30.0	30.0
- carrier -	MW-06 surface																	
13-09352	MW-06	2013	1	Phase I	0-10	3.1	<0.5	21.2	5.7	23.4	8.9	15.1	17.7	<0.02	<5	<10	<50	<50
P415-6WA	MW-06	2015	3	Phase I	0-15	2.5	0.08	12.2	4.5	17.2	7.0	10.7	31.0	<0.05	<10	<40	<40	<40
P417-6WA	MW-06	2017	5	Phase I	0-15	3.0	0.03	21.3	4.9	21.5	13.9	15.5	15.0	<0.05	<10	<50	<50	<100
P417-BD4 (Dup)	MW-06	2017	5	Phase I	0-15	3.0	0.04	16.8	4.9	21.5	10.4	14.1	13.0	<0.05	<10	<50	<50	<100
MW-06A	MW-06	2019	7	Phase II	0-15	2.3	0.057	7.5	2.8	18.0	7.5	8.6	10.0	<0.01	<7.0	<4.0	55	13
	MW-06 depth																	
13-09353	MW-06	2013	1	Phase I	30-40	3.1	<0.5	23.0	6.2	20.1	9.1	14.8	18.7	<0.02	<5	<10	<50	<50
P415-6WB	MW-06	2015	3	Phase I	40-50	2.4	0.03	14.6	4.8	15.7	6.0	10.9	13.0	<0.05	<10	<40	<40	<40
P417-6WB	MW-06	2017	5	Phase I	40-50	3.7	0.04	16.8	4.9	16.0	7.0	12.0	14.0	<0.05	<10	<50	<50	<100
MW-06B	MW-06	2019	7	Phase II	40-50	3.2	<0.050	20.0	5.9	22.0	4.5	13.0	22.0	<0.01	<7.0	<4.0	14	<6.0

TABLE 3A
PIN-4 Non-Hazardous Waste Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents							-											
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic M	ean		•	•	•	1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mear						2.8	1.0	20.0	5.0	14.1	10.0	10.1	15.2	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviation						1.1	0.0	0.0	0.0	4.9	5.0	3.4	13.8	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standa						6.1	1.0	20.0	5.0	28.6	25.0	20.4	56.6	0.10	10.0	10.0	50.0	50.0
Downgradient																		
	MW-07 surface																	
13-09354	MW-07	2013	1	Phase I	0-10	2.5	<0.5	23.9	5.3	19.9	9.4	12.4	16.7	<0.02	<5	<10	<50	<50
P415-7WA	MW-07	2015	3	Phase I	0-15	1.9	0.12	5.7	2.0	16.5	7.0	8.9	9.0	<0.05	<10	<40	78	46
P417-7WA	MW-07	2017	5	Phase I	0-15	4.1	0.04	14.3	5.0	15.4	11.6	15.8	9.0	<0.05	<10	<50	<50	<100
MW-07A	MW-07	2019	7	Phase II	0-15	1.5	<0.10	3.8	1.9	25.0	4.6	12.0	17.0	<0.01	<7.0	<4.0	55	13
																		-
	MW-07 depth																	
13-09355	MW-07	2013	1	Phase I	30-40	3.3	<0.5	20.0	5.3	22.1	12.1	14.9	11.8	<0.02	<5	<10	87	72
P415-7WB	MW-07	2015	3	Phase I	40-50	4.1	0.02	18.0	6.4	22.0	14.8	16.7	12.0	<0.05	<10	<40	<40	<40
P417-7WB	MW-07	2017	5	Phase I	40-50	4.0	0.09	16.2	4.1	26.5	10.5	24.2	8.0	<0.05	<10	<50	<50	<100
MW-07B	MW-07	2019	7	Phase II	40-50	7.0	0.062	11.0	3.4	26.0	12.0	18.0	3.1	<0.01	<7.0	<4.0	56	14
																		1
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																		+
	L	l	1	1	1				1	1	1	1			1	1	l	لــــــــــــــــــــــــــــــــــــــ

### TABLE 3A

## PIN-4 Non-Hazardous Waste Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents

LITIK TO. Tuble of Contents	<u>-</u>																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
						П	ı									T		
Background Data - Arithmetic M						1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mea						2.8	1.0	20.0	5.0	14.1	10.0	10.1	15.2	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviati						1.1 <b>6.1</b>	0.0 <b>1.0</b>	0.0 <b>20.0</b>	0.0 <b>5.0</b>	4.9 <b>28.6</b>	5.0 <b>25.0</b>	3.4 <b>20.4</b>	13.8	0.00 <b>0.10</b>	0.0 <b>10.0</b>	0.0 <b>10.0</b>	0.0 <b>50.0</b>	0.0 <b>50.0</b>
Baseline Data Mean + 3x Stand	ard Deviation					6.1	1.0	20.0	5.0	28.6	25.0	20.4	56.6	0.10	10.0	10.0	50.0	50.0
Downgradient		1		1		T	ı	ı	ı	ı	ı		ı		ı	I		
	MW-08 surface																	
13-09356	MW-08	2013	1	Phase I	0-10	3.6	<0.5	25.1	5.5	13.5	17.2	15.2	6.9	<0.02	<5	<10	<50	<50
P415-8WA	MW-08	2015	3	Phase I	0-15	4.0	0.06	14.2	4.9	12.1	16.1	13.5	17.0	<0.05	<10	<40	53	<40
P415-BD2 (Dup)	MW-08	2015	3	Phase I	0-15	5.1	0.07	15.5	5.8	12.9	20.9	14.9	16.0	<0.05	<10	<40	40	<40
P415-8WA (Interlab)	MW-08	2015	5	Phase I	0-15	3.6	0.071	14.0	4.8	14.0	17.0	12.0	17.0	0.015	<12	<10	<50	<50
P417-8WA	MW-08	2017	5	Phase I	0-15	3.8	0.07	18.5	4.2	12.9	17.8	11.8	20.0	<0.05	<10	<50	65	<100
MW-08A	MW-08	2019	7	Phase II	0-15	4.1	<0.050	17.0	5.7	17.0	15.0	14.0	8.3	<0.01	<7.0	<4.0	23	<6.0
	MW-08 depth																	
13-09357	MW-08	2013	1	Phase I	30-40	3.7	<0.5	30.3	6.2	15.5	17.3	15.8	7.1	<0.02	<5	<10	<50	<50
P415-8WB	MW-08	2015	3	Phase I	40-50	4.1	0.04	13.4	4.5	10.6	15.0	12.2	11.0	<0.05	<10	<40	<40	<40
P417-8WB	MW-08	2017	5	Phase I	40-50	4.7	0.08	12.8	4.1	10.1	13.3	11.0	18.0	<0.05	<10	<50	<50	<100
MW-08B	MW-08	2019	7	Phase II	40-50	4.0	<0.050	17.0	5.2	13.0	12.0	14.0	4.9	<0.01	<7.0	<4.0	<8.0	<6.0
															Legend			

N/A = not analyzed

Legend

XX Sample exceeds baseline mean

XX Sample exceeds baseline mean + 3x SD

**TABLE 3B** 

## PIN-4 Non-Hazardous Waste Landfill - Summary of Groundwater Monitoring Analytical Data

Link To: Table of Contents	in	k To	: Tal	ble o	f Con	tents
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Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu* (mg/L)	Pb* (mg/L)	Ni* (mg/L)	Zn* (mg/L)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/L)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/L)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/L)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/L)
Baseline Data	<del></del>	<del>!</del>		•		!			!			!	!	!	*	Į.
Downgradient																
10-32034	MW-07	2010			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
10-32035	MW-08	2010			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
11-34569	MW-06	2011			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
11-34568	MW-07	2011			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
11-34567	MW-08	2011			<0.0030	<0.0010	0.0053	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	0.9	<1.0	<1.0
12-15340	MW-06	2012			0.0350	<0.0010	0.0550	0.0190	0.0460	0.1600	0.0470	0.2500	<0.05	<0.05	<1.0	<1.0
12-15341 Dup	MW-06	2012			0.0280	<0.0010	0.0770	0.0240	0.0540	0.1300	0.0610	0.2200	<0.05	<0.05	<1.0	<1.0
12-15342**	MW-07	2012			0.0070	<0.0010	0.0480	0.0100	0.0570	0.0340	0.0310	3.0000	<0.05	<0.05	<1.0	<1.0
12-15343	MW-08	2012			0.0030	<0.0010	0.0510	<0.0030	0.0110	<0.0050	0.0180	0.0070	<0.05	0.9	<1.0	<1.0
				N value	9	9	9	9	9	9	9	9	9	9	9	9
Baseline Data - Arithmetic Mean					0.0089	0.0005	0.0257	0.0047	0.0201	0.0238	0.0188	0.0628	0.025	0.25	0.5	0.5
Baseline Data - Arithmetic Mear	Corrected for Detection Limit				0.0030	0.0010	0.0257	0.0030	0.0050	0.0100	0.0050	0.0100	0.05	0.5	1.0	1.0
Baseline Data - Standard Deviation	on				0.0000	0.0000	0.0273	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.0	0.0	0.0
Baseline Data - Corrected Arithr	netic Mean + 3x Standard Devi	ation			0.0030	0.0010	0.1077	0.0030	0.0050	0.0100	0.0050	0.0100	0.05	0.5	1.0	1.0
*If haseline or hackground grith	metic mean was helow the de	tection limit, the	e mean has heer	modified to mi	atch the dete	ction limit va	lue.				·				· · · · · · · · · · · · · · · · · · ·	

Jpgra	adien	t - M	W-05
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opgradient - WW-05										
Not sampled - frozen	MW-05	2013	1	Phase I						
Not sampled - dry	MW-05	2015	3	Phase I						
Not sampled - dry	MW-05	2017	5	Phase I						
MW-05 - dry	MW-05	2019	7	Phase II						

### **TABLE 3B**

### PIN-4 Non-Hazardous Waste Landfill - Summary of Groundwater Monitoring Analytical Data

Link To: Table of Contents Monitoring F4\* Monitoring F1\* F2\* F3\* As\* Cd\* Cr Co\* Cu\* Pb\* Ni\* Sample ID Location Year Year Phase Zn\* C<sub>6</sub>-C<sub>10</sub>  $C_{10}$ - $C_{16}$ C<sub>16</sub>-C<sub>34</sub> C<sub>34</sub>-C<sub>50</sub> (mg/L) **Baseline Data** Downgradient 10-32034 MW-07 2010 < 0.0030 < 0.0010 < 0.0050 < 0.0030 < 0.0050 < 0.0100 < 0.0050 < 0.0100 < 0.05 < 0.5 <1.0 <1.0 10-32035 MW-08 2010 <0.0030 < 0.0010 <0.0050 <0.0030 <0.0050 < 0.0100 < 0.0050 <0.0100 < 0.05 <0.5 <1.0 <1.0 11-34569 MW-06 2011 <0.0030 < 0.0010 <0.0050 <0.0030 < 0.0050 < 0.0100 < 0.0050 <0.0100 < 0.05 < 0.5 <1.0 <1.0 11-34568 MW-07 2011 <0.0030 < 0.0010 <0.0050 <0.0030 <0.0050 < 0.0100 <0.0050 <0.0100 < 0.05 < 0.5 <1.0 <1.0 11-34567 MW-08 2011 <0.0030 < 0.0010 0.0053 <0.0030 <0.0050 < 0.0100 <0.0050 <0.0100 < 0.05 0.9 <1.0 <1.0 12-15340 2012 0.0350 < 0.0010 0.0550 0.0190 0.0460 0.1600 0.0470 0.2500 < 0.05 <0.05 <1.0 <1.0 MW-06 0.0280 0.0770 0.0240 0.1300 0.0610 0.2200 <1.0 <1.0 12-15341 Dup MW-06 2012 < 0.0010 0.0540 < 0.05 < 0.05 12-15342\*\* MW-07 2012 0.0070 < 0.0010 0.0480 0.0100 0.0570 0.0340 0.0310 3.0000 < 0.05 < 0.05 <1.0 <1.0 12-15343 MW-08 2012 0.0030 < 0.0010 0.0510 <0.0030 0.0110 <0.0050 0.0180 0.0070 < 0.05 0.9 <1.0 <1.0 N value 9 9 9 9 9 9 9 9 9 9 9 9 Baseline Data - Arithmetic Mean 0.0089 0.0005 0.0257 0.0047 0.0201 0.0238 0.0188 0.0628 0.025 0.25 0.5 0.5 Baseline Data - Arithmetic Mean Corrected for Detection Limit 0.0030 0.0010 0.0257 0.0030 0.0050 0.0100 0.0050 0.0100 0.05 0.5 1.0 1.0 Baseline Data - Standard Deviation 0.0000 0.0000 0.0000 0.0000 0.0 0.0 0.0000 0.0273 0.0000 0.0000 0.00 0.0 1.0 Baseline Data - Corrected Arithmetic Mean + 3x Standard Deviation 0.0030 0.0010 0.1077 0.0030 0.0050 0.0100 0.0050 0.0100 0.05 0.5 1.0 Downgradient - MW-06 Not sampled - frozen MW-06 2013 1 Phase I 3 0.0100 MW-06 2015 Phase I 0.0003 < 0.00001 0.0007 0.0002 0.0020 0.0006 0.0023 < 0.1 0.2 < 0.1 < 0.1 P415-6W P417-6W MW-06 2017 5 Phase I 0.0003 <0.00001 0.0010 0.0001 0.0020 0.0010 0.0018 0.0090 < 0.1 < 0.1 < 0.1 < 0.1 MW-06 2019 7 Phase II 0.0004 < 0.000020 <0.0010 <0.00030 0.0017 0.00037 0.0010 0.0067 <0.025 < 0.10 <0.10 < 0.10 MW-06

### **TABLE 3B**

### PIN-4 Non-Hazardous Waste Landfill - Summary of Groundwater Monitoring Analytical Data

Link To: Table of Contents F4\* Monitoring Monitoring F1\* F2\* F3\* Cd\* Cr Co\* Cu\* Pb\* Ni\* Sample ID Location Year Year Phase As\* Zn\* C<sub>6</sub>-C<sub>10</sub>  $C_{10}$ - $C_{16}$ C<sub>16</sub>-C<sub>34</sub> C<sub>34</sub>-C<sub>50</sub> (mg/L) **Baseline Data** Downgradient 10-32034 MW-07 2010 < 0.0030 < 0.0010 < 0.0050 < 0.0030 < 0.0050 < 0.0100 < 0.0050 < 0.0100 < 0.05 < 0.5 <1.0 <1.0 10-32035 MW-08 2010 <0.0030 < 0.0010 <0.0050 <0.0030 < 0.0050 < 0.0100 <0.0050 <0.0100 < 0.05 <0.5 <1.0 <1.0 11-34569 MW-06 2011 <0.0030 < 0.0010 <0.0050 <0.0030 < 0.0050 < 0.0100 < 0.0050 <0.0100 < 0.05 < 0.5 <1.0 <1.0 11-34568 MW-07 2011 <0.0030 < 0.0010 <0.0050 <0.0030 < 0.0050 < 0.0100 <0.0050 <0.0100 < 0.05 < 0.5 <1.0 <1.0 11-34567 MW-08 2011 <0.0030 < 0.0010 0.0053 <0.0030 < 0.0050 < 0.0100 <0.0050 <0.0100 < 0.05 0.9 <1.0 <1.0 12-15340 2012 0.0350 < 0.0010 0.0550 0.0190 0.0460 0.1600 0.0470 0.2500 < 0.05 <0.05 <1.0 <1.0 MW-06 0.0280 0.0770 0.0240 0.1300 0.0610 0.2200 <1.0 <1.0 12-15341 Dup MW-06 2012 < 0.0010 0.0540 < 0.05 < 0.05 12-15342\*\* MW-07 2012 0.0070 < 0.0010 0.0480 0.0100 0.0570 0.0340 0.0310 3.0000 < 0.05 < 0.05 <1.0 <1.0 12-15343 MW-08 2012 0.0030 < 0.0010 0.0510 <0.0030 0.0110 <0.0050 0.0180 0.0070 < 0.05 0.9 <1.0 <1.0 N value 9 9 9 9 9 9 9 9 9 9 9 9 Baseline Data - Arithmetic Mean 0.0089 0.0005 0.0257 0.0047 0.0201 0.0238 0.0188 0.0628 0.025 0.25 0.5 0.5 Baseline Data - Arithmetic Mean Corrected for Detection Limit 0.0030 0.0010 0.0257 0.0030 0.0050 0.0100 0.0050 0.0100 0.05 0.5 1.0 1.0 0.0000 0.0000 0.0 Baseline Data - Standard Deviation 0.0000 0.0273 0.0000 0.0000 0.0000 0.0000 0.00 0.0 0.0 1.0 Baseline Data - Corrected Arithmetic Mean + 3x Standard Deviation 0.0030 0.0010 0.1077 0.0030 0.0050 0.0100 0.0050 0.0100 0.05 0.5 1.0 Downgradient - MW-07 0.00414 13-09335 MW-07 2013 1 Phase I < 0.0010 <0.00009 0.00069 0.0050 0.00145 0.0038 0.0134 < 0.1 < 0.1 < 0.15 < 0.25 <0.0005 <0.0001 MW-07 2015 3 Phase I < 0.00020 <0.00001 <0.0001 0.0010 0.0010 < 0.0010 < 0.1 0.1 < 0.1 < 0.1 P415-7W P417-7W MW-07 2017 5 Phase I < 0.00020 <0.00001 0.0009 <0.0001 0.0020 < 0.00010 0.0016 0.0020 < 0.1 < 0.1 < 0.1 < 0.1 MW-07 2019 7 Phase II < 0.00020 < 0.000020 <0.0010 <0.00030 0.0019 0.00015 0.0015 0.0095 < 0.025 < 0.10 <0.10 < 0.10 MW-07

### **TABLE 3B**

## PIN-4 Non-Hazardous Waste Landfill - Summary of Groundwater Monitoring Analytical Data

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LITIK TO. TUDIE Of CONTENTS																
Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr (mg/L)	Co* (mg/L)	Cu* (mg/L)	Pb* (mg/L)	Ni* (mg/L)	Zn* (mg/L)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/L)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/L)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/L)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/L)
Baseline Data		•	•	•	•	•	•	•	•	•	•	•	•	•		
Downgradient																
10-32034	MW-07	2010			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
10-32035	MW-08	2010			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
11-34569	MW-06	2011			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
11-34568	MW-07	2011			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
11-34567	MW-08	2011			<0.0030	<0.0010	0.0053	<0.0030	<0.0050	<0.0100	<0.0050	<0.0100	<0.05	0.9	<1.0	<1.0
12-15340	MW-06	2012			0.0350	<0.0010	0.0550	0.0190	0.0460	0.1600	0.0470	0.2500	<0.05	<0.05	<1.0	<1.0
12-15341 Dup	MW-06	2012			0.0280	<0.0010	0.0770	0.0240	0.0540	0.1300	0.0610	0.2200	<0.05	<0.05	<1.0	<1.0
12-15342**	MW-07	2012			0.0070	<0.0010	0.0480	0.0100	0.0570	0.0340	0.0310	3.0000	<0.05	<0.05	<1.0	<1.0
12-15343	MW-08	2012			0.0030	<0.0010	0.0510	<0.0030	0.0110	<0.0050	0.0180	0.0070	<0.05	0.9	<1.0	<1.0
				N value	9	9	9	9	9	9	9	9	9	9	9	9
Baseline Data - Arithmetic Mean					0.0089	0.0005	0.0257	0.0047	0.0201	0.0238	0.0188	0.0628	0.025	0.25	0.5	0.5
Baseline Data - Arithmetic Mear	Corrected for Detection Limit	t			0.0030	0.0010	0.0257	0.0030	0.0050	0.0100	0.0050	0.0100	0.05	0.5	1.0	1.0
Baseline Data - Standard Deviation	on				0.0000	0.0000	0.0273	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.0	0.0	0.0
Baseline Data - Corrected Arithm	netic Mean + 3x Standard Devi	iation			0.0030	0.0010	0.1077	0.0030	0.0050	0.0100	0.0050	0.0100	0.05	0.5	1.0	1.0
Downgradient - MW-08	3															
13-09336	MW-08	2013	1	Phase I	0.0016	<0.00009	0.0246	0.00058	0.0105	0.00111	0.0106	0.0226	<0.1	0.36	<0.15	<0.25
P415-8W	MW-08	2015	3	Phase I	0.0016	0.00001	0.0285	0.0005	0.0100	0.0008	0.0142	0.0080	<0.1	0.2	<0.1	<0.1
P417-8W	MW-08	2017	5	Phase I	0.0004	0.00004	0.0034	0.0002	0.0030	0.0002	0.0034	0.0010	<0.1	0.4	0.3	<0.1
MW-08	MW-08	2019	7	Phase II	0.00033	0.000035	0.0073	<0.00030	0.0052	0.00034	0.0054	0.0087	<0.025	0.39	0.15	<0.10
	•	•	•			•						•	Legend	•	-	•

N/A = not analyzed

xX Sample exceeds baseline mean
xX Sample exceeds baseline mean + 3x SD

TABLE 4
PIN-4 Station Area Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents																		
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3 C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic M	ean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mea	n					2.5	1.0	20.0	5.0	13.2	10.0	9.4	15.0	0.10	10.0	10.0	18.5	50.0
Baseline Data - Standard Deviation								0.0	0.0	4.1	5.4	3.0	0.0	0.00	0.0	0.0	13.9	0.0
Baseline Data Mean + 3x Standard Deviation								20.0	5.0	25.4	26.1	18.5	15.0	0.10	10.0	10.0	60.2	50.0

* If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.														
DEW Line Cleanup Tier I Criteria						200			1					
DEW Line Cleanup Tier II Criteria	30	5	250	50	100	500	100	500	5					

Upgradient																		
Oppranient	P4-13 surface																	
		2212			0.40													
13-09395 - sampling error	P4-13 P4-13	2013	1	Phase I	0-10 0-15	2.0	0.00	44.7				42.4	40.0	<0.05	<10	<40	.10	<40
P415-13A		2015	3	Phase I		2.9	0.02	11.7	7.2	35.2	5.7	13.4	18.0					
P417-13A	P4-13	2017	5	Phase I	0-15	4.0	0.06	14.4	5.3	18.8	10.0	14.6	17.0	<0.05	<10	<50		<100
P4-13A	P4-13	2019	7	Phase II	0-15	2.9	<0.050	14.0	5.3	28.0	7.2	14.0	16.0	<0.01	<7.0	3.9	30	5.8
	P4-13 Depth																	
13-09396 - sampling error	P4-13	2013	1	Phase I	30-40													
P415-13B	P4-13	2015	3	Phase I	40-50	4.1	0.02	12.1	4.6	10.5	10.5	9.9	6.0	<0.05	<10	<40	<40	<40
P417-13B	P4-13	2017	5	Phase I	40-50	4.7	0.02	11.2	4.8	12.3	10.7	10.3	7.0	<0.05	<10	<50	<50	<100
P4-13B	P4-13	2019	7	Phase II	40-50	3.6	<0.050	9.0	5.0	9.7	18.0	10.0	5.0	<0.01	<7.0	<3.0		<4.7

TABLE 4
PIN-4 Station Area Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents																		
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3 C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic M	ean	•	•	•	•	1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mear						2.5	1.0	20.0	5.0	13.2	10.0	9.4	15.0	0.10	10.0	10.0	18.5	50.0
Baseline Data - Standard Deviation						1.0	0.0	0.0	0.0	4.1	5.4	3.0	0.0	0.00	0.0	0.0	13.9	0.0
Baseline Data Mean + 3x Standa						5.4	1.0	20.0	5.0	25.4	26.1	18.5	15.0	0.10	10.0	10.0	60.2	50.0
Downgradient															I			
	P4-14 surface																	
13-09397	P4-14	2013	1	Phase I	0-10	2.8	<0.5	8.5	3.3	11.8	11.5	7.1	21.6	<0.02	<5	<10	80	80
P415-14A	P4-14	2015	3	Phase I	0-15	3.4	0.07	10.7	4.2	10.8	9.8	8.6	12.0	<0.05	<10	<40	<40	<40
P417-14A	P4-14	2017	5	Phase I	0-15	2.7	0.07	7.7	2.9	8.8	8.7	5.8	19.0	<0.05	<10	<50	<50	<100
P4-14A	P4-14	2019	7	Phase II	0-15	2.4	0.13	5.9	3.2	9.0	6.5	5.9	22.0	<0.030	<25	9.5	200	45
	P4-14 Depth																	
13-09399	P4-14	2013	1	Phase I	30-40	2.5	<0.5	10.5	3.3	10.6	9.2	7.5	13.9	<0.02	<5	<10	<50	<50
P415-14B	P4-14	2015	3	Phase I	40-50	4.8	0.04	17.4	6.9	12.8	11.1	12.9	7.0	<0.05	<10	<40	<40	<40
P417-14B P4-14B	P4-14 P4-14	2017 2019	5 7	Phase I Phase II	40-50 40-50	3.1	0.06	10.1 12.0	3.2 <b>5.7</b>	10.0 13.0	8.2 10.0	8.1 <b>11.0</b>	11.0 8.6	<0.05 <0.01	<10 <7.0	<50 5.1	<50 <b>53</b>	<100 12
P4-14D	F4-14	2019	,	Filase II	40-30	3.0	0.000	12.0	5.7	13.0	10.0	11.0	8.0	<0.01	<7.0	5.1	33	12
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	L														1			

TABLE 4
PIN-4 Station Area Landfill - Summary of Soil Monitoring Analytical Data

Sample ID  Background Data - Arithmetic Mean  Baseline Data - Arithmetic Mean  Baseline Data - Standard Deviation  Baseline Data Mean + 3x Standard De	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd*	Cr*	C.*						F1*	F2*	F3	F4*
Baseline Data - Arithmetic Mean Baseline Data - Standard Deviation	eviation			•		, 6, 6,	(mg/kg)	(mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	C <sub>6</sub> -C <sub>10</sub> (mg/kg)	C <sub>10</sub> -C <sub>16</sub> (mg/kg)	C <sub>16</sub> -C <sub>34</sub> (mg/kg)	C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Baseline Data - Arithmetic Mean Baseline Data - Standard Deviation	eviation				!	1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Standard Deviation	eviation					2.5	1.0	20.0	5.0	13.2	10.0	9.4	15.0	0.10	10.0	10.0	18.5	50.0
	eviation					1.0	0.0	0.0	0.0	4.1	5.4	3.0	0.0	0.00	0.0	0.0	13.9	0.0
						5.4	1.0	20.0	5.0	25.4	26.1	18.5	15.0	0.10	10.0	10.0	60.2	50.0
Downgradient						-			0.0					5.25				
	94-15 surface																	
13-09400	P4-15	2013	1	Phase I	0-10	3.2	<0.5	16.3	5.0	10.8	10.0	10.3	7.3	<0.02	<5	<10	<50	<50
13-09401 (Dup)	P4-15	2013	1	Phase I	0-10	3.3	<0.5	16.6	5.1	10.8	9.0	10.5	7.7	<0.02	<5	<10	<50	<50
P415-15A	P4-15	2015	3	Phase I	0-15	3.9	0.04	14.3	5.4	10.6	9.7	10.9	7.0	<0.05	<10	<40	<40	<40
P415-BD5 (Dup)	P4-15	2015	3	Phase I	0-15	3.9	0.04	13.2	5.5	11.9	9.8	12.0	8.0	<0.05	<10	<40	<40	<40
P415-15A (Interlab)	P4-15	2015	3	Phase I	0-15	3.2	<0.05	13.0	4.9	18.0	11.0	10.0	<10	<0.01	<12	<10	<50	<50
P417-15A	P4-15	2017	5	Phase I	0-15	4.4	0.11	13.9	5.4	12.1	11.4	12.2	15.0	<0.05	<10	<50	<50	<100
P4-15A	P4-15	2019	7	Phase II	0-15	2.3	0.14	7.9	3.4	12.0	11.0	7.4	24.0	<0.01	<7.0	3.4	44	7.5
	P4-15 depth																	
13-09402	P4-15	2013	1	Phase I	30-40	3.5	<0.5	17.4	5.2	11.2	10.0	10.5	7.4	<0.02	<5	<10	<50	<50
P415-15B	P4-15	2015	3	Phase I	40-50	4.6	0.03	16.2	6.2	11.7	10.0	12.4	7.0	<0.05	<10	<40	59	181
P417-15B	P4-15	2017	5	Phase I	40-50	4.3	0.03	18.1	5.9	11.9	9.4	13.7	7.0	<0.05	<10	<50	<50	<100
P4-15B	P4-15	2019	7	Phase II	40-50	3.2	<0.050	11.0	5.0	11.0	9.1	10.0	7.0	<0.01	<7.0	<2.0	13	<3.9

TABLE 4
PIN-4 Station Area Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents	<u>S</u>																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3 C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic N					•	1.5	1.0	20.0		19.0	10.0	0.2	16.1	0.10				
Baseline Data - Arithmetic Mea						2.5	1.0 1.0	20.0	5.0 <b>5.0</b>	13.2	10.0 10.0	9.2 <b>9.4</b>	16.1 <b>15.0</b>	0.10 <b>0.10</b>	N/A 10.0	N/A 10.0	N/A 18.5	N/A <b>50.0</b>
Baseline Data - Standard Deviat						1.0	0.0	0.0	0.0	4.1	5.4	3.0	0.0	0.00	0.0	0.0	13.9	0.0
Baseline Data Mean + 3x Stand						5.4	1.0	20.0	5.0	25.4	26.1	18.5	15.0	0.10	10.0	10.0	60.2	50.0
Downgradient Downgradient	ard Deviation					3.4	1.0	20.0	3.0	23.4	20.1	10.5	13.0	0.10	10.0	10.0	00.2	30.0
Downgraulent	P4-16 surface																	
		2042		Di I	0.10	4.0	.0.5	40.5	- 4	42.2	42.0	42.2	5.0	.0.03	· · ·	.40	.50	.50
13-09403	P4-16 P4-16	2013 2015	3	Phase I Phase I	0-10 0-15	<b>4.3</b> 1.1	<0.5 0.15	19.5 3.7	<b>5.4</b> 1.5	<b>13.3</b> 5.9	<b>12.9</b> 3.1	<b>12.2</b> 3.9	5.8 4.0	<0.02 <0.05	<5 <10	<10 <40	<50 <b>56</b>	<50 <40
P415-16A P417-16A	P4-16 P4-16	2015	5	Phase I	0-15	4.1	0.15	15.3	4.9	12.8	3.1 12.0	3.9 <b>11.6</b>	5.0	<0.05	<10	<40 <50	<50	<100
	P4-16 P4-16	2017	5	Phase I	0-15	4.1	0.02	15.3	<b>5.1</b>	14.9	12.6	11.6	5.0	<0.05	<10	<50	<50	<100
P417-BD8 (Dup)	P4-16	2017	7	Phase II	0-15	2.6	<0.10	9.3	3.9	10.0	9.3	8.4	3.5	<0.03	<7.0	4.6	67	16
P4-16A	P4-10	2019	,	Pilase II	0-15	2.0	<0.10	9.5	5.9	10.0	9.5	0.4	3.3	<0.01	<7.0	4.0	67	10
																		-
																		+
	P4-16 depth																	
		2212			20.40			400					_		_			
13-09404	P4-16	2013	1	Phase I	30-40	2.7	<0.5	18.3	3.5	14.0	13.6	10.3	<5	<0.02	<5	<10	<50	<50
P415-16B	P4-16	2015	3	Phase I	40-50	3.8	0.03	11.7	4.5	9.9	9.7	9.5	4.0	<0.05	<10	<40	<40	<40
P417-16B	P4-16	2017	5	Phase I	40-50	4.4	0.03	14.0	5.0	12.5	12.5	10.9	5.0	<0.05	<10	<50	<50	<100
P4-16B	P4-16	2019	7	Phase II	40-50	3.6	<0.050	10.0	5.0	11.0	11.0	11.0	3.9	<0.05	<7.0	<4.0	40	8.4
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TABLE 4
PIN-4 Station Area Landfill - Summary of Soil Monitoring Analytical Data
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Link To: Table of Conte	<u>nts</u>																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3 C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmeti	ic Mean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic N						2.5	1.0	20.0	5.0	13.2	10.0	9.4	15.0	0.10	10.0	10.0	18.5	50.0
Baseline Data - Standard Dev						1.0	0.0	0.0	0.0	4.1	5.4	3.0	0.0	0.00	0.0	0.0	13.9	0.0
Baseline Data Mean + 3x Sta						5.4	1.0	20.0	5.0	25.4	26.1	18.5	15.0	0.10	10.0	10.0	60.2	50.0
Downgradient						5	2.0	20.0	5.0		2012	10.0	25.0	0.20	2010	20.0	00.2	30.0
Downg. autent	P4-17 surface																	
13-09405	P4-17	2013	1	Phase I	0-10	3.9	<0.5	10.8	4.6	9.5	15.4	10.2	5.9	<0.02	<5	<10	<50	<50
P415-17A	P4-17	2015	3	Phase I	0-10	3.9	0.03	9.5	4.6	7.2	13.3	9.3	5.0	<0.02	<10	<40	<40	<40
P417-17A	P4-17	2017	5	Phase I	0-15	5.1	0.04	10.6	4.3	7.6	12.0	10.0	5.0	<0.05	<10	<50	<50	<100
P4-17A	P4-17	2017	7	Phase II	0-15	3.3	<0.050	8.1	4.5	9.1	11.0	9.5	4.8	<0.03	<7.0	<4.0	<8.0	<6.0
13-09406	P4-17 depth	2013	1	Phase I	30-40	3.7	<0.5	10.2	4.4	8.8	11.9	9.8	<5	<0.02	<5	<10	<50	<50
P415-17B	P4-17	2015	3	Phase I	40-50	4.0	0.03	9.0	3.9	7.2	11.6	8.8	4.0	<0.05	<10	<40	<40	<40
P417-17B	P4-17	2017	5	Phase I	40-50	4.6	0.03	10.6	5.1	9.5	13.1	12.1	6.0	<0.05	<10	<50	<50	<100
P4-17B	P4-17	2019	7	Phase II	40-50	3.6	<0.050	8.8	4.9	9.5	10.0	10.0	5.1	<0.01	<7.0	<4.0	<8.0	<6.0

N/A = not analyzed

Legend
XX Sample exceeds baseline mean
XX Sample exceeds baseline mean + 3x SD

TABLE 5
PIN-4 USAF Landfill - Summary of Soil Monitoring Analytical Data
Link To: Table of Contents

Link To: Table of Contents																		
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
	•	-	=	=	-	•	-	-				-		· · · · · · · · · · · · · · · · · · ·				
Background Data - Arithmetic Me	ean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mear	ı		2.9	1.0	20.0	5.0	12.5	10.0	12.3	15.0	0.10	10.0	10.0	50.0	50.0			
Baseline Data - Standard Deviation	on					0.9	0.0	0.0	0.0	5.6	0.0	2.4	0.0	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standa	rd Deviation		·	5.6	1.0	20.0	5.0	29.4	10.0	19.5	15.0	0.10	10.0	10.0	50.0	50.0		

\* If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.

DEW Line Cleanup Tier I Criteria						200			1		
DEW Line Cleanup Tier II Criteria	30	5	250	50	100	500	100	500	5		

### **Monitoring Data**

Upgradient																		
	P4-18 surface																	
13-09407	P4-18	2013	1	Phase I	0-10	4.0	<0.5	9.6	3.9	8.1	12.1	9.0	5.8	<0.02	<10	<10	<50	<50
P415-18A	P4-18	2015	3	Phase I	0-15	4.7	0.02	10.5	4.0	7.3	9.9	9.1	4.0	<0.05	<10	<40	<40	<40
P417-18A	P4-18	2017	5	Phase I	0-15	5.2	0.02	10.0	4.2	8.1	13.2	9.2	6.0	<0.05	<10	<50	<50	<100
P4-18A	P4-18	2019	7	Phase II	0-15	3.6	<0.050	8.4	3.5	8.1	11.0	7.6	5.1	<0.01	<7.0	<2.0	9.3	<3.9
	P4-18 depth																	
13-09409	P4-18	2013	1	Phase I	30-40	4.0	<0.5	9.8	3.8	7.9	11.9	8.3	5.6	<0.02	<5	<10	<50	<50
P415-18B	P4-18	2015	3	Phase I	40-50	4.3	0.02	10.4	4.0	7.9	30.9	8.8	5.0	<0.05	<10	<40	<40	<40
P417-18B	P4-18	2017	5	Phase I	40-50	5.3	0.02	10.0	4.3	8.6	10.9	9.2	6.0	<0.05	<10	<50	<50	<100
P4-18B	P4-18	2019	7	Phase II	40-50	3.1	<0.050	7.9	3.2	6.2	8.3	6.9	5.3	<0.01	<7.0	<4.0	<8.0	<6.0
													-					
					1		1											

TABLE 5
PIN-4 USAF Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents																		
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic M	lean	-	•		•	1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mea						2.9	1.0	20.0	5.0	12.5	10.0	12.3	15.0	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviati						0.9	0.0	0.0	0.0	5.6	0.0	2.4	0.0	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standa						5.6	1.0	20.0	5.0	29.4	10.0	19.5	15.0	0.10	10.0	10.0	50.0	50.0
Downgradient																		
	P4-19 surface																	
13-09410	P4-19	2013	1	Phase I	0-10	3.3	<0.5	12.1	5.4	11.0	13.5	14.1	11.9	<0.02	<5	<10	<50	<50
13-09411 (Dup)	P4-19	2013	1	Phase I	0-10	3.6	<0.5	12.3	5.7	11.6	30.6	14.8	10.4	<0.02	<5	<10	<50	<50
P415-19A	P4-19	2015	3	Phase I	0-15	3.9	0.04	11.2	5.4	10.5	12.8	13.9	8.0	<0.05	<10	<40	<40	<40
P417-19A	P4-19	2017	5	Phase I	0-15	4.0	0.04	12.7	5.2	10.2	8.1	14.4	8.0	<0.05	<10	<50	<50	<100
P4-19A	P4-19	2019	7	Phase II	0-15	3.2	<0.050	9.4	4.8	11.0	7.8	13.0	7.3	<0.01	<7.0	<2.0	20	<3.9
	P4-19 depth	2212			20.40		0.5								_			
13-09412 P415 10B	P4-19 P4-19	2013 2015	3	Phase I Phase I	30-40	3.4	<0.5	11.5	5.6 5.6	11.5 12.9	<b>11.1</b> 8.4	14.6 17.5	9.0 6.0	<0.02 <0.05	<5 <10	<10 <40	<50 <40	<50 <40
P415-19B P417-19B	P4-19 P4-19	2015	5	Phase I	40-50 40-50	4.3	0.02	13.3 13.4	5.6	11.4	9.3	16.0	9.0	<0.05	<10	<40 <50	<40 <50	<100
P4-19B	P4-19	2019	7	Phase II	40-50	3.3	<0.050	9.0	5.0	11.0	7.7	12.0	6.3	<0.01	<7.0	<4.0	11	<6.0
l	1	1	1		1	1	1	l		l	l	1	1	1	1	1	l	

TABLE 5
PIN-4 USAF Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Content	<u>'S</u>																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic N	Mean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mea						2.9	1.0	20.0	5.0	12.5	10.0	12.3	15.0	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviat						0.9	0.0	0.0	0.0	5.6	0.0	2.4	0.0	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Stand						5.6	1.0	20.0	5.0	29.4	10.0	19.5	15.0	0.10	10.0	10.0	50.0	50.0
Downgradient														I	I		I	
	P4-20 surface																	
13-09413	P4-20	2013	1	Phase I	0-10	3.4	<0.5	11.7	4.4	9.2	9.4	11.7	8.3	<0.02	<5	<10	<50	<50
P415-20A	P4-20	2015	3	Phase I	0-15	4.0	0.05	12.5	5.2	10.7	9.5	14.1	10.0	<0.05	<10	<40	<40	<40
P417-20A	P4-20	2017	5	Phase I	0-15	3.8	0.04	11.1	4.6	9.2	7.4	12.0	9.0	<0.05	<10	<50	<50	<100
P417-BD6 (Dup)	P4-20	2017	5	Phase I	0-15	4.3	0.04	11.0	5.3	10.8	8.6	13.2	10.0	<0.05	<10	<50	<50	<100
P4-20A	P4-20	2019	7	Phase II	0-15	3.5	<0.050	11.0	5.0	11.0	8.6	12.0	9.7	<0.01	<7.0	2.4	34	8.5
	P4-20 depth																	
13-09414	P4-20	2013	1	Phase I	30-40	3.3	<0.5	11.1	4.0	8.8	8.7	11.5	7.4	<0.02	<5	<10	<50	<50
P415-20B	P4-20	2015	3	Phase I	40-50	3.3	0.02	10.5	4.2	8.0	7.1	11.9	6.0	<0.05	<10	<40	<40	<40
P417-20B	P4-20	2017	5	Phase I	40-50	4.2	0.04	11.1	4.7	9.6	7.9	12.7	9.0	<0.05	<10	<50	<50	<100
P4-20B	P4-20	2019	7	Phase II	40-50	3.4	<0.050	10.0	4.8	9.6	7.9	13.0	7.2	<0.01	<7.0	<3.0	26	7.9

# TABLE 5 PIN-4 USAF Landfill - Summary of Soil Monitoring Analytical Data

L	Lir	ık	To:	Tabı	le o	t Ca	oni	tent	ts

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co* (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn* (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic N	1ean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mea	ın					2.9	1.0	20.0	5.0	12.5	10.0	12.3	15.0	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviat	ion					0.9	0.0	0.0	0.0	5.6	0.0	2.4	0.0	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Stand	ard Deviation					5.6	1.0	20.0	5.0	29.4	10.0	19.5	15.0	0.10	10.0	10.0	50.0	50.0
Downgradient						•												
	P4-21 surface																	
13-09415	P4-21	2013	1	Phase I	0-10	3.4	<0.5	12.1	4.7	9.9	9.3	13.0	9.1	<0.02	<5	<10	<50	<50
P415-21A	P4-21	2015	3	Phase I	0-15	3.6	0.03	11.9	5.0	9.8	8.0	14.3	7.0	<0.05	<10	<40	<40	<40
P415-BD4 (Dup)	P4-21	2015	3	Phase I	0-15	3.7	0.03	12.4	5.4	10.8	8.4	13.8	8.0	<0.05	<10	<40	<40	<40
P415-21A (Interlab)	P4-21	2015	3	Phase I	0-15	3.1	<0.05	12.0	4.9	11.0	8.3	13.0	<10	<0.01	<12	<10	<50	<50
P417-21A	P4-21	2017	5	Phase I	0-15	4.1	0.04	11.0	5.1	10.0	7.9	13.6	9.0	<0.05	<10	<50	<50	<100
P4-21A	P4-21	2019	7	Phase II	0-15	3.2	<0.050	10.0	5.0	10.0	7.9	13.0	7.9	<0.01	<7.0	<3.0	29	7.8
	P4-21 depth																	
13-09416	P4-21	2013	1	Phase I	30-40	3.5	<0.5	13.1	5.0	10.6	9.5	13.8	9.1	<0.02	<5	<10	<50	<50
P415-21B	P4-21	2015	3	Phase I	40-50	4.0	0.03	12.5	6.1	11.4	8.7	16.0	7.0	<0.05	<10	<40	<40	<40
P417-21B	P4-21	2017	5	Phase I	40-50	4.1	0.03	10.8	5.6	10.7	7.9	14.6	8.0	<0.05	<10	<50	<50	<100
P4-21B	P4-21	2019	7	Phase II	40-50	3.3	<0.050	10.0	5.3	10.0	7.9	14.0	7.3	<0.01	<7.0	<3.0	21	5.2
															Legend			

N/A = not analyzed

Legend
XX Sample exceeds baseline mean
XX Sample exceeds baseline mean + 3x SD

### **TABLE 6A**

# PIN-4 Tier II Disposal Facility - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic M	ean			1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A		
Baseline Data - Arithmetic Mear	n				1.8	1.0	20.0	7.2	32.4	10.0	12.8	26.5	0.10	10.0	10.0	50.0	50.0	
Baseline Data - Standard Deviation	on		1.0	0.0	0.0	1.6	10.8	0.0	4.5	9.4	0.00	0.0	0.0	0.0	0.0			
Baseline Data Mean + 3x Standa	ard Deviation				4.8	1.0	20.0	11.9	64.7	10.0	26.4	54.7	0.10	10.0	10.0	50.0	50.0	
* If basaling or background gritl	hmatic maan was balaw t	ha dataction	limit the mear	hac been med	ified to m	atch the d	staction lin	nit valuo								•		

DEW Line Cleanup Tier I Criteria						200			1		
DEW Line Cleanup Tier II Criteria	30	5	250	50	100	500	100	500	5		

# **Monitoring Data**

Upgradien <sup>1</sup>
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Opgradient	MW-01 surface																	
13-09340	MW-01	2013	1	Phase I	0-10	1.9	<0.5	10.6	4.9	17.5	3.9	7.6	15.3	<0.02	<5	<10	<50	<50
13-09341 Dup	MW-01	2013	1	Phase I	0-10	1.4	<0.5	8.6	3.3	13.3	2.9	5.7	10.7	<0.02	<5	<10	<50	<50
P414-1WA	MW-01	2013	2	Phase I	0-15	1.7	0.02	7.1	6.7	14.9	<5	18.8	11.0	<0.10	<10	<50	<50	<100
P415-1WA	MW-01	2015	3	Phase I	0-15	2.2	0.02	7.7	5.3	21.7	3.4	8.2	14.0	<0.05	<10	<40	<40	<40
P416-1WA	MW-01	2015	4	Phase I	0-15	1.4	<0.05	18.0	4.3	14.0	2.5	11.0	13.0	<0.03	<12	<10	<50	<50
P417-1WA	MW-01	2017	5	Phase I	0-15	2.3	0.02	12.7	6.2	17.0	3.7	11.1	20.0	<0.01	<10	<50	<50	<100
MW-01A	MW-01	2017	7	Phase II	0-15	2.2	<0.050	12.0	7.8	33.0	4.5	12.0	26.0	<0.03	<7.0	<4.0	24	<6.0
MW-09A (Dup)	MW-01	2019	7	Phase II	0-15	2.1	<0.050	12.0	8.0	24.0	3.6	12.0	26.0	<0.01	<7.0	<4.0	20	<6.0
	MW-01 depth																	
13-09342	MW-01	2013	1	Phase I	30-40	2.7	<0.5	14.8	7.2	27.5	6.1	11.8	19.9	<0.02	<5	<10	<50	<50
P414-1WB	MW-01	2014	2	Phase I	40-50	1.9	0.02	12.5	9.3	37.7	<4.9	21.5	24.0	<0.10	<10	<50	<50	<100
P415-1WB	MW-01	2015	3	Phase I	40-50	2.8	0.03	12.6	9.0	21.7	4.5	17.6	25.0	<0.05	<10	<40	<40	<40
P416-1WB	MW-01	2016	4	Phase I	40-50	1.9	<0.05	24.0	6.0	17.0	3.6	15.0	16.0	<0.01	<12	<10	<50	<50
P417-1WB	MW-01	2017	5	Phase I	40-50	2.3	0.02	12.2	6.4	18.9	3.7	10.9	23.0	<0.05	<10	<50	<50	<100
MW-01B	MW-01	2019	7	Phase II	40-50	2.9	<0.050	13.0	8.6	32.0	4.4	12.0	25.0	<0.01	<7.0	<3.0	16	<4.7

# TABLE 6A PIN-4 Tier II Disposal Facility - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents Monitoring Monitoring F1\* F2\* F3\* F4\* Cd\* Cr\* Co Pb\* Total PCB\* Sample ID Location Date Year Phase Depth As Cu Ni Zn  $C_6 - C_{10}$ C<sub>10</sub>-C<sub>16</sub> C<sub>16</sub>-C<sub>34</sub>  $C_{34}$ - $C_{50}$ (mg/kg) (cm) (mg/kg) (mg/kg) Background Data - Arithmetic Mean 1.5 1.0 20.0 5.0 19.0 10.0 9.2 16.1 0.10 N/A N/A N/A N/A 1.8 20.0 32.4 12.8 26.5 10.0 10.0 Baseline Data - Arithmetic Mean 1.0 7.2 10.0 0.10 50.0 50.0 Baseline Data - Standard Deviation 1.0 0.0 0.0 1.6 10.8 0.0 4.5 9.4 0.00 0.0 0.0 0.0 0.0 4.8 11.9 64.7 26.4 54.7 10.0 50.0 Baseline Data Mean + 3x Standard Deviation 1.0 20.0 10.0 0.10 10.0 50.0 Downgradient MW-02 surface 13-09343 MW-02 2013 1 Phase I 0-10 1.6 <0.5 16.7 6.7 36.5 7.0 17.1 27.3 < 0.02 <5 <10 154 79 P414-2WA MW-02 2014 2 Phase I 0-15 2.0 0.06 12.1 8.7 50.7 <4.9 20.9 34.0 < 0.10 <10 <50 118 <100 MW-02 2015 3 0-15 2.4 0.01 9.4 8.0 45.4 3.7 12.2 20.0 < 0.05 <10 <40 <40 <40 P415-2WA Phase I 2016 P416-2WA MW-02 4 Phase I 0-15 2.2 < 0.1 16.0 7.3 22.0 5.1 16.0 25.0 < 0.02 <12 <10 150 <50 P417-2WA MW-02 2017 5 Phase I 0-15 2.9 0.06 22.6 7.8 31.8 5.4 22.8 27.0 < 0.05 <10 <50 193 <100 MW-02 2019 7 Phase II 0-15 2.4 0.20 5.7 6.3 96.0 3.2 16.0 13.0 < 0.02 <13 14 450 130 MW-02A MW-02 depth MW-02 2013 Phase I Not sampled - too wet 1 2 MW-02 2014 40-50 11.3 24.0 <10 <50 P414-2WB Phase I 1.6 0.01 8.1 45.6 <4.9 16.5 < 0.10 <50 <100 MW-02 2015 40-50 4.1 12.9 70.1 42.0 69.0 < 0.05 <10 <40 <40 P415-2WB 3 Phase I 0.09 15.5 11.3 80 P416-2WB MW-02 2016 4 Phase I 40-50 <2 <0.1 13.0 8.4 71.0 3.5 15.0 <20 < 0.02 <23 <20 <100 <100 MW-02 2017 5 40-50 3.7 0.15 26.8 7.5 60.1 22.8 33.0 < 0.05 <10 <50 128 <100 P417-2WB Phase I 6.6 MW-02B MW-02 2019 7 Phase II 40-50 2.0 0.15 3.5 5.5 110.0 2.1 12.0 7.2 < 0.04 <39 25 850 230

# TABLE 6A PIN-4 Tier II Disposal Facility - Summary of Soil Monitoring Analytical Data

<u>Link To: Table of Contents</u>	1		1		ı						1	ı		Γ	ı	ı	ı	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic Me	222		•			1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	21/2	21/2	21/2	21/2
Baseline Data - Arithmetic Mean						1.8	1.0 1.0	20.0	7.2	32.4	10.0	12.8	26.5	0.10	N/A 10.0	N/A 10.0	N/A <b>50.0</b>	N/A <b>50.0</b>
Baseline Data - Standard Deviation						1.0	0.0	0.0	1.6	10.8	0.0	4.5	9.4	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standa						4.8	1.0	20.0	11.9	64.7	10.0	26.4	54.7	0.00	10.0	10.0	50.0	50.0
Downgradient	ru Deviation					4.0	1.0	20.0	11.9	04.7	10.0	20.4	34.7	0.10	10.0	10.0	50.0	50.0
Downgraulent	MW-03 surface																	
12.00244	MW-03	2013	1	Phase I	0-10	1.3	<0.5	14.0	5.9	29.2	4.1	10.3	22.0	<0.02	<5	<10	<50	<50
13-09344	MW-03	2013	2	Phase I	0-10	2.0	0.07	8.1	5.9	88.6	4.1 <5	10.3	11.0	<0.02	<10	<50	123	<100
P414-3WA	MW-03	2014	3	Phase I	0-15	1.8	<0.07	11.2	6.5	28.9	3.9	11.7	18.0	<0.10	<10	<40	<40	<40
P415-3WA P416-3WA	MW-03	2015	4	Phase I	0-15	1.4	<0.01	21.0	7.5	32.0	3.9	16.0	26.0	<0.05	<10	<10	<50	<40 <50
P417-3WA	MW-03	2017	5	Phase I	0-15	1.7	0.02	16.1	6.8	36.5	3.5	13.5	26.0	<0.01	<10	<50	<50	<100
MW-03A	MW-03	2017	7	Phase II	0-15	1.4	<0.050	12.0	6.6	29.0	2.6	11.0	20.0	<0.03	<7.0	<4.0	9.6	<6.0
13-09345 P414-3WB	MW-03 depth MW-03 MW-03	2013	1 2	Phase I Phase I	30-40 40-50	1.5	<0.5	13.7	<b>8.2</b> 5.9	51.0 73.1	4.1	<b>13.0</b> 10.2	23.1	<0.02	<5 <10	<10 <50	<50 <b>63</b>	<50 <100
P415-3WB	MW-03	2015	3	Phase I	40-50	1.9	0.01	11.4	7.2	30.3	3.6	13.1	18.0	<0.05	<10	<10	<40	<40
P415-BD1 (Dup)	MW-03	2015	3	Phase I	0-15	3.0	0.03	10.6	6.7	36.4	4.9	12.6	22.0	<0.05	<10	<40	<40	<40
P415-3WB (Interlab)	MW-03	2015	3	Phase I	40-50	1.2	<0.05	24.0	5.7	26.0	3.2	15.0	17.0	<0.01	<12	<10	<50	<50
P416-3WB	MW-03	2016	4	Phase I	40-50	1.5	<0.05	26.0	8.0	39.0	3.6	18.0	22.0	<0.01	<12	<10	<50	<50
P416-BD1 (Dup)	MW-03	2016	4	Phase I	40-50	1.4	<0.05	19.0	7.2	37.0	3.1	14.0	20.0	<0.01	<12	<10	<50	<50
P416-3WB (Interlab)	MW-03	2016	4	Phase I	40-50	2.5	0.01	22.6	7.7	37.9	3.6	18.8	25.0	<0.05	<10	<50	<50	<100
P417-3WB	MW-03	2017	5	Phase I	40-50	1.9	0.01	17.7	7.6	34.2	4.0	15.6	25.0	<0.05	<10	<50	<50	<100
P417-BD5 (Dup)	MW-03	2017	5	Phase I	40-50	2.1	0.02	17.3	7.0	30.8	4.4	14.6	22.0	<0.05	<10	<50	<50	<100
MW-03B	MW-03	2019	7	Phase II	40-50	1.7	<0.050	12.0	6.7	32.0	2.8	11.0	21.0	<0.01	<7.0	<4.0	9.1	<6.0

### **TABLE 6A**

# PIN-4 Tier II Disposal Facility - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents

Crm   (rmg/kg)   (rm	Link To: Table of Contel	113																	
Part	Sample ID	Location	Date	_	_											C <sub>6</sub> -C <sub>10</sub>	C <sub>10</sub> -C <sub>16</sub>	C <sub>16</sub> -C <sub>34</sub>	C <sub>34</sub> -C <sub>50</sub>
Part	Dealers of Date Additional						4.5	4.0	20.0	5.0	40.0	10.0	0.2	45.4	0.10				
New Park   Sender   Control   Cont								_									· ·	· ·	· ·
Name																			
MW-04 surface																			
MW-04 surface		iluaru Deviation					4.0	1.0	20.0	11.5	04.7	10.0	20.4	34.7	0.10	10.0	10.0	30.0	30.0
1399346   MW-04   2014   2   Phase   0-10   2.8   -0.5   17.2   8.3   51.6   7.6   12.6   23.0   -0.02   -0.5   -1.0   -0.5	Downgradient	1.014.04	1				1	1	1	1									
### MW-04   2014   2   Phase   0-15   1-9   0.01   1.10   7.2   2.12   6.5   1.90   17.0   6.10   6.90   6.50   6.10   #### MW-04   2015   3   Phase   0-15   2.5   0.01   9.3   7.5   24.1   3.3   15.6   22.0   0.05   6.10   6.40   6.40   6.40   #### AUTHOR AND AUTHOR AND AUTHOR AND AUTHOR AND AUTHOR AU		MW-04 surface																	
MIS-SAMA MAY-04 2015 3 Phase   0-15 2.5 0.01 9.3 7.5 24.1 3.3 15.6 220 -0.05 <10 <40 <40 <40 <40 <40 <40 <40 <40 <40 <4	13-09346																		
MW-04   2015   4   Phasel   0-15   2.1   <0.05   13.0   7.1   29.0   3.5   11.0   21.0   <0.01   <1.2   <1.0   <5.0   <5.0   <5.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.0   <1.	P414-4WA																		
MW-04   2017   5   Phase   0-15   2.9   <0.01   16.7   7.1   31.6   3.8   3.5   21.0   <0.05   <10   <50   <50   <100   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00   <0.00																			
MW-04A	P416-4WA																		
MW-104 (Dup)  MW-04 2019 7 Phase II 0-15 1.8 <0.050 11.0 6.9 19.0 2.8 11.0 20.0 <0.01 <7.0 <4.0 31 <6.0 <6.0																			
MW-04 depth																			
13-09347 MW-04 2013 1 Phase   30-40 2.5 < 0.5   13.8   7.0   27.3   5.5   9.9   17.4   <0.02   <5   <10   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <5	MW-10A (Dup)	MW-04	2019	7	Phase II	0-15	1.8	<0.050	11.0	6.9	19.0	2.8	11.0	20.0	<0.01	<7.0	<4.0	31	<6.0
13-09347 MW-04 2013 1 Phase   30-40 2.5 < 0.5   13.8   7.0   27.3   5.5   9.9   17.4   <0.02   <5   <10   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <5																			
13-09347 MW-04 2013 1 Phase   30-40 2.5 < 0.5   13.8   7.0   27.3   5.5   9.9   17.4   <0.02   <5   <10   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <50   <5																			
4414-4WB         MW-04         2014         2         Phase I         40-50         1.8         <0.01         10.5         7.6         25.2         <5         16.9         18.0         <0.10         <10         <50         <50         <100           4414-BDI (Dup)         MW-04         2014         2         Phase I         40-50         2.0         <0.01         10.4         7.2         23.5         <4.9         20.5         16.0         <0.10         <10         <50         <50         <50         <100           2414-BDI (Dup)         MW-04         2014         2         Phase I         40-50         2.1         <0.1         49.0         7.4         21.0         3.8         26.0         17.0         <0.01         <12         <10         <50         N/A           2415-4WB         MW-04         2016         4         Phase I         40-50         2.2         <0.05         18.0         8.2         29.0         3.4         14.0         <0.05         <10         <40         <40         <40         <40         <40         <40         <40         <40         <40         <40         <40         <40         <40         <40         <40         <40         <40 </td <td></td> <td>· ·</td> <td>2012</td> <td>1</td> <td>Dhara I</td> <td>20.40</td> <td>2.5</td> <td>40.5</td> <td>12.0</td> <td>7.0</td> <td>27.2</td> <td></td> <td>0.0</td> <td>17.4</td> <td>40.03</td> <td></td> <td>-110</td> <td>-50</td> <td>450</td>		· ·	2012	1	Dhara I	20.40	2.5	40.5	12.0	7.0	27.2		0.0	17.4	40.03		-110	-50	450
Add-Ball (Dup) MW-04 2014 2 Phase I 40-50 2.0 <0.01 10.4 7.2 23.5 <0.9 20.5 16.0 <0.10 <10 <50 <50 <10 <10 <10 <10 <50 <50 <10 <10 <10 <10 <10 <10 <10 <10 <10 <1							_												
MW-04   2014   2   Phase   40-50   2.1   <0.1   49.0   7.4   21.0   3.8   26.0   17.0   <0.01   <12   <10   <50   N/A																			
PAIS-4WB MW-04 2015 3 Phase I 40-50 <b>2.4</b> <0.01 9.1 6.7 27.1 3.8 10.6 14.0 <0.05 <10 <40 <40 <40 <40 <40 <40 <40 <40 <40 <4							_												
MW-04 2016 4 Phase I 40-50 2.2 <0.05 18.0 8.2 29.0 3.4 14.0 22.0 <0.01 <12 <10 <50 <50 <10 <10 <10 <10 <10 <10 <10 <10 <10 <1							_												
PAIT-4WB MW-04 2017 5 Phase II 40-50 <b>2.4</b> <0.01 12.9 7.2 24.7 3.6 12.1 22.0 <0.05 <10 <50 <50 <10 <10 <10 <10 <10 <10 <10 <10 <10 <1																			
MW-04B MW-04 2019 7 Phase II 40-50 2.3 <0.050 13.0 7.8 24.0 3.2 12.0 22.0 <0.01 <7.0 <3.0 11 <4.7							_												
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N/A = not analyzed

Legend
XX Sample exceeds baseline mean
XX Sample exceeds baseline mean + 3x SD

**TABLE 6B** 

# PIN-4 Tier II Disposal Facility - Summary of Groundwater Monitoring Analytical Data

Link To: Table of Contents

<u>Link To: Table of Content:</u>	<u> </u>	1	1	1												1
Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr* (mg/L)	Co (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (mg/L)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/L)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/L)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/L)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/L)
Baseline Data	<u>.</u>	1		ļ.					!			Į.	Į.			1
Upgradient																
10-32054	MW-01B	2010			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0010	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
11-34574	MW-01B	2011			<0.0030	<0.0010	0.0237	0.0074	0.0053	<0.0010	0.0597	0.6940	<0.05	<0.5	<1.0	<1.0
12-15344	MW-01B	2012			0.0010	<0.0010	0.8700	0.0100	0.0250	<0.0050	0.4500	0.1200	<0.05	<0.5	<1.0	<1.0
Downgradient																
10-32036	MW-02	2010			<0.0030	<0.0010	<0.0050	0.0315	0.0107	<0.0100	0.0374	<0.0100	<0.05	<0.5	<1.0	<1.0
10-32037	MW-03	2010			<0.0030	<0.0010	<0.0050	0.0060	0.0113	<0.0100	0.0248	<0.0100	<0.05	<0.5	<1.0	<1.0
10-32038	MW-04	2010			0.0037	<0.0010	<0.0050	0.0069	0.0101	<0.0100	0.0142	1.40	<0.05	<0.5	<1.0	<1.0
11-34570	MW-02	2011			<0.0030	<0.0010	<0.0050	0.0650	<0.0050	<0.0100	0.1600	0.9000	<0.05	<0.5	<1.0	<1.0
11-34571 (Dup)	MW-02	2011			<0.0030	<0.0010	<0.0050	0.0610	<0.0050	<0.0100	0.1200	0.4000	<0.05	<0.5	<1.0	<1.0
11-34572	MW-03	2011			<0.0030	<0.0010	<0.0050	0.0077	0.0172	<0.0100	0.0253	3.92	<0.05	0.6	<1.0	<1.0
11-34573	MW-04	2011			<0.0030	<0.0010	0.0109	0.0042	0.0079	<0.0100	0.0696	0.4140	<0.05	<0.5	<1.0	<1.0
12-15345	MW-02	2012			0.0090	<0.0010	0.0380	0.0380	0.0350	0.0060	0.0980	3.20	<0.05	<0.5	<1.0	<1.0
12-15346	MW-03	2012			0.0030	<0.0010	0.0720	0.0100	0.0390	0.0050	0.0510	5.20	<0.05	<0.5	<1.0	<1.0
12-15347	MW-04	2012			0.0030	<0.0010	0.1800	0.0100	0.0140	<0.0050	0.0940	0.3200	<0.05	<0.5	<1.0	<1.0
				N value	13	13	13	13	13	13	13	13	13	13	13	13
Baseline Data - Arithmetic Mear	n				0.0024	0.0005	0.0932	0.0199	0.0141	0.0040	0.0928	1.28	0.025	0.3	0.5	0.5
Baseline Data - Arithmetic Mea	n Corrected for Detection Limit				0.0030	0.0010	0.0050	0.0199	0.0141	0.0100	0.0928	1.28	0.05	0.5	1.0	1.0
Baseline Data - Standard Deviat	ion				0.0000	0.0000	0.0000	0.0219	0.0120	0.0000	0.1165	1.71	0.00	0.0	0.0	0.0
Baseline Data - Corrected Arith	metic Mean + 3x Standard Devia	ation			0.0030	0.0010	0.0050	0.0855	0.0502	0.0100	0.4423	6.41	0.05	0.5	1.0	1.0

### **Monitoring Data**

Upgradient -	MW-01

Not sampled - insufficient water	MW-01	2013	1	Phase I												
P414-1W	MW-01	2014	2	Phase I	0.0021	0.00028	0.8990	0.0140	0.0610	0.0025	0.6710	0.3380	<0.2	<0.2	0.1	<0.1
P415-1W	MW-01	2015	3	Phase I	<0.0010	0.00004	0.0078	0.0008	0.0070	<0.0005	0.0220	0.0300	<0.1	<0.1	<0.1	<0.1
P416-1W	MW-01	2016	4	Phase I	0.00099	0.00021	0.5520	0.0127	0.0194	0.00307	0.4120	0.1940	<0.1	<0.1	<0.2	<0.2
P417-1W	MW-01	2017	5	Phase I	0.0004	0.00018	0.1900	0.0134	0.0050	0.0002	0.1360	0.1380	<0.1	<0.1	<0.1	<0.1
MW-01	MW-01	2019	7	Phase II	0.00054	0.000048	0.0210	0.00074	0.0047	0.00022	0.1200	0.0240	0.035	<0.10	<0.10	<0.10
MW-09 (Dup)	MW-01	2019	7	Phase II	0.00045	0.000042	0.0180	0.00071	0.0051	0.0001	0.1100	0.0240	<0.025	<0.10	<0.10	<0.10

### **TABLE 6B**

### PIN-4 Tier II Disposal Facility - Summary of Groundwater Monitoring Analytical Data

Link To: Table of Contents

Carrier   Phase   As*   Cd*   Cr*   Co   Cu   Pb*   Ni   Zn   Cr-Cp;   Cg-Cp;   Cg	F4* C <sub>34</sub> -C <sub>50</sub> (mg/L)  <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.
Upgradient	<1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0
10-32054 MW-018 2010	<1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0
12-15344	<1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0
12-15344   MW-01B   2012   0.0010   0.0010   0.8700   0.0100   0.0250   0.0050   0.4500   0.1200   0.055   0.055   0.100   0.0050   0.00	<1.0 <1.0 <1.0 <1.0 <1.0 <1.0
Downgradient	<1.0 <1.0 <1.0 <1.0 <1.0
10-32036 MW-02 2010	<1.0 <1.0 <1.0 <1.0
10-32037 MW-03 2010	<1.0 <1.0 <1.0 <1.0
10-32038	<1.0 <1.0 <1.0
11-34570 MW-02 2011	<1.0 <1.0
11-34571 (Dup)   MW-02   2011	<1.0
11-34572       MW-03       2011       <0.0030       <0.0010       <0.0050       0.0077       0.0172       <0.0100       0.0253       3.92       <0.05       0.6       <1.0         11-34573       MW-04       2011       <0.0030	
11-34573	<1.0
12-15345 MW-02 2012 0.0090 <0.0010 0.0380 0.0380 0.0350 0.0060 0.0980 3.20 <0.05 <0.5 <1.0   12-15346 MW-03 2012 0.0030 <0.0010 0.0720 0.0100 0.0390 0.0050 0.0510 5.20 <0.05 <0.5 <1.0   12-15347 MW-04 2012 0.0030 <0.0010 0.1800 0.0100 0.0140 <0.0050 0.0940 0.3200 <0.05 <0.5 <1.0   12-15347 MW-04 2012 0.0030 <0.0010 0.1800 0.0100 0.0140 <0.0050 0.0940 0.3200 <0.05 <0.5 <1.0   13 13 13 13 13 13 13 13 13 13 13 13 13 1	-1.0
12-15346 MW-03 2012 0.0030 <0.0010 0.0720 0.0100 0.0390 0.0050 0.0510 5.20 <0.05 <0.5 <1.0 12-15347 MW-04 2012 0.0030 <0.0010 0.1800 0.0100 0.0140 <0.0050 0.0940 0.3200 <0.05 <0.5 <1.0 N value 13 13 13 13 13 13 13 13 13 13 13 13 13	<1.0
12-15347 MW-04 2012 0.0030 <0.0010 0.1800 0.0100 0.0140 <0.0050 0.0940 0.3200 <0.05 <0.5 <1.0    N value 13 13 13 13 13 13 13 13 13 13 13 13 13	<1.0
N value   13   13   13   13   13   13   13   1	<1.0
Baseline Data - Arithmetic Mean         0.0024         0.0005         0.0932         0.0199         0.0141         0.0040         0.0928         1.28         0.025         0.3         0.5           Baseline Data - Arithmetic Mean Corrected for Detection Limit         0.0030         0.0010         0.0050         0.0199         0.0141         0.0100         0.0928         1.28         0.05         0.5         1.0           Baseline Data - Standard Deviation         0.0000         0.0000         0.0000         0.0219         0.0120         0.0000         0.1165         1.71         0.00         0.0           Baseline Data - Corrected Arithmetic Mean + 3x Standard Deviation         0.0030         0.0010         0.0050         0.0855         0.0502         0.0100         0.4423         6.41         0.05         0.5         1.0	<1.0
Baseline Data - Arithmetic Mean Corrected for Detection Limit         0.0030         0.0010         0.0050         0.0199         0.0141         0.0100         0.0928         1.28         0.05         0.5         1.0           Baseline Data - Standard Deviation         0.0000         0.0000         0.0000         0.0219         0.0120         0.0000         0.1165         1.71         0.00         0.0           Baseline Data - Corrected Arithmetic Mean + 3x Standard Deviation         0.0030         0.0010         0.0050         0.0855         0.0502         0.0100         0.4423         6.41         0.05         0.5         1.0	13
Baseline Data - Standard Deviation         0.0000         0.0000         0.0000         0.0219         0.0120         0.0000         0.1165         1.71         0.00         0.0         0.0           Baseline Data - Corrected Arithmetic Mean + 3x Standard Deviation         0.0030         0.0010         0.0050         0.0855         0.0502         0.0100         0.4423         6.41         0.05         0.5         1.0	0.5
Baseline Data - Corrected Arithmetic Mean + 3x Standard Deviation 0.0030 0.0010 0.0050 0.0855 0.0502 0.0100 0.4423 6.41 0.05 0.5 1.0	1.0
	0.0
	1.0
Downgradient - MW-02	
13-09330 MW-02 2013 1 Phasel 0.0060 0.000437 0.0238 0.0201 0.0484 0.0061 0.0697 0.7910 <0.1 <0.1 <0.15 <	<0.25
13-09331 (Dup) MW-02 2013 1 Phase   0.0065 0.000294 0.0216 0.0195 0.0701 0.00752 0.0611 0.4440 <0.1 <0.1 <0.15	<0.25
P414-2W MW-02 2014 2 Phasel 0.0042 0.00024 0.0509 0.0261 0.0200 0.0045 0.0869 0.5160 <0.2 <0.2 <0.1	<0.1
P415-2W MW-02 2015 3 Phase   0.0022 0.00002 <b>0.0058</b> 0.0110 <0.0020 0.0008 0.0280 0.2340 <0.1 <0.1 <0.1	<0.1
P416-2W MW-02 2016 4 Phase   0.00664 0.000255 0.0473 0.0149 0.0190 0.0123 0.0574 1.95 <0.1 <0.1 <0.2	<0.2
P417-2W MW-02 2017 5 Phase   0.00026 0.00025 <b>0.0073</b> 0.0096 0.0040 0.0042 0.0294 <b>1.82</b> <0.1 <0.1 <0.1	<0.1
MW-02 MW-02 2019 7 Phase II 0.0026 <0.000020 0.0011 0.0081 0.0012 0.00082 0.0250 0.8100 <0.025 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <0.10 <	<0.10

### **TABLE 6B**

# PIN-4 Tier II Disposal Facility - Summary of Groundwater Monitoring Analytical Data

<u>Link To: Table of Contents</u>																
Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr* (mg/L)	Co (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (mg/L)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/L)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/L)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/L)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/L)
Baseline Data																
Upgradient																
10-32054	MW-01B	2010			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0010	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
11-34574	MW-01B	2011			<0.0030	<0.0010	0.0237	0.0074	0.0053	<0.0010	0.0597	0.6940	<0.05	<0.5	<1.0	<1.0
12-15344	MW-01B	2012			0.0010	<0.0010	0.8700	0.0100	0.0250	<0.0050	0.4500	0.1200	<0.05	<0.5	<1.0	<1.0
Downgradient							•	•							•	
10-32036	MW-02	2010			<0.0030	<0.0010	<0.0050	0.0315	0.0107	<0.0100	0.0374	<0.0100	<0.05	<0.5	<1.0	<1.0
10-32037	MW-03	2010			<0.0030	<0.0010	<0.0050	0.0060	0.0113	<0.0100	0.0248	<0.0100	<0.05	<0.5	<1.0	<1.0
10-32038	MW-04	2010			0.0037	<0.0010	<0.0050	0.0069	0.0101	<0.0100	0.0142	1.40	<0.05	<0.5	<1.0	<1.0
11-34570	MW-02	2011			<0.0030	<0.0010	<0.0050	0.0650	<0.0050	<0.0100	0.1600	0.9000	<0.05	<0.5	<1.0	<1.0
11-34571 (Dup)	MW-02	2011			<0.0030	<0.0010	<0.0050	0.0610	<0.0050	<0.0100	0.1200	0.4000	<0.05	<0.5	<1.0	<1.0
11-34572	MW-03	2011			<0.0030	<0.0010	<0.0050	0.0077	0.0172	<0.0100	0.0253	3.92	<0.05	0.6	<1.0	<1.0
11-34573	MW-04	2011			<0.0030	<0.0010	0.0109	0.0042	0.0079	<0.0100	0.0696	0.4140	<0.05	<0.5	<1.0	<1.0
12-15345	MW-02	2012			0.0090	<0.0010	0.0380	0.0380	0.0350	0.0060	0.0980	3.20	<0.05	<0.5	<1.0	<1.0
12-15346	MW-03	2012			0.0030	<0.0010	0.0720	0.0100	0.0390	0.0050	0.0510	5.20	<0.05	<0.5	<1.0	<1.0
12-15347	MW-04	2012			0.0030	<0.0010	0.1800	0.0100	0.0140	<0.0050	0.0940	0.3200	<0.05	<0.5	<1.0	<1.0
				N value	13	13	13	13	13	13	13	13	13	13	13	13
Baseline Data - Arithmetic Mean					0.0024	0.0005	0.0932	0.0199	0.0141	0.0040	0.0928	1.28	0.025	0.3	0.5	0.5
Baseline Data - Arithmetic Mean Corr	ected for Detection Limit	t			0.0030	0.0010	0.0050	0.0199	0.0141	0.0100	0.0928	1.28	0.05	0.5	1.0	1.0
Baseline Data - Standard Deviation					0.0000	0.0000	0.0000	0.0219	0.0120	0.0000	0.1165	1.71	0.00	0.0	0.0	0.0
Baseline Data - Corrected Arithmetic	Mean + 3x Standard Devi	iation			0.0030	0.0010	0.0050	0.0855	0.0502	0.0100	0.4423	6.41	0.05	0.5	1.0	1.0
Downgradient - MW-03																
13-09332	MW-03	2013	1	Phase I	0.0015	0.000119	0.2110	0.0079	0.0158	0.00251	0.0633	0.0394	<0.1	<0.1	<0.15	<0.25
P414-3W	MW-03	2014	2	Phase I	0.0009	0.00008	0.1800	0.0078	0.0210	0.0010	0.0546	0.0920	<0.2	<0.2	<0.1	<0.1
P414-BDW1 (Dup)	MW-03	2014	2	Phase I	0.0020	0.00008	0.1140	0.0110	0.0300	0.0030	0.0654	0.1600	<0.2	<0.2	<0.1	<0.1
P414-3W (Interlab)	MW-03	2014	2	Phase I	0.0012	0.00007	0.2400	0.0093	0.0270	0.0033	0.1000	0.1400	<0.1	<0.71	<1.4	N/A
P415-3W	MW-03	2015	3	Phase I	<0.0004	0.00002	0.0081	N/A	0.0095	<0.0002	0.0418	0.0620	<0.1	<0.1	<0.1	<0.1
P415-BDW1 (Dup)	MW-03	2015	3	Phase I	0.0004	0.00003	0.0079	0.0072	0.0090	N/A	0.0401	0.0600	<0.1	<0.1	<0.1	<0.1
P415-3W (Interlab)	MW-03	2015	3	Phase I	0.00028	0.000058	0.0150	0.0076	0.0095	<0.0002	0.0500	0.0540	N/A	<0.1	<0.2	<0.2
P416-3W	MW-03	2016	4	Phase I	0.00029	0.000028	0.0057	0.00368	0.00755	<0.0002	0.0158	0.0164	<0.1	<0.1	<0.2	<0.2
P416-BDW1 (Dup)	MW-03	2016	4	Phase I	0.0004	0.000035	0.0067	0.00384	0.00815	<0.0002	0.0179	0.0211	<0.1	<0.1	<0.2	<0.2
P416-3W (Interlab)	MW-03	2016	4	Phase I	0.0003	0.00004	0.0113	0.0044	0.0090	<0.0001	0.0206	0.0210	<0.1	<0.1	<0.1	<0.1
P417-3W	MW-03	2017	5	Phase I	0.0004	0.00001	0.0034	0.0055	0.0100	<0.0001	0.0211	0.0130	<0.1	<0.1	<0.1	<0.1
P417-BDW1 (Dup)	MW-03	2017	5	Phase I	0.0004	0.00002	0.0012	0.0055	0.0100	<0.0001	0.0209	0.0110	<0.1	<0.1	<0.1	<0.1
MW-03	MW-03	2019	7	Phase II	0.00041	0.000023	<0.0010	0.0020	0.0130	0.00013	0.0190	0.9700	<0.025	<0.10	<0.10	<0.10

### **TABLE 6B**

### PIN-4 Tier II Disposal Facility - Summary of Groundwater Monitoring Analytical Data

Link To: Table of Contents

<u>Link To: Table of Contents</u>																
Sample ID	Location	Year	Monitoring Year	Monitoring Phase	As* (mg/L)	Cd* (mg/L)	Cr* (mg/L)	Co (mg/L)	Cu (mg/L)	Pb* (mg/L)	Ni (mg/L)	Zn (mg/L)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/L)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/L)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/L)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/L)
Baseline Data	!	· ·			Į.	Į.	Į.	Į.	Į.			Į.				ļ.
Upgradient																
10-32054	MW-01B	2010			<0.0030	<0.0010	<0.0050	<0.0030	<0.0050	<0.0010	<0.0050	<0.0100	<0.05	<0.5	<1.0	<1.0
11-34574	MW-01B	2011			<0.0030	<0.0010	0.0237	0.0074	0.0053	<0.0010	0.0597	0.6940	<0.05	<0.5	<1.0	<1.0
12-15344	MW-01B	2012			0.0010	<0.0010	0.8700	0.0100	0.0250	<0.0050	0.4500	0.1200	<0.05	<0.5	<1.0	<1.0
Downgradient			'	J.	U.		U			U	U				,	
10-32036	MW-02	2010			<0.0030	<0.0010	<0.0050	0.0315	0.0107	<0.0100	0.0374	<0.0100	<0.05	<0.5	<1.0	<1.0
10-32037	MW-03	2010			<0.0030	<0.0010	<0.0050	0.0060	0.0113	<0.0100	0.0248	<0.0100	<0.05	<0.5	<1.0	<1.0
10-32038	MW-04	2010			0.0037	<0.0010	<0.0050	0.0069	0.0101	<0.0100	0.0142	1.40	<0.05	<0.5	<1.0	<1.0
11-34570	MW-02	2011			<0.0030	<0.0010	<0.0050	0.0650	<0.0050	<0.0100	0.1600	0.9000	<0.05	<0.5	<1.0	<1.0
11-34571 (Dup)	MW-02	2011			<0.0030	<0.0010	<0.0050	0.0610	<0.0050	<0.0100	0.1200	0.4000	<0.05	<0.5	<1.0	<1.0
11-34572	MW-03	2011			<0.0030	<0.0010	<0.0050	0.0077	0.0172	<0.0100	0.0253	3.92	<0.05	0.6	<1.0	<1.0
11-34573	MW-04	2011			<0.0030	<0.0010	0.0109	0.0042	0.0079	<0.0100	0.0696	0.4140	<0.05	<0.5	<1.0	<1.0
12-15345	MW-02	2012			0.0090	<0.0010	0.0380	0.0380	0.0350	0.0060	0.0980	3.20	<0.05	<0.5	<1.0	<1.0
12-15346	MW-03	2012			0.0030	<0.0010	0.0720	0.0100	0.0390	0.0050	0.0510	5.20	<0.05	<0.5	<1.0	<1.0
12-15347	MW-04	2012			0.0030	<0.0010	0.1800	0.0100	0.0140	<0.0050	0.0940	0.3200	<0.05	<0.5	<1.0	<1.0
				N value	13	13	13	13	13	13	13	13	13	13	13	13
Baseline Data - Arithmetic Mean					0.0024	0.0005	0.0932	0.0199	0.0141	0.0040	0.0928	1.28	0.025	0.3	0.5	0.5
Baseline Data - Arithmetic Mean Co	rrected for Detection Limi	it			0.0030	0.0010	0.0050	0.0199	0.0141	0.0100	0.0928	1.28	0.05	0.5	1.0	1.0
Baseline Data - Standard Deviation					0.0000	0.0000	0.0000	0.0219	0.0120	0.0000	0.1165	1.71	0.00	0.0	0.0	0.0
<b>Baseline Data - Corrected Arithmeti</b>	c Mean + 3x Standard Dev	viation			0.0030	0.0010	0.0050	0.0855	0.0502	0.0100	0.4423	6.41	0.05	0.5	1.0	1.0
Downgradient - MW-04																
13-09333	MW-04	2013	1	Phase I	<0.0100	<0.00090	6.78	0.0419	0.1150	<0.0050	2.00	0.7930	<0.1	<0.1	<0.15	<0.25
P414-4W	MW-04	2014	2	Phase I	0.0040	0.00041	5.57	0.0380	0.1300	0.0010	2.00	1.8800	<0.2	<0.2	<0.1	<0.1
P415-4W	MW-04	2015	3	Phase I	<0.0020	0.00008	0.0610	0.0050	0.0100	<0.0010	0.1590	0.9800	<0.1	<0.1	<0.1	<0.1
P416-4W	MW-04	2016	4	Phase I	0.00043	0.000077	0.0851	0.0046	0.0383	<0.0004	0.1060	0.1780	<0.1	<0.1	<0.2	<0.2
P417-4W	MW-04	2017	5	Phase I	0.0004	0.00007	0.0687	0.0045	0.0070	<0.0001	0.1090	0.7040	<0.1	<0.1	<0.1	<0.1
MW-04	MW-04	2019	7	Phase II	0.00046	0.000054	0.0120	0.0017	0.0094	0.00024	0.0500	0.5700	<0.025	<0.10	<0.10	<0.10
									•			•	Legend			

N/A = not analyzed

Legend
XX Sample exceeds baseline mean
XX Sample exceeds baseline mean + 3x SD

TABLE 7
PIN-4 Airstrip Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents																		
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
	•		-	-	-	-'			•	-'	•							
Background Data - Arithmetic Me	ean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mear	1					1.6	1.0	20.0	5.3	24.2	10.0	12.7	21.7	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviation	on					0.8	0.0	0.0	2.1	6.0	0.0	3.5	11.3	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standa	rd Deviation				·	4.1	1.0	20.0	11.5	42.1	10.0	23.3	55.6	0.10	10.0	10.0	50.0	50.0

\* If baseline or background arithmetic mean was below the detection limit, the mean has been modified to match the detection limit value.

DEW Line Cleanup Tier I Criteria						200			1	
DEW Line Cleanup Tier II Criteria	30	5	250	50	100	500	100	500	5	

### **Monitoring Data**

Upgradient																		
	P4-22 surface																	
13-09359	P4-22	2013	1	Phase I	0-10	1.4	<0.5	8.1	3.1	21.9	3.8	6.5	32.1	<0.02	<5	<10	140	113
P415-22A	P4-22	2015	3	Phase I	0-15	1.5	0.35	5.4	3.0	25.2	3.6	6.4	31.0	<0.05	<10	<40	49	<40
P417-22A	P4-22	2017	5	Phase I	0-15	3.1	0.05	11.9	6.0	14.1	3.5	9.5	22.0	<0.05	<10	<50	<50	<100
P4-22A	P4-22	2019	7	Phase II	0-15	1.7	<0.050	10.0	5.9	13.0	2.7	8.7	15.0	<0.01	<7.0	<3.0	11	<4.7
P4-27A (Dup)	P4-22	2019	7	Phase II	0-15	1.7	<0.050	10.0	6.4	14.0	3.0	9.2	16.0	<0.01	<7.0	<4.0	16	<6.0
	P4-22 depth																	
13-09360	P4-22	2013	1	Phase I	30-40	2.8	<0.5	11.8	4.7	15.0	4.8	8.3	17.6	<0.02	<5	<10	<50	<50
13-09361	P4-22	2013	1	Phase I	30-40	2.6	<0.5	11.0	4.4	17.1	4.5	7.9	16.5	<0.02	<5	<10	<50	<50
P415-22B	P4-22	2015	3	Phase I	40-50	3.0	0.05	10.4	5.8	18.2	4.6	10.1	13.0	<0.05	<10	<40	<40	<40
P417-22B	P4-22	2017	5	Phase I	40-50	2.8	0.11	9.8	5.0	21.6	3.3	8.6	23.0	<0.05	<10	<50	67	<100
P4-22B	P4-22	2019	7	Phase II	40-50	1.7	<0.050	10.0	6.2	12.0	2.9	9.3	15.0	<0.01	<7.0	<4.0	9.2	<6.0

TABLE 7
PIN-4 Airstrip Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Conten	<u>ts</u>																	
Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
Background Data - Arithmetic	Mean					1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Me						1.6	1.0	20.0	5.3	24.2	10.0	12.7	21.7	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Devia						0.8	0.0	0.0	2.1	6.0	0.0	3.5	11.3	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Stan						4.1	1.0	20.0	11.5	42.1	10.0	23.3	55.6	0.10	10.0	10.0	50.0	50.0
Downgradient																		
20 mgradiene	P4-23 surface																	
13-09362	P4-23	2013	1	Phase I	0-10	1.4	<0.5	14.9	5.2	19.0	4.5	11.4	16.3	<0.02	<5	<10	<50	<50
P415-23A	P4-23	2015	3	Phase I	0-10	1.1	0.20	3.2	3.0	21.9	1.8	11.4	7.0	<0.02	<10	<40	133	46
P417-23A	P4-23	2017	5	Phase I	0-15	1.8	0.03	14.1	5.7	22.6	3.5	12.4	19.0	<0.05	<10	<50	<50	<100
P4-23A	P4-23	2019	7	Phase II	0-15	<1.0	0.28	4.7	2.6	46.0	1.2	18.0	6.4	<0.04	<39	12	570	150
	P4-23 depth																	
13-09363	P4-23	2013	1	Phase I	30-40	1.3	<0.5	14.9	5.2	20.9	4.4	12.2	16.8	<0.02	<5	<10	<50	<50
P415-23B	P4-23	2015	3	Phase I	40-50	1.6	0.05	12.6	5.0	25.3	4.0	12.6	14.0	<0.05	<10	<40	45	<40
P415-BD7 (Dup)	P4-23	2015	3	Phase I	40-50	1.6	0.07	11.7	4.7	29.0	3.7	14.0	14.0	<0.05	<10	<40	42	<40
P415-23B (Interlab)	P4-23	2015	3	Phase I	40-50	<1	0.051	12.0	4.5	26.0	3.5	11.0	15.0	<0.01	<12	<10	66	<50
P417-23B	P4-23	2017	5	Phase I	40-50	1.6	0.05	13.5	5.0	25.0	3.5	13.8	17.0	<0.05	<10	<50	<50	<100
P417-23B (Dup)	P4-23	2017	5	Phase I	40-50	1.7	0.05	17.2	5.2	23.7	3.8	15.2	17.0	<0.05	<10	<50	<50	<100
P4-23B	P4-23	2019	7	Phase II	40-50	1.3	<0.050	12.0	4.9	15.0	2.8	9.7	16.0	<0.01	<7.0	<4.0	21	<6.0

# TABLE 7 PIN-4 Airstrip Landfill - Summary of Soil Monitoring Analytical Data

Link To: Table of Contents

Sample ID	Location	Date	Monitoring Year	Monitoring Phase	Depth (cm)	As (mg/kg)	Cd* (mg/kg)	Cr* (mg/kg)	Co (mg/kg)	Cu (mg/kg)	Pb* (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	Total PCB* (mg/kg)	F1* C <sub>6</sub> -C <sub>10</sub> (mg/kg)	F2* C <sub>10</sub> -C <sub>16</sub> (mg/kg)	F3* C <sub>16</sub> -C <sub>34</sub> (mg/kg)	F4* C <sub>34</sub> -C <sub>50</sub> (mg/kg)
	•		•	•	•													
Background Data - Arithmetic M						1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
Baseline Data - Arithmetic Mear						1.6	1.0	20.0	5.3	24.2	10.0	12.7	21.7	0.10	10.0	10.0	50.0	50.0
Baseline Data - Standard Deviation						0.8	0.0	0.0	2.1	6.0	0.0	3.5	11.3	0.00	0.0	0.0	0.0	0.0
Baseline Data Mean + 3x Standa	rd Deviation					4.1	1.0	20.0	11.5	42.1	10.0	23.3	55.6	0.10	10.0	10.0	50.0	50.0
Downgradient																		
	P4-24 surface																	
13-09364	P4-24	2013	1	Phase I	0-10	1.7	<0.5	16.7	7.5	20.7	3.9	14.1	20.9	<0.02	<5	<10	<50	<50
P415-24A	P4-24	2015	3	Phase I	0-15	1.9	0.01	12.2	7.2	16.8	3.8	12.7	16.0	<0.05	<10	<40	<40	<40
P417-24A	P4-24	2017	5	Phase I	0-15	2.3	0.03	20.3	6.9	24.1	3.4	17.7	21.0	<0.05	<10	<50	<50	<100
P4-24A	P4-24	2019	7	Phase II	0-15	1.6	<0.10	3.8	2.2	19.0	3.8	9.9	21.0	<0.04	<37	<12	120	<19
	P4-24 depth																	
13-09365	P4-24	2013	1	Phase I	30-40	1.6	<0.5	14.6	6.7	20.6	3.7	13.1	20.5	<0.02	<5	<10	<50	<50
P415-24B	P4-24	2015	3	Phase I	40-50	2.3	0.02	12.9	7.2	21.0	4.1	13.3	18.0	<0.05	<10	<40	<40	<40
P417-24B	P4-24	2017	5	Phase I	40-50	2.0	0.02	16.6	5.1	18.3	3.6	15.0	17.0	<0.05	<10	<50	<50	<100
P4-24B	P4-24	2019	7	Phase II	40-50	1.8	0.15	4.8	3.6	49.0	3.8	26.0	22.0	<0.03	<34	<15	120	26
															Legend			

N/A = not analyzed

egend
XX Sample exceeds baseline mean
XX Sample exceeds baseline mean + 3x SD

# **APPENDIX A**

**Statement of Limitations** 



This report has been prepared exclusively for the Department of National Defence (DND) Canada. Any other person or entity may not rely upon the report without express written consent from Department of National Defence (DND) Canada.

Any use, which a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties. Arcadis Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Some of the information presented in this report was provided through existing documents. Although attempts were made, whenever possible, to obtain a minimum of two confirmatory sources of information, Arcadis Canada Inc., in certain instances, has been required to assume that the information provided is accurate.

The conclusions presented represent the best judgment of the assessors based on current environmental standards and on the site conditions observed on August 21, 22, 23 and 24, 2019. Due to the nature of the investigation and the limited data available, the assessors cannot warrant against undiscovered environmental liabilities.

Should additional information become available, Arcadis Canada Inc. requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

There is no warranty, expressed or implied that the work reported herein has uncovered all potential environmental liabilities, nor does the report preclude the possibility of contamination outside of the areas of investigation. The findings of this report were developed in a manner consistent with a level of care and skill normally exercised by members of the environmental science and engineering profession currently practicing under similar conditions in the area.

A potential remains for the presence of unknown, unidentified, or unforeseen surface and sub-surface contamination. Any evidence of such potential site contamination would require appropriate surface and sub-surface exploration and testing.

If new information is developed in future work (which may include excavations, borings, or other studies), Arcadis Canada Inc. should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

# **APPENDIX B**

**Laboratory QA/QC Reports and Certificates of Analysis** 

# **APPENDIX B1**

**Laboratory QA/QC Reports and Certificates of Analysis – Soil** 



Your Project #: 30000251

Site#: PIN-4

### **Attention: Elliott Holden**

ARCADIS Canada Inc 1050 Morrison Drive Suite 201 Ottawa, ON Canada K2H 8K7

Your C.O.C. #: 591565-02-01, 591565-03-01, 591565-04-01, 591565-05-01, 591565-07-01, 591565-08-01, 591565-09-01

Report Date: 2019/12/04 Report #: R2819708

Report #: R2819708 Version: 5 - Revision

### **CERTIFICATE OF ANALYSIS – REVISED REPORT**

BV LABS JOB #: B971727 Received: 2019/08/27, 10:30

Sample Matrix: Soil # Samples Received: 70

		Date	Date		
Analyses	Quantity	Extracted	Analyzed	<b>Laboratory Method</b>	Analytical Method
BTEX/F1 by HS GC/MS/FID (MeOH extract) (2)	27	N/A	2019/08/30	AB SOP-00039	CCME CWS/EPA 8260d m
BTEX/F1 by HS GC/MS/FID (MeOH extract) (2)	43	N/A	2019/08/31	AB SOP-00039	CCME CWS/EPA 8260d m
CCME Hydrocarbons (F2-F4)+F3A/B in soil (3)	4	2019/08/29	2019/08/29	AB SOP-00036 / AB SOP-00040	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4)+F3A/B in soil (3)	11	2019/08/29	2019/08/30	AB SOP-00036 / AB SOP-00040	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4)+F3A/B in soil (3)	1	2019/08/29	2019/08/31	AB SOP-00036 / AB SOP-00040	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (4)	13	2019/08/29	2019/08/29	AB SOP-00036 / AB SOP-00040	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (4)	39	2019/08/29	2019/08/30	AB SOP-00036 / AB SOP-00040	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (4)	14	2019/08/29	2019/08/31	AB SOP-00036 / AB SOP-00040	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in soil) (4)	4	2019/08/30	2019/08/31	AB SOP-00036 / AB SOP-00040	CCME PHC-CWS m
CCME Hydrocarbons (F2/F2+F3B) in soil (5)	16	N/A	2019/12/03		Auto Calc
Elements by ICPMS - Soils	12	2019/08/30	2019/08/30	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Soils	15	2019/08/30	2019/08/31	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Soils	36	2019/08/31	2019/08/31	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Soils	7	2019/09/03	2019/09/03	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Moisture	70	N/A	2019/08/30	AB SOP-00002	CCME PHC-CWS m
Non Routine/Non Validated Matrix Tested (6)	1	N/A	2019/08/29		
Polychlorinated Biphenyls in Soil (1)	8	2019/08/30	2019/08/30	CAL SOP-00149	EPA 8082A R1 m
Polychlorinated Biphenyls in Soil (1)	40	2019/08/30	2019/08/31	CAL SOP-00149	EPA 8082A R1 m



Your Project #: 30000251

Site#: PIN-4

**Attention: Elliott Holden** 

ARCADIS Canada Inc 1050 Morrison Drive Suite 201 Ottawa, ON Canada K2H 8K7

Your C.O.C. #: 591565-02-01, 591565-03-01, 591565-04-01, 591565-05-01, 591565-07-01, 591565-08-01, 591565-09-01

Report Date: 2019/12/04

Report #: R2819708 Version: 5 - Revision

### **CERTIFICATE OF ANALYSIS – REVISED REPORT**

BV LABS JOB #: B971727 Received: 2019/08/27, 10:30

Sample Matrix: Soil # Samples Received: 70

		Date	Date		
Analyses	Quantity	Extracted	Analyzed	<b>Laboratory Method</b>	<b>Analytical Method</b>
Polychlorinated Biphenyls in Soil (1)	2	2019/08/30	2019/09/03	CAL SOP-00149	EPA 8082A R1 m
Polychlorinated Biphenyls in Soil (1)	18	2019/08/31	2019/08/31	CAL SOP-00149	EPA 8082A R1 m
Polychlorinated Biphenyls in Soil (1)	2	2019/08/31	2019/09/03	CAL SOP-00149	EPA 8082A R1 m
Total PCBs in Soil (1)	10	N/A	2019/09/03		Auto Calc
Total PCBs in Soil (1)	60	N/A	2019/09/04		Auto Calc

#### Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

- \* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
- (1) This test was performed by BV Labs Calgary Environmental
- (2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
- (3) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories
- conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent



Your Project #: 30000251

Site#: PIN-4

**Attention: Elliott Holden** 

ARCADIS Canada Inc 1050 Morrison Drive Suite 201 Ottawa, ON Canada K2H 8K7

Your C.O.C. #: 591565-02-01, 591565-03-01, 591565-04-01, 591565-05-01, 591565-07-01, 591565-08-01, 591565-09-01

Report Date: 2019/12/04

Report #: R2819708 Version: 5 - Revision

# **CERTIFICATE OF ANALYSIS** – REVISED REPORT

#### BV LABS JOB #: B971727 Received: 2019/08/27, 10:30

following Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Validation of Performance-Based Alternative Methods September 2003. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

(4) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Validation of Performance-Based Alternative Methods September 2003. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

(5) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Validation of Performance-Based Alternative Methods September 2003. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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

### **Encryption Key**

 $\label{lem:please} \textit{Please direct all questions regarding this Certificate of Analysis to your Project Manager.}$ 

Parminder Virk, Key Account Specialist Email: Parminder.Virk@bvlabs.com Phone# (403)735-2235

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ5997			WJ5998	WJ5998		WJ5999		
Sampling Date		2019/08/21			2019/08/21	2019/08/21		2019/08/21		
Sampling Date		13:00			13:00	13:00		14:00		
COC Number		591565-02-01			591565-02-01	591565-02-01		591565-02-01		
	UNITS	MW-01A	RDL	QC Batch	MW-01B	MW-01B Lab-Dup	RDL	MW-02A	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<4.0	4.0	9569474	<3.0	<3.0	3.0	14 (1)	6.4	9568947
F3 (C16-C34 Hydrocarbons)	mg/kg	24	8.0	9569474	16	21	6.4	450 (1)	14	9568947
F4 (C34-C50 Hydrocarbons)	mg/kg	<6.0	6.0	9569474	<4.7	<4.7	4.7	130 (1)	10	9568947
Reached Baseline at C50	mg/kg	Yes	N/A	9569474	Yes	Yes	N/A	Yes	N/A	9568947
Physical Properties										
Moisture	%	16	0.30	9568918	13	N/A	0.30	54	0.30	9568708
Field Preserved Volatiles										
F1 (C6-C10)	mg/kg	<7.0	7.0	9569760	<7.0	<7.0	7.0	<13 (1)	13	9569760
Surrogate Recovery (%)	•					•				
1,4-Difluorobenzene (sur.)	%	101	N/A	9569760	101	101	N/A	100	N/A	9569760
4-Bromofluorobenzene (sur.)	%	103	N/A	9569760	103	103	N/A	103	N/A	9569760
D10-o-Xylene (sur.)	%	120	N/A	9569760	122	119	N/A	127	N/A	9569760
D4-1,2-Dichloroethane (sur.)	%	119	N/A	9569760	120	118	N/A	120	N/A	9569760
O-TERPHENYL (sur.)	%	91	N/A	9569474	86	97	N/A	88	N/A	9568947

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

N/A = Not Applicable



BV Labs Job #: B971727 ARCADIS Canada Inc
Report Date: 2019/12/04 Client Project #: 30000251
Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6000			WJ6001	WJ6002			WJ6003		
Sampling Date		2019/08/21 14:00			2019/08/21 15:00	2019/08/21 15:00			2019/08/21 16:00		
COC Number		591565-02-01			591565-02-01	591565-02-01			591565-02-01		
	UNITS	MW-02B	RDL	QC Batch	MW-03A	MW-03B	RDL	QC Batch	MW-04A	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	25 (1)	13	9568947	<4.0	<4.0	4.0	9569474	3.1	3.0	9568947
F3 (C16-C34 Hydrocarbons)	mg/kg	850 (1)	28	9568947	9.6	9.1	8.0	9569474	23	6.4	9568947
F4 (C34-C50 Hydrocarbons)	mg/kg	230 (1)	21	9568947	<6.0	<6.0	6.0	9569474	8.0	4.7	9568947
Reached Baseline at C50	mg/kg	Yes	N/A	9568947	Yes	Yes	N/A	9569474	Yes	N/A	9568947
Physical Properties											
Moisture	%	77	0.30	9568708	13	11	0.30	9568918	13	0.30	9568708
Field Preserved Volatiles											
F1 (C6-C10)	mg/kg	<39 (1)	39	9569760	<7.0	<7.0	7.0	9569760	<7.0	7.0	9569760
Surrogate Recovery (%)	3'	•			•	•	-	•	•	•	
1,4-Difluorobenzene (sur.)	%	98	N/A	9569760	100	100	N/A	9569760	99	N/A	9569760
4-Bromofluorobenzene (sur.)	%	100	N/A	9569760	101	101	N/A	9569760	102	N/A	9569760
D10-o-Xylene (sur.)	%	125	N/A	9569760	126	123	N/A	9569760	123	N/A	9569760
D4-1,2-Dichloroethane (sur.)	%	119	N/A	9569760	120	121	N/A	9569760	122	N/A	9569760
O-TERPHENYL (sur.)	%	83	N/A	9568947	77	77	N/A	9569474	95	N/A	9568947

RDL = Reportable Detection Limit

N/A = Not Applicable



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

	-										
BV Labs ID		WJ6004			WJ6005	WJ6006			WJ6019		
Sampling Date		2019/08/21 16:00			2019/08/21 13:20	2019/08/21 16:20			2019/08/22 08:40		
COC Number		591565-02-01			591565-02-01	591565-02-01			591565-03-01		
	UNITS	MW-04B	RDL	QC Batch	MW-09A	MW-10A	RDL	QC Batch	P4-6A	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	<3.0	3.0	9568947	<4.0	<4.0	4.0	9569474	3.3	3.0	9568853
F3 (C16-C34 Hydrocarbons)	mg/kg	11	6.4	9568947	20	31	8.0	9569474	10	6.4	9568853
F4 (C34-C50 Hydrocarbons)	mg/kg	<4.7	4.7	9568947	<6.0	<6.0	6.0	9569474	<4.7	4.7	9568853
Reached Baseline at C50	mg/kg	Yes	N/A	9568947	Yes	Yes	N/A	9569474	Yes	N/A	9568853
Physical Properties						•			•		
Moisture	%	12	0.30	9568708	16	11	0.30	9568918	5.8	0.30	9568473
Field Preserved Volatiles											
F1 (C6-C10)	mg/kg	<7.0	7.0	9569760	<7.0	<7.0	7.0	9569760	<7.0	7.0	9569766
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	99	N/A	9569760	101	103	N/A	9569760	100	N/A	9569766
4-Bromofluorobenzene (sur.)	%	102	N/A	9569760	100	104	N/A	9569760	101	N/A	9569766
D10-o-Xylene (sur.)	%	128	N/A	9569760	119	123	N/A	9569760	109	N/A	9569766
D4-1,2-Dichloroethane (sur.)	%	124	N/A	9569760	119	124	N/A	9569760	113	N/A	9569766
O-TERPHENYL (sur.)	%	88	N/A	9568947	79	90	N/A	9569474	88	N/A	9568853
RDL = Reportable Detection Lin	mit										
$N/\Delta = Not \Delta nnlicable$											



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

AT1 BTEX AND F1-F4 IN SOIL (VIALS)

	<del> </del>	1		1	1				
BV Labs ID		WJ6020	WJ6020	WJ6021	WJ6022	WJ6023	WJ6024		
Sampling Date		2019/08/22	2019/08/22	2019/08/22	2019/08/22	2019/08/22	2019/08/22		
Jamping Date		08:40	08:40	09:20	09:20	10:00	10:00		
COC Number		591565-03-01	591565-03-01	591565-03-01	591565-03-01	591565-03-01	591565-03-01		
	UNITS	P4-6B	P4-6B Lab-Dup	P4-7A	P4-7B	P4-8A	P4-8B	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<3.0	N/A	3.1	<3.0	<3.0	<3.0	3.0	9568853
F3 (C16-C34 Hydrocarbons)	mg/kg	7.9	N/A	14	13	13	12	6.4	9568853
F4 (C34-C50 Hydrocarbons)	mg/kg	<4.7	N/A	<4.7	<4.7	<4.7	<4.7	4.7	9568853
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	Yes	Yes	Yes	N/A	9568853
Physical Properties	•			•	•			•	
Moisture	%	5.0	N/A	11	12	7.4	10	0.30	9568473
Field Preserved Volatiles									
F1 (C6-C10)	mg/kg	<7.0	<7.0	<7.0	<7.0	<7.0	<7.0	7.0	9569766
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	100	100	101	103	101	101	N/A	9569766
4-Bromofluorobenzene (sur.)	%	102	99	101	104	103	101	N/A	9569766
D10-o-Xylene (sur.)	%	114	113	108	115	120	111	N/A	9569766
D4-1,2-Dichloroethane (sur.)	%	115	112	114	119	115	117	N/A	9569766
O-TERPHENYL (sur.)	%	85	N/A	82	83	82	82	N/A	9568853

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6025	WJ6026		WJ6027		WJ6028	WJ6039		
Sampling Date		2019/08/22 10:40	2019/08/22 10:40		2019/08/22 11:10		2019/08/22 11:10	2019/08/22 11:40		
COC Number		591565-03-01	591565-03-01		591565-03-01		591565-03-01	591565-04-01		
	UNITS	P4-9A	P4-9B	RDL	P4-10A	RDL	P4-10B	P4-11A	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	4.1	4.6	3.0	11 (1)	6.0	4.3	3.9	3.0	9568853
F3 (C16-C34 Hydrocarbons)	mg/kg	93	69	6.4	360 (1)	13	44	33	6.4	9568853
F4 (C34-C50 Hydrocarbons)	mg/kg	20	16	4.7	100 (1)	9.6	14	7.7	4.7	9568853
Reached Baseline at C50	mg/kg	Yes	Yes	N/A	Yes	N/A	Yes	Yes	N/A	9568853
Physical Properties										
Moisture	%	29	19	0.30	51	0.30	16	14	0.30	9568473
Field Preserved Volatiles										
F1 (C6-C10)	mg/kg	<7.0	<7.0	7.0	<18 (1)	18	8.9	<7.0	7.0	9569766
Surrogate Recovery (%)		•			•			•		
1,4-Difluorobenzene (sur.)	%	100	100	N/A	102	N/A	100	99	N/A	9569766
4-Bromofluorobenzene (sur.)	%	102	101	N/A	102	N/A	102	101	N/A	9569766
D10-o-Xylene (sur.)	%	117	117	N/A	109	N/A	117	116	N/A	9569766
D4-1,2-Dichloroethane (sur.)	%	116	118	N/A	115	N/A	117	112	N/A	9569766
O-TERPHENYL (sur.)	%	84	92	N/A	96	N/A	89	82	N/A	9568853

RDL = Reportable Detection Limit

N/A = Not Applicable



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6040			WJ6041	WJ6041			WJ6042		
Sampling Date		2019/08/22 11:40			2019/08/22 12:40	2019/08/22 12:40			2019/08/22 12:40		
COC Number		591565-04-01			591565-04-01	591565-04-01			591565-04-01		
	UNITS	P4-11B	RDL	QC Batch	P4-12A	P4-12A Lab-Dup	RDL	QC Batch	P4-12B	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	3.6	3.0	9568853	<10 (1)	<10	10	9568890	4.5	3.0	9568853
F3 (C16-C34 Hydrocarbons)	mg/kg	20	6.4	9568853	90 (1)	100	21	9568890	51	6.4	9568853
F4 (C34-C50 Hydrocarbons)	mg/kg	<4.7	4.7	9568853	<15 (1)	<15	15	9568890	13	4.7	9568853
Reached Baseline at C50	mg/kg	Yes	N/A	9568853	Yes	Yes	N/A	9568890	Yes	N/A	9568853
Physical Properties											
Moisture	%	11	0.30	9568473	61	54	0.30	9568435	16	0.30	9568473
Field Preserved Volatiles											
F1 (C6-C10)	mg/kg	<7.0	7.0	9569766	<21 (1)	N/A	21	9569766	<7.0	7.0	9569766
Surrogate Recovery (%)					•						
1,4-Difluorobenzene (sur.)	%	98	N/A	9569766	101	N/A	N/A	9569766	99	N/A	9569766
4-Bromofluorobenzene (sur.)	%	101	N/A	9569766	102	N/A	N/A	9569766	100	N/A	9569766
D10-o-Xylene (sur.)	%	119	N/A	9569766	134	N/A	N/A	9569766	109	N/A	9569766
D4-1,2-Dichloroethane (sur.)	%	110	N/A	9569766	113	N/A	N/A	9569766	112	N/A	9569766
O-TERPHENYL (sur.)	%	82	N/A	9568853	98	86	N/A	9568890	103	N/A	9568853

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

N/A = Not Applicable



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

	_		_							
BV Labs ID		WJ6043			WJ6044	WJ6045		WJ6046		
Sampling Date		2019/08/22			2019/08/22	2019/08/22		2019/08/22		
Sampling Date		13:00			13:30	13:30		14:00		
COC Number		591565-04-01			591565-04-01	591565-04-01		591565-04-01		
	UNITS	P4-25A	RDL	QC Batch	P4-1A	P4-1B	RDL	P4-2A	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<6.4 (1)	6.4	9568947	<4.0	<4.0	4.0	<8.8 (1)	8.8	9568890
F3 (C16-C34 Hydrocarbons)	mg/kg	130 (1)	14	9568947	8.2	<8.0	8.0	83 (1)	18	9568890
F4 (C34-C50 Hydrocarbons)	mg/kg	26 (1)	10	9568947	<6.0	<6.0	6.0	19 (1)	13	9568890
Reached Baseline at C50	mg/kg	Yes	N/A	9568947	Yes	Yes	N/A	Yes	N/A	9568890
Physical Properties										
Moisture	%	54	0.30	9568708	8.8	6.3	0.30	55	0.30	9568435
Field Preserved Volatiles	•									•
F1 (C6-C10)	mg/kg	<16 (1)	16	9569766	<7.0	<7.0	7.0	<19 (1)	19	9569760
Surrogate Recovery (%)					•	•				•
1,4-Difluorobenzene (sur.)	%	100	N/A	9569766	101	100	N/A	100	N/A	9569760
4-Bromofluorobenzene (sur.)	%	102	N/A	9569766	102	102	N/A	103	N/A	9569760
D10-o-Xylene (sur.)	%	134	N/A	9569766	114	119	N/A	135	N/A	9569760
D4-1,2-Dichloroethane (sur.)	%	113	N/A	9569766	116	117	N/A	120	N/A	9569760
O-TERPHENYL (sur.)	%	87	N/A	9568947	92	106	N/A	87	N/A	9568890

RDL = Reportable Detection Limit

N/A = Not Applicable



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6047			WJ6048			WJ6068	WJ6069		
Campling Data		2019/08/22			2019/08/22			2019/08/22	2019/08/22		
Sampling Date		14:00			14:20			14:40	14:40		
COC Number		591565-04-01			591565-04-01			591565-05-01	591565-05-01		
	UNITS	P4-2B	RDL	QC Batch	P4-26B	RDL	QC Batch	P4-3A	P4-3B	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	<4.0	4.0	9568890	<3.0	3.0	9568947	<4.0	<4.0	4.0	9568890
F3 (C16-C34 Hydrocarbons)	mg/kg	8.8	8.0	9568890	21	6.4	9568947	76	41	8.0	9568890
F4 (C34-C50 Hydrocarbons)	mg/kg	<6.0	6.0	9568890	5.1	4.7	9568947	15	9.0	6.0	9568890
Reached Baseline at C50	mg/kg	Yes	N/A	9568890	Yes	N/A	9568947	Yes	Yes	N/A	9568890
Physical Properties											
Moisture	%	15	0.30	9568435	15	0.30	9568708	33	22	0.30	9568435
Field Preserved Volatiles											
F1 (C6-C10)	mg/kg	<7.0	7.0	9569760	7.4	7.0	9569766	<7.0	<7.0	7.0	9569760
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	99	N/A	9569760	101	N/A	9569766	98	100	N/A	9569760
4-Bromofluorobenzene (sur.)	%	103	N/A	9569760	102	N/A	9569766	100	102	N/A	9569760
D10-o-Xylene (sur.)	%	133	N/A	9569760	115	N/A	9569766	114	127	N/A	9569760
D4-1,2-Dichloroethane (sur.)	%	121	N/A	9569760	112	N/A	9569766	116	118	N/A	9569760
O-TERPHENYL (sur.)	%	85	N/A	9568890	91	N/A	9568947	104	94	N/A	9568890
RDL = Reportable Detection Li	mit		_			_				_	
N/A = Not Applicable											



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6070			WJ6071	WJ6071	WJ6072	WJ6073		
Sampling Date		2019/08/22 15:20			2019/08/22 15:20	2019/08/22 15:20	2019/08/22 16:00	2019/08/22 16:00		
COC Number		591565-05-01			591565-05-01	591565-05-01	591565-05-01	591565-05-01		
	UNITS	P4-4A	RDL	QC Batch	P4-4B	P4-4B Lab-Dup	P4-5A	P4-5B	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<4.0	4.0	9568890	3.2	4.0	4.2	3.2	3.0	9568853
F3 (C16-C34 Hydrocarbons)	mg/kg	57	8.0	9568890	29	31	19	12	6.4	9568853
F4 (C34-C50 Hydrocarbons)	mg/kg	7.3	6.0	9568890	7.4	8.1	4.8	<4.7	4.7	9568853
Reached Baseline at C50	mg/kg	Yes	N/A	9568890	Yes	Yes	Yes	Yes	N/A	9568853
Physical Properties	Physical Properties									
Moisture	%	41	0.30	9568435	18	20	14	6.9	0.30	9568473
Field Preserved Volatiles										
F1 (C6-C10)	mg/kg	11	7.0	9569760	<7.0	N/A	7.2	<7.0	7.0	9569760
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	100	N/A	9569760	100	N/A	99	98	N/A	9569760
4-Bromofluorobenzene (sur.)	%	103	N/A	9569760	103	N/A	101	101	N/A	9569760
D10-o-Xylene (sur.)	%	131	N/A	9569760	123	N/A	121	118	N/A	9569760
D4-1,2-Dichloroethane (sur.)	%	121	N/A	9569760	117	N/A	118	119	N/A	9569760
O-TERPHENYL (sur.)	%	94	N/A	9568890	86	81	89	76	N/A	9568853

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6074			WJ6075	WJ6075			WJ6076		
Sampling Date		2019/08/23 10:00			2019/08/23 10:00	2019/08/23 10:00			2019/08/23 10:40		
COC Number		591565-05-01			591565-05-01	591565-05-01			591565-05-01		
	UNITS	MW-05A	RDL	QC Batch	MW-05B	MW-05B Lab-Dup	RDL	QC Batch	MW-06A	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	<4.0	4.0	9569474	<3.0	N/A	3.0	9568947	<4.0	4.0	9568890
F3 (C16-C34 Hydrocarbons)	mg/kg	18	8.0	9569474	12	N/A	6.4	9568947	55	8.0	9568890
F4 (C34-C50 Hydrocarbons)	mg/kg	<6.0	6.0	9569474	<4.7	N/A	4.7	9568947	13	6.0	9568890
Reached Baseline at C50	mg/kg	Yes	N/A	9569474	Yes	N/A	N/A	9568947	Yes	N/A	9568890
Physical Properties											
Moisture	%	8.9	0.30	9568918	7.4	N/A	0.30	9568708	32	0.30	9568435
Field Preserved Volatiles	,										
F1 (C6-C10)	mg/kg	<7.0	7.0	9569757	<7.0	<7.0	7.0	9569757	<7.0	7.0	9569775
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	98	N/A	9569757	99	99	N/A	9569757	101	N/A	9569775
4-Bromofluorobenzene (sur.)	%	99	N/A	9569757	102	99	N/A	9569757	99	N/A	9569775
D10-o-Xylene (sur.)	%	120	N/A	9569757	125	123	N/A	9569757	120	N/A	9569775
D4-1,2-Dichloroethane (sur.)	%	107	N/A	9569757	108	107	N/A	9569757	98	N/A	9569775
O-TERPHENYL (sur.)	%	79	N/A	9569474	92	N/A	N/A	9568947	91	N/A	9568890

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

### AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6077	WJ6077	WJ6112	WJ6114	WJ6116	WJ6118		
Sampling Date		2019/08/23 10:40	2019/08/23 10:40	2019/08/23 11:20	2019/08/23 12:00	2019/08/23 12:00	2019/08/23 12:00		
COC Number		591565-05-01	591565-05-01	591565-07-01	591565-07-01	591565-07-01	591565-07-01		
	UNITS	MW-06B	MW-06B Lab-Dup	MW-07A	MW-07B	MW-08A	MW-08B	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<4.0	N/A	<4.0	<4.0	<4.0	<4.0	4.0	9568890
F3 (C16-C34 Hydrocarbons)	mg/kg	14	N/A	55	56	23	<8.0	8.0	9568890
F4 (C34-C50 Hydrocarbons)	mg/kg	<6.0	N/A	13	14	<6.0	<6.0	6.0	9568890
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	Yes	Yes	Yes	N/A	9568890
Physical Properties	•								
Moisture	%	14	N/A	34	21	13	11	0.30	9568435
Field Preserved Volatiles								•	
F1 (C6-C10)	mg/kg	<7.0	<7.0	<7.0	<7.0	<7.0	<7.0	7.0	9569775
Surrogate Recovery (%)								•	
1,4-Difluorobenzene (sur.)	%	101	101	101	102	102	102	N/A	9569775
4-Bromofluorobenzene (sur.)	%	99	99	98	97	99	98	N/A	9569775
D10-o-Xylene (sur.)	%	112	113	102	103	108	110	N/A	9569775
D4-1,2-Dichloroethane (sur.)	%	99	97	100	98	101	99	N/A	9569775
O-TERPHENYL (sur.)	%	84	N/A	92	91	108	101	N/A	9568890

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

## AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6120			WJ6122	WJ6124		WJ6126		
Sampling Date		2019/08/23			2019/08/23	2019/08/23		2019/08/23		
		10:20			16:10	16:10		13:50		
COC Number		591565-07-01			591565-07-01	591565-07-01		591565-07-01		
	UNITS	MW-11A	RDL	QC Batch	P4-13A	P4-13B	RDL	P4-14A	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<4.0	4.0	9568890	3.9	<3.0	3.0	9.5 (1)	8.5	9568853
F3 (C16-C34 Hydrocarbons)	mg/kg	12	8.0	9568890	30	15	6.4	200 (1)	18	9568853
F4 (C34-C50 Hydrocarbons)	mg/kg	<6.0	6.0	9568890	5.8	<4.7	4.7	45 (1)	13	9568853
Reached Baseline at C50	mg/kg	Yes	N/A	9568890	Yes	Yes	N/A	Yes	N/A	9568853
Physical Properties										
Moisture	%	9.0	0.30	9568435	11	10	0.30	65	0.30	9568473
Field Preserved Volatiles										
F1 (C6-C10)	mg/kg	<7.0	7.0	9569775	<7.0	<7.0	7.0	<25 (1)	25	9569775
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	102	N/A	9569775	102	101	N/A	102	N/A	9569775
4-Bromofluorobenzene (sur.)	%	100	N/A	9569775	99	99	N/A	99	N/A	9569775
D10-o-Xylene (sur.)	%	109	N/A	9569775	110	109	N/A	113	N/A	9569775
D4-1,2-Dichloroethane (sur.)	%	100	N/A	9569775	102	101	N/A	101	N/A	9569775
O-TERPHENYL (sur.)	%	94	N/A	9568890	78	83	N/A	80	N/A	9568853

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

## AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6128			WJ6130	WJ6163	WJ6163	WJ6164		
Sampling Date		2019/08/23 13:50			2019/08/23 14:20	2019/08/23 14:20	2019/08/23 14:20	2019/08/23 15:00		
COC Number		591565-07-01			591565-07-01	591565-08-01	591565-08-01	591565-08-01		
	UNITS	P4-14B	RDL	QC Batch	P4-15A	P4-15B	P4-15B Lab-Dup	P4-16A	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	5.1	3.0	9568853	3.4	<2.0	N/A	4.6	2.0	9568947
F3 (C16-C34 Hydrocarbons)	mg/kg	53	6.4	9568853	44	13	N/A	67	5.5	9568947
F4 (C34-C50 Hydrocarbons)	mg/kg	12	4.7	9568853	7.5	<3.9	N/A	16	3.9	9568947
Reached Baseline at C50	mg/kg	Yes	N/A	9568853	Yes	Yes	N/A	Yes	N/A	9568947
Physical Properties		•						•		
Moisture	%	30	0.30	9568473	29	13	15	46	0.30	9568708
Field Preserved Volatiles										
F1 (C6-C10)	mg/kg	<7.0	7.0	9569757	<7.0	<7.0	N/A	<7.0	7.0	9569757
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	99	N/A	9569757	100	99	N/A	98	N/A	9569757
4-Bromofluorobenzene (sur.)	%	100	N/A	9569757	100	99	N/A	100	N/A	9569757
D10-o-Xylene (sur.)	%	113	N/A	9569757	108	125	N/A	108	N/A	9569757
D4-1,2-Dichloroethane (sur.)	%	104	N/A	9569757	104	106	N/A	104	N/A	9569757
O-TERPHENYL (sur.)	%	87	N/A	9568853	98	86	N/A	85	N/A	9568947

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

# AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6165	WJ6166	WJ6167			WJ6168		
Sampling Data		2019/08/23	2019/08/23	2019/08/23			2019/08/23		
Sampling Date		15:00	15:30	15:30			16:40		
COC Number		591565-08-01	591565-08-01	591565-08-01			591565-08-01		
	UNITS	P4-16B	P4-17A	P4-17B	RDL	QC Batch	P4-18A	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<4.0	<4.0	<4.0	4.0	9568890	<2.0	2.0	9568947
F3 (C16-C34 Hydrocarbons)	mg/kg	40	<8.0	<8.0	8.0	9568890	9.3	5.5	9568947
F4 (C34-C50 Hydrocarbons)	mg/kg	8.4	<6.0	<6.0	6.0	9568890	<3.9	3.9	9568947
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	N/A	9568890	Yes	N/A	9568947
Physical Properties									
Moisture	%	16	12	11	0.30	9568435	7.8	0.30	9568708
Field Preserved Volatiles									
F1 (C6-C10)	mg/kg	<7.0	<7.0	<7.0	7.0	9569757	<7.0	7.0	9569757
Surrogate Recovery (%)	•				•				
1,4-Difluorobenzene (sur.)	%	98	100	99	N/A	9569757	100	N/A	9569757
4-Bromofluorobenzene (sur.)	%	101	100	99	N/A	9569757	100	N/A	9569757
D10-o-Xylene (sur.)	%	122	126	114	N/A	9569757	114	N/A	9569757
D4-1,2-Dichloroethane (sur.)	%	106	108	104	N/A	9569757	107	N/A	9569757
O-TERPHENYL (sur.)	%	88	85	88	N/A	9568890	87	N/A	9568947
RDL = Reportable Detection Li	mit								
N/A = Not Applicable									



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

# AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6169			WJ6170			WJ6171		
Sampling Data		2019/08/23			2019/08/23			2019/08/23		
Sampling Date		16:40			17:10			17:10		
COC Number		591565-08-01			591565-08-01			591565-08-01		
	UNITS	P4-18B	RDL	QC Batch	P4-19A	RDL	QC Batch	P4-19B	RDL	QC Batch
Ext. Pet. Hydrocarbon										
F2 (C10-C16 Hydrocarbons)	mg/kg	<4.0	4.0	9568890	<2.0	2.0	9568947	<4.0	4.0	9568890
F3 (C16-C34 Hydrocarbons)	mg/kg	<8.0	8.0	9568890	20	5.5	9568947	11	8.0	9568890
F4 (C34-C50 Hydrocarbons)	mg/kg	<6.0	6.0	9568890	<3.9	3.9	9568947	<6.0	6.0	9568890
Reached Baseline at C50	mg/kg	Yes	N/A	9568890	Yes	N/A	9568947	Yes	N/A	9568890
Physical Properties	•			•			•		•	
Moisture	%	8.1	0.30	9568435	9.5	0.30	9568708	6.2	0.30	9568435
Field Preserved Volatiles										
F1 (C6-C10)	mg/kg	<7.0	7.0	9569757	<7.0	7.0	9569757	<7.0	7.0	9569757
Surrogate Recovery (%)				•		•	•		•	
1,4-Difluorobenzene (sur.)	%	99	N/A	9569757	99	N/A	9569757	99	N/A	9569757
4-Bromofluorobenzene (sur.)	%	101	N/A	9569757	102	N/A	9569757	106	N/A	9569757
D10-o-Xylene (sur.)	%	119	N/A	9569757	117	N/A	9569757	124	N/A	9569757
D4-1,2-Dichloroethane (sur.)	%	108	N/A	9569757	108	N/A	9569757	114	N/A	9569757
O-TERPHENYL (sur.)	%	90	N/A	9568890	82	N/A	9568947	90	N/A	9568890
RDL = Reportable Detection Li	nit								•	
N/A = Not Applicable										



BV Labs Job #: B971727 ARCADIS Canada Inc
Report Date: 2019/12/04 Client Project #: 30000251
Sampler Initials: EH

# AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6172		WJ6176	WJ6177	WJ6178	WJ6179		
Sampling Date		2019/08/23 17:40		2019/08/23 17:40	2019/08/23 18:00	2019/08/23 18:00	2019/08/23 19:30		
COC Number		591565-08-01		591565-09-01	591565-09-01	591565-09-01	591565-09-01		
	UNITS	P4-20A	RDL	P4-20B	P4-21A	P4-21B	P4-22A	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	2.4	2.0	<3.0	<3.0	<3.0	<3.0	3.0	9568947
F3 (C16-C34 Hydrocarbons)	mg/kg	34	5.5	26	29	21	11	6.4	9568947
F4 (C34-C50 Hydrocarbons)	mg/kg	8.5	3.9	7.9	7.8	5.2	<4.7	4.7	9568947
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	Yes	Yes	Yes	N/A	9568947
Physical Properties									
Moisture	%	13	0.30	12	17	13	12	0.30	9568708
Field Preserved Volatiles									
F1 (C6-C10)	mg/kg	<7.0	7.0	<7.0	<7.0	<7.0	<7.0	7.0	9569757
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	98	N/A	99	99	97	99	N/A	9569757
4-Bromofluorobenzene (sur.)	%	106	N/A	103	103	103	104	N/A	9569757
D10-o-Xylene (sur.)	%	119	N/A	123	118	119	120	N/A	9569757
D4-1,2-Dichloroethane (sur.)	%	112	N/A	113	112	113	115	N/A	9569757
O-TERPHENYL (sur.)	%	92	N/A	85	85	87	89	N/A	9568947
RDL = Reportable Detection Lin	nit							_	



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

## AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6180			WJ6181			WJ6182	WJ6182		
Sampling Date		2019/08/23 19:30			2019/08/23 20:00			2019/08/23 20:00	2019/08/23 20:00		
COC Number		591565-09-01			591565-09-01			591565-09-01	591565-09-01		
	UNITS	P4-22B	RDL	QC Batch	P4-23A	RDL	QC Batch	P4-23B	P4-23B Lab-Dup	RDL	QC Batch
Ext. Pet. Hydrocarbon											
F2 (C10-C16 Hydrocarbons)	mg/kg	<4.0	4.0	9569474	12 (1)	11	9568947	<4.0	<4.0	4.0	9569474
F3 (C16-C34 Hydrocarbons)	mg/kg	9.2	8.0	9569474	570 (1)	25	9568947	21	20	8.0	9569474
F4 (C34-C50 Hydrocarbons)	mg/kg	<6.0	6.0	9569474	150 (1)	18	9568947	<6.0	<6.0	6.0	9569474
Reached Baseline at C50	mg/kg	Yes	N/A	9569474	Yes	N/A	9568947	Yes	Yes	N/A	9569474
Physical Properties											
Moisture	%	11	0.30	9568918	74	0.30	9568708	19	17	0.30	9568918
Field Preserved Volatiles											
F1 (C6-C10)	mg/kg	<7.0	7.0	9569757	<39 (1)	39	9569766	<7.0	N/A	7.0	9569766
Surrogate Recovery (%)					•				•	•	
1,4-Difluorobenzene (sur.)	%	100	N/A	9569757	99	N/A	9569766	102	N/A	N/A	9569766
4-Bromofluorobenzene (sur.)	%	106	N/A	9569757	101	N/A	9569766	101	N/A	N/A	9569766
D10-o-Xylene (sur.)	%	121	N/A	9569757	112	N/A	9569766	113	N/A	N/A	9569766
D4-1,2-Dichloroethane (sur.)	%	115	N/A	9569757	112	N/A	9569766	113	N/A	N/A	9569766
O-TERPHENYL (sur.)	%	76	N/A	9569474	87	N/A	9568947	80	78	N/A	9569474

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

N/A = Not Applicable

(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.



## AT1 BTEX AND F1-F4 IN SOIL (VIALS)

BV Labs ID		WJ6183			WJ6184		WJ6185		
Sampling Date		2019/08/23			2019/08/23		2019/08/23		
Sampling Date		20:30			20:30		19:50		
COC Number		591565-09-01			591565-09-01		591565-09-01		
	UNITS	P4-24A	RDL	QC Batch	P4-24B	RDL	P4-27A	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<12 (1)	12	9568947	<15 (1)	15	<4.0	4.0	9569474
F3 (C16-C34 Hydrocarbons)	mg/kg	120 (1)	26	9568947	120 (1)	30	16	8.0	9569474
F4 (C34-C50 Hydrocarbons)	mg/kg	<19 (1)	19	9568947	26 (1)	23	<6.0	6.0	9569474
Reached Baseline at C50	mg/kg	Yes	N/A	9568947	Yes	N/A	Yes	N/A	9569474
Physical Properties									
Moisture	%	75	0.30	9568708	73	0.30	11	0.30	9568918
Field Preserved Volatiles									
F1 (C6-C10)	mg/kg	<37 (1)	37	9569757	<34 (1)	34	<7.0	7.0	9569766
Surrogate Recovery (%)	•								
1,4-Difluorobenzene (sur.)	%	99	N/A	9569757	102	N/A	99	N/A	9569766
4-Bromofluorobenzene (sur.)	%	105	N/A	9569757	103	N/A	100	N/A	9569766
D10-o-Xylene (sur.)	%	120	N/A	9569757	115	N/A	115	N/A	9569766
D4-1,2-Dichloroethane (sur.)	%	114	N/A	9569757	113	N/A	112	N/A	9569766
O-TERPHENYL (sur.)	%	85	N/A	9568947	77	N/A	89	N/A	9569474

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to high moisture content, sample contains => 50% moisture.



#### **RESULTS OF CHEMICAL ANALYSES OF SOIL**

BV Labs ID		WJ6073	
Sampling Date		2019/08/22 16:00	
COC Number		591565-05-01	
	UNITS	P4-5B	QC Batch
MISCELLANEOUS			



## PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		WJ5999	WJ6000	WJ6025	WJ6026	WJ6027	WJ6041	Ì	
Sampling Date		2019/08/21 14:00	2019/08/21 14:00	2019/08/22 10:40	2019/08/22 10:40	2019/08/22 11:10	2019/08/22 12:40		
COC Number		591565-02-01	591565-02-01	591565-03-01	591565-03-01	591565-03-01	591565-04-01		
	UNITS	MW-02A	MW-02B	P4-9A	P4-9B	P4-10A	P4-12A	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F3A (C16-C22)	mg/kg	<50 (1)	110 (1)	<50	<50	<50 (1)	<50 (1)	50	9694792
F3B (C22-C34)	mg/kg	400 (1)	740 (1)	83	60	330 (1)	75 (1)	50	9694792
F2% (BIC)	mg/kg	3.3	3.2	NC	NC	3.3	NC	N/A	9689819
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	Yes	Yes	N/A	9694792
Surrogate Recovery (%)							•		
O-TERPHENYL (sur.)	%	88	83	84	92	96	98	N/A	9694792

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits calculated based on method detection limits (MDLs) due to high moisture content, sample contains => 50% moisture.

BV Labs ID		WJ6042	WJ6043	WJ6076	WJ6112	WJ6114	WJ6126		
Comuling Data		2019/08/22	2019/08/22	2019/08/23	2019/08/23	2019/08/23	2019/08/23		
Sampling Date		12:40	13:00	10:40	11:20	12:00	13:50		
COC Number		591565-04-01	591565-04-01	591565-05-01	591565-07-01	591565-07-01	591565-07-01		
	UNITS	P4-12B	P4-25A	MW-06A	MW-07A	MW-07B	P4-14A	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F3A (C16-C22)	mg/kg	<50	<50 (1)	<50	<50	<50	<50 (1)	50	9694792
F3B (C22-C34)	mg/kg	<50	110 (1)	<50	<50	<50	170 (1)	50	9694792
F2% (BIC)	mg/kg	NC	NC	NC	NC	NC	NC	N/A	9689819
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	Yes	Yes	N/A	9694792
Surrogate Recovery (%)	•	•						•	
O-TERPHENYL (sur.)	%	103	87	91	92	91	80	N/A	9694792

RDL = Reportable Detection Limit

N/A = Not Applicable

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) due to high moisture content, sample contains => 50% moisture.



bs Job #: B971727 ARCADIS Canada Inc
rt Date: 2019/12/04 Client Project #: 30000251
Sampler Initials: EH

## PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		WJ6164	WJ6181	WJ6183	WJ6184		
Canada Bata		2019/08/23	2019/08/23	2019/08/23	2019/08/23		
Sampling Date		15:00	20:00	20:30	20:30		
COC Number		591565-08-01	591565-09-01	591565-09-01	591565-09-01		
	UNITS	P4-16A	P4-23A	P4-24A	P4-24B	RDL	QC Batch
Ext. Pet. Hydrocarbon							
F3A (C16-C22)	mg/kg	<50	<50 (1)	<50 (1)	<50 (1)	50	9694792
F3B (C22-C34)	mg/kg	54	530 (1)	100 (1)	97 (1)	50	9694792
F2% (BIC)	mg/kg	NC	2.3	NC	NC	N/A	9689819
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	N/A	9694792
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	85	87	85	77	N/A	9694792

RDL = Reportable Detection Limit

N/A = Not Applicable

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) due to high moisture content, sample contains => 50% moisture.



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

BV Labs ID		WJ5997	WJ5998		WJ5999		WJ6000	WJ6000		
Sampling Date		2019/08/21	2019/08/21		2019/08/21		2019/08/21	2019/08/21		
		13:00	13:00		14:00		14:00	14:00		
COC Number		591565-02-01	591565-02-01		591565-02-01		591565-02-01	591565-02-01		
	UNITS	MW-01A	MW-01B	RDL	MW-02A	RDL	MW-02B	MW-02B Lab-Dup	RDL	QC Batch
Polychlorinated Biphenyls										
Aroclor 1016	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	<0.040	0.040	9570395
Aroclor 1221	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	<0.040	0.040	9570395
Aroclor 1232	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	<0.040	0.040	9570395
Aroclor 1242	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	<0.040	0.040	9570395
Aroclor 1248	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	<0.040	0.040	9570395
Aroclor 1254	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	<0.040	0.040	9570395
Aroclor 1260	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	<0.040	0.040	9570395
Aroclor 1262	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	<0.040	0.040	9570395
Aroclor 1268	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	<0.040	0.040	9570395
Total PCB	mg/kg	<0.010	<0.010	0.010	<0.020	0.020	<0.040	N/A	0.040	9568356
Surrogate Recovery (%)										
NONACHLOROBIPHENYL (sur.)	%	62	73	N/A	57	N/A	62	76	N/A	9570395

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

N/A = Not Applicable

BV Labs ID		WJ6001	WJ6002	WJ6003	WJ6004	WJ6005	WJ6006		
Sampling Date		2019/08/21	2019/08/21	2019/08/21	2019/08/21	2019/08/21	2019/08/21		
Sampling Date		15:00	15:00	16:00	16:00	13:20	16:20		
COC Number		591565-02-01	591565-02-01	591565-02-01	591565-02-01	591565-02-01	591565-02-01		
	UNITS	MW-03A	MW-03B	MW-04A	MW-04B	MW-09A	MW-10A	RDL	QC Batch
Polychlorinated Biphenyls									
Aroclor 1016	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1221	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1232	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1242	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1248	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1254	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1260	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1262	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1268	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Total PCB	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9568356
Surrogate Recovery (%)									
NONACHLOROBIPHENYL (sur.)	%	61	79	93	78	65	67	N/A	9570395
DDI Dementalala Data ati an Lina					<u> </u>				

RDL = Reportable Detection Limit



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

BV Labs ID		WJ6019	WJ6020	WJ6021	WJ6022	WJ6023	WJ6024		
Sampling Date		2019/08/22 08:40	2019/08/22 08:40	2019/08/22 09:20	2019/08/22 09:20	2019/08/22 10:00	2019/08/22 10:00		
COC Number		591565-03-01	591565-03-01	591565-03-01	591565-03-01	591565-03-01	591565-03-01		
	UNITS	P4-6A	P4-6B	P4-7A	P4-7B	P4-8A	P4-8B	RDL	QC Batch
Polychlorinated Biphenyls									
Aroclor 1016	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1221	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1232	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1242	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1248	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1254	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1260	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1262	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Aroclor 1268	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570395
Total PCB	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9568356
Surrogate Recovery (%)									
NONACHLOROBIPHENYL (sur.)	%	82	90	88	85	88	84	N/A	9570395
RDL = Reportable Detection Lim	it								
N/A = Not Applicable									

N/A = Not Applicable

BV Labs ID		WJ6025	WJ6026		WJ6027		WJ6028		
Compling Date		2019/08/22	2019/08/22		2019/08/22		2019/08/22		
Sampling Date		10:40	10:40		11:10		11:10		
COC Number		591565-03-01	591565-03-01		591565-03-01		591565-03-01		
	UNITS	P4-9A	P4-9B	RDL	P4-10A	RDL	P4-10B	RDL	QC Batch
Polychlorinated Biphenyls									
Aroclor 1016	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9570395
Aroclor 1221	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9570395
Aroclor 1232	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9570395
Aroclor 1242	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9570395
Aroclor 1248	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9570395
Aroclor 1254	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9570395
Aroclor 1260	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9570395
Aroclor 1262	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9570395
Aroclor 1268	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9570395
Total PCB	mg/kg	<0.010	<0.010	0.010	<0.025	0.025	<0.010	0.010	9568356
Surrogate Recovery (%)									
NONACHLOROBIPHENYL (sur.)	%	74	67	N/A	75	N/A	71	N/A	9570395
RDL = Reportable Detection Lim	it				<u> </u>				



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

BV Labs ID		WJ6039	WJ6039	WJ6040		WJ6041		WJ6042		
Sampling Date		2019/08/22	2019/08/22	2019/08/22		2019/08/22		2019/08/22		
Sampling Date		11:40	11:40	11:40		12:40		12:40		
COC Number		591565-04-01	591565-04-01	591565-04-01		591565-04-01		591565-04-01		
	UNITS	P4-11A	P4-11A Lab-Dup	P4-11B	RDL	P4-12A	RDL	P4-12B	RDL	QC Batch
Polychlorinated Biphenyls										
Aroclor 1016	mg/kg	<0.010	<0.010	<0.010	0.010	<0.020	0.020	<0.010	0.010	9571070
Aroclor 1221	mg/kg	<0.010	<0.010	<0.010	0.010	<0.020	0.020	<0.010	0.010	9571070
Aroclor 1232	mg/kg	<0.010	<0.010	<0.010	0.010	<0.020	0.020	<0.010	0.010	9571070
Aroclor 1242	mg/kg	<0.010	<0.010	<0.010	0.010	<0.020	0.020	<0.010	0.010	9571070
Aroclor 1248	mg/kg	<0.010	<0.010	<0.010	0.010	<0.020	0.020	<0.010	0.010	9571070
Aroclor 1254	mg/kg	<0.010	<0.010	<0.010	0.010	<0.020	0.020	<0.010	0.010	9571070
Aroclor 1260	mg/kg	<0.010	<0.010	<0.010	0.010	<0.020	0.020	<0.010	0.010	9571070
Aroclor 1262	mg/kg	<0.010	<0.010	<0.010	0.010	<0.020	0.020	<0.010	0.010	9571070
Aroclor 1268	mg/kg	<0.010	<0.010	<0.010	0.010	<0.020	0.020	< 0.010	0.010	9571070
Total PCB	mg/kg	<0.010	N/A	<0.010	0.010	<0.020	0.020	<0.010	0.010	9568356
Surrogate Recovery (%)										
NONACHLOROBIPHENYL (sur.)	%	84	75	97	N/A	75	N/A	87	N/A	9571070
1										

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

				1	l			1	
BV Labs ID		WJ6043		WJ6044	WJ6045		WJ6046		
Sampling Date		2019/08/22		2019/08/22	2019/08/22		2019/08/22		
Sampling Date		13:00		13:30	13:30		14:00		
COC Number		591565-04-01		591565-04-01	591565-04-01		591565-04-01		
	UNITS	P4-25A	RDL	P4-1A	P4-1B	RDL	P4-2A	RDL	QC Batch
Polychlorinated Biphenyls									
Aroclor 1016	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9571070
Aroclor 1221	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9571070
Aroclor 1232	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9571070
Aroclor 1242	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9571070
Aroclor 1248	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9571070
Aroclor 1254	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9571070
Aroclor 1260	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9571070
Aroclor 1262	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9571070
Aroclor 1268	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9571070
Total PCB	mg/kg	<0.020	0.020	<0.010	<0.010	0.010	<0.020	0.020	9568356
Surrogate Recovery (%)									
NONACHLOROBIPHENYL (sur.)	%	89	N/A	85	83	N/A	83	N/A	9571070
RDL = Reportable Detection Lim	it								
N/A = Not Applicable									



## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

BV Labs ID		WJ6047	WJ6048	WJ6068	WJ6069		WJ6070		
Samulina Data		2019/08/22	2019/08/22	2019/08/22	2019/08/22		2019/08/22		
Sampling Date		14:00	14:20	14:40	14:40		15:20		
COC Number		591565-04-01	591565-04-01	591565-05-01	591565-05-01		591565-05-01		
	UNITS	P4-2B	P4-26B	P4-3A	P4-3B	QC Batch	P4-4A	RDL	QC Batch
Polychlorinated Biphenyls									
Aroclor 1016	mg/kg	<0.010	<0.010	<0.010	<0.010	9571070	<0.010	0.010	9569721
Aroclor 1221	mg/kg	<0.010	<0.010	<0.010	<0.010	9571070	<0.010	0.010	9569721
Aroclor 1232	mg/kg	<0.010	<0.010	<0.010	<0.010	9571070	<0.010	0.010	9569721
Aroclor 1242	mg/kg	<0.010	<0.010	<0.010	<0.010	9571070	<0.010	0.010	9569721
Aroclor 1248	mg/kg	<0.010	<0.010	<0.010	<0.010	9571070	<0.010	0.010	9569721
Aroclor 1254	mg/kg	<0.010	<0.010	<0.010	<0.010	9571070	<0.010	0.010	9569721
Aroclor 1260	mg/kg	<0.010	<0.010	<0.010	<0.010	9571070	<0.010	0.010	9569721
Aroclor 1262	mg/kg	<0.010	<0.010	<0.010	<0.010	9571070	<0.010	0.010	9569721
Aroclor 1268	mg/kg	<0.010	<0.010	<0.010	<0.010	9571070	<0.010	0.010	9569721
Total PCB	mg/kg	<0.010	<0.010	<0.010	<0.010	9568356	<0.010	0.010	9568356
Surrogate Recovery (%)									
NONACHLOROBIPHENYL (sur.)	%	73	94	69	79	9571070	79	N/A	9569721
RDL = Reportable Detection Lim	nit								
N/A = Not Applicable									

RDL = Reportable Detection Limit
N/A = Not Applicable

BV Labs ID		WJ6071	WJ6072	WJ6073		WJ6074		WJ6075		
Sampling Date		2019/08/22	2019/08/22	2019/08/22		2019/08/23		2019/08/23		
Sampling Date		15:20	16:00	16:00		10:00		10:00		
COC Number		591565-05-01	591565-05-01	591565-05-01		591565-05-01		591565-05-01		
	UNITS	P4-4B	P4-5A	P4-5B	RDL	MW-05A	RDL	MW-05B	RDL	QC Batch
Polychlorinated Biphenyls										
Aroclor 1016	mg/kg	<0.010	<0.010	<0.010	0.010	<0.050	0.050	<0.010	0.010	9569721
Aroclor 1221	mg/kg	<0.010	<0.010	<0.010	0.010	<0.050	0.050	<0.010	0.010	9569721
Aroclor 1232	mg/kg	<0.010	<0.010	<0.010	0.010	<0.050	0.050	<0.010	0.010	9569721
Aroclor 1242	mg/kg	<0.010	<0.010	<0.010	0.010	<0.050	0.050	<0.010	0.010	9569721
Aroclor 1248	mg/kg	<0.010	<0.010	<0.010	0.010	<0.050	0.050	<0.010	0.010	9569721
Aroclor 1254	mg/kg	<0.010	<0.010	<0.010	0.010	0.15	0.050	<0.010	0.010	9569721
Aroclor 1260	mg/kg	<0.010	<0.010	<0.010	0.010	<0.050	0.050	<0.010	0.010	9569721
Aroclor 1262	mg/kg	<0.010	<0.010	<0.010	0.010	<0.050	0.050	<0.010	0.010	9569721
Aroclor 1268	mg/kg	<0.010	<0.010	<0.010	0.010	<0.050	0.050	<0.010	0.010	9569721
Total PCB	mg/kg	<0.010	<0.010	<0.010	0.010	0.15	0.050	<0.010	0.010	9568356
Surrogate Recovery (%)										
NONACHLOROBIPHENYL (sur.)	%	77	74	80	N/A	84	N/A	66	N/A	9569721

RDL = Reportable Detection Limit



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

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BV Labs ID		WJ6076	WJ6077		WJ6112	WJ6114		
Sampling Date		2019/08/23	2019/08/23		2019/08/23	2019/08/23		
Sampling Date		10:40	10:40		11:20	12:00		
COC Number		591565-05-01	591565-05-01		591565-07-01	591565-07-01		
	UNITS	MW-06A	MW-06B	QC Batch	MW-07A	MW-07B	RDL	QC Batch
Polychlorinated Biphenyls								
Aroclor 1016	mg/kg	<0.010	<0.010	9569721	<0.010	<0.010	0.010	9569721
Aroclor 1221	mg/kg	<0.010	<0.010	9569721	<0.010	<0.010	0.010	9569721
Aroclor 1232	mg/kg	<0.010	<0.010	9569721	<0.010	<0.010	0.010	9569721
Aroclor 1242	mg/kg	<0.010	<0.010	9569721	<0.010	<0.010	0.010	9569721
Aroclor 1248	mg/kg	<0.010	<0.010	9569721	<0.010	<0.010	0.010	9569721
Aroclor 1254	mg/kg	<0.010	<0.010	9569721	<0.010	<0.010	0.010	9569721
Aroclor 1260	mg/kg	<0.010	<0.010	9569721	<0.010	<0.010	0.010	9569721
Aroclor 1262	mg/kg	<0.010	<0.010	9569721	<0.010	<0.010	0.010	9569721
Aroclor 1268	mg/kg	<0.010	<0.010	9569721	<0.010	<0.010	0.010	9569721
Total PCB	mg/kg	<0.010	<0.010	9568356	<0.010	<0.010	0.010	9568358
Surrogate Recovery (%)								
NONACHLOROBIPHENYL (sur.)	%	77	75	9569721	78	78	N/A	9569721
RDL = Reportable Detection Lim	it	•	•			•	•	
N/A = Not Applicable								
i								

BV Labs ID		WJ6116		WJ6118	WJ6118		WJ6120		
Sampling Date		2019/08/23		2019/08/23	2019/08/23		2019/08/23		
Sampling Date		12:00		12:00	12:00		10:20		
COC Number		591565-07-01		591565-07-01	591565-07-01		591565-07-01		
	LINUTC	MW-08A	OC Botob	MW-08B	MW-08B	OC Botob	B41A/ 11 A	DDI	OC Botch
	UNITS	IVIVV-U8A	QC Batch	IVIVV-U8B	Lab-Dup	QC Batch	MW-11A	RDL	QC Batch
Polychlorinated Biphenyls									
Aroclor 1016	mg/kg	<0.010	9571070	<0.010	<0.010	9570180	<0.010	0.010	9571070
Aroclor 1221	mg/kg	<0.010	9571070	<0.010	<0.010	9570180	<0.010	0.010	9571070
Aroclor 1232	mg/kg	<0.010	9571070	<0.010	<0.010	9570180	<0.010	0.010	9571070
Aroclor 1242	mg/kg	<0.010	9571070	<0.010	<0.010	9570180	<0.010	0.010	9571070
Aroclor 1248	mg/kg	<0.010	9571070	<0.010	<0.010	9570180	<0.010	0.010	9571070
Aroclor 1254	mg/kg	<0.010	9571070	<0.010	<0.010	9570180	0.020	0.010	9571070
Aroclor 1260	mg/kg	<0.010	9571070	<0.010	<0.010	9570180	<0.010	0.010	9571070
Aroclor 1262	mg/kg	<0.010	9571070	<0.010	<0.010	9570180	<0.010	0.010	9571070
Aroclor 1268	mg/kg	<0.010	9571070	<0.010	<0.010	9570180	<0.010	0.010	9571070
Total PCB	mg/kg	<0.010	9568358	<0.010	N/A	9568358	0.020	0.010	9568358
Surrogate Recovery (%)									
NONACHLOROBIPHENYL (sur.)	%	74	9571070	80	82	9570180	86	N/A	9571070

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

# POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

BV Labs ID		WJ6122	WJ6124			WJ6126		
Sampling Date		2019/08/23	2019/08/23			2019/08/23		
Sampling Date		16:10	16:10			13:50		
COC Number		591565-07-01	591565-07-01			591565-07-01		
	UNITS	P4-13A	P4-13B	RDL	QC Batch	P4-14A	RDL	QC Batch
Polychlorinated Biphenyls								
Aroclor 1016	mg/kg	<0.010	<0.010	0.010	9571070	<0.030	0.030	9570180
Aroclor 1221	mg/kg	<0.010	<0.010	0.010	9571070	<0.030	0.030	9570180
Aroclor 1232	mg/kg	<0.010	<0.010	0.010	9571070	<0.030	0.030	9570180
Aroclor 1242	mg/kg	<0.010	<0.010	0.010	9571070	<0.030	0.030	9570180
Aroclor 1248	mg/kg	<0.010	<0.010	0.010	9571070	<0.030	0.030	9570180
Aroclor 1254	mg/kg	<0.010	<0.010	0.010	9571070	<0.030	0.030	9570180
Aroclor 1260	mg/kg	<0.010	<0.010	0.010	9571070	<0.030	0.030	9570180
Aroclor 1262	mg/kg	<0.010	<0.010	0.010	9571070	<0.030	0.030	9570180
Aroclor 1268	mg/kg	<0.010	<0.010	0.010	9571070	<0.030	0.030	9570180
Total PCB	mg/kg	<0.010	<0.010	0.010	9568358	<0.030	0.030	9568358
Surrogate Recovery (%)								
NONACHLOROBIPHENYL (sur.)	%	87	85	N/A	9571070	75	N/A	9570180
RDL = Reportable Detection Lim	it							
N/A = Not Applicable								

BV Labs ID		WJ6128	WJ6130	WJ6163	WJ6164			WJ6165		
Sampling Date		2019/08/23	2019/08/23	2019/08/23	2019/08/23			2019/08/23		
		13:50	14:20	14:20	15:00			15:00		
COC Number		591565-07-01	591565-07-01	591565-08-01	591565-08-01			591565-08-01		
	UNITS	P4-14B	P4-15A	P4-15B	P4-16A	RDL	QC Batch	P4-16B	RDL	QC Batch
Polychlorinated Biphenyls										
Aroclor 1016	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9571070	<0.050	0.050	9570180
Aroclor 1221	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9571070	<0.050	0.050	9570180
Aroclor 1232	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9571070	<0.050	0.050	9570180
Aroclor 1242	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9571070	<0.050	0.050	9570180
Aroclor 1248	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9571070	<0.050	0.050	9570180
Aroclor 1254	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9571070	<0.050	0.050	9570180
Aroclor 1260	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9571070	<0.050	0.050	9570180
Aroclor 1262	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9571070	<0.050	0.050	9570180
Aroclor 1268	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9571070	<0.050	0.050	9570180
Total PCB	mg/kg	<0.010	<0.010	<0.010	<0.010	0.010	9568358	<0.050	0.050	9568358
Surrogate Recovery (%)										
NONACHLOROBIPHENYL (sur.)	%	90	88	90	72	N/A	9571070	73	N/A	9570180
		•		-	•					

RDL = Reportable Detection Limit



BV Labs Job #: B971727 ARCADIS Canada Inc
Report Date: 2019/12/04 Client Project #: 30000251
Sampler Initials: EH

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

BV Labs ID		WJ6166	WJ6167	WJ6168	WJ6169	WJ6170	WJ6171		
Sampling Date		2019/08/23 15:30	2019/08/23 15:30	2019/08/23 16:40	2019/08/23 16:40	2019/08/23 17:10	2019/08/23 17:10		
COC Number		591565-08-01	591565-08-01	591565-08-01	591565-08-01	591565-08-01	591565-08-01		
	UNITS	P4-17A	P4-17B	P4-18A	P4-18B	P4-19A	P4-19B	RDL	QC Batch
Polychlorinated Biphenyls									
Aroclor 1016	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1221	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1232	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1242	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1248	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1254	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1260	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1262	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1268	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Total PCB	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9568358
Surrogate Recovery (%)									
NONACHLOROBIPHENYL (sur.)	%	83	81	84	82	83	81	N/A	9570180
RDL = Reportable Detection Lim	it								
N/A = Not Applicable									

BV Labs ID		WJ6172	WJ6176	WJ6177	WJ6178	WJ6179	WJ6180		
Sampling Date		2019/08/23	2019/08/23	2019/08/23	2019/08/23	2019/08/23	2019/08/23		
Sampling Date		17:40	17:40	18:00	18:00	19:30	19:30		
COC Number		591565-08-01	591565-09-01	591565-09-01	591565-09-01	591565-09-01	591565-09-01		
	UNITS	P4-20A	P4-20B	P4-21A	P4-21B	P4-22A	P4-22B	RDL	QC Batch
Polychlorinated Biphenyls									
Aroclor 1016	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1221	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1232	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1242	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1248	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1254	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1260	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1262	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Aroclor 1268	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9570180
Total PCB	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9568358
Surrogate Recovery (%)									
NONACHLOROBIPHENYL (sur.)	%	84	52	74	84	75	83	N/A	9570180

RDL = Reportable Detection Limit



ARCADIS Canada Inc Report Date: 2019/12/04 Client Project #: 30000251 Sampler Initials: EH

# POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

BV Labs ID		WJ6181		WJ6182		WJ6183		WJ6184		
Sampling Date		2019/08/23 20:00		2019/08/23 20:00		2019/08/23 20:30		2019/08/23 20:30		
COC Number		591565-09-01		591565-09-01		591565-09-01		591565-09-01		
	UNITS	P4-23A	RDL	P4-23B	RDL	P4-24A	RDL	P4-24B	RDL	QC Batch
Polychlorinated Biphenyls										
Aroclor 1016	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9570180
Aroclor 1221	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9570180
Aroclor 1232	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9570180
Aroclor 1242	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9570180
Aroclor 1248	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9570180
Aroclor 1254	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9570180
Aroclor 1260	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9570180
Aroclor 1262	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9570180
Aroclor 1268	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9570180
Total PCB	mg/kg	<0.040	0.040	<0.010	0.010	<0.040	0.040	<0.030	0.030	9568358
Surrogate Recovery (%)				•		•				
NONACHLOROBIPHENYL (sur.)	%	79	N/A	78	N/A	70	N/A	75	N/A	9570180
RDL = Reportable Detection Lim	it									

BV Labs ID		WJ6185		
Samulina Data		2019/08/23		
Sampling Date		19:50		
COC Number		591565-09-01		
	UNITS	P4-27A	RDL	QC Batch
Polychlorinated Biphenyls				
Aroclor 1016	mg/kg	<0.010	0.010	9570180
Aroclor 1221	mg/kg	<0.010	0.010	9570180
Aroclor 1232	mg/kg	<0.010	0.010	9570180
Aroclor 1242	mg/kg	<0.010	0.010	9570180
Aroclor 1248	mg/kg	<0.010	0.010	9570180
Aroclor 1254	mg/kg	<0.010	0.010	9570180
Aroclor 1260	mg/kg	<0.010	0.010	9570180
Aroclor 1262	mg/kg	<0.010	0.010	9570180
Aroclor 1268	mg/kg	<0.010	0.010	9570180
Total PCB	mg/kg	<0.010	0.010	9568358
Surrogate Recovery (%)				
NONACHLOROBIPHENYL (sur.)	%	73	N/A	9570180
RDL = Reportable Detection Lim	nit			
N/A = Not Applicable				



BV Labs Job #: B971727 ARCADIS Canada Inc
Report Date: 2019/12/04 Client Project #: 30000251
Sampler Initials: EH

	WJ5997		WJ5998			WJ5999		
	2019/08/21		2019/08/21			2019/08/21		
	13:00		13:00			14:00		
	591565-02-01		591565-02-01			591565-02-01		
UNITS	MW-01A	QC Batch	MW-01B	RDL	QC Batch	MW-02A	RDL	QC Batch
mg/kg	2.2	9570208	2.9	1.0	9570216	2.4 (1)	1.0	9572285
mg/kg	<0.050	9570208	<0.050	0.050	9570216	0.20 (2)	0.10	9572285
mg/kg	12	9570208	13	1.0	9570216	5.7 (1)	1.0	9572285
mg/kg	7.8	9570208	8.6	0.50	9570216	6.3 (2)	1.0	9572285
mg/kg	33	9570208	32	1.0	9570216	96 (1)	1.0	9572285
mg/kg	4.5	9570208	4.4	0.50	9570216	3.2 (2)	1.0	9572285
mg/kg	12	9570208	12	1.0	9570216	16 (1)	1.0	9572285
mg/kg	26 (1)	9570208	25 (1)	1.0	9570216	13 (1)	1.0	9572285
	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	mg/kg 2.2 mg/kg 2.2 mg/kg 4.5 mg/kg 33 mg/kg 4.5 mg/kg 12	2019/08/21   13:00	2019/08/21   2019/08/21   13:00   13:00   591565-02-01   591565-02-01   UNITS   MW-01A   QC Batch   MW-01B	2019/08/21   2019/08/21   13:00   13:00	2019/08/21   13:00   13:00	2019/08/21   2019/08/21   2019/08/21   13:00   14:00   14:00   14:00   14:00   1591565-02-01   591565-02-01   591565-02-01   591565-02-01   10NITS   MW-01A   QC Batch   MW-01B   RDL   QC Batch   MW-02A   RDK   RDK	2019/08/21   2019/08/21   13:00   14:00   14:00

RDL = Reportable Detection Limit

<sup>(2)</sup> Detection limits raised due to sample matrix.

BV Labs ID		WJ6000		WJ6001	WJ6002	WJ6003	WJ6004		
Sampling Date		2019/08/21		2019/08/21	2019/08/21	2019/08/21	2019/08/21		
Sampling Date		14:00		15:00	15:00	16:00	16:00		
COC Number		591565-02-01		591565-02-01	591565-02-01	591565-02-01	591565-02-01		
	UNITS	MW-02B	QC Batch	MW-03A	MW-03B	MW-04A	MW-04B	RDL	QC Batch
Elements									
Total Arsenic (As)	mg/kg	2.0	9571120	1.4	1.7	1.6	2.3	1.0	9570216
Total Cadmium (Cd)	mg/kg	0.15	9571120	<0.050	<0.050	<0.050	<0.050	0.050	9570216
Total Chromium (Cr)	mg/kg	3.5	9571120	12	12	10	13	1.0	9570216
Total Cobalt (Co)	mg/kg	5.5	9571120	6.6	6.7	6.0	7.8	0.50	9570216
Total Copper (Cu)	mg/kg	110	9571120	29	32	19	24	1.0	9570216
Total Lead (Pb)	mg/kg	2.1	9571120	2.6	2.8	2.5	3.2	0.50	9570216
Total Nickel (Ni)	mg/kg	12	9571120	11	11	9.3	12	1.0	9570216
Total Zinc (Zn)	mg/kg	7.2 (1)	9571120	20 (1)	21 (1)	18 (1)	22 (1)	1.0	9570216

RDL = Reportable Detection Limit

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.



BV Labs Job #: B971727 Report Date: 2019/12/04

ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

## **ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		WJ6005	WJ6006		WJ6019	WJ6020		WJ6021		
Sampling Date		2019/08/21 13:20	2019/08/21 16:20		2019/08/22 08:40	2019/08/22 08:40		2019/08/22 09:20		
COC Number		591565-02-01	591565-02-01		591565-03-01	591565-03-01		591565-03-01		
	UNITS	MW-09A	MW-10A	QC Batch	P4-6A	P4-6B	QC Batch	P4-7A	RDL	QC Batch
Elements										
Total Arsenic (As)	mg/kg	2.1	1.8	9570216	3.4	2.6	9571113	3.6	1.0	9571120
Total Cadmium (Cd)	mg/kg	<0.050	<0.050	9570216	<0.050	<0.050	9571113	<0.050	0.050	9571120
Total Chromium (Cr)	mg/kg	12	11	9570216	6.3	5.7	9571113	10	1.0	9571120
Total Cobalt (Co)	mg/kg	8.0	6.9	9570216	2.2	2.1	9571113	4.7	0.50	9571120
Total Copper (Cu)	mg/kg	24	19	9570216	15	3.9	9571113	11	1.0	9571120
Total Lead (Pb)	mg/kg	3.6	2.8	9570216	6.5	5.8	9571113	6.6	0.50	9571120
Total Nickel (Ni)	mg/kg	12	11	9570216	4.5	3.9	9571113	11	1.0	9571120
Total Zinc (Zn)	mg/kg	26 (1)	20 (1)	9570216	3.2 (1)	4.2 (1)	9571113	6.7 (1)	1.0	9571120
		•	•					•		

RDL = Reportable Detection Limit

(1) Detection limits calculated based on method detection limits (MDLs) at client request.

BV Labs ID		WJ6022	WJ6023	WJ6024	WJ6025		WJ6026		
Sampling Date		2019/08/22 09:20	2019/08/22 10:00	2019/08/22 10:00	2019/08/22 10:40		2019/08/22 10:40		
COC Number		591565-03-01	591565-03-01	591565-03-01	591565-03-01		591565-03-01		
	UNITS	P4-7B	P4-8A	P4-8B	P4-9A	QC Batch	P4-9B	RDL	QC Batch
Elements									
Total Arsenic (As)	mg/kg	3.5	2.2	3.0	3.1	9571120	2.6	1.0	9571113
Total Cadmium (Cd)	mg/kg	<0.050	<0.050	<0.050	0.052	9571120	<0.050	0.050	9571113
Total Chromium (Cr)	mg/kg	14	6.7	9.1	9.6	9571120	8.1	1.0	9571113
Total Cobalt (Co)	mg/kg	4.3	2.5	3.5	4.0	9571120	3.3	0.50	9571113
Total Copper (Cu)	mg/kg	11	6.0	8.1	16	9571120	13	1.0	9571113
Total Lead (Pb)	mg/kg	7.1	4.6	5.4	7.3	9571120	6.4	0.50	9571113
Total Nickel (Ni)	mg/kg	11	6.1	8.9	9.7	9571120	8.5	1.0	9571113
Total Zinc (Zn)	mg/kg	6.8 (1)	4.9 (1)	5.9 (1)	11 (1)	9571120	8.4 (1)	1.0	9571113

RDL = Reportable Detection Limit

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.



BV Labs ID		WJ6027			WJ6028	WJ6039	WJ6040		
Sampling Date		2019/08/22			2019/08/22	2019/08/22	2019/08/22		
Sampling Date		11:10			11:10	11:40	11:40		
COC Number		591565-03-01			591565-03-01	591565-04-01	591565-04-01		
	UNITS	P4-10A	RDL	QC Batch	P4-10B	P4-11A	P4-11B	RDL	QC Batch
Elements									
Total Arsenic (As)	mg/kg	2.2 (1)	1.0	9571113	2.2	2.5	2.8	1.0	9571120
Total Cadmium (Cd)	mg/kg	0.10 (2)	0.10	9571113	<0.050	<0.050	<0.050	0.050	9571120
Total Chromium (Cr)	mg/kg	5.7 (1)	1.0	9571113	9.5	9.0	13	1.0	9571120
Total Cobalt (Co)	mg/kg	2.9 (2)	1.0	9571113	4.2	2.7	3.4	0.50	9571120
Total Copper (Cu)	mg/kg	21 (1)	1.0	9571113	13	9.2	11	1.0	9571120
Total Lead (Pb)	mg/kg	6.5 (2)	1.0	9571113	3.9	6.5	6.0	0.50	9571120
Total Nickel (Ni)	mg/kg	8.6 (1)	1.0	9571113	7.4	5.9	7.1	1.0	9571120
Total Zinc (Zn)	mg/kg	26 (1)	1.0	9571113	11 (1)	10 (1)	11 (1)	1.0	9571120

RDL = Reportable Detection Limit

- (1) Detection limits calculated based on method detection limits (MDLs) at client request.
- (2) Detection limits raised due to sample matrix.

BV Labs ID		WJ6041			WJ6042		WJ6043		
Campling Data		2019/08/22			2019/08/22		2019/08/22		
Sampling Date		12:40			12:40		13:00		
COC Number		591565-04-01			591565-04-01		591565-04-01		
	UNITS	P4-12A	RDL	QC Batch	P4-12B	QC Batch	P4-25A	RDL	QC Batch
Elements									
Total Arsenic (As)	mg/kg	1.3 (1)	1.0	9572285	1.6	9571120	1.3	1.0	9570216
Total Cadmium (Cd)	mg/kg	0.13 (2)	0.10	9572285	<0.050	9571120	0.099	0.050	9570216
Total Chromium (Cr)	mg/kg	4.0 (1)	1.0	9572285	7.1	9571120	4.5	1.0	9570216
Total Cobalt (Co)	mg/kg	1.9 (2)	1.0	9572285	1.8	9571120	1.7	0.50	9570216
Total Copper (Cu)	mg/kg	12 (1)	1.0	9572285	4.0	9571120	7.4	1.0	9570216
Total Lead (Pb)	mg/kg	3.3 (2)	1.0	9572285	4.2	9571120	3.5	0.50	9570216
Total Nickel (Ni)	mg/kg	3.5 (1)	1.0	9572285	3.8	9571120	3.4	1.0	9570216
Total Zinc (Zn)	mg/kg	13 (1)	1.0	9572285	5.8 (1)	9571120	10 (1)	1.0	9570216

RDL = Reportable Detection Limit

- (1) Detection limits calculated based on method detection limits (MDLs) at client request.
- (2) Detection limits raised due to sample matrix.



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

## **ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		WJ6044	WJ6045	WJ6046		WJ6047		WJ6048		
Sampling Date		2019/08/22 13:30	2019/08/22 13:30	2019/08/22 14:00		2019/08/22 14:00		2019/08/22 14:20		
COC Number		591565-04-01	591565-04-01	591565-04-01		591565-04-01		591565-04-01		
	UNITS	P4-1A	P4-1B	P4-2A	QC Batch	P4-2B	QC Batch	P4-26B	RDL	QC Batch
Elements										
Total Arsenic (As)	mg/kg	3.9	3.7	2.0	9571120	2.7	9572451	2.1	1.0	9570216
Total Cadmium (Cd)	mg/kg	<0.050	<0.050	<0.050	9571120	<0.050	9572451	<0.050	0.050	9570216
Total Chromium (Cr)	mg/kg	9.5	9.4	15	9571120	15	9572451	17	1.0	9570216
Total Cobalt (Co)	mg/kg	3.7	3.4	3.4	9571120	5.3	9572451	5.7	0.50	9570216
Total Copper (Cu)	mg/kg	8.0	7.5	14	9571120	9.5	9572451	10	1.0	9570216
Total Lead (Pb)	mg/kg	14	9.4	6.2	9571120	5.0	9572451	4.7	0.50	9570216
Total Nickel (Ni)	mg/kg	8.8	7.5	8.6	9571120	9.2	9572451	11	1.0	9570216
Total Zinc (Zn)	mg/kg	5.8 (1)	5.2 (1)	12 (1)	9571120	14 (1)	9572451	17 (1)	1.0	9570216
		•	•	•		•		•		

RDL = Reportable Detection Limit

(1) Detection limits calculated based on method detection limits (MDLs) at client request.

BV Labs ID		WJ6068		WJ6069		WJ6070	WJ6070		
Sampling Date		2019/08/22 14:40		2019/08/22 14:40		2019/08/22 15:20	2019/08/22 15:20		
COC Number		591565-05-01		591565-05-01		591565-05-01	591565-05-01		
	UNITS	P4-3A	QC Batch	P4-3B	QC Batch	P4-4A	P4-4A Lab-Dup	RDL	QC Batch
Elements									
Total Arsenic (As)	mg/kg	1.8	9571120	2.2	9571113	3.2	3.2	1.0	9571120
Total Cadmium (Cd)	mg/kg	<0.050	9571120	<0.050	9571113	<0.050	<0.050	0.050	9571120
Total Chromium (Cr)	mg/kg	8.2	9571120	8.0	9571113	9.9	10	1.0	9571120
Total Cobalt (Co)	mg/kg	2.0	9571120	2.1	9571113	2.9	2.9	0.50	9571120
Total Copper (Cu)	mg/kg	4.1	9571120	5.6	9571113	8.8	8.6	1.0	9571120
Total Lead (Pb)	mg/kg	8.8	9571120	8.2	9571113	10	10	0.50	9571120
Total Nickel (Ni)	mg/kg	3.6	9571120	3.8	9571113	7.1	7.2	1.0	9571120
Total Zinc (Zn)	mg/kg	5.7 (1)	9571120	6.0 (1)	9571113	11 (1)	10 (1)	1.0	9571120

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

(1) Detection limits calculated based on method detection limits (MDLs) at client request.



BV Labs ID		WJ6071			WJ6072	WJ6073		WJ6074		
Sampling Date		2019/08/22			2019/08/22	2019/08/22		2019/08/23		
Sampling Date		15:20			16:00	16:00		10:00		
COC Number		591565-05-01			591565-05-01	591565-05-01		591565-05-01		
	UNITS	P4-4B	RDL	QC Batch	P4-5A	P4-5B	QC Batch	MW-05A	RDL	QC Batch
Elements										
Total Arsenic (As)	mg/kg	3.6 (1)	1.0	9572451	4.0	3.6	9571113	1.6	1.0	9570208
Total Cadmium (Cd)	mg/kg	<0.10 (2)	0.10	9572451	<0.050	<0.050	9571113	0.058	0.050	9570208
Total Chromium (Cr)	mg/kg	9.7 (1)	1.0	9572451	9.5	9.4	9571113	8.2	1.0	9570208
Total Cobalt (Co)	mg/kg	3.1 (2)	1.0	9572451	3.7	3.0	9571113	3.6	0.50	9570208
Total Copper (Cu)	mg/kg	8.0 (1)	1.0	9572451	7.8	7.3	9571113	10	1.0	9570208
Total Lead (Pb)	mg/kg	9.6 (2)	1.0	9572451	15	9.0	9571113	12	0.50	9570208
Total Nickel (Ni)	mg/kg	7.1 (1)	1.0	9572451	8.3	7.1	9571113	6.3	1.0	9570208
Total Zinc (Zn)	mg/kg	6.6 (1)	1.0	9572451	4.5 (1)	4.6 (1)	9571113	26 (1)	1.0	9570208

RDL = Reportable Detection Limit

- (1) Detection limits calculated based on method detection limits (MDLs) at client request.
- (2) Detection limits raised due to sample matrix.

BV Labs ID		WJ6075		WJ6076	WJ6077		WJ6112		
Sampling Date		2019/08/23		2019/08/23	2019/08/23		2019/08/23		
Sampling Date		10:00		10:40	10:40		11:20		
COC Number		591565-05-01		591565-05-01	591565-05-01		591565-07-01		
	UNITS	MW-05B	QC Batch	MW-06A	MW-06B	RDL	MW-07A	RDL	QC Batch
Elements									
Total Arsenic (As)	mg/kg	2.6	9570208	2.3	3.2	1.0	1.5 (1)	1.0	9571113
Total Cadmium (Cd)	mg/kg	<0.050	9570208	0.057	<0.050	0.050	<0.10 (2)	0.10	9571113
Total Chromium (Cr)	mg/kg	9.2	9570208	7.5	20	1.0	3.8 (1)	1.0	9571113
Total Cobalt (Co)	mg/kg	3.3	9570208	2.8	5.9	0.50	1.9 (2)	1.0	9571113
Total Copper (Cu)	mg/kg	7.7	9570208	18	22	1.0	25 (1)	1.0	9571113
Total Lead (Pb)	mg/kg	12	9570208	7.5	4.5	0.50	4.6 (2)	1.0	9571113
Total Nickel (Ni)	mg/kg	6.7	9570208	8.6	13	1.0	12 (1)	1.0	9571113
Total Zinc (Zn)	mg/kg	11 (1)	9570208	10 (1)	22 (1)	1.0	17 (1)	1.0	9571113

RDL = Reportable Detection Limit

- (1) Detection limits calculated based on method detection limits (MDLs) at client request.
- (2) Detection limits raised due to sample matrix.



BV Labs Job #: B971727 ARCADIS Canada Inc
Report Date: 2019/12/04 Client Project #: 30000251
Sampler Initials: EH

## **ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)**

BV Labs ID		WJ6114	WJ6116	WJ6118	WJ6118	WJ6120		
Sampling Date		2019/08/23	2019/08/23	2019/08/23	2019/08/23	2019/08/23		
		12:00	12:00	12:00	12:00	10:20		
COC Number		591565-07-01	591565-07-01	591565-07-01	591565-07-01	591565-07-01		
	UNITS	MW-07B	MW-08A	MW-08B	MW-08B Lab-Dup	MW-11A	RDL	QC Batch
Elements								
Total Arsenic (As)	mg/kg	7.0	4.1	4.0	4.2	1.9	1.0	9571113
Total Cadmium (Cd)	mg/kg	0.062	<0.050	<0.050	<0.050	0.053	0.050	9571113
Total Chromium (Cr)	mg/kg	11	17	17 (1)	17	8.5	1.0	9571113
Total Cobalt (Co)	mg/kg	3.4	5.7	5.2	5.5	3.8	0.50	9571113
Total Copper (Cu)	mg/kg	26	17	13	13	11	1.0	9571113
Total Lead (Pb)	mg/kg	12	15	12	12	12	0.50	9571113
Total Nickel (Ni)	mg/kg	18	14	14	15	7.1	1.0	9571113
Total Zinc (Zn)	mg/kg	3.1 (2)	8.3 (2)	4.9 (2)	5.0 (2)	21 (2)	1.0	9571113

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

- (1) Matrix spike exceeds acceptance limits due to probable matrix interference.
- (2) Detection limits calculated based on method detection limits (MDLs) at client request.

-										
BV Labs ID		WJ6122		WJ6124		WJ6126		WJ6128		
Sampling Date		2019/08/23		2019/08/23		2019/08/23		2019/08/23		
		16:10		16:10		13:50		13:50		
COC Number		591565-07-01		591565-07-01		591565-07-01		591565-07-01		
	UNITS	P4-13A	QC Batch	P4-13B	QC Batch	P4-14A	QC Batch	P4-14B	RDL	QC Batch
Elements										
Total Arsenic (As)	mg/kg	2.9	9572285	3.6	9571113	2.4	9572451	3.8	1.0	9571120
Total Cadmium (Cd)	mg/kg	<0.050	9572285	<0.050	9571113	0.13	9572451	0.066	0.050	9571120
Total Chromium (Cr)	mg/kg	14	9572285	9.0	9571113	5.9	9572451	12	1.0	9571120
Total Cobalt (Co)	mg/kg	5.3	9572285	5.0	9571113	3.2	9572451	5.7	0.50	9571120
Total Copper (Cu)	mg/kg	28	9572285	9.7	9571113	9.0	9572451	13	1.0	9571120
Total Lead (Pb)	mg/kg	7.2	9572285	18	9571113	6.5	9572451	10	0.50	9571120
Total Nickel (Ni)	mg/kg	14	9572285	10	9571113	5.9	9572451	11	1.0	9571120
Total Zinc (Zn)	mg/kg	16 (1)	9572285	5.0 (1)	9571113	22 (1)	9572451	8.6 (1)	1.0	9571120
1										

RDL = Reportable Detection Limit

(1) Detection limits calculated based on method detection limits (MDLs) at client request.



BV Labs ID		WJ6130		WJ6163			WJ6164		
Sampling Date		2019/08/23 14:20		2019/08/23 14:20			2019/08/23 15:00		
COC Number		591565-07-01		591565-08-01			591565-08-01		
	UNITS	P4-15A	QC Batch	P4-15B	RDL	QC Batch	P4-16A	RDL	QC Batch
Elements									
Total Arsenic (As)	mg/kg	2.3	9571120	3.2	1.0	9571113	2.6 (1)	1.0	9572451
Total Cadmium (Cd)	mg/kg	0.14	9571120	<0.050	0.050	9571113	<0.10 (2)	0.10	9572451
Total Chromium (Cr)	mg/kg	7.9	9571120	11	1.0	9571113	9.3 (1)	1.0	9572451
Total Cobalt (Co)	mg/kg	3.4	9571120	5.0	0.50	9571113	3.9 (2)	1.0	9572451
Total Copper (Cu)	mg/kg	12	9571120	11	1.0	9571113	10 (1)	1.0	9572451
Total Lead (Pb)	mg/kg	11	9571120	9.1	0.50	9571113	9.3 (2)	1.0	9572451
Total Nickel (Ni)	mg/kg	7.4	9571120	10	1.0	9571113	8.4 (1)	1.0	9572451
Total Zinc (Zn)	mg/kg	24 (1)	9571120	7.0 (1)	1.0	9571113	3.5 (1)	1.0	9572451

RDL = Reportable Detection Limit

- (1) Detection limits calculated based on method detection limits (MDLs) at client request.
- (2) Detection limits raised due to sample matrix.

	_									
BV Labs ID		WJ6165	WJ6166	WJ6167		WJ6168		WJ6169		
Sampling Date		2019/08/23	2019/08/23	2019/08/23		2019/08/23		2019/08/23		
Sampling Date		15:00	15:30	15:30		16:40		16:40		
COC Number		591565-08-01	591565-08-01	591565-08-01		591565-08-01		591565-08-01		
	UNITS	P4-16B	P4-17A	P4-17B	QC Batch	P4-18A	QC Batch	P4-18B	RDL	QC Batch
Elements										
Total Arsenic (As)	mg/kg	3.6	3.3	3.6	9570216	3.6	9570208	3.1	1.0	9570216
Total Cadmium (Cd)	mg/kg	<0.050	<0.050	<0.050	9570216	<0.050	9570208	<0.050	0.050	9570216
Total Chromium (Cr)	mg/kg	10	8.1	8.8	9570216	8.4	9570208	7.9	1.0	9570216
Total Cobalt (Co)	mg/kg	5.0	4.5	4.9	9570216	3.5	9570208	3.2	0.50	9570216
Total Copper (Cu)	mg/kg	11	9.1	9.5	9570216	8.1	9570208	6.2	1.0	9570216
Total Lead (Pb)	mg/kg	11	11	10	9570216	11	9570208	8.3	0.50	9570216
Total Nickel (Ni)	mg/kg	11	9.5	10	9570216	7.6	9570208	6.9	1.0	9570216
Total Zinc (Zn)	mg/kg	3.9 (1)	4.8 (1)	5.1 (1)	9570216	5.1 (1)	9570208	5.3 (1)	1.0	9570216

RDL = Reportable Detection Limit

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.



BV Labs ID		WJ6170		WJ6171	WJ6172	WJ6176	WJ6177		
Sampling Date		2019/08/23		2019/08/23	2019/08/23	2019/08/23	2019/08/23		
Sampling Date		17:10		17:10	17:40	17:40	18:00		
COC Number		591565-08-01		591565-08-01	591565-08-01	591565-09-01	591565-09-01		
	UNITS	P4-19A	QC Batch	P4-19B	P4-20A	P4-20B	P4-21A	RDL	QC Batch
Elements									
Total Arsenic (As)	mg/kg	3.2	9570216	3.3	3.5	3.4	3.2	1.0	9570208
Total Cadmium (Cd)	mg/kg	<0.050	9570216	<0.050	<0.050	<0.050	<0.050	0.050	9570208
Total Chromium (Cr)	mg/kg	9.4	9570216	9.0	11	10	10	1.0	9570208
Total Cobalt (Co)	mg/kg	4.8	9570216	5.0	5.0	4.8	5.0	0.50	9570208
Total Copper (Cu)	mg/kg	11	9570216	11	11	9.6	10	1.0	9570208
Total Lead (Pb)	mg/kg	7.8	9570216	7.7	8.6	7.9	7.9	0.50	9570208
Total Nickel (Ni)	mg/kg	13	9570216	12	12	13	13	1.0	9570208
Total Zinc (Zn) mg/kg 7.3 (1) 9570216 6.3 (1) 9.7 (1) 7.2 (1) 7.9 (1) 1.0 9570									
RDL = Reportable Detection	Limit								

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.

BV Labs ID		WJ6178	WJ6179	WJ6180	WJ6180		WJ6181		
Sampling Date		2019/08/23 18:00	2019/08/23 19:30	2019/08/23 19:30	2019/08/23 19:30		2019/08/23 20:00		
COC Number		591565-09-01	591565-09-01	591565-09-01	591565-09-01		591565-09-01		
	UNITS	P4-21B	P4-22A	P4-22B	P4-22B Lab-Dup	QC Batch	P4-23A	RDL	QC Batch
Elements									
Total Arsenic (As)	mg/kg	3.3	1.7	1.7	1.7	9570208	<1.0	1.0	9571120
Total Cadmium (Cd)	mg/kg	<0.050	<0.050	<0.050	<0.050	9570208	0.28	0.050	9571120
Total Chromium (Cr)	mg/kg	10	10	10	9.8	9570208	4.7	1.0	9571120
Total Cobalt (Co)	mg/kg	5.3	5.9	6.2	5.9	9570208	2.6	0.50	9571120
Total Copper (Cu)	mg/kg	10	13	12	15	9570208	46	1.0	9571120
Total Lead (Pb)	mg/kg	7.9	2.7	2.9	2.8	9570208	1.2	0.50	9571120
Total Nickel (Ni)	mg/kg	14	8.7	9.3	8.8	9570208	18	1.0	9571120
Total Zinc (Zn)	mg/kg	7.3 (1)	15 (1)	15 (1)	14	9570208	6.4 (1)	1.0	9571120

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.



BV Labs ID		WJ6182			WJ6183	WJ6184			WJ6185		
Sampling Date		2019/08/23 20:00			2019/08/23 20:30	2019/08/23 20:30			2019/08/23 19:50		
COC Number		591565-09-01			591565-09-01	591565-09-01			591565-09-01		
	UNITS	P4-23B	RDL	QC Batch	P4-24A	P4-24B	RDL	QC Batch	P4-27A	RDL	QC Batch
Elements											
Total Arsenic (As)	mg/kg	1.3	1.0	9570208	1.6 (1)	1.8 (1)	1.0	9571120	1.7	1.0	9570216
Total Cadmium (Cd)	mg/kg	<0.050	0.050	9570208	<0.10 (2)	0.15 (2)	0.10	9571120	<0.050	0.050	9570216
Total Chromium (Cr)	mg/kg	12	1.0	9570208	3.8 (1)	4.8 (1)	1.0	9571120	10	1.0	9570216
Total Cobalt (Co)	mg/kg	4.9	0.50	9570208	2.2 (2)	3.6 (2)	1.0	9571120	6.4	0.50	9570216
Total Copper (Cu)	mg/kg	15	1.0	9570208	19 (1)	49 (1)	1.0	9571120	14	1.0	9570216
Total Lead (Pb)	mg/kg	2.8	0.50	9570208	3.8 (2)	3.8 (2)	1.0	9571120	3.0	0.50	9570216
Total Nickel (Ni)	mg/kg	9.7	1.0	9570208	9.9 (1)	26 (1)	1.0	9571120	9.2	1.0	9570216
Total Zinc (Zn)	mg/kg	16 (1)	1.0	9570208	21 (1)	22 (1)	1.0	9571120	16 (1)	1.0	9570216

RDL = Reportable Detection Limit

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.

<sup>(2)</sup> Detection limits raised due to sample matrix.



ARCADIS Canada Inc Report Date: 2019/12/04 Client Project #: 30000251 Sampler Initials: EH

#### **GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.5°C
Package 2	4.3°C
Package 3	3.8°C
Package 4	3.0°C
Package 5	3.3°C
Package 6	2.9°C
Package 7	4.9°C

BTEXF1-F24: Detection limits calculated based on method detection limits (MDLs) at client request.

Version 3: Report reissued to amend client sample ID for BV sample ID: WJ6075 as per client request on 2019/11/15. Refer to attachment for details.

Report reissued with adjusted DL for F1- sample P4-19A (WJ6170) 2019/11/27

Version 5: Report reissued to include results for F3a and F3b on select samples as per client request received 2019/11/27

#### POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL) Comments

Sample WJ5999 [MW-02A] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture. Sample WJ6000 [MW-02B] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture. Sample WJ6027 [P4-10A] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture. Sample WJ6041 [P4-12A] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture. Sample WJ6043 [P4-25A] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture. Sample WJ6046 [P4-2A] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture. Sample WJ6074 [MW-05A] Polychlorinated Biphenyls in Soil: Detection limits raised due to dilution to bring analyte within the calibrated range. Sample WJ6126 [P4-14A] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture.

Sample WJ6165 [P4-16B] Polychlorinated Biphenyls in Soil: Detection limits raised due to matrix interference.

Sample WJ6181 [P4-23A] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture. Sample WJ6183 [P4-24A] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture.

Sample WJ6184 [P4-24B] Polychlorinated Biphenyls in Soil: Detection limits raised due to high moisture content, samples contain => 50% moisture.

Results relate only to the items tested.



## **QUALITY ASSURANCE REPORT**

ARCADIS Canada Inc Client Project #: 30000251

Sampler Initials: EH

			Matrix	Spike	Spiked	Blank	Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9568853	O-TERPHENYL (sur.)	2019/08/29	80	60 - 140	79	60 - 140	90	%				
9568890	O-TERPHENYL (sur.)	2019/08/31	86	60 - 140	82	60 - 140	111	%				
9568947	O-TERPHENYL (sur.)	2019/08/30	87	60 - 140	93	60 - 140	91	%				
9569474	O-TERPHENYL (sur.)	2019/08/31	89	60 - 140	77	60 - 140	80	%				
9569721	NONACHLOROBIPHENYL (sur.)	2019/08/30	75	50 - 130	85	50 - 130	85	%				
9569757	1,4-Difluorobenzene (sur.)	2019/08/31	96	50 - 140	99	50 - 140	98	%				
9569757	4-Bromofluorobenzene (sur.)	2019/08/31	101	50 - 140	100	50 - 140	99	%				
9569757	D10-o-Xylene (sur.)	2019/08/31	131	50 - 140	125	50 - 140	117	%				
9569757	D4-1,2-Dichloroethane (sur.)	2019/08/31	104	50 - 140	102	50 - 140	102	%				
9569760	1,4-Difluorobenzene (sur.)	2019/08/31	98	50 - 140	101	50 - 140	102	%				
9569760	4-Bromofluorobenzene (sur.)	2019/08/31	105	50 - 140	102	50 - 140	103	%				
9569760	D10-o-Xylene (sur.)	2019/08/31	129	50 - 140	113	50 - 140	111	%				
9569760	D4-1,2-Dichloroethane (sur.)	2019/08/31	112	50 - 140	117	50 - 140	115	%				
9569766	1,4-Difluorobenzene (sur.)	2019/08/30	96	50 - 140	100	50 - 140	100	%				
9569766	4-Bromofluorobenzene (sur.)	2019/08/30	104	50 - 140	102	50 - 140	103	%				
9569766	D10-o-Xylene (sur.)	2019/08/30	118	50 - 140	115	50 - 140	114	%				
9569766	D4-1,2-Dichloroethane (sur.)	2019/08/30	108	50 - 140	114	50 - 140	115	%				
9569775	1,4-Difluorobenzene (sur.)	2019/08/31	97	50 - 140	101	50 - 140	101	%				
9569775	4-Bromofluorobenzene (sur.)	2019/08/31	97	50 - 140	97	50 - 140	98	%				
9569775	D10-o-Xylene (sur.)	2019/08/31	120	50 - 140	112	50 - 140	103	%				
9569775	D4-1,2-Dichloroethane (sur.)	2019/08/31	96	50 - 140	96	50 - 140	99	%				
9570180	NONACHLOROBIPHENYL (sur.)	2019/08/31	93	50 - 130	89	50 - 130	90	%				
9570395	NONACHLOROBIPHENYL (sur.)	2019/08/31	65	50 - 130	84	50 - 130	85	%				
9571070	NONACHLOROBIPHENYL (sur.)	2019/08/31	67	50 - 130	100	50 - 130	96	%				
9694792	O-TERPHENYL (sur.)	2019/08/29			79	60 - 140	90	%				
9568435	Moisture	2019/08/30					<0.30	%	12	20		
9568473	Moisture	2019/08/30					<0.30	%	7.4	20		
9568708	Moisture	2019/08/30					<0.30	%	17	20		
9568853	F2 (C10-C16 Hydrocarbons)	2019/08/29	90	60 - 140	90	60 - 140	<3.0	mg/kg	23	40		
9568853	F3 (C16-C34 Hydrocarbons)	2019/08/29	92	60 - 140	92	60 - 140	<6.4	mg/kg	6.3	40		
9568853	F4 (C34-C50 Hydrocarbons)	2019/08/29	88	60 - 140	90	60 - 140	<4.7	mg/kg	9.1	40		
9568890	F2 (C10-C16 Hydrocarbons)	2019/08/29	94	60 - 140	91	60 - 140	<4.0	mg/kg	NC	40		



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9568890	F3 (C16-C34 Hydrocarbons)	2019/08/29	90	60 - 140	93	60 - 140	<8.0	mg/kg	15	40		
9568890	F4 (C34-C50 Hydrocarbons)	2019/08/29	94	60 - 140	92	60 - 140	<6.0	mg/kg	NC	40		
9568918	Moisture	2019/08/30					<0.30	%	8.4	20		
9568947	F2 (C10-C16 Hydrocarbons)	2019/08/30	91	60 - 140	98	60 - 140	<3.0	mg/kg	NC	40		
9568947	F3 (C16-C34 Hydrocarbons)	2019/08/30	93	60 - 140	101	60 - 140	<6.4	mg/kg	30	40		
9568947	F4 (C34-C50 Hydrocarbons)	2019/08/30	91	60 - 140	98	60 - 140	<4.7	mg/kg	NC	40		
9569474	F2 (C10-C16 Hydrocarbons)	2019/08/31	100	60 - 140	83	60 - 140	<4.0	mg/kg	NC	40		
9569474	F3 (C16-C34 Hydrocarbons)	2019/08/31	102	60 - 140	85	60 - 140	<8.0	mg/kg	4.0	40		
9569474	F4 (C34-C50 Hydrocarbons)	2019/08/31	100	60 - 140	83	60 - 140	<6.0	mg/kg	NC	40		
9569721	Aroclor 1016	2019/08/30					<0.010	mg/kg	NC	50		
9569721	Aroclor 1221	2019/08/30					<0.010	mg/kg	NC	50		
9569721	Aroclor 1232	2019/08/30					<0.010	mg/kg	NC	50		
9569721	Aroclor 1242	2019/08/30					<0.010	mg/kg	NC	50		
9569721	Aroclor 1248	2019/08/30					<0.010	mg/kg	NC	50		
9569721	Aroclor 1254	2019/08/30					<0.010	mg/kg	NC	50		
9569721	Aroclor 1260	2019/08/30	70	50 - 130	84	50 - 130	<0.010	mg/kg	NC	50		
9569721	Aroclor 1262	2019/08/30					<0.010	mg/kg	NC	50		
9569721	Aroclor 1268	2019/08/30					<0.010	mg/kg	NC	50		
9569757	F1 (C6-C10)	2019/08/31	97	60 - 140	105	60 - 140	<7.0	mg/kg	NC	30		
9569760	F1 (C6-C10)	2019/08/31	112	60 - 140	120	60 - 140	<7.0	mg/kg	NC	30		
9569766	F1 (C6-C10)	2019/08/30	110	60 - 140	96	60 - 140	<7.0	mg/kg	NC	30		
9569775	F1 (C6-C10)	2019/08/31	110	60 - 140	96	60 - 140	<7.0	mg/kg	NC	30		
9570180	Aroclor 1016	2019/08/31					<0.010	mg/kg	NC	50		
9570180	Aroclor 1221	2019/08/31					<0.010	mg/kg	NC	50		
9570180	Aroclor 1232	2019/08/31					<0.010	mg/kg	NC	50		
9570180	Aroclor 1242	2019/08/31					< 0.010	mg/kg	NC	50		
9570180	Aroclor 1248	2019/08/31					<0.010	mg/kg	NC	50		
9570180	Aroclor 1254	2019/08/31					<0.010	mg/kg	NC	50		
9570180	Aroclor 1260	2019/08/31	101	50 - 130	92	50 - 130	<0.010	mg/kg	NC	50		
9570180	Aroclor 1262	2019/08/31					<0.010	mg/kg	NC	50		
9570180	Aroclor 1268	2019/08/31					<0.010	mg/kg	NC	50		
9570208	Total Arsenic (As)	2019/08/30	90	75 - 125	96	80 - 120	<1.0	mg/kg	0.34	30	97	53 - 147



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

RPD Matrix Spike Spiked Blank **Method Blank QC Standard** QC Batch **Parameter** Date % Recovery QC Limits | % Recovery **QC Limits** Value UNITS Value (%) QC Limits % Recovery QC Limits 9570208 Total Cadmium (Cd) 2019/08/30 75 - 125 80 - 120 < 0.050 mg/kg NC 30 72 - 128 59 - 141 9570208 Total Chromium (Cr) 2019/08/30 97 75 - 125 99 80 - 120 <1.0 mg/kg 4.2 30 78 9570208 Total Cobalt (Co) 2019/08/30 90 75 - 125 98 80 - 120 < 0.50 mg/kg 4.1 30 89 58 - 142 9570208 2019/08/30 30 Total Copper (Cu) 90 75 - 125 100 80 - 120 <1.0 mg/kg 18 111 83 - 117 9570208 Total Lead (Pb) 2019/08/30 77 75 - 125100 80 - 120 < 0.50 mg/kg 2.8 35 99 79 - 121 9570208 Total Nickel (Ni) 2019/08/30 89 75 - 125 97 80 - 120 <1.0 5.3 30 97 79 - 121 mg/kg 9570208 2019/08/30 75 - 125 30 79 - 121 Total Zinc (Zn) 89 98 80 - 120 <10 mg/kg 6.1 98 9570216 Total Arsenic (As) 2019/08/31 93 75 - 125 97 80 - 120 <1.0 mg/kg 1.4 30 99 53 - 147 9570216 Total Cadmium (Cd) 2019/08/31 93 75 - 125 95 80 - 120 < 0.050 96 72 - 128 mg/kg 9570216 Total Chromium (Cr) 2019/08/31 99 104 75 - 125 80 - 120 <1.0 mg/kg 5.6 30 79 59 - 141 92 9570216 Total Cobalt (Co) 2019/08/31 94 75 - 125 98 80 - 120 < 0.50 mg/kg 58 - 142 9570216 Total Copper (Cu) 2019/08/31 75 - 125 99 80 - 120 <1.0 2.9 83 - 117 93 mg/kg 30 114 9570216 2019/08/31 81 75 - 125 96 80 - 120 <0.50 1.7 35 99 79 - 121 Total Lead (Pb) mg/kg 9570216 2019/08/31 Total Nickel (Ni) 95 75 - 125 97 80 - 120 <1.0 mg/kg 100 79 - 121 9570216 Total Zinc (Zn) 2019/08/31 75 - 125 98 80 - 120 <10 2.5 101 79 - 121 NC mg/kg 30 9570395 2019/09/03 < 0.010 Aroclor 1016 mg/kg NC 50 9570395 2019/09/03 Aroclor 1221 < 0.010 mg/kg NC 50 9570395 Aroclor 1232 2019/09/03 <0.010 mg/kg NC 50 9570395 2019/09/03 < 0.010 NC 50 Aroclor 1242 mg/kg 9570395 Aroclor 1248 2019/09/03 < 0.010 mg/kg NC 50 9570395 Aroclor 1254 2019/09/03 < 0.010 NC 50 mg/kg 9570395 Aroclor 1260 2019/09/03 75 50 - 130 83 50 - 130 < 0.010 mg/kg NC 50 9570395 2019/09/03 <0.010 NC 50 Aroclor 1262 mg/kg 9570395 Aroclor 1268 2019/09/03 < 0.010 mg/kg NC 50 9571070 Aroclor 1016 2019/08/31 < 0.010 mg/kg NC 50 9571070 <0.010 50 Aroclor 1221 2019/08/31 mg/kg NC 50 9571070 Aroclor 1232 2019/08/31 < 0.010 mg/kg NC 9571070 Aroclor 1242 2019/08/31 < 0.010 mg/kg NC 50 9571070 2019/08/31 <0.010 NC 50 Aroclor 1248 mg/kg 9571070 50 Aroclor 1254 2019/08/31 < 0.010 NC mg/kg 9571070 Aroclor 1260 2019/08/31 77 50 - 130 105 50 - 130 < 0.010 mg/kg NC 50 9571070 2019/08/31 < 0.010 Aroclor 1262 mg/kg NC 50



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

			Matrix Spike		Spiked	Blank	Blank Method B		RPD		QC Sta	andard
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value UNITS		Value (%)	QC Limits	% Recovery	QC Limits
9571070	Aroclor 1268	2019/08/31					<0.010	mg/kg	NC	50		
9571113	Total Arsenic (As)	2019/08/31	103	75 - 125	95	80 - 120	<1.0	mg/kg	4.2	30	100	53 - 147
9571113	Total Cadmium (Cd)	2019/08/31	105	75 - 125	94	80 - 120	<0.050	mg/kg	NC	30	120	72 - 128
9571113	Total Chromium (Cr)	2019/08/31	126 (1)	75 - 125	98	80 - 120	<1.0	mg/kg	0.17	30	77	59 - 141
9571113	Total Cobalt (Co)	2019/08/31	101	75 - 125	96	80 - 120	<0.50	mg/kg	5.3	30	89	58 - 142
9571113	Total Copper (Cu)	2019/08/31	99	75 - 125	97	80 - 120	<1.0	mg/kg	1.9	30	111	83 - 117
9571113	Total Lead (Pb)	2019/08/31	81	75 - 125	98	80 - 120	<0.50	mg/kg	1.3	35	96	79 - 121
9571113	Total Nickel (Ni)	2019/08/31	101	75 - 125	95	80 - 120	<1.0	mg/kg	2.3	30	98	79 - 121
9571113	Total Zinc (Zn)	2019/08/31	100	75 - 125	96	80 - 120	<10	mg/kg	1.3 (2)	30	100	79 - 121
9571120	Total Arsenic (As)	2019/08/31	87	75 - 125	96	80 - 120	<1.0	mg/kg	0.36	30	109	53 - 147
9571120	Total Cadmium (Cd)	2019/08/31	89	75 - 125	95	80 - 120	<0.050	mg/kg	NC	30	106	72 - 128
9571120	Total Chromium (Cr)	2019/08/31	95	75 - 125	98	80 - 120	<1.0	mg/kg	0.94	30	92	59 - 141
9571120	Total Cobalt (Co)	2019/08/31	87	75 - 125	97	80 - 120	<0.50	mg/kg	0.12	30	98	58 - 142
9571120	Total Copper (Cu)	2019/08/31	83	75 - 125	98	80 - 120	<1.0	mg/kg	2.5	30	117	83 - 117
9571120	Total Lead (Pb)	2019/08/31	82	75 - 125	95	80 - 120	<0.50	mg/kg	1.1	35	107	79 - 121
9571120	Total Nickel (Ni)	2019/08/31	83	75 - 125	97	80 - 120	<1.0	mg/kg	1.1	30	108	79 - 121
9571120	Total Zinc (Zn)	2019/08/31	81	75 - 125	96	80 - 120	<10	mg/kg	8.0 (2)	30	109	79 - 121
9572285	Total Arsenic (As)	2019/09/03	104	75 - 125	96	80 - 120	<1.0	mg/kg	14	30	99	53 - 147
9572285	Total Cadmium (Cd)	2019/09/03	104	75 - 125	98	80 - 120	<0.050	mg/kg	NC	30	94	72 - 128
9572285	Total Chromium (Cr)	2019/09/03	NC	75 - 125	97	80 - 120	<1.0	mg/kg	17	30	87	59 - 141
9572285	Total Cobalt (Co)	2019/09/03	111	75 - 125	98	80 - 120	<0.50	mg/kg	11	30	90	58 - 142
9572285	Total Copper (Cu)	2019/09/03	109	75 - 125	97	80 - 120	<1.0	mg/kg	15	30	108	83 - 117
9572285	Total Lead (Pb)	2019/09/03	92	75 - 125	99	80 - 120	<0.50	mg/kg	13	35	95	79 - 121
9572285	Total Nickel (Ni)	2019/09/03	110	75 - 125	97	80 - 120	<1.0	mg/kg	16	30	98	79 - 121
9572285	Total Zinc (Zn)	2019/09/03	NC	75 - 125	99	80 - 120	<10	mg/kg	16	30	97	79 - 121
9572451	Total Arsenic (As)	2019/09/03	108	75 - 125	95	80 - 120	<1.0	mg/kg	14	30	102	53 - 147
9572451	Total Cadmium (Cd)	2019/09/03	108	75 - 125	94	80 - 120	<0.050	mg/kg	NC	30	96	72 - 128
9572451	Total Chromium (Cr)	2019/09/03	113	75 - 125	96	80 - 120	<1.0	mg/kg	54 (1)	30	84	59 - 141
9572451	Total Cobalt (Co)	2019/09/03	106	75 - 125	94	80 - 120	<0.50	mg/kg	13	30	91	58 - 142
9572451	Total Copper (Cu)	2019/09/03	106	75 - 125	94	80 - 120	<1.0	mg/kg	NC	30	111	83 - 117
9572451	Total Lead (Pb)	2019/09/03	105	75 - 125	93	80 - 120	<0.50	mg/kg	15	35	95	79 - 121
9572451	Total Nickel (Ni)	2019/09/03	100	75 - 125	95	80 - 120	<1.0	mg/kg	9.6	30	101	79 - 121



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9572451	Total Zinc (Zn)	2019/09/03	109	75 - 125	97	80 - 120	<10	mg/kg	NC	30	99	79 - 121
9694792	F3A (C16-C22)	2019/08/29			93	60 - 140	<50	mg/kg				
9694792	F3B (C22-C34)	2019/08/29			91	60 - 140	<50	mg/kg				

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

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

- (1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
- (2) Detection limits calculated based on method detection limits (MDLs) at client request.



ARCADIS Canada Inc Client Project #: 30000251 Sampler Initials: EH

#### **VALIDATION SIGNATURE PAGE**

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

Daniel Reslan, cCT, QP, Organics Manager
Justo Beinel
Justin Geisel, B.Sc., Organics Supervisor
Julha O
Roland Menard, Analyst II
Strlo
Suwan Fock, B.Sc., QP, Inorganics Senior Analyst
Jingynan Soney
Historian Cons. OR Conspirer Coning Applicat
Jingyuan Song, QP, Organics – Senior Analyst
1 pranica felk

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

(AUVE)														Page I of 7	
		Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Canada T	2E 6P8 Tel (403) 291-	3077 Toll-free:800-563	3-6266 Fax:(	(403) 291-	9468 www.bvl	abs.com			СН	AIN OF CUST	ODY RECORD		
VERITAS.		INVOICE TO:			REPOR	T TO:				PROJECT INFORMATION	۷:		Laboratory Use C	Only:	
									B60371			Bottle Order #:			
Company Name: Atterition:	Flight Holden			Attention:					Quotation #: P.O. #:	30000251		B971727	591565		
Address:	1050 Morrison I		Address:	19-11-1					Project:	30000251			COC #:	Project Manager:	
	Ottawa ON K2H		<u> </u>	-			Fax:		Project Name:	PIN-4		1000		Parminder Virk	
Tel:	(613) 721-0555 Jacob.Holden@		Tel:	TROY, A	USTRI			DIS, C.OM		ELLIOTT HO	CLDEN		C#591565-02-01	Parminder VIIK	
Email:	Jacob. Holderig	Jaroudiciosiii		cial Instructions		1 1			SIS REQUESTED (PLI	EASE BE SPECIFIC)		Turnaround Time (TAT) Required:			
Regulatory Ci	iteria:	HE LAB FOR REQUIRED !	METALS: 0	NLT REPOR	ET			3					Please provide advance notice for ru	sh projects	
		A5, cd, c P6, N1) 211 PHCs: ON E1, F2, F3 (i.e., No!			Itered ? ( Y / N )	(NO BETX	COL CE				Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests Please note: Standard TAT for certain tests are > 5 days - contact your Project Manager Idelails				
				70 III II I	Field Filtere	7 4	35				Job Specific Rush Date Required: Rush Confirmation Nu				
	SAMPLES MUST BE K	KEPT COOL ( < 10°C ) FROM TIME OF SAMP	LING UNTIL DELIVER	Y TO BV LABS		Metals	1-1	700				# of Bottles	Comments	all lab for #)	
Samp	le Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Me	正. 2	UN LU					Outments		
1		MW-01A	19/08/21	13:00	5		$\times$	$\langle \times \rangle$				5			
2		MW-013	19/08/21	13:00	5		$\times$ $>$	$\times \times$				5	Received in Ye	ellowknife	
3		MW-02A	19/08/21	14100	5		$\times$	$\times \times$				5	By: U. MERCO	10:30 AM	
4		MW-02B	19/08/21	14:00	5		$\times$					5 AUG 2.7 2019			
5		MW-03A	19/08/21	15:00	S		$\times$	$\times$				5			
6		MW-03B	19/08/21	15:00	S		×>	$\times \times$				5	Temp: AC	1 R /	
7	100	MW-04A	19/08/2	4	5		$\times$	$\times$				5			
8		MW-G4B	19/08/21	16:00	5		$\times$	$\times \times$				5			

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RECEIVED BY: (Signature/Print)

S

6

White: BV Labs

Yes

Custody Seal Intact on Cooler?

No

5

5

Temperature (°C) on Receipt

see ACTR

# iars used and

not submitted

Time

50.00

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Date: (YY/MM/DD)

19/05/25

19/08/21

10:00

13:20

\*\* ALL SAMPLES ARE HELD FOR 50 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

MW-09A

\* RELINQUISHED BY: (Signature/Print)

ELLIOT HOLDEN

Bureau Veritas Canada (2019) Inc.

Date: (YY/MM/DD)

35806102

														2999		
BU FEAU VERITAS	Bureau Veritas Laboratories 4000 19st N.E., Calgary, Alberta Canad	da T2E 6P8 Tel:(403) 291-	3077 Toll-free:800-56:	3-6266 Fax:(4	03) 291-9468	www.bvlabs.co	om					CHAIN	DF CUSTODY RECORD	Page 2 of 7		
VERITAS	INVOICE TO:	REPORT	TO:				PI	ROJECT INFO	ORMATION:		Laboratory Use Only:					
					PAG	E1		Quotation #:		13 60	371		BV Labs Job #:	Bottle Order #:		
Attention: Elliott Ho		Attention:											B971727			
Address: 1050 Mc	rrison Drive Suite 201	Address:								30000251				591565		
	ON K2H 8K7		Second discount of the second					Project Name:	7	PIN-4			COC #:	Project Manager:		
101.	1-0555 Ext: 237 Fax: (613) 721-00		***************************************	uguanani e	Fax: _	9:5-00		Site #:	ELLICT HOLDEN		,	C#591565-03-01	Parminder Virk			
Email: Jacob.H	olden@arcadis.com	Email:	-					Sampled By:			HELDEN	<u> </u>	COMMENT AND THE STATE OF THE ST			
Regulatory Criteria:		Spec	ial Instructions		_		ANALY	SIS REQUESTED (PI	LEASE B	E SPECIFIC)		English Co.	Turnaround Time (TAT) Required:  Please provide advance notice for rush projects			
CCME Other	AME AS PAGE!	SAME A	S PAGE	1	ed ?(Y/N)	METALS						(will be Standa Please details	r (Standard) TAT: applied if Rush TAT is not specified): rd TAT = 5-7 Working days for most tests note: Standard TAT for certain tests are > 5 days	- contact your Project Manager for		
SAMPLES ML	SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UN				ils Field Filtered		CBS					Date R	ecific Rush TAT (if applies to entire submiss equired:  Infirmation Number:	(call lab for #)		
Sample Barcode Lat	AND ASSESSMENT OF THE PROPERTY	Date Sampled	Time Sampled	Matrix	Metals $\mathcal{T}$	Total Car	0					# of Bo	titles Commen	ats		
1	P4-6A	19/08/22	8:40	5	<b>&gt;</b>	< X	X					5	,			
2	P4-6B	19/08/22	8:40	S	$\times$	X	X					5				
3	P4-7A	19/08/22	9:20	S	$\rightarrow$	$\langle \times \rangle$	X					5	By: J. MEZ	erros 10:30 M		
4	P4-7B	19/08/22	9:20	S	X	$\langle \times \rangle$	$\times$					5	ALLEY /	,		
5	P4-8A	19/08/22	10:00	S	×	$\langle \times \rangle$	X					5				
6	P4-83	19/08/22	10:00	S	>	$\langle \times \rangle$	$\times$					5	Onio- /	170 /		
7	P4-9A	19/08/22	10:40	5	\ \ \ \ \	$\langle X$	$\times$					5				
8	P4-9B	19/08/22	10:40	S	>	$\langle \times \rangle$	X					5				
9	P4-10A	19/08/22		S	$\geq$	X	$\times$					5				
10	P4-10B	19/08/22	11:10	5	$ \rangle$	$\langle \times$	$\times$					5				
* RELINQUIS	HED BY: (Signature/Print) Date	e: (YY/MM/DD) Tim	ie /		D BY: (Sign			Date: (YY/MN		Time	# jars used and not submitted		Laboratory Use Only	Custody Seal latest as Cooler?		

Bureau Veritas Canada (2019) Inc.

85809105

20:00

Temperature (°C) on Receipt

Custody Seal Intact on Cooler?

White: BV Labs

No.

Yellow: Client

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34 ELLIGHT HOLDEN

19/08/25

" ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

10:00

		Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Cana	ada T2E 6P8 Tel:(403) 291-3077	Toll-free:800-563-62	66 Fax:(403)	291-9468 ww	w bylabs cor	n					CHAIN OF	CUSTODY RECORD	Page 3of 7
BUREAU VERITAS		NVOICE TO:			REPORT TO:					PI	ROJECT INFOR	RMATION:		Laboratory Use	Only:
	#2000 ADCAD		Company Name:	SAME	A5	PA	SEI		Quotation #:	1	3603	チし		BV Labs Job #:	Bottle Order #:
Company Name: Attention:	Elliott Holden	10 Guillada III.	Attention:						P.O. #:	-				B971727	591565
Address.	1050 Morrison E		Address:						Project:		30000251			COC #:	Project Manager:
	Ottawa ON K2H	8K7 Ext: 237 <sub>Fax:</sub> (613) 721-0	0029 <sub>Tel:</sub>		-11-11-11-11-11-11-11-11-11-11-11-11-11	Fax:			Project Name: Site #:		PIN-4				Parminder Virk
Tel: Email:	Jacob.Holden@		Email:						Sampled By:	-	ELLIGT	T HOLDE	2	C#591565-04-01	
	-		Special In	structions				ANALYS	SIS REQUESTED (F	PLEASE B	BE SPECIFIC)			Turnaround Time (TAT) R	
Regulatory C	SAME	AS PAGE	SAME AS	S PAGE	Filtered ? ( Y / N )	<b>1</b>	1265	8					(will be app Standard T Please not details Job Speci	Please provide advance notice for standard) TAT:  lifed if Rush TAT is not specified):  "AT = 5-7 Working days for most tests "Standard TAT for certain tests are > 5 days fic Rush TAT (if applies to entire submis	- contact your Project Manager for
		EPT COOL ( < 10°C ) FROM TIME OF S	SAMPLING UNTIL DELIVERY TO	BV LABS Time Sampled	Matrix M	1	MET	PCB					Date Requ Rush Confir # of Bottle:	mation Number:	(call lab for #)
Samp	ple Barcode Label	Sample (Location) Identification	19/08/22	11:40	5	×	X	X					5		
1					S		X	X					5		
2		P4-11 B	19/08/22	11:40			()	$\bigcirc$					5	Received in Y	ellowknife
3		P4-12 A	19/08/22	12:40	S	$\sim$	X	$\rightarrow$						By: J. MER	10:307
4		P4-12 B	19/08/22	12:40	5	X	X	$\times$					5	1314	
5		P4-25A	19/08/22	13:00	5	X	X	X					5	AUG 27	2019
6		P4-1A	19/08/22	13:30	5	X	X	X					5		in .
ь			1	A	5	()		X					5	Temp: AC	TRI
7		P4-1 B	19/08/22	13:30			$\rightarrow$	$\langle \cdot \rangle$					5		
8		P4-2A	19/08/22	14:00	5		X	$\Delta$							
9		P4-2B	19/08/22	14:00	5	X	X	X					5		
10		P4-26B	19  08/22	14:20	5	X	X	$\times$					5		
	* RELINQUISHED BY	: (Signature/Print) D	ate: (YY/MM/DD) Time	1211	RECEIVED				Date: (YY/M		Time	# jars used and not submitted	Time Sensitive	Laboratory Use Only Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
24	ELCIOT	HCLDEN 19	108 25 10:00	1000	) 30	55174	LEE		201908	520	20:00			See ACTIZ	Yes No
WWW.BVLABS.	COM/TERMS-AND-CONDIT	RITING, WORK SUBMITTED ON THIS CHAIN ( IONS. INQUISHER TO ENSURE THE ACCURACY OF AFTER SAMPLE RECEIPT, FOR SPECIAL RI	THE CHAIN OF CUSTODY RECORD	AN INCOMPLETE CHA	AND CONDITION	S. SIGNING	OF THIS CHAI	N OF CUSTOD	Y DOCUMENT IS ACK	KNOWLEDG	L MENT AND ACCE	PTANCE OF OUR TERM	IS WHICH ARE AVA	ILABLE FOR VIEWING AT	White: BV Labs Yellow; Client

Bureau Veritas Canada (2019) Inc.

BUREAU VERITAS	Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Canada	T2E 6P8 Tel:(403)	291-3077 Toll-free:800-56	33-6266 Fax (4	403) 2	91-9468 w	www.bvlabs	com							CHAIN	OF CU	STODY RECORD	Page Hof 7
M.A.SHARAGA	INVOICE TO:			REPORT	T TO:						F	ROJECT	INFORMA	TION:			Laboratory Use (	Only:
Company Name: #3269	ARCADIS Canada Inc	Compan	ny Name: 5AME	: AS	F	746	EI		0.	uotation#:		B 60	037	- 1			BV Labs Job #:	Bottle Order #:
Attention: Elliott I		Attention							P.	O. #:							B971727	
Mudi 633.	Morrison Drive Suite 201	Address	-							roject:		300002	51				COC#:	591565
(040) 7	721-0555 Ext: 237 Fax: (613) 721-002	9	( <del></del>			-				roject Name:	8	PIN-4				11.00		Project Manager:
100	Holden@arcadis.com	9 Tel: Email:	2 <del>000-00-00-00-00-00-00-00-00-00-00-00-00</del>			_ Fax:				ite #: ampled By:	5		CTT	HOLT	シミハ	]	C#591565-05-01	Parminder Virk
Regulatory Criteria:			Special Instructions		1	1		ANA	ALYSIS RE	QUESTED (P	LEASE I	BE SPECIF	FIC)		1		Turnaround Time (TAT) Red	uired:
															Parit	les (Chand	Please provide advance notice for rulard) TAT:	sh projects
_ <	AME AS PAGE !	5 AME	AS PAG	EI	ŝ										1	C 2000 170	if Rush TAT is not specified):	$\times$
CCME					( Y / N )		S										5-7 Working days for most tests.	$\swarrow$
Other						4	, f								details	e note: Sta s	andard TAT for certain tests are > 5 days - c	ontact your Project Manager for
					Filtered	IL	Y	S		1 1						Specific R Required:	ush TAT (if applies to entire submission	n)
					Field	(	1-	5								Confirmation		
SAMPLES N	MUST BE KEPT COOL ( < 10°C ) FROM TIME OF SAME	PLING UNTIL DELIV	ERY TO BV LABS		Metals F	_	X	1									(c	all lab for #)
Sample Barcode L	abel Sample (Location) Identification	Date Sample	d Time Sampled	Matrix	Met	IT									# of B	ottles	Comments	
1	P4-3A	19/08/2	2 14:40	5		X	X	X							E	5		
2	P4-313	19/08/2	22 14:40	5		X	X	X							9	5	Received in	/allowknife
3	P4-4A	19/08/2	2 15:20	5		X	X	X							G	5	By: 0, men	
4	P4-4B	19/08/2	12 15:20	5		X	$\times$	X							ũ	5		10:30 AW
5	P4-5A	19/08/2	16:00	5		X	X	X							C	5	AUG 2	7 2019
6	P4-5B	19/08/2	2 16100	5		×	$\times$	X							9	5	Temp: AC	ITQ /
7	MW-OSA	19/08/2	13 10:00	5		X	X	X							Ä	5	romps	
8	MW-05B	19/08/2	23 10:00	5		X	X	X							1			
9	MW-06A	19/08/2	10:40	5		X	X	X	+						1	5		
		1 1		-			/	1 \	/									

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Date: (YY/MM/DD)

19/08/25

Time

" ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

\* RELINQUISHED BY: (Signature/Print)

ELCIOTT HOLDEN

Bureau Veritas Canada (2019) Inc.

Date: (YY/MM/DD)

20190828 09:UZ

Time

# jars used and not submitted

Time Sensitive

Laboratory Use Only

Custody Seal Intact on Cooler?

No

Yellow: Client

Yes

Temperature (°C) on Receipt

See ACTR

RECEIVED BY: (Signature/Print)

BUREAU	Bureau Veritas Laboratories 4000 19st N.E., Calgary, Alberta Canada	a T2E 6P8 Tel:(403) 291-	3077 Toll-free:800-56	3-6266 Fax:(4	103) 29	91-9468 w	ww.bvlabs.	com			1	CHAIN OI	CUSTODY RECORD	Page 5of 7
VERITAS	INVOICE TO:			REPORT	TO:					PROJECT INFO	RMATION:		Laboratory Use 0	Only:
#3269	ARCADIS Canada Inc	Company No	me: <u>SAM</u>	- 45	3	PA	GE	1	Quotation#:	B603	71		BV Labs Job #:	Bottle Order #:
Company Name: #3269 Attention: Elliott H		Attention:							P.O. #:				2071707	
	orrison Drive Suite 201	Address:							Project:	30000251			B971727	591565
	ON K2H 8K7								Project Name:				COC #:	Project Manager:
	21-0555 Ext: 237 Fax: (613) 721-002	29 Tel:	:	MATERIAL INC.		Fax:			Site #:	PIN-4				Parminder Virk
Email: Jacob.H	lolden@arcadis.com	Email:	New York Company of the Company of t						Sampled By:	ELLIC	IT HOLDEN	)	C#591565-07-01	
Regulatory Criteria:		Spec	ial Instructions					ANA	ALYSIS REQUESTED (PL	EASE BE SPECIFIC)			Turnaround Time (TAT) Re-	quired:
ATI S	AME AS PAGE 1	SAME	AS PAG	El	?(Y/N)							(will be ap	Please provide advance notice for ru Standard) TAT: plied if Rush TAT is not specified):	ush projects
CCME					7		N					16.00 17.000	TAT = 5-7 Working days for most tests te: Standard TAT for certain tests are > 5 days - (	contact your Project Manager for
Other					2 pe	7	J					details	e. Standard TAT for Certain lesis are 2.5 days - 1	soniaci your Project Manager for
					Filtered	TT	4	N					ific Rush TAT (if applies to entire submissi	on)
					P P	1	1-	M				Date Req	NESTER CONTRACTOR OF THE PROPERTY OF THE PROPE	
SAMPLES M	UST BE KEPT COOL ( < 10°C ) FROM TIME OF SAM	PLING UNTIL DELIVERY	TO BV LABS		s Field	_	川川	U				Rush Conf	rmation Number:	call lab for #)
		Marie Control of the	SERVICE AND AND ASSESSMENT		Metals	TT	1	Δ,				# of Bottle	Comments	3
Sample Barcode La	bel Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	2		. ,	-/				-	1000 Walleton	
1	MW-07A	19/08/23	11:20	5		$\times$	X	X				5		
2	MW-07B	19/08/23	11:20	5		X	X	X				5	Received in By: J mo	LCM
3	MW-CEA	19/08/23	12:00	S		X	X	X				5		10:30Um
4	MW-08B	19/08/23	12:00	S		X	X	X				5	AUG 2	7 2019
5	MW-11A	19/08/23	10:20	5		X	X	X				5		- 10
6	P4-13A	19/08/23	16:10	5		X	X	X				5	Temp: A	CTR
7	P4-13 B	19/08/23	16:10	5		X	X	X				5		
8	P4-14A	19/08/23	13:50	5		X	$\times$	X				5		
9	P4-14B	19/08/23	13;50	5		X	X	X				-5		
	10000000		100 100 100 100	0.000	1	1	1. 1	/						

\*\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BY LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT 11 IS THE REPORTS AND CONDITIONS.

Time

10:00

IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Date: (YY/MM/DD)

19/08/25

" ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

\* RELINQUISHED BY: (Signature/Print)

EXECUTIT HOLDEN

Bureau Veritas Canada (2019) Inc.

Date: (YY/MM/DD)

20190828 DaiUZ

Time

# jars used and not submitted

Time Sensitive

Laboratory Use Only

Temperature (°C) on Receipt

Custody Seal Intact on Cooler?

No

Yes

White: BV Labs

RECEIVED BY: (Signature/Print)

BU REAU VERITAS		Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Canada	T2E 6P8 Tel:(403) 291-	3077 Toll-free:800-56	53-6266 Fax:	(403) 2	91-9468 w	ww.bvlabs.c	com			(	CHAIN OF CU	STODY RECORD	Page 6 of 7
		INVOICE TO:			REPOR	RT TO:					PROJECT INFORMATIO	N:		Laboratory Use 0	Only:
Company Name:	#3269 ARCA	DIS Canada Inc	Company Na	me: SAME	A5	PA	GE	1		Quotation #:	B6037			BV Labs Job #:	Bottle Order #:
Attention: Address:	Elliott Holden	Drive Suite 201	Attention: Address:	Kill Street Street					aumaimmenti-m-	P.O. #: Project:	30000251		<u> </u>	3971727	591565
	Ottawa ON Ka			***************************************						Project Name:				COC #:	Project Manager:
Tel: Email:	(613) 721-055 Jacob.Holden	65 Ext: 237 Fax: (613) 721-002 @arcadis.com	Tel:				_ Fax:			Site #: Sampled By:	PIN-4 ELCICT H	CLDEN		C#591565-08-01	Parminder Virk
Regulatory Crit	eria		Spec	ial Instructions		1	I		ANALY	SIS REQUESTED (PLE	EASE BE SPECIFIC)		1	Turnaround Time (TAT) Rec	quired:
CCME	-	VE AS PAGE!	SAME	AS PA	GE	Filtered ? ( Y / N )	53	225	50				Standard TAT = Please note: Standetails	lard) TAT: if Rush TAT is not specified): - 5-7 Working days for most tests undard TAT for certain tests are > 5 days - c ush TAT (if applies to entire submission	
S	AMPLES MUST BE	KEPT COOL ( < 10°C ) FROM TIME OF SAMI	PLING UNTIL DELIVERY	TO BV LABS		Is Field	-	13	CB				Rush Confirmation		all lab for #)
Sample	Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals	止	1	Δ				# of Bottles	Comments	
1		P4-15B	19/08/23	14:20	5		X	X	X				5	- indin Ve	llowknife
2		P4-16A	19/08/23	15:00	5		X	X	X				5	Received in Ye	como
3	and the second	P4-16B	19/08/23	15100	5	130	X	X	X				5		10, 6000
4		P4-17A	19/08/23	15:30	5		X	X	X				5	AUG 27	7019
5		P4-17B	19/08/23	15:30	5		X	X	X				5	*C	TR
6		P4-18A	19/08/23	16:40	5		X	X	X				5	Temp: 11	

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time # jars used an	1	Laboratory Use Only	
FLICIOTI HOLDEN	19/08/25	10:00	TWO JESTALEE	50190858	09:02 not submitted	Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
//	T '						see ACTR	Yes No

S

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\*UNILESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BY LABS\* STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS. 1 IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

19/08/23

19/08/23 16:40

19/05/23 17:10

19/08/23 17:10

17:40

" ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

P4-18B

P4-19A

P4-19B

P4-20 A

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10

Bureau Veritas Canada (2019) Inc.

White: BV Labs

Yellow: Client

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5 5

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	BUREAU	Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Canada	T2E 6P8 Tel:(403) 291-30	077 Toll-free:800-56	3-6266 Fax:(4	403) 29	1-9468 w	ww.bvlabs.c	om				CHAIN	OF CUSTODY RECORD	Page 7 of 7
H	VERITAS	INVOICE TO:			REPORT	гто:						PROJECT INFORMATION:		Laboratory Use	Only:
Corr	npany Name: #3269 ARC	CADIS Canada Inc	Company Nam	ne: SAME	AS	PA	GE	Ī		Quotation #:	5	B6 0371		BV Labs Job #:	Bottle Order #:
20000	ntion: Elliott Holde		Attention:							P.O. #:				B971727	
Add	1855.	on Drive Suite 201	Address:							Project:		30000251			591565
/0.0000	Ottawa ON	K2H 8K7 555 Ext: 237 <sub>Fax:</sub> (613) 721-002	20	S <del>ame</del>						Project Nam	ne:	PIN-4		COC #:	Project Manager:
Tel:		en@arcadis.com	Tel:	5 <del>-10.11111111111111111111111111111111111</del>			Fax:			Site #: Sampled By	r	ELLICT HO	LDEN	C#591565-09-01	Parminder Virk
1			Specia	al Instructions		1 1			ANA	LYSIS REQUESTED			ı	Turnaround Time (TAT) Re	auired:
1 5	Regulatory Criteria:			Security of the Control of the Contr		1					T			Please provide advance notice for r	ush projects
	□ ATI □ CCME SAM □ Other	NE AS PAGE (	5 ME	AS PA	GE	ed ? ( Y / N )	+	57					(will be Standa Please details		
						Filtered	IT	1	S					pecific Rush TAT (if applies to entire submiss Required:	ion)
						Field F	1	一一	C 13				190,000,000	Confirmation Number:	
	SAMPLES MUST E	BE KEPT COOL ( < 10°C ) FROM TIME OF SAMI	PLING UNTIL DELIVERY 1	TO BV LABS		Metals F	H	3	0				# of B		(call lab for #)
	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Met			Limes				# 01 15	Comment	S
1		P4-20B	19/08/23	17:40	5		$\times$	X	X				_		llowknife
2		P4-21A	19/08/23	18:00	S		X	X	X				5	By: Umini	An v
3		P4-213	19/08/23	18:00	5		X	X	X				E		10, July
4		P4-22A	19/08/23	19:30	5		X	X	X				E	AUU 27	7019
5		P4-22B	19/08/23	19:30	5		X	X	X				Ę	Temp: Ac	1 TL
6		P4-23A	19/08/23	20:00	S		$\times$	X	×				Ē	2	
7		P4-23B	19/08/23	20:00	S		$\times$	X	$\times$				Č	5	
8		P4-24A	19/08/23	20:30	S		X	X	$\times$				Ę	5	
9		P4-24B	19/08/23	20:30	S		X	X	X				E	5	
10		P4-27A	19/08/23	19:50	5		X	X	$\times$				_L	5	

RECEIVED BY: (Signature/Print)

\*\*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BY LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT JUSTICA CEC

\* RELINQUISHED BY: (Signature/Print)

\*\* ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

Date: (YY/MM/DD)

· IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Time

Bureau Veritas Canada (2019) Inc.

Date: (YY/MM/DD)

Time

# jars used and not submitted

Laboratory Use Only

Custody Seal Intact on Cooler? Yes

White: BV Labs

No

Yellow: Client

by Holden, Elliott on Fri, 15 Nov at 12:18 PM via Email

FW: Job Confirmation Report [ B971727 ] - Project 30000251

Hi Parminder,

It has come to my attention that sample WJ6075 was given an incorrect Client Sample ID on BV Lab Job# B971727. On the attached Confirmation Report and CoA, the Client Sample ID for sample WJ6075 is P4-05B; however, the Client Sample ID should be MW-05B.

Could you revise the CoA with this Client Sample ID change?

Regards,

Elliott Holden, B.Eng. | Elliott.Holden@arcadis.com (mailto:Elliott.Holden@arcadis.com)

Arcadis Canada Inc. | Suite 201, 1050 Morrison Drive | Ottawa, Ontario, K2H 8K7

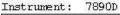
T. 613 703 3818 | C. 613 809 4651 | F. 613 721 0029

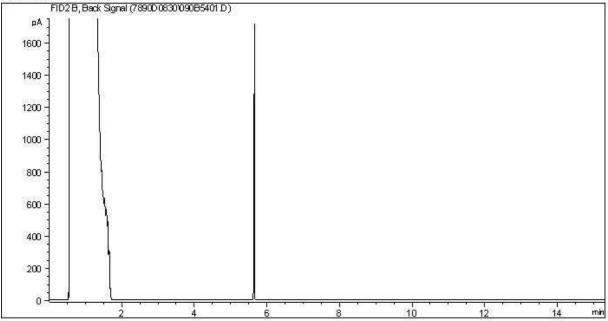
www.arcadis.com (https://nam02.safelinks.protection.outlook.com/?

url = http:%3A%2F%2Fwww.arcadis.com%2F&data = 202%7C01%7Cjacob.holden%40arcadis.com%7C6f4e378ea7cf405d23b708d766d4b134%7C7f90057d3ea046feb07ce0568627081b%7C1%7C0%7C637090937138721979&sdata = jnoGHSd%2BiTcDh5X1mhzyBZmEXbXqLz8b0%2Bc8cvJvM9g%3Database0.

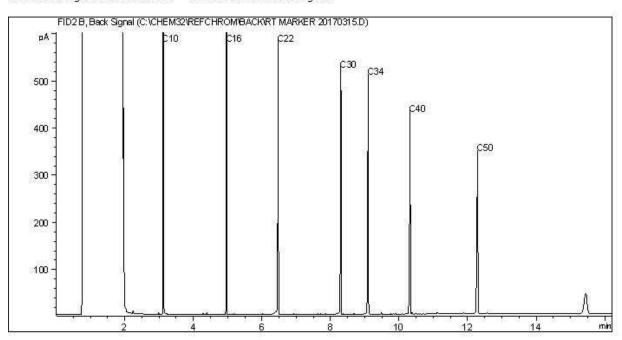
ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-01A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

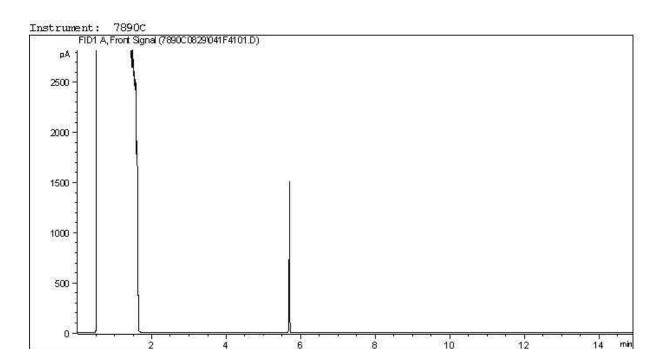


TYPICAL PRODUCT CARBON NUMBER RANGES

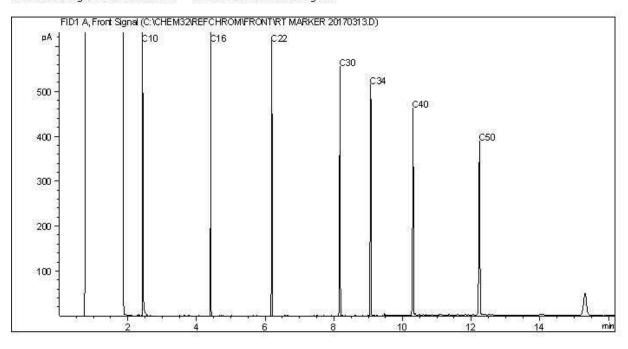
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-01B

### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

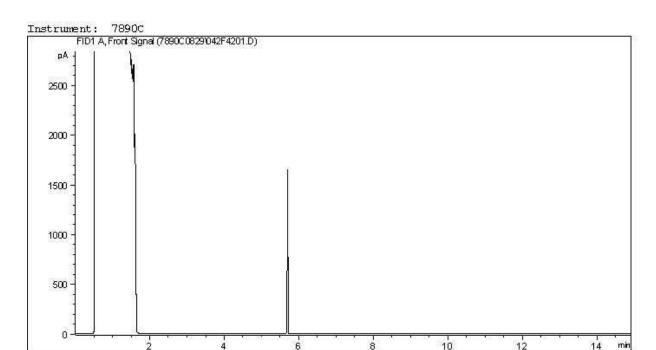
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

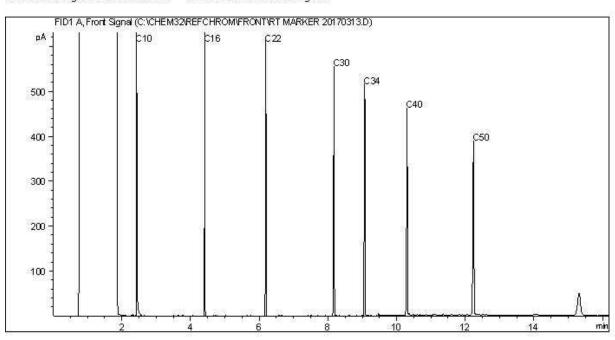
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-01B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

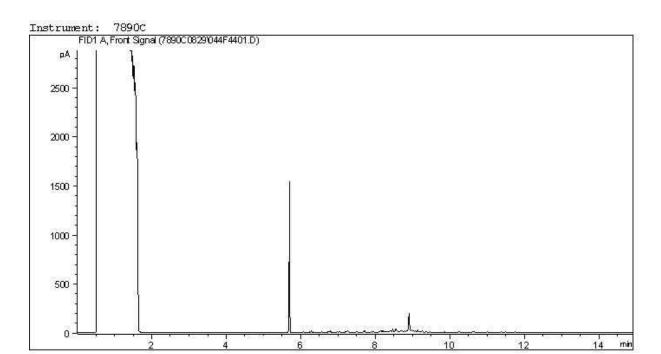


TYPICAL PRODUCT CARBON NUMBER RANGES

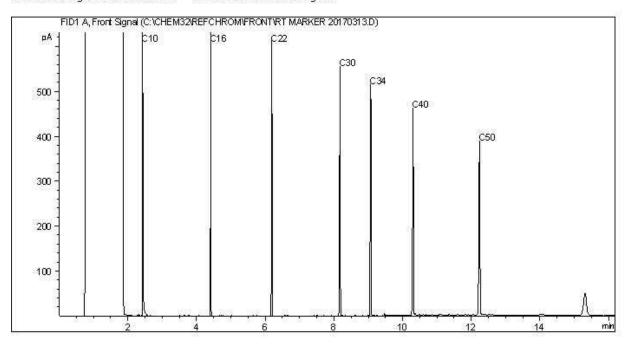
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-02A

### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

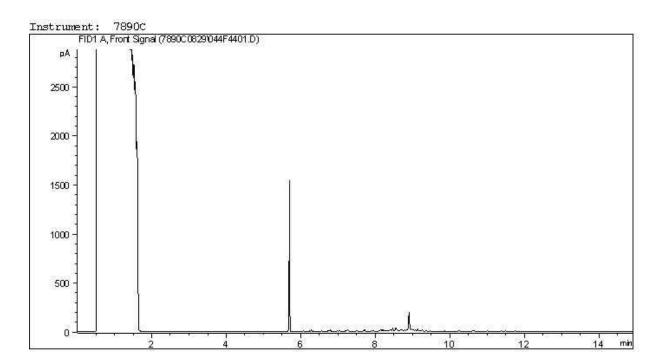
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

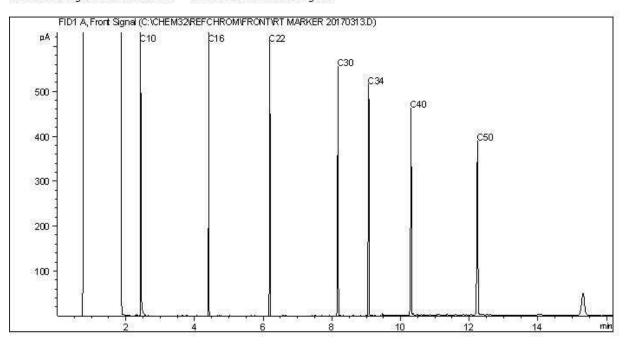
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-02A

# CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram

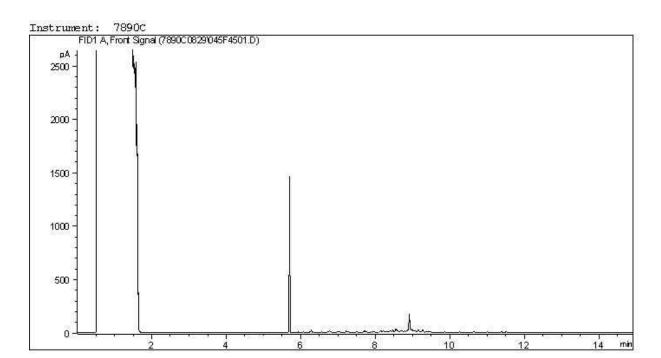


TYPICAL PRODUCT CARBON NUMBER RANGES

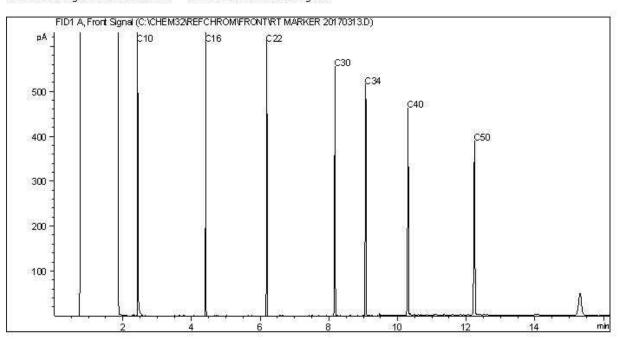
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-02B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

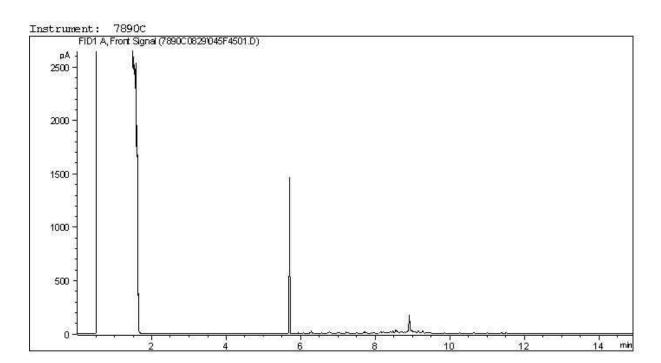


TYPICAL PRODUCT CARBON NUMBER RANGES

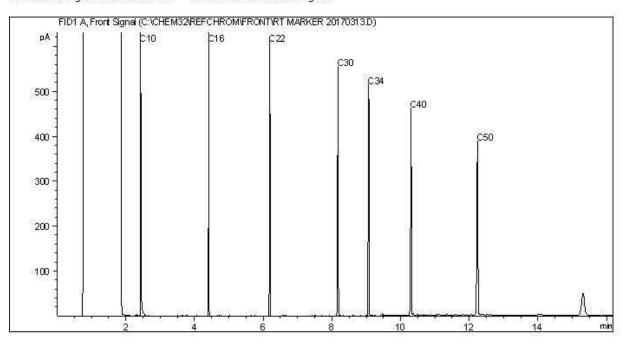
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-02B

# CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram

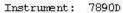


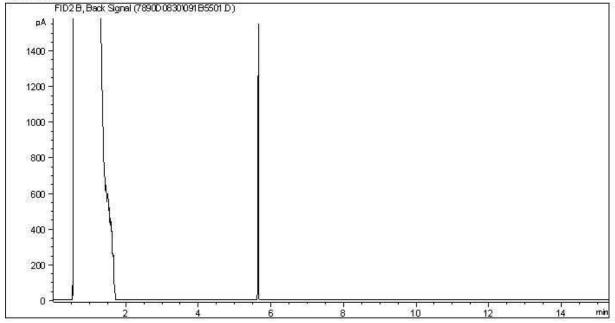
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	_	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	1	C60+

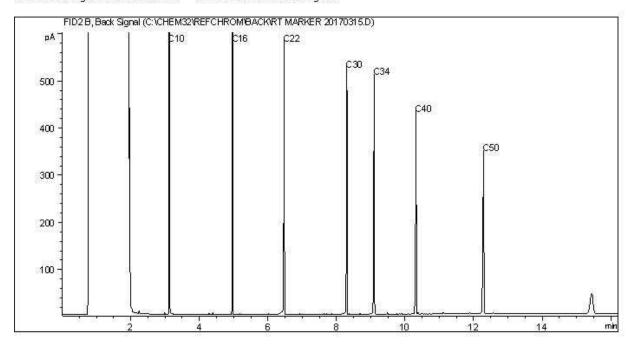
ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-03A

### CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

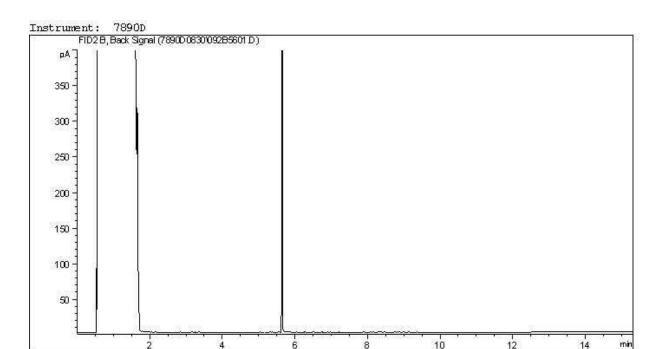


TYPICAL PRODUCT CARBON NUMBER RANGES

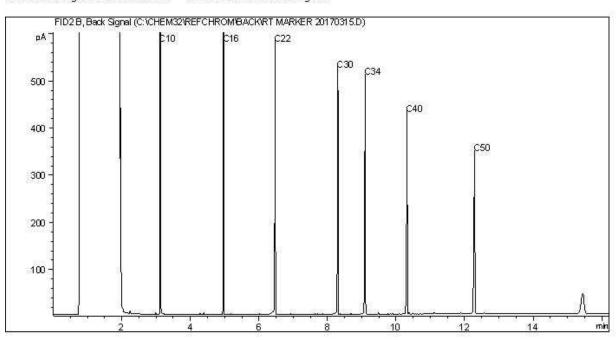
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-03B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

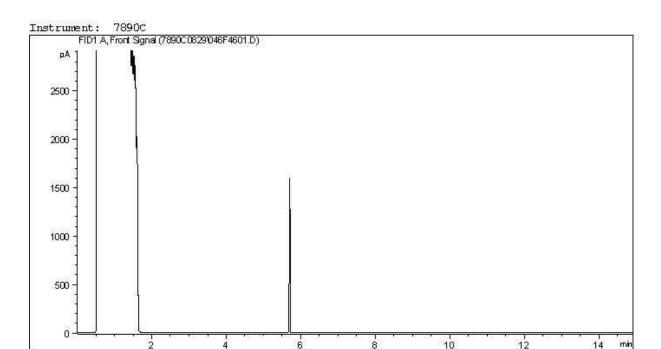


TYPICAL PRODUCT CARBON NUMBER RANGES

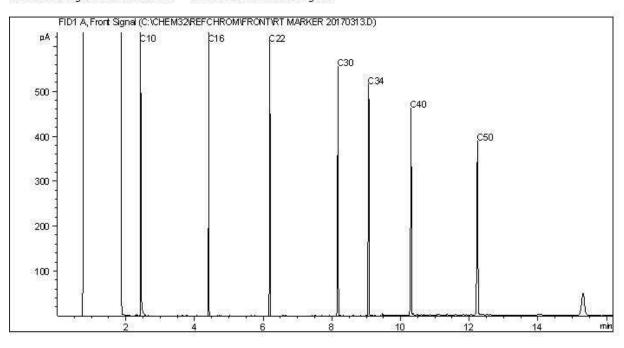
Gasoline:	C4		C12	Diesel:	c8 -	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	c20 -	C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3 -	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-04A

### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

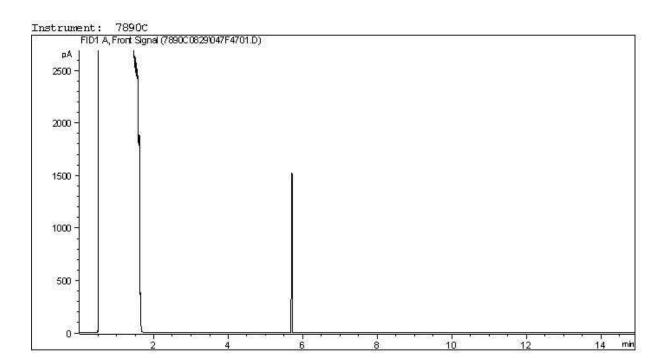
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

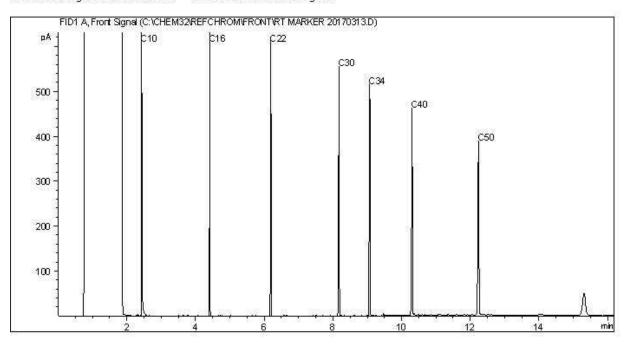
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-04B

### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

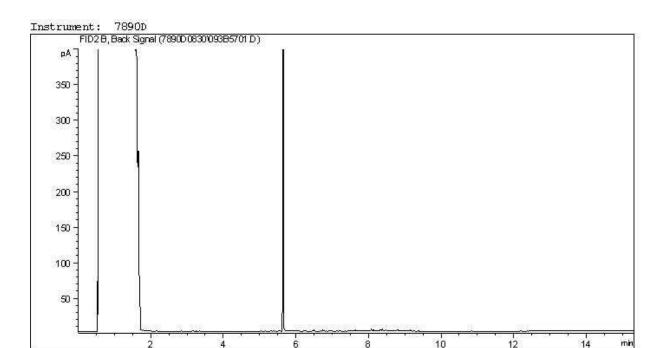
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

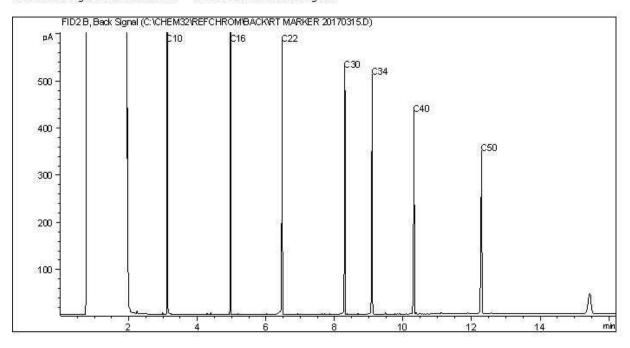
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-09A

### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

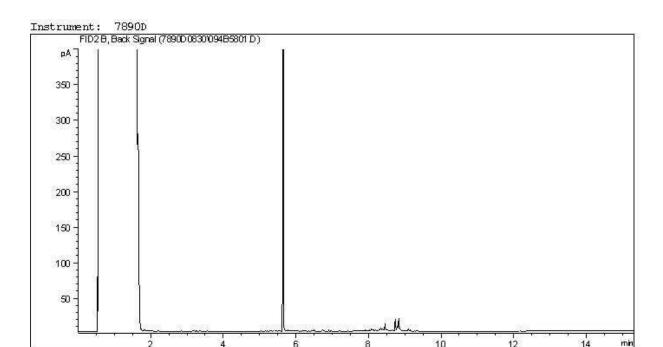
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

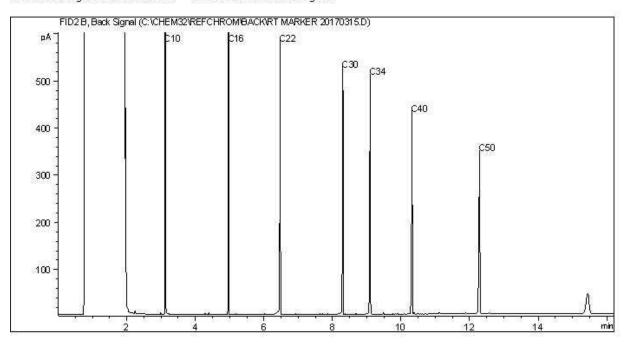
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-10A

### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

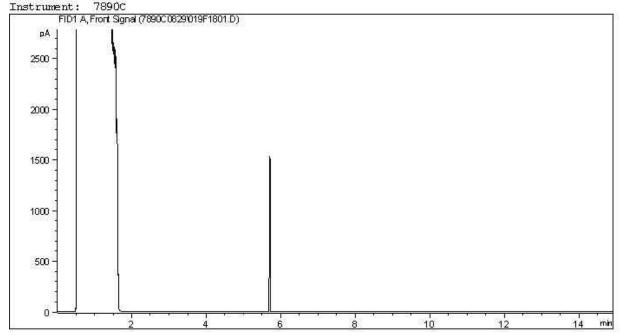
 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

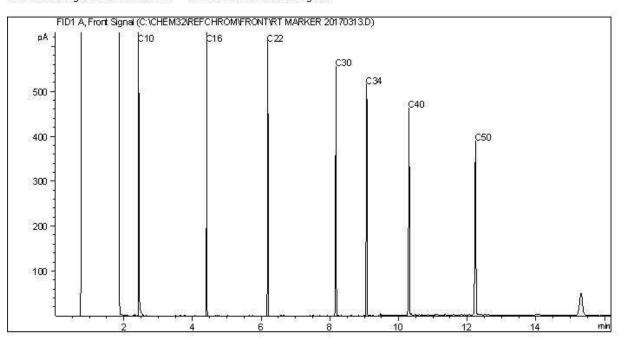
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-6A

CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

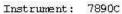


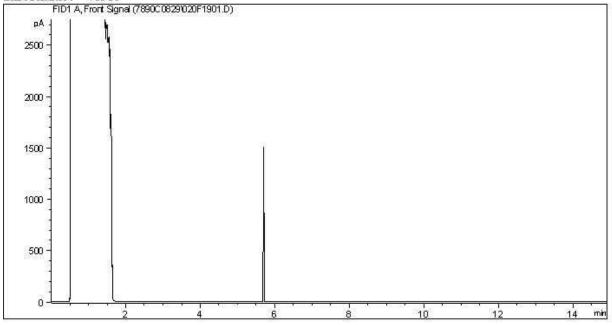
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

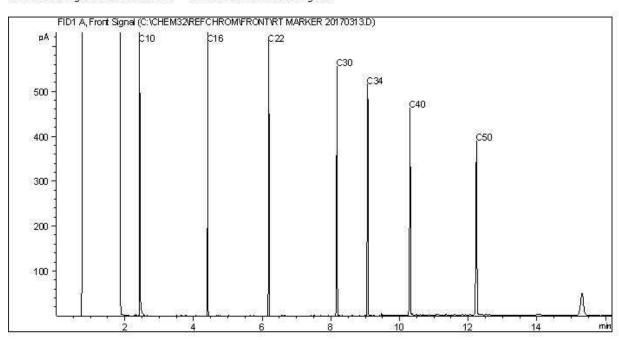
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-6B

CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

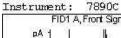


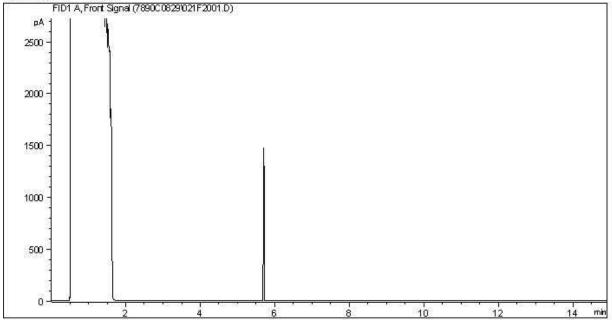
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

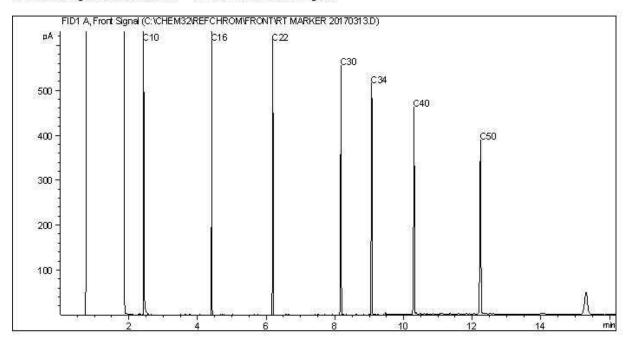
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: P4-7A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

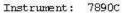


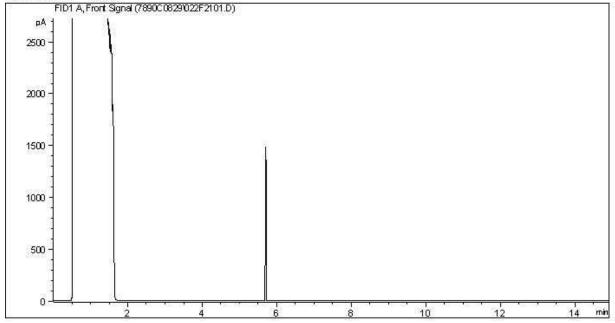
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

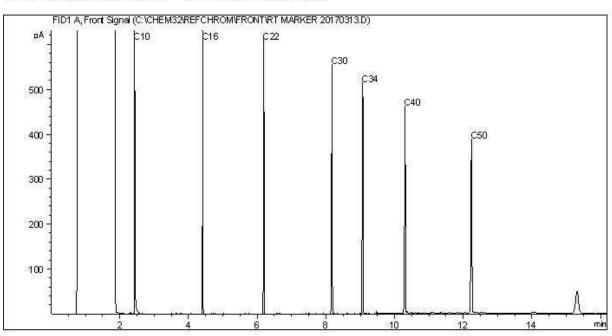
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-7B

CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



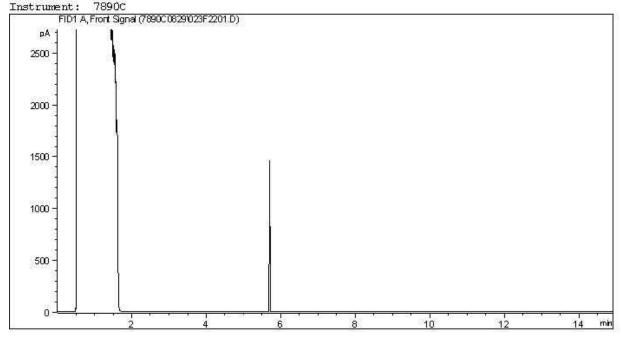
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

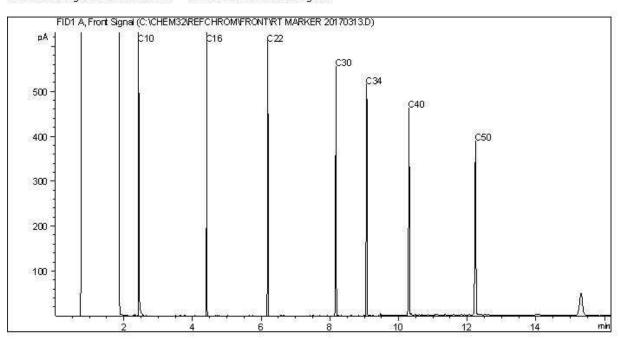
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-8A

CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

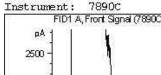
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

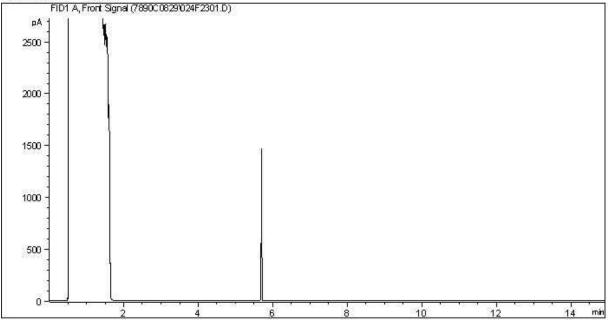
 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

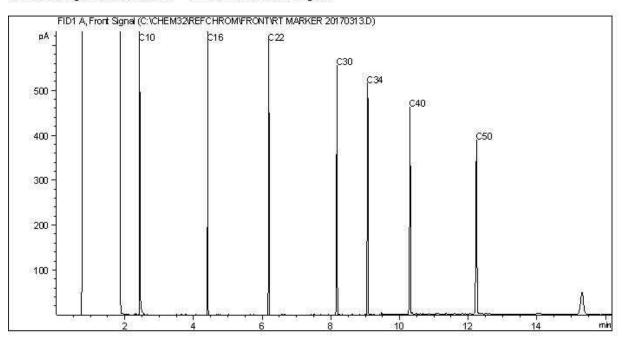
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: P4-8B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

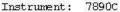


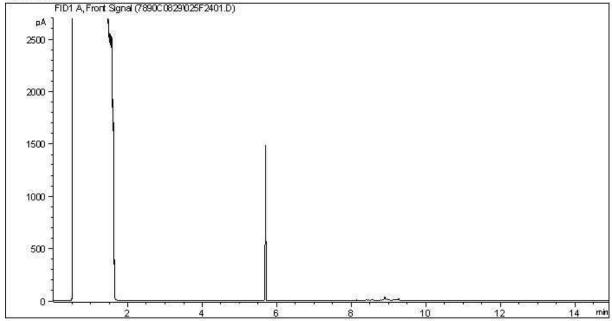
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

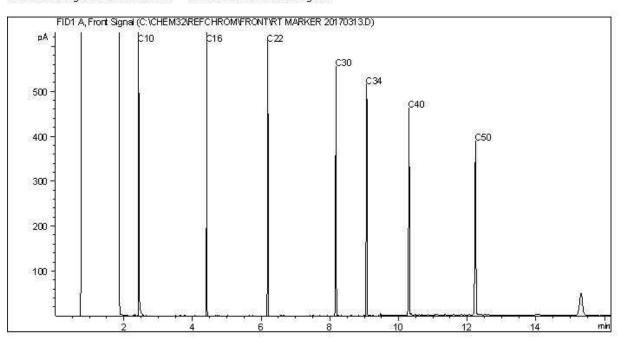
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-9A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

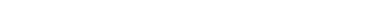


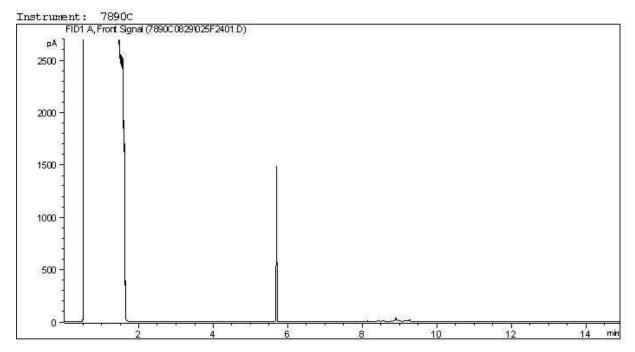
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

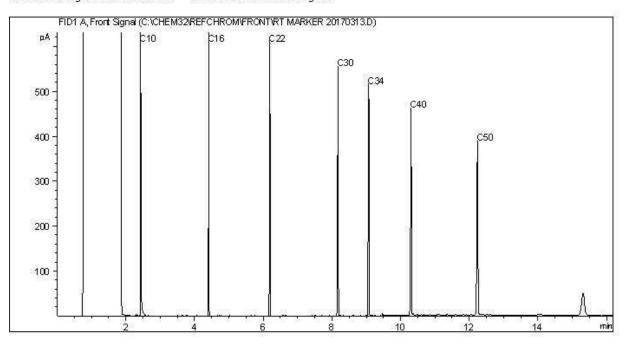
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-9A

CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram





Carbon Range Distribution - Reference Chromatogram

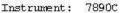


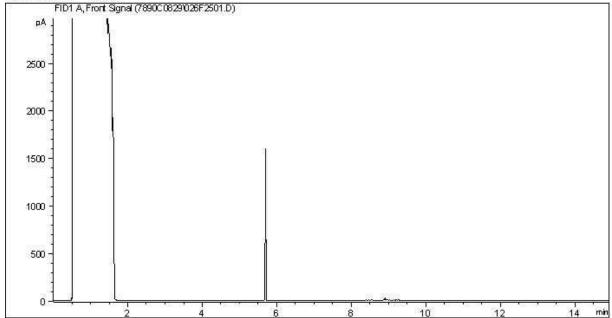
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

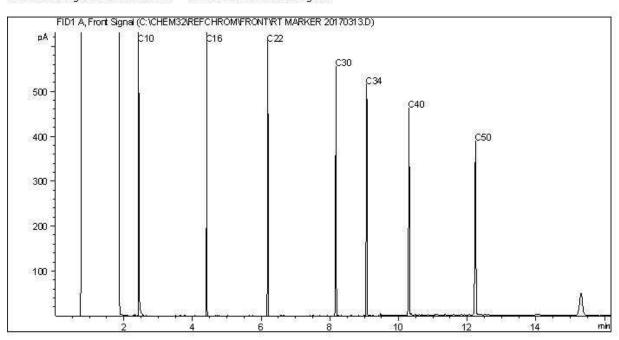
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-9B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

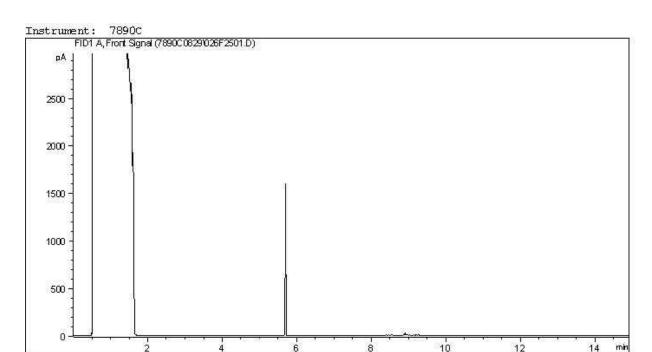


TYPICAL PRODUCT CARBON NUMBER RANGES

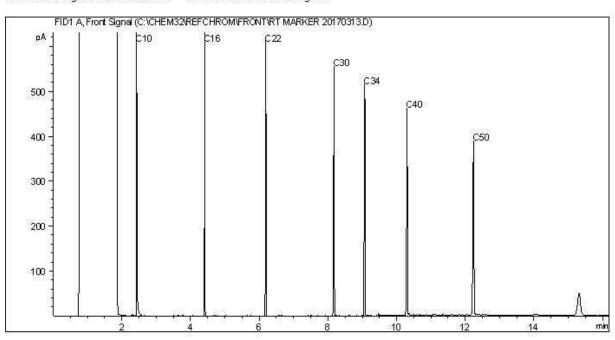
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-9B

# CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram

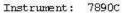


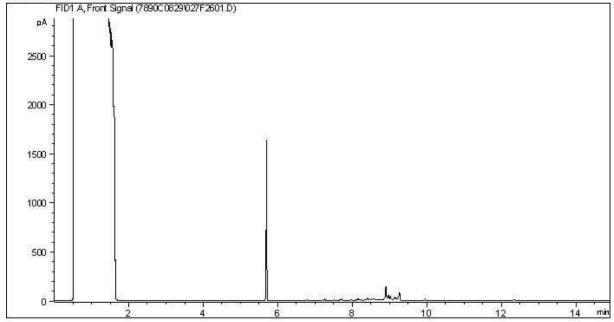
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

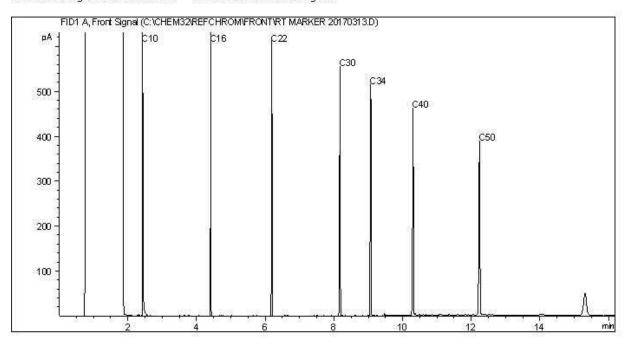
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-10A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

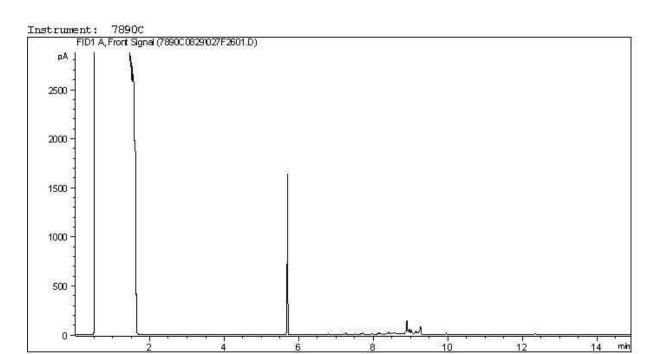


TYPICAL PRODUCT CARBON NUMBER RANGES

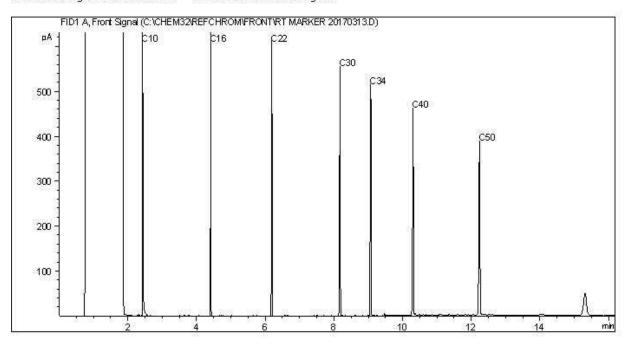
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	_	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	1	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-10A

# CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

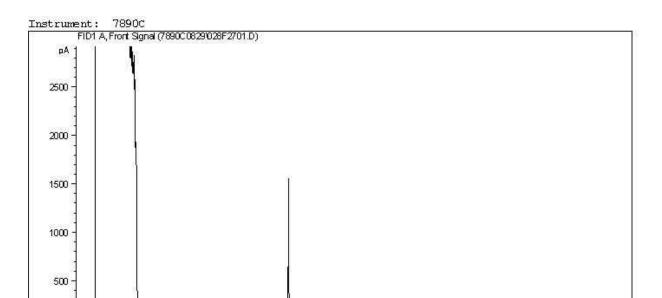
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-10B

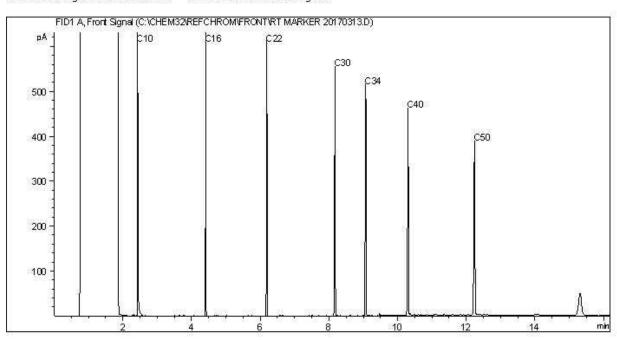
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# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

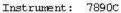


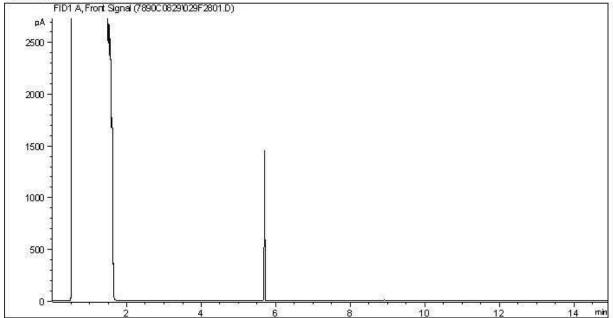
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

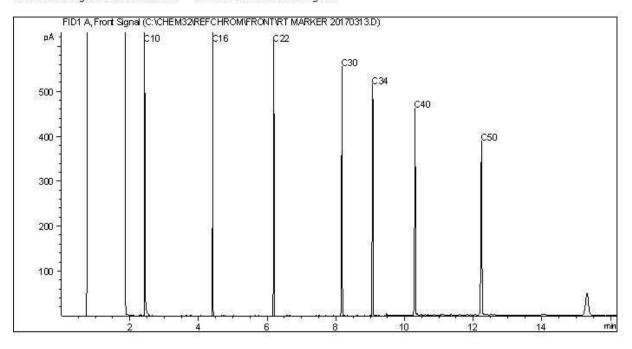
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-11A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

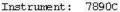


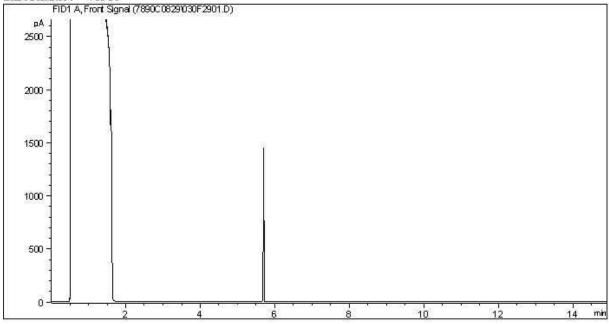
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

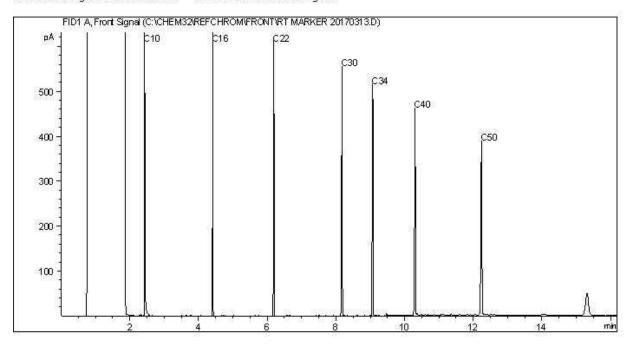
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-11B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



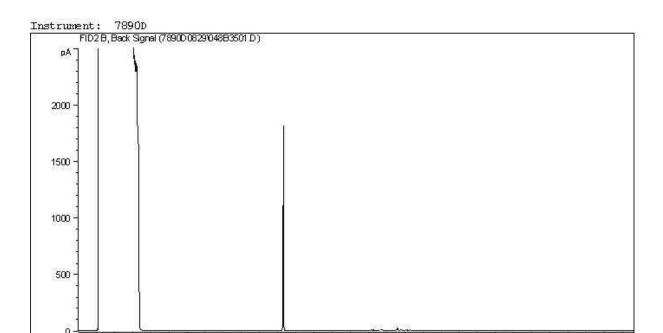
### TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1 Sept.	C60+

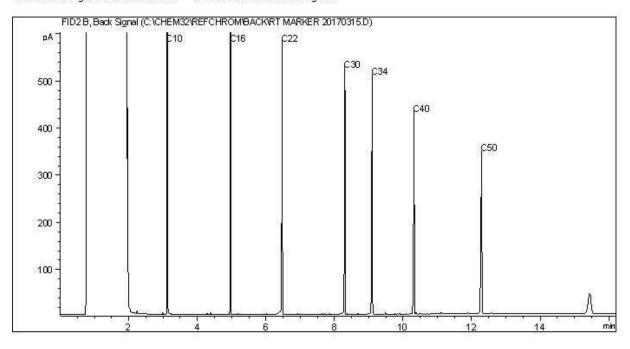
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-12A

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### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

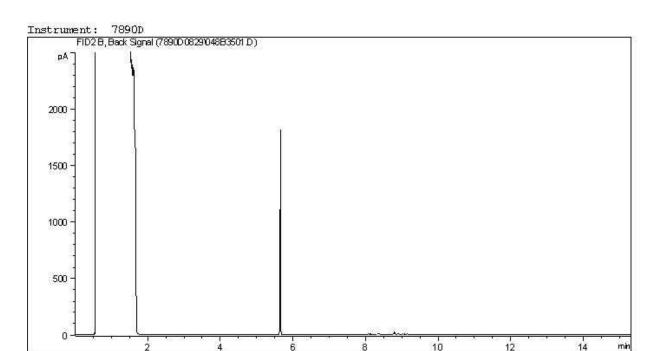
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

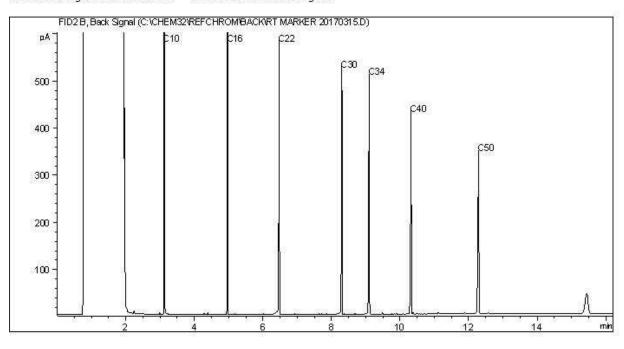
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-12A

### CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

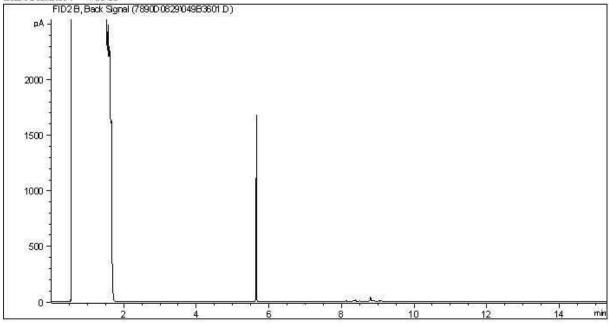
BV Labs Job #: B971727 Report Date: 2019/12/04

BV Labs Sample: WJ6041 Lab-Dup

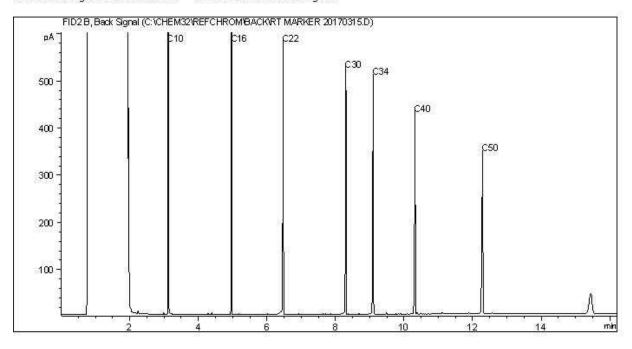
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: P4-12A

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: 7890D



Carbon Range Distribution - Reference Chromatogram

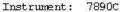


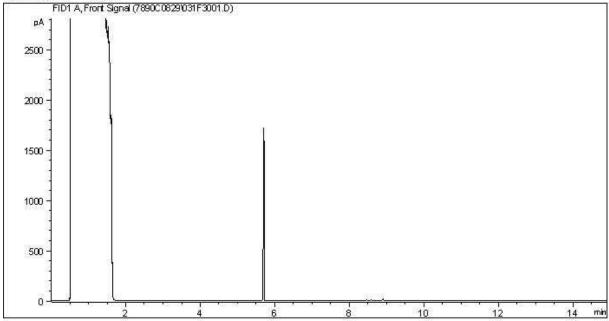
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12 Diesel: C8 - C22 Varsol: c8 C12 Lubricating Oils: c20 - c40Kerosene: c7 - C16 Crude Oils: c3 - c60+

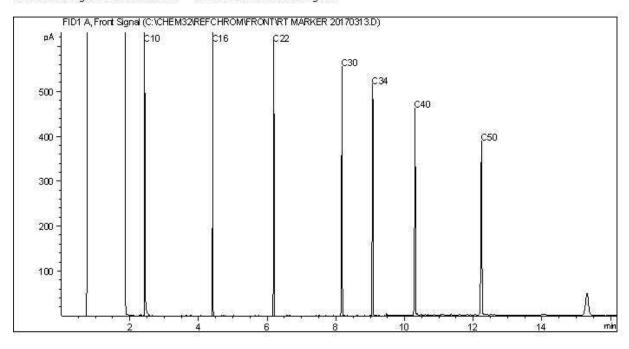
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-12B

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

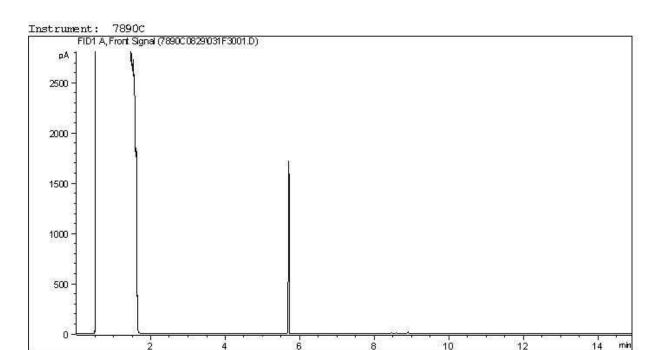


TYPICAL PRODUCT CARBON NUMBER RANGES

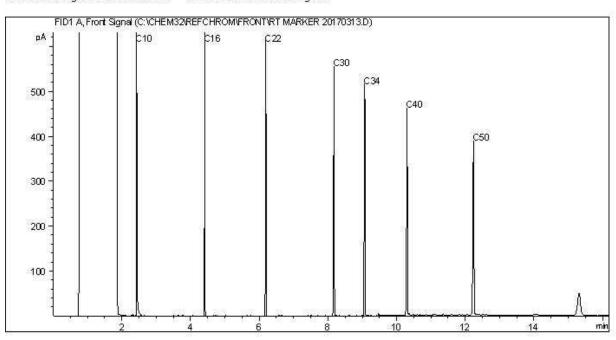
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-12B

## CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram

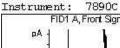


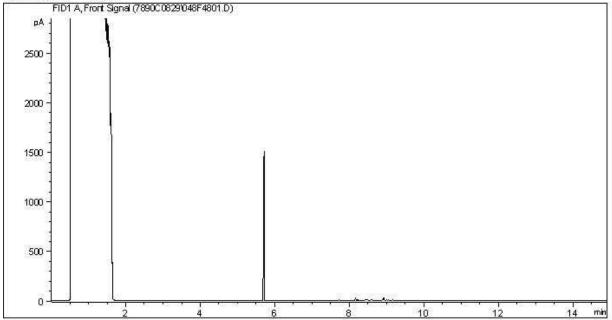
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

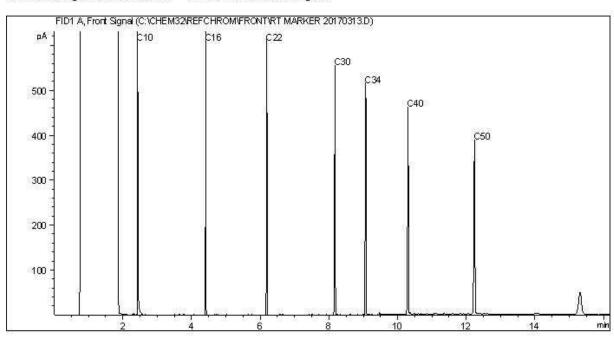
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: P4-25A

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

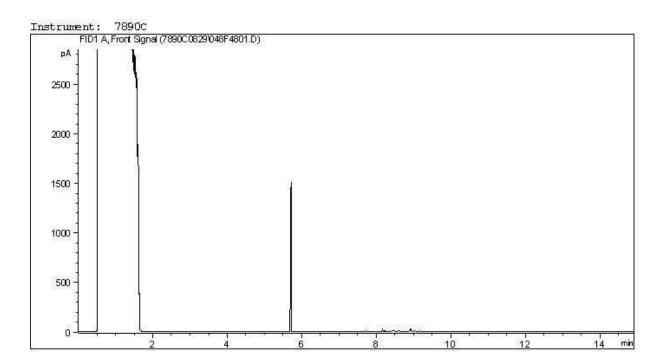


TYPICAL PRODUCT CARBON NUMBER RANGES

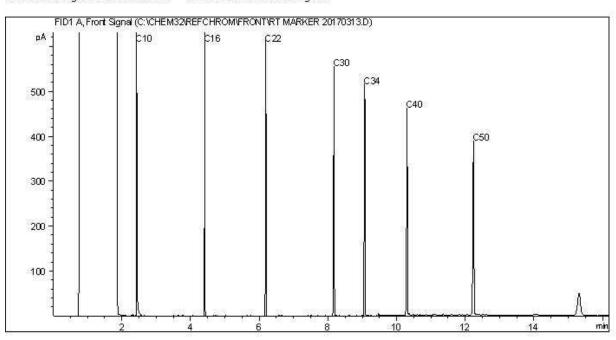
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-25A

## CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram



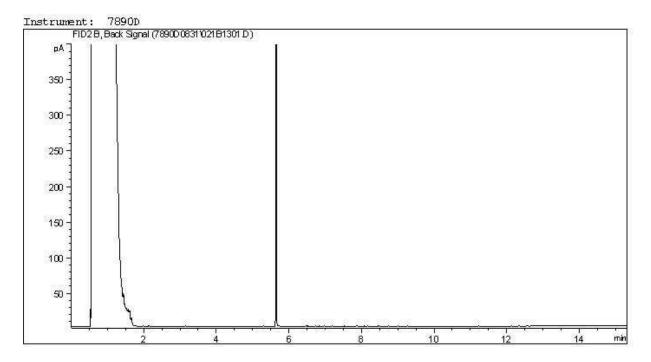
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	cs -	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	c20 -	C40
Kerosene:	c7	=	C16	Crude Oils:	c3 -	C60+

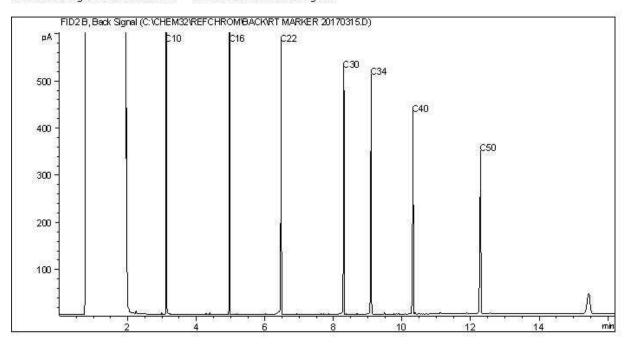
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-1A

CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

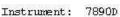
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

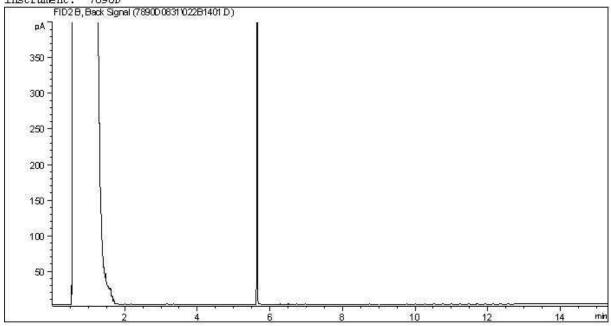
 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

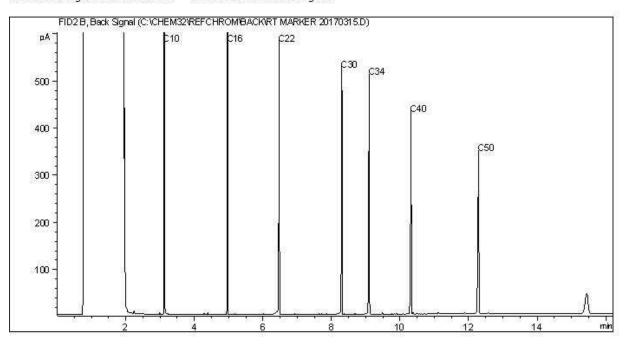
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-1B

CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



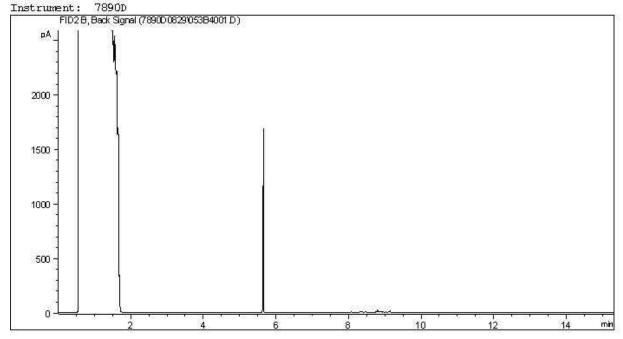
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

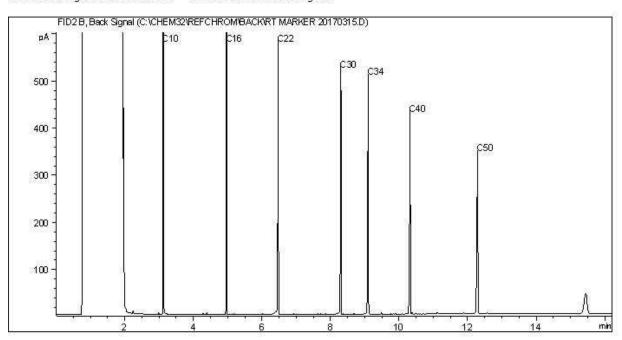
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-2A

CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

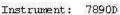


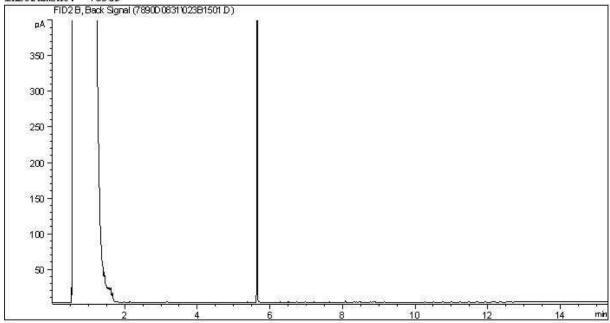
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

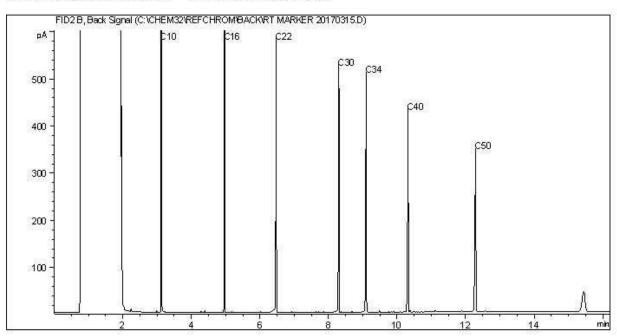
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-2B

CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

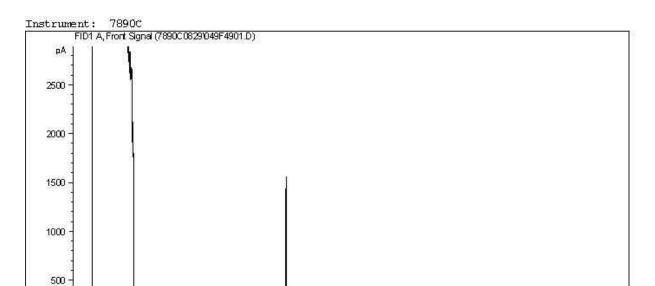
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-26B

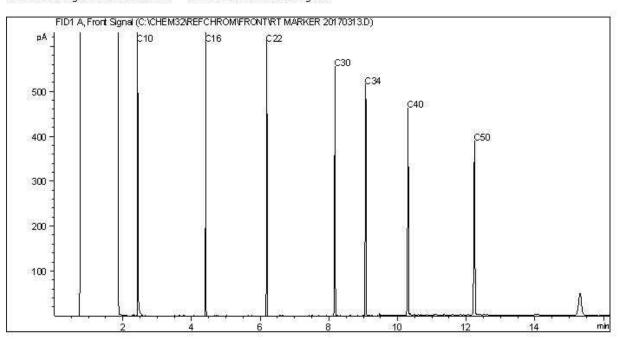
10

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### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

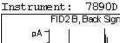
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

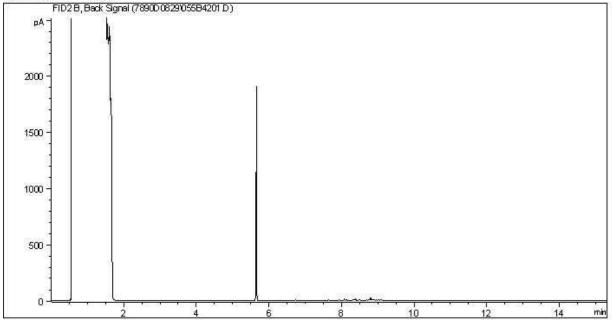
 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

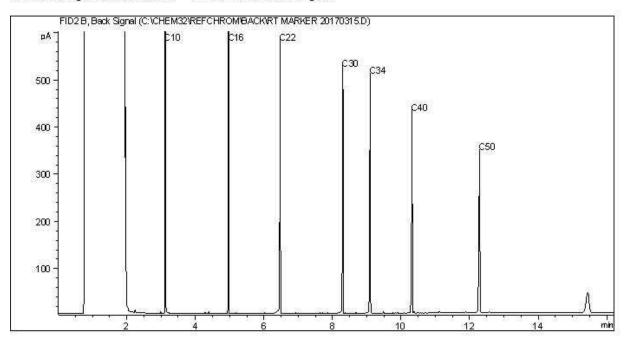
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: P4-3A

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



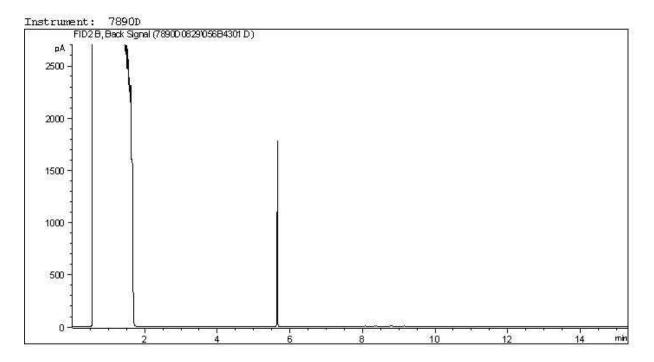
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

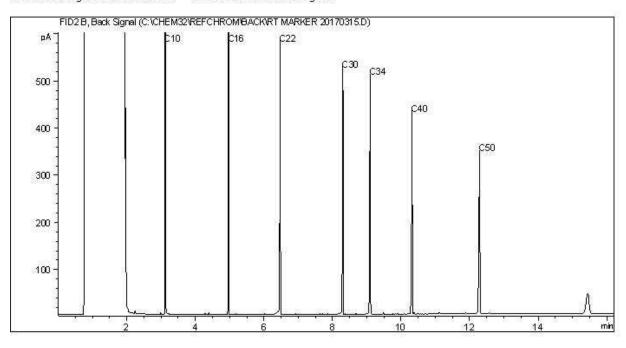
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-3B

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

#### CCIVIE HYDROCALDONS (F2-F4 III SOII) CHIOMATOGIAN



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

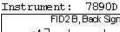
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

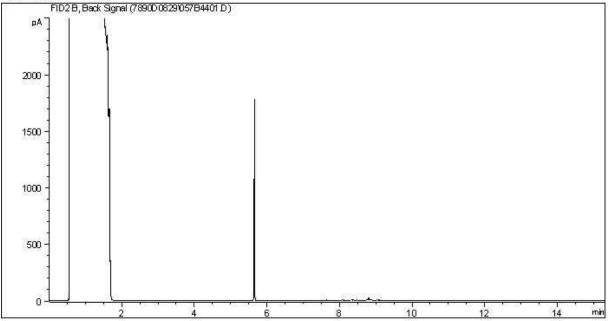
 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

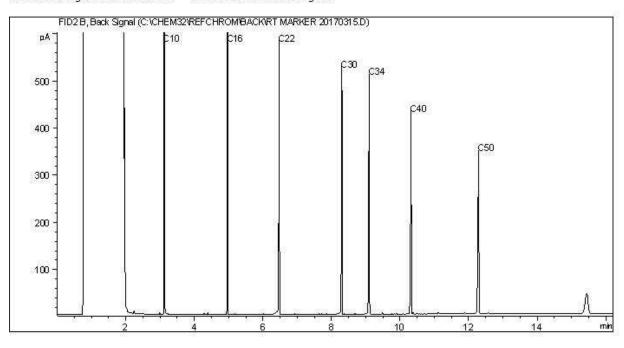
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: P4-4A

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

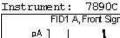


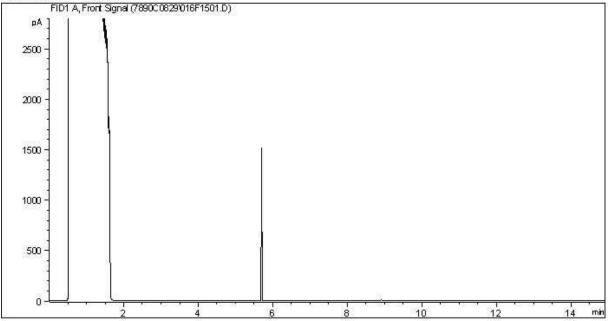
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

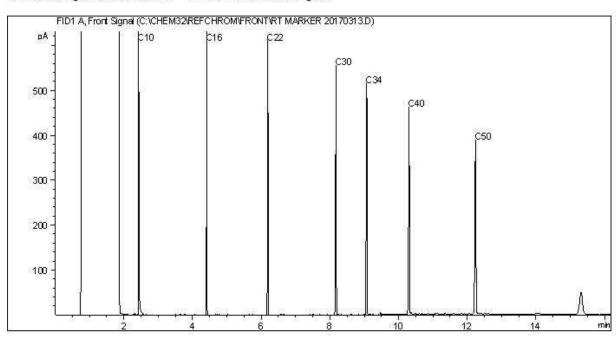
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: P4-4B

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4		C12	Diesel:	c8 -	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	c20 -	C40
Kerosene:	c7	=	C16	Crude Oils:	c3 -	C60+

500

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-4B

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#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram

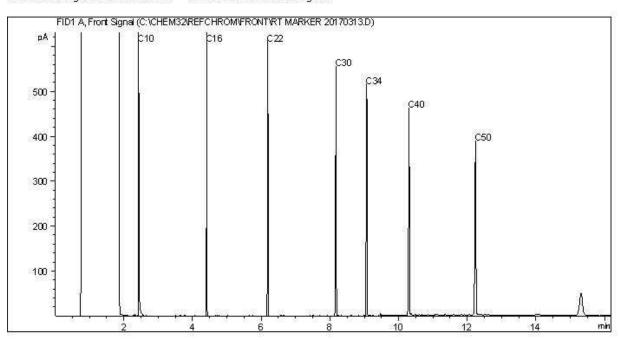
Instrument: 7890C

FID1 A, Front Signal (7890C0829)017F1601.D)

pA

2500 
1500 
1000 -

Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

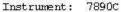
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

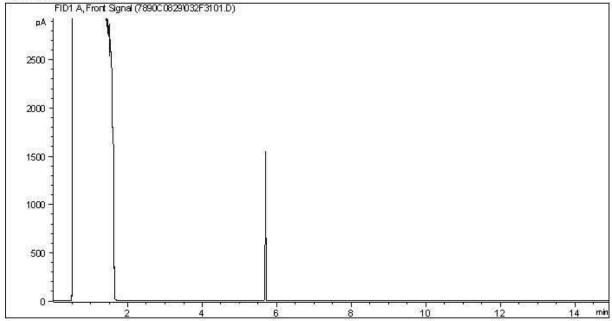
 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

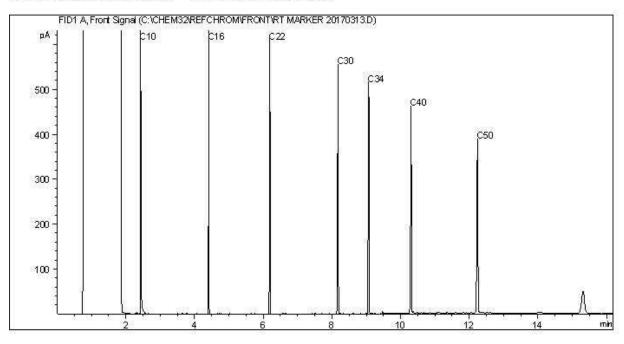
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-5A

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

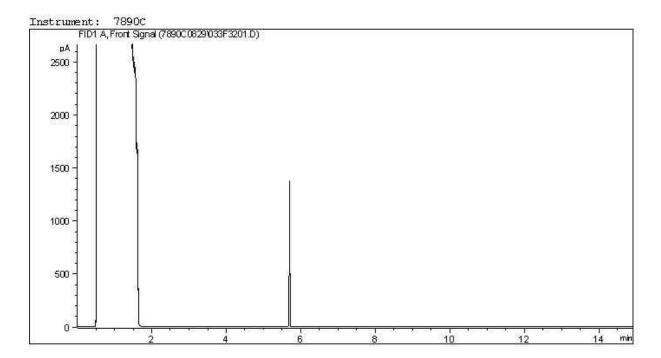


#### TYPICAL PRODUCT CARBON NUMBER RANGES

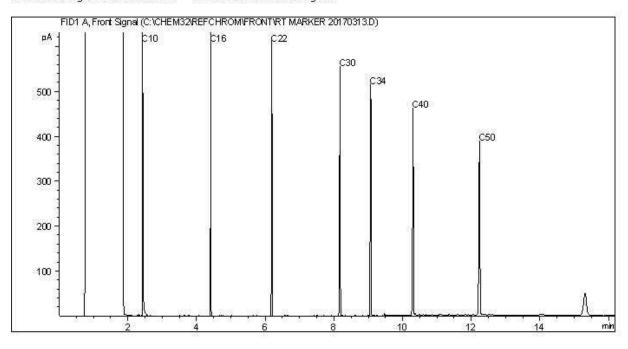
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-5B

### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

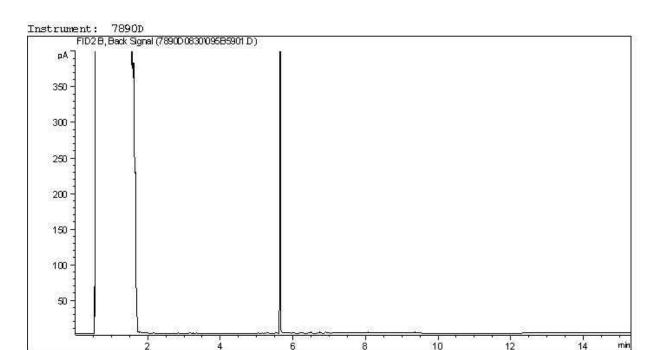
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

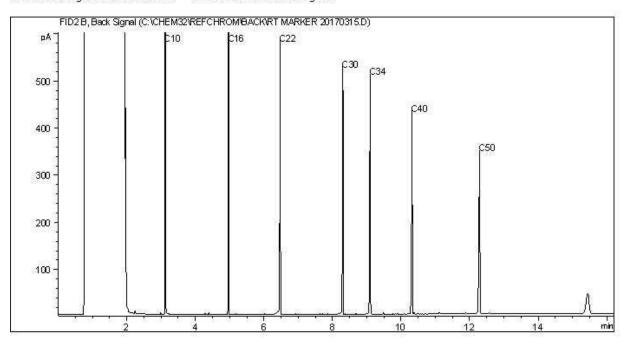
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-05A

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

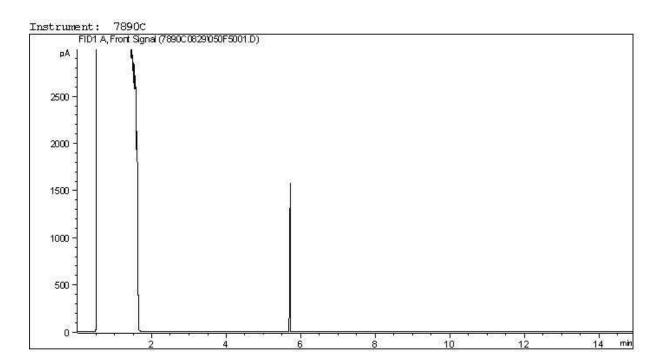


TYPICAL PRODUCT CARBON NUMBER RANGES

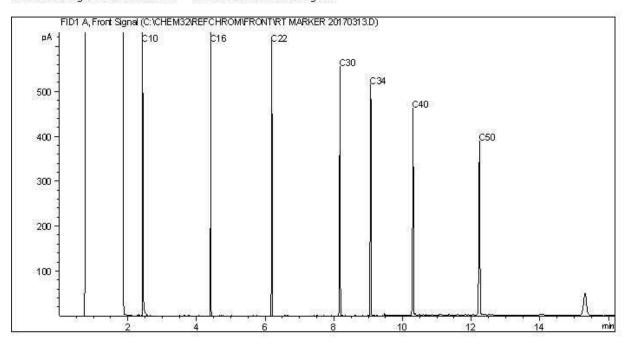
Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-05B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



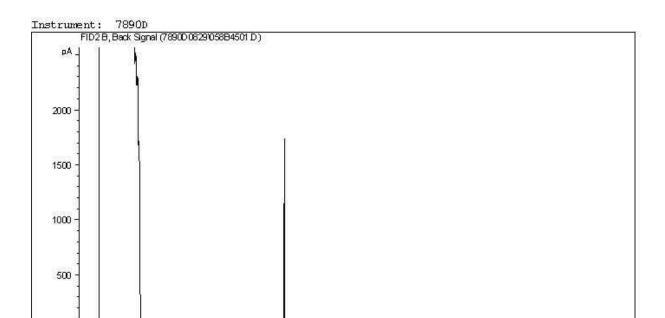
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

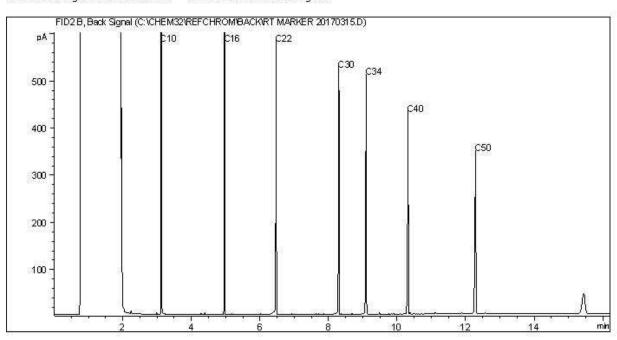
ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-06A

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## CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

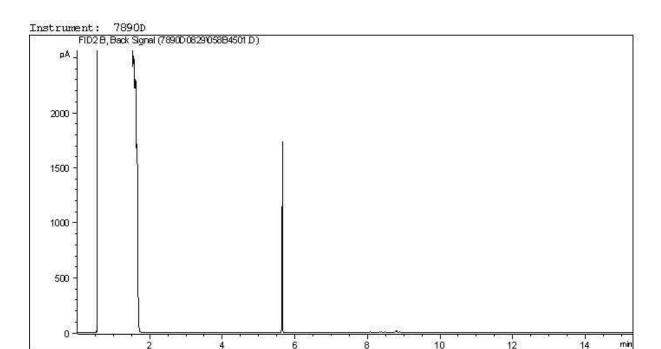


TYPICAL PRODUCT CARBON NUMBER RANGES

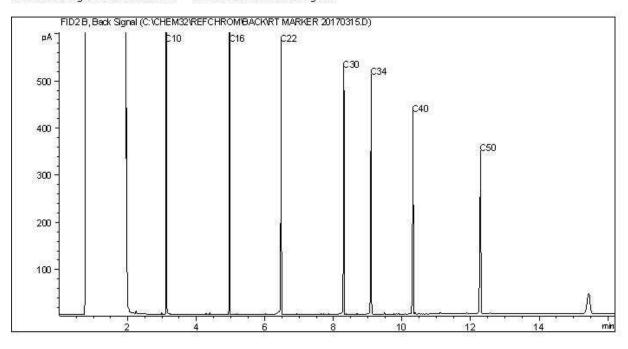
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-06A

#### CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

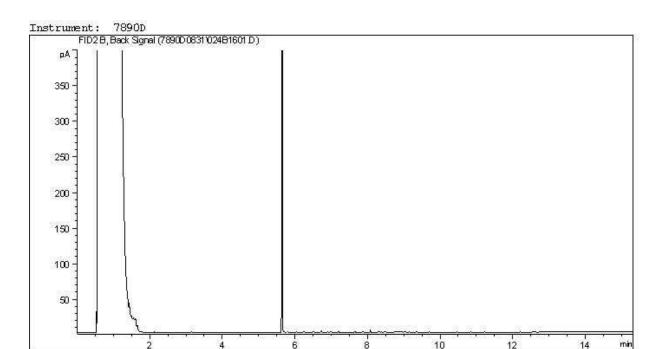
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

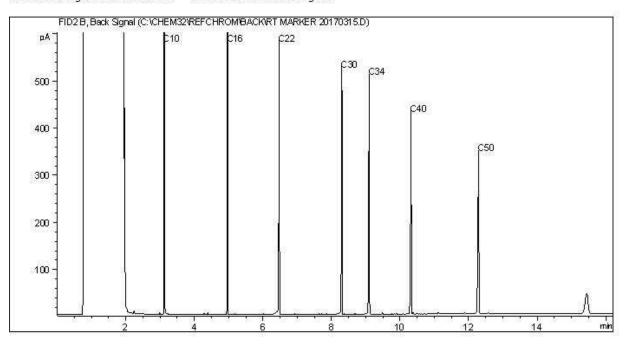
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-06B

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



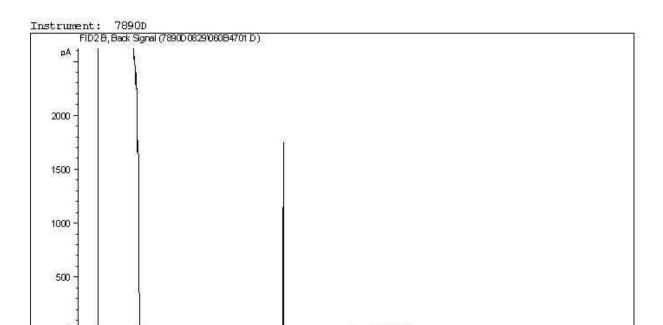
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

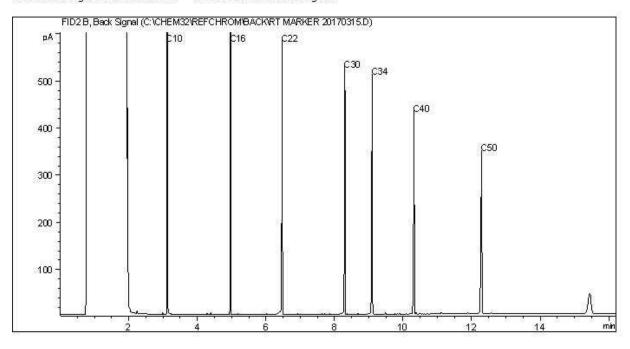
ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-07A

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#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

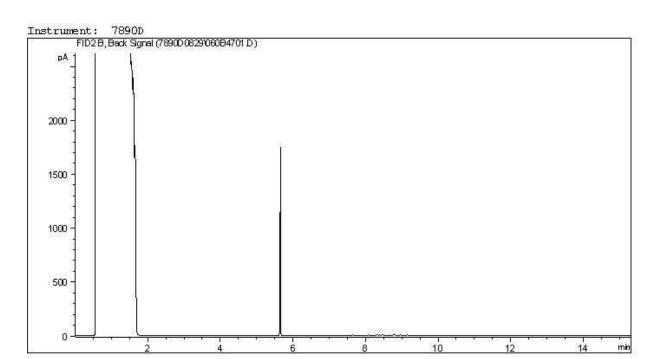
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

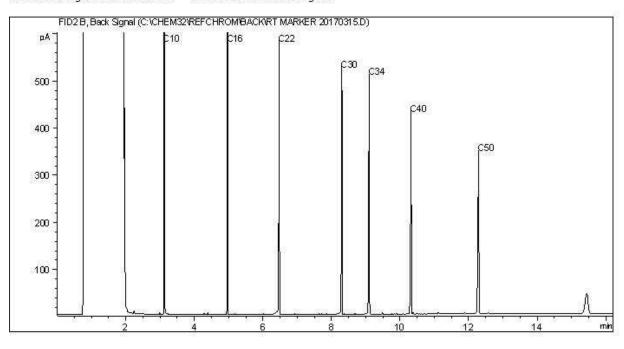
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-07A

#### CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

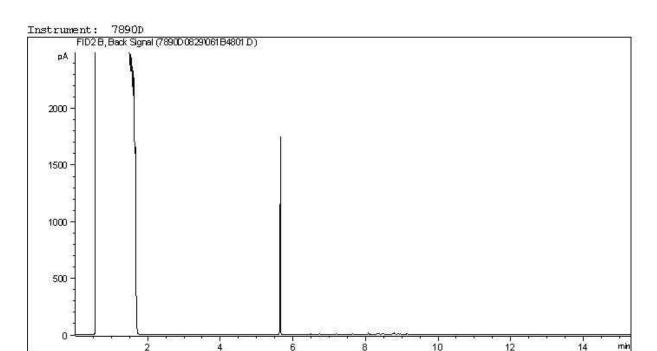
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

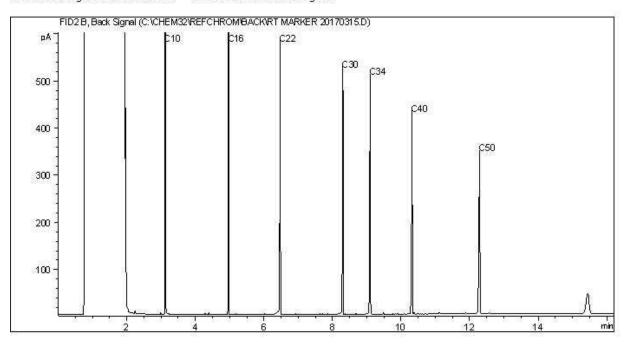
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-07B

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

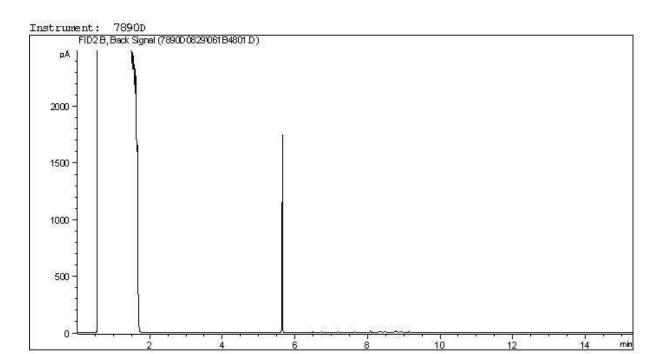


TYPICAL PRODUCT CARBON NUMBER RANGES

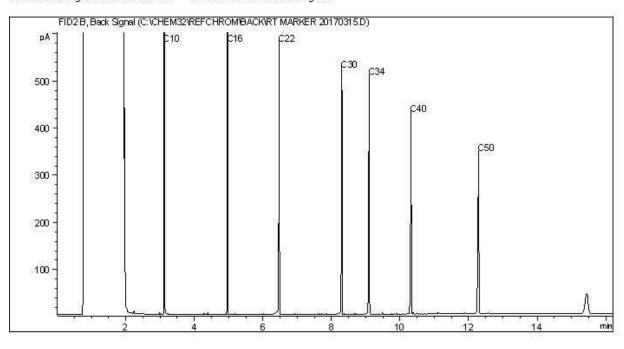
Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-07B

## CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram

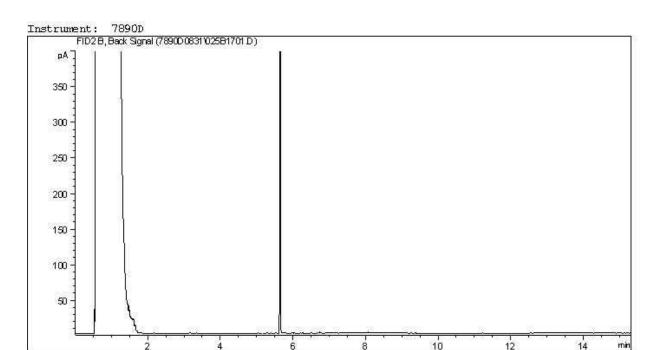


TYPICAL PRODUCT CARBON NUMBER RANGES

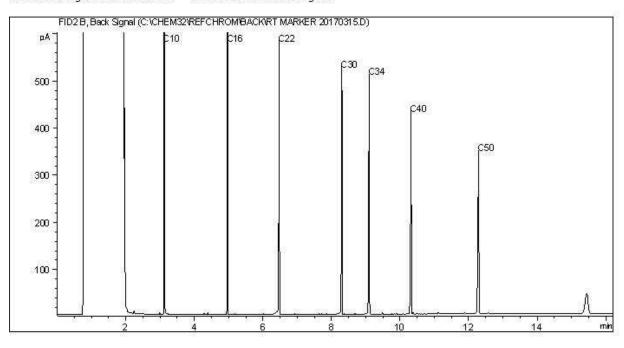
Gasoline:	C4		C12	Diesel:	c8	$\leftarrow$	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	C20	4	C40
Kerosene:	c7	=	C16	Crude Oils:	c3	<u> </u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-08A

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



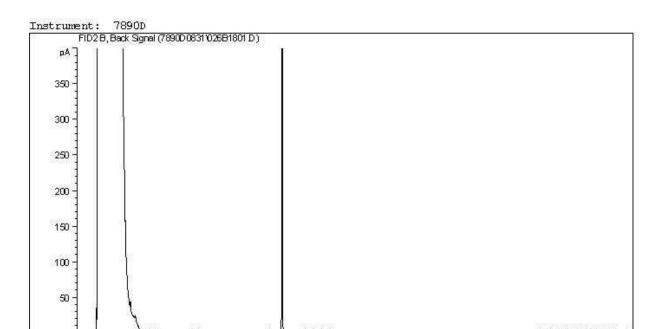
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u> </u>	C60+

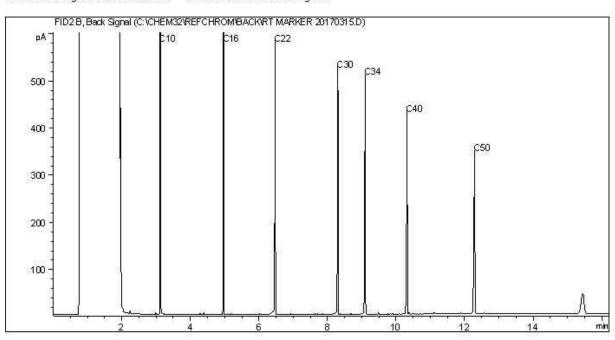
ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-08B

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#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

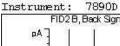


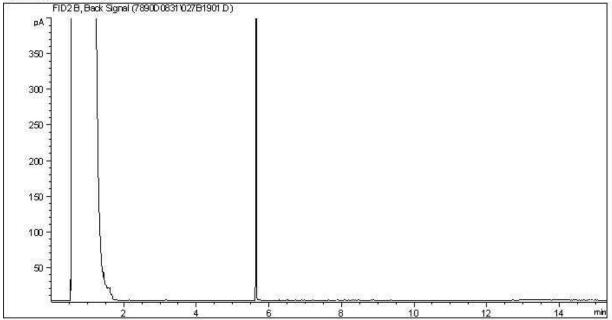
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	_	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	1	C60+

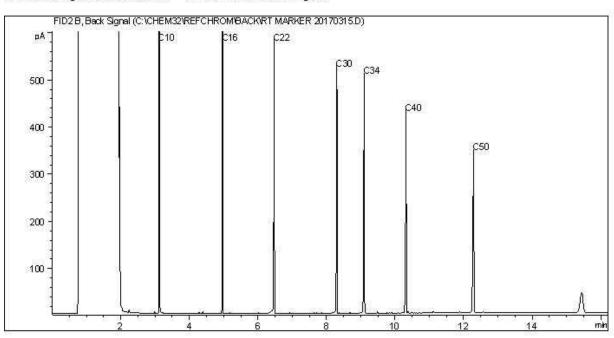
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: MW-11A

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

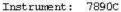


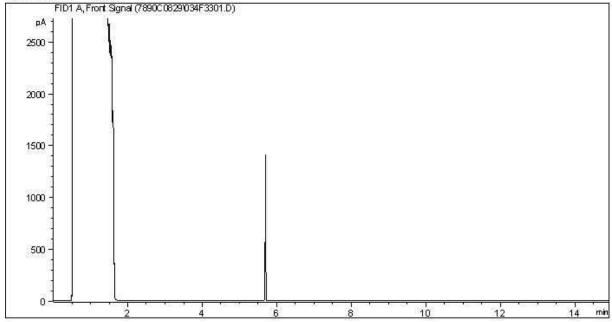
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u> </u>	C60+

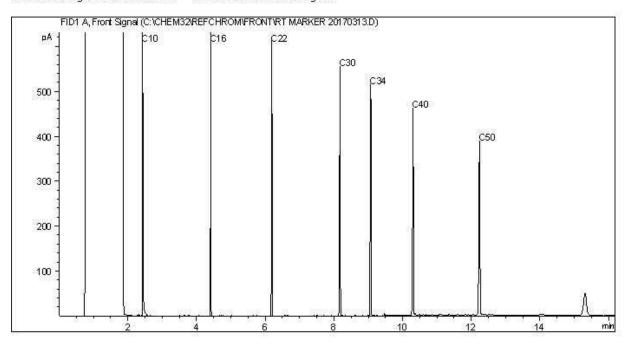
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-13A

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

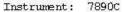


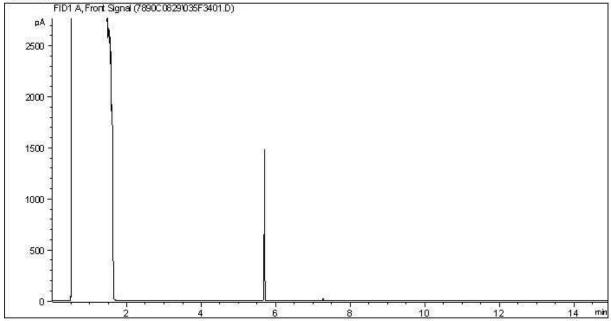
#### TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u> </u>	C60+

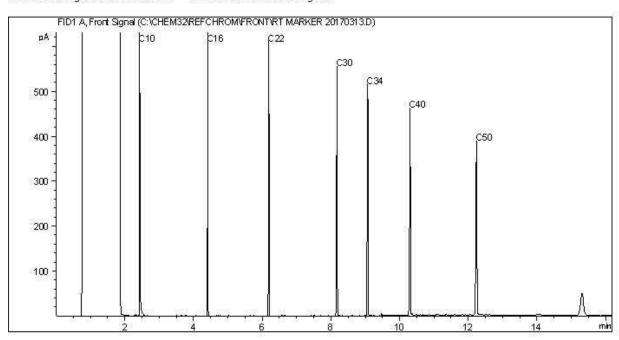
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-13B

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

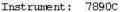


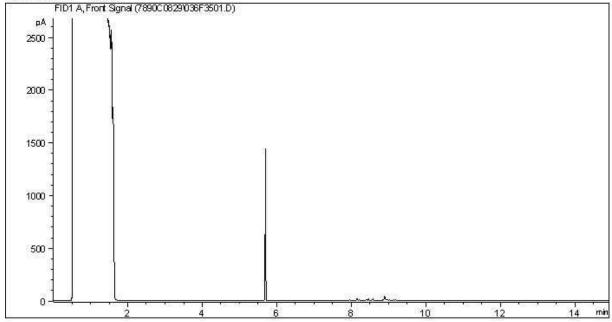
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u> </u>	C60+

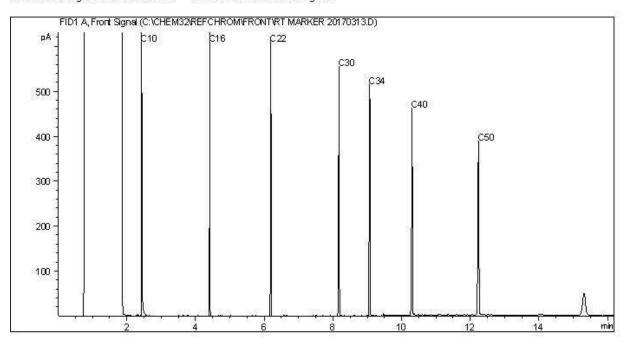
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-14A

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

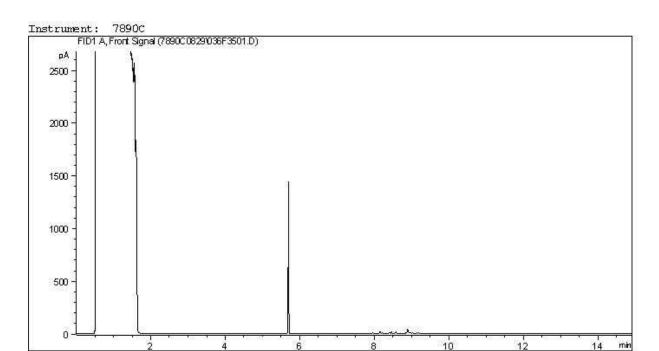


TYPICAL PRODUCT CARBON NUMBER RANGES

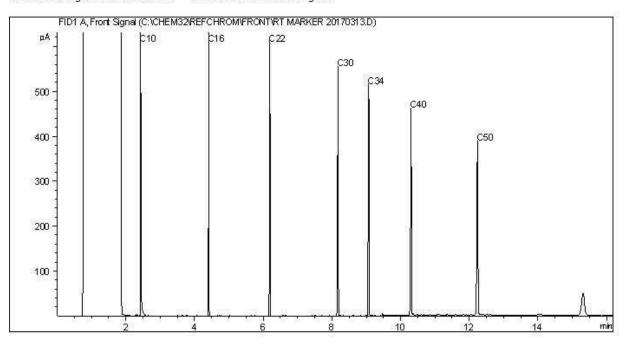
Gasoline:	C4	-	C12	Diesel:	cs -	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	c20 -	C40
Kerosene:	c7	=	C16	Crude Oils:	c3 -	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-14A

## CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram

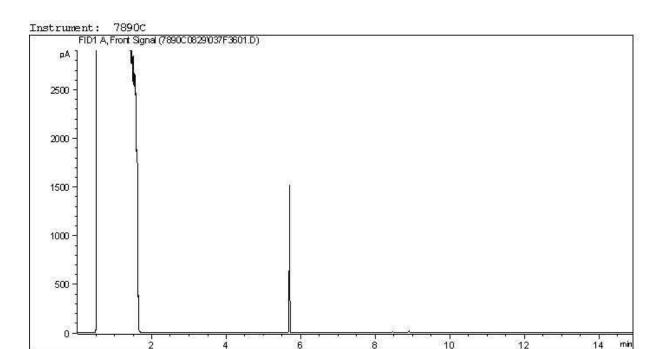


TYPICAL PRODUCT CARBON NUMBER RANGES

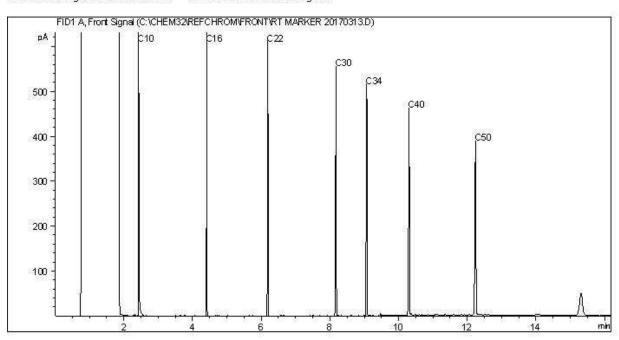
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u> </u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-14B

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

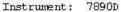


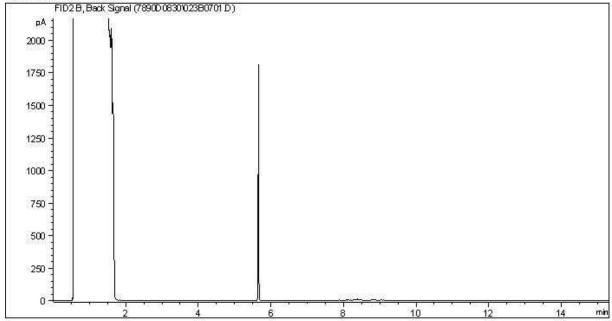
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4		C12	Diesel:	c8 -	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	c20 -	C40
Kerosene:	c7	=	C16	Crude Oils:	c3 -	C60+

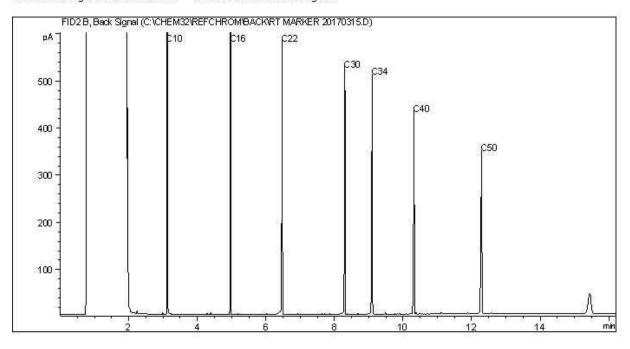
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-15A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

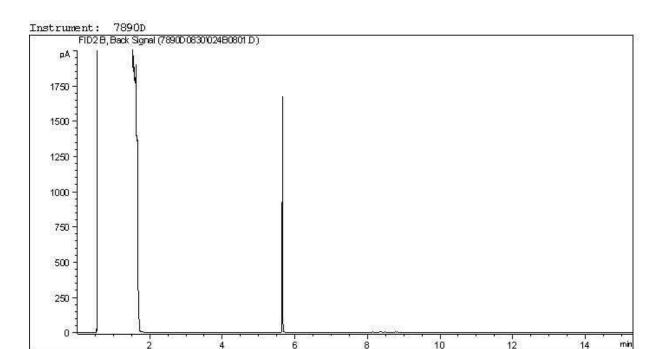


#### TYPICAL PRODUCT CARBON NUMBER RANGES

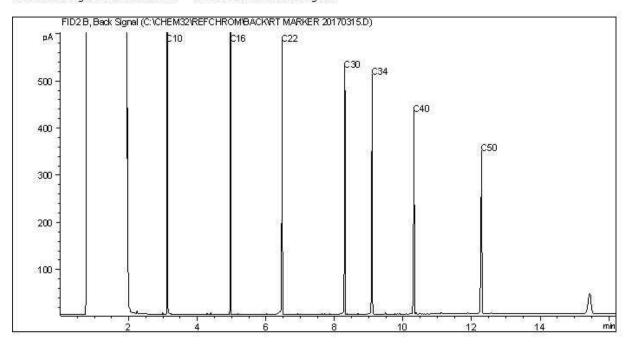
Gasoline:	C4		C12	Diesel:	c8	$\leftarrow$	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	C20	4	C40
Kerosene:	c7	=	C16	Crude Oils:	c3	<u> </u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-15B

## CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

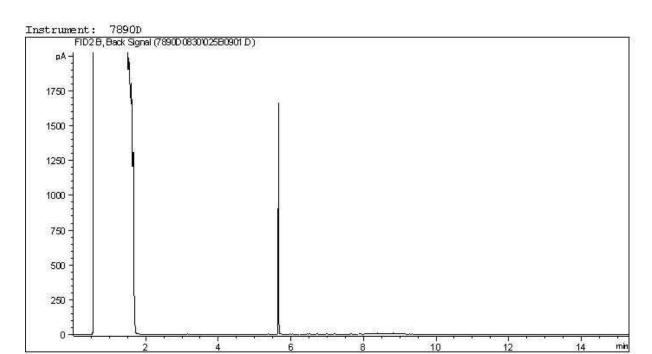


TYPICAL PRODUCT CARBON NUMBER RANGES

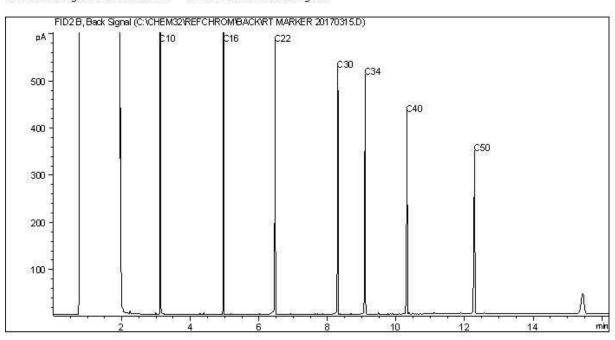
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u> </u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-16A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

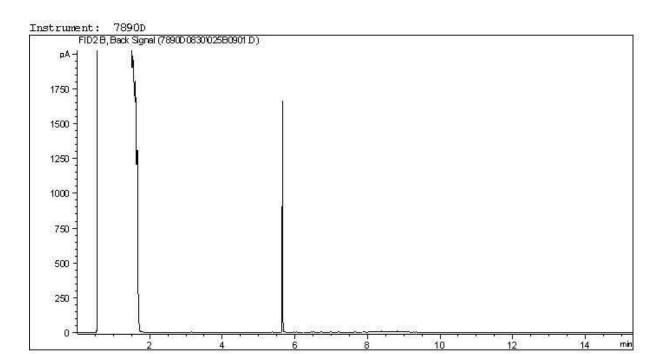


TYPICAL PRODUCT CARBON NUMBER RANGES

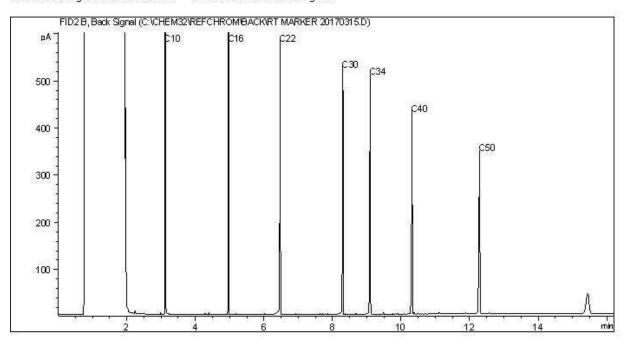
Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1 Sept.	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-16A

# CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram



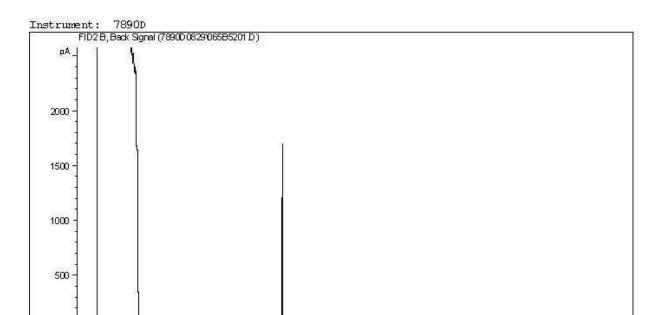
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

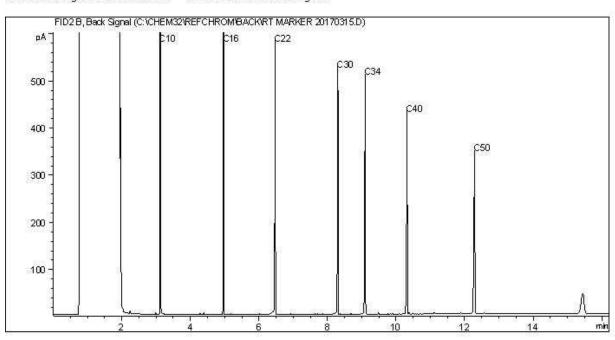
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-16B

10

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

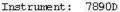


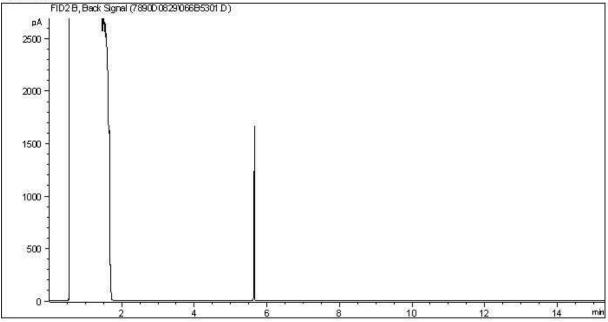
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

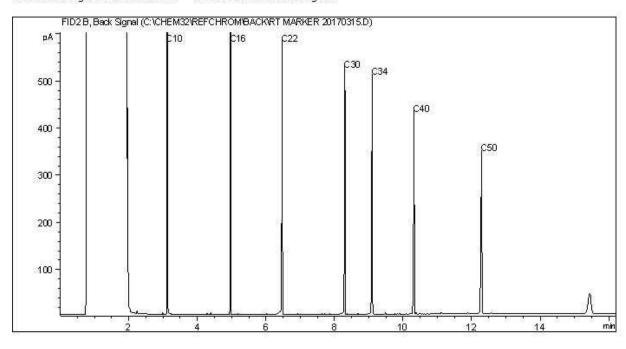
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-17A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

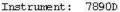


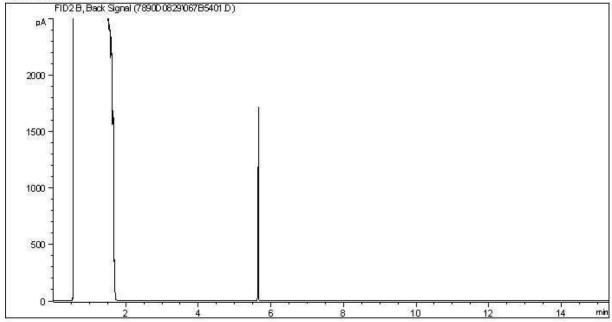
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

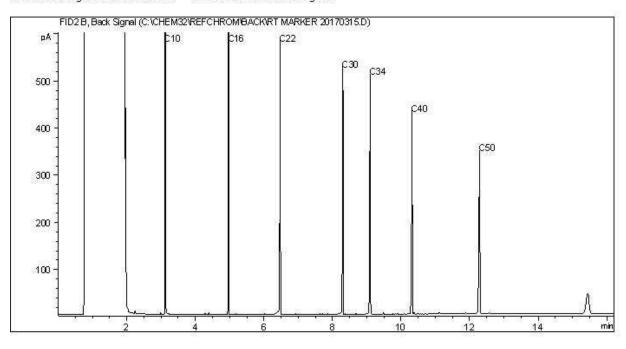
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-17B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

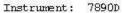


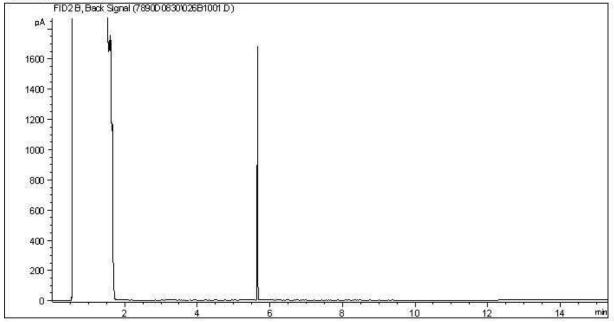
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1	C60+

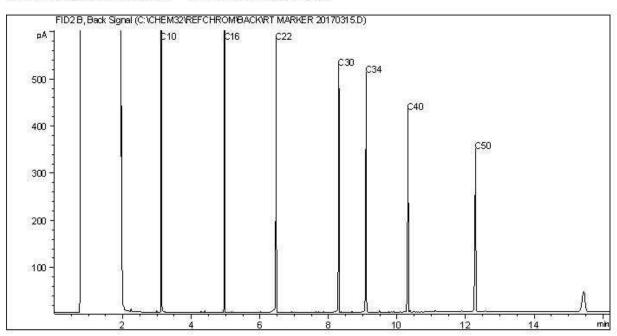
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-18A

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

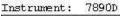


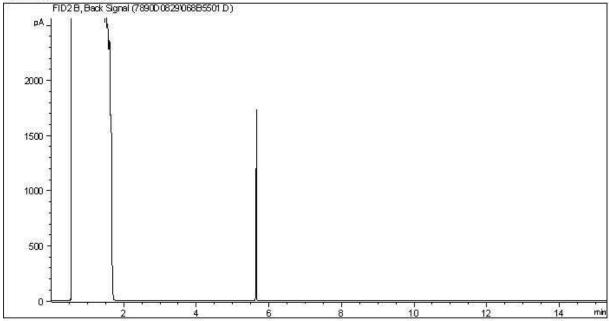
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4		C12	Diesel:	c8	$\leftarrow$	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	C20	4	C40
Kerosene:	c7	=	C16	Crude Oils:	c3	<u> </u>	C60+

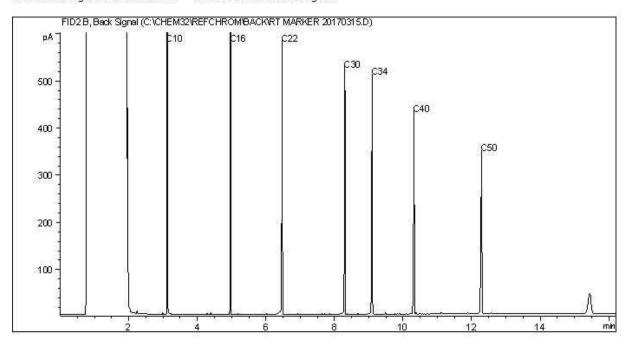
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-18B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

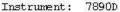


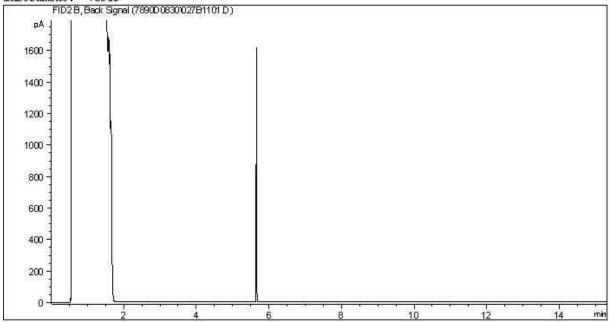
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

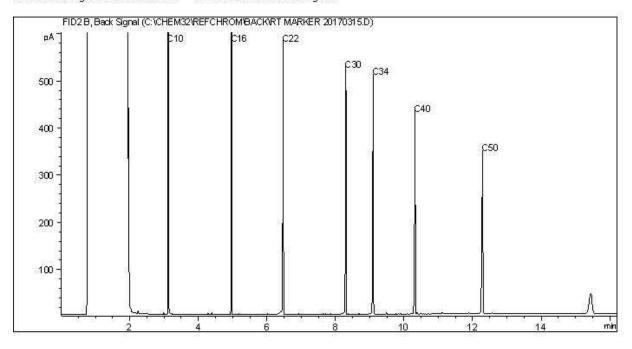
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-19A

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

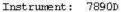


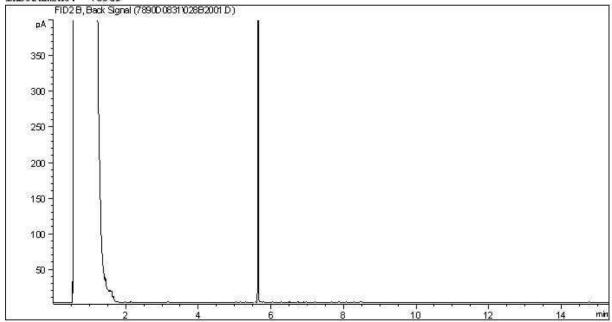
#### TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1	C60+

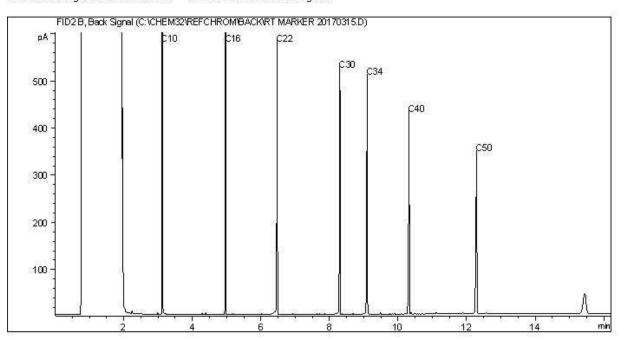
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-19B

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

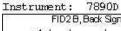


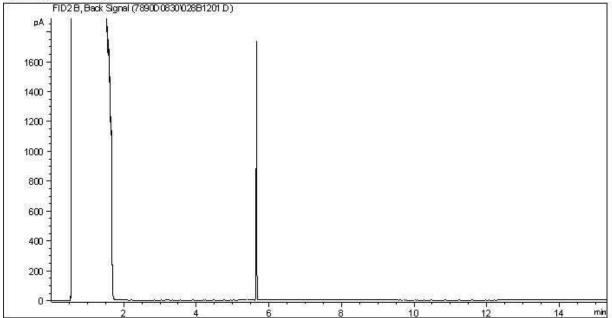
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

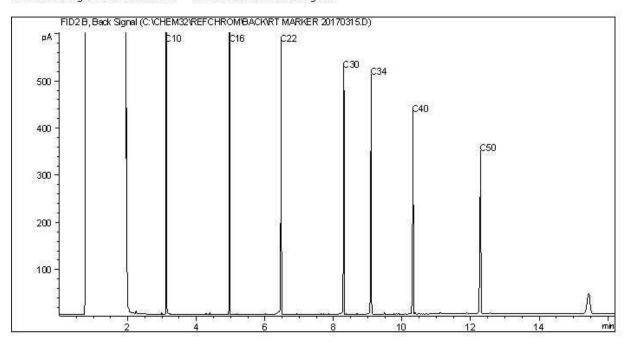
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: P4-20A

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

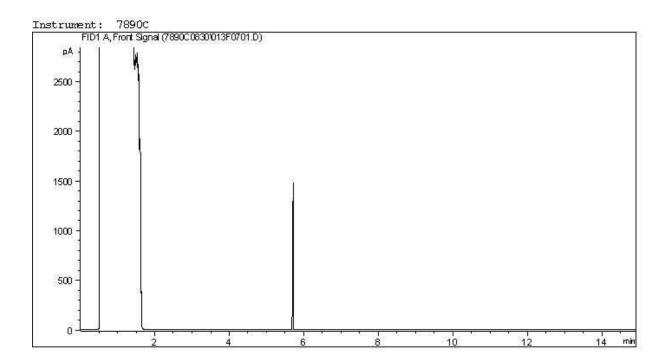


TYPICAL PRODUCT CARBON NUMBER RANGES

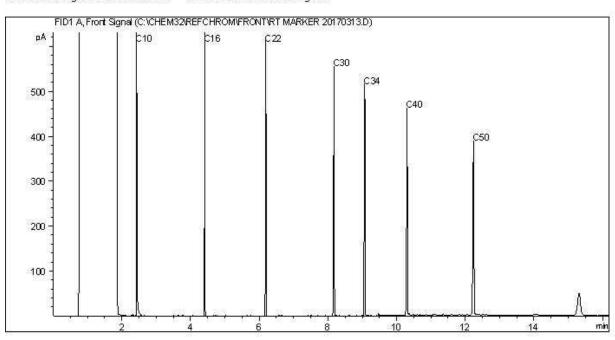
Gasoline:	C4		C12	Diesel:	c8	4	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	C20	1	C40
Kerosene:	c7	_	C16	Crude Oils:	C3	( <u>11</u> )	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-20B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

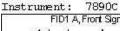


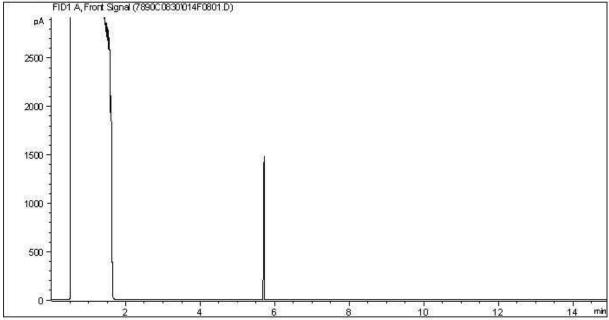
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1	C60+

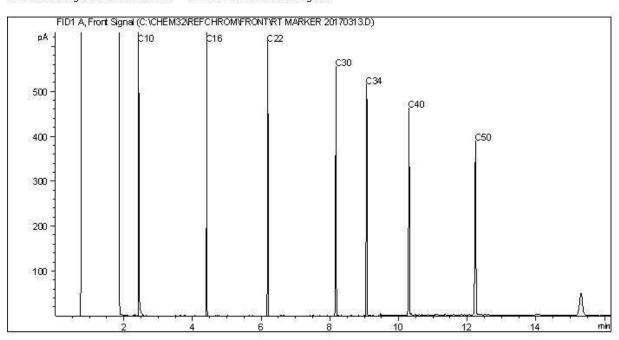
**ARCADIS Canada Inc** Client Project #: 30000251 Client ID: P4-21A

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12 Diesel: C8 - C22 Varsol: c8 - c12 Lubricating Oils: c20 - c40Kerosene: c7 - c16 Crude Oils: c3 - c60+

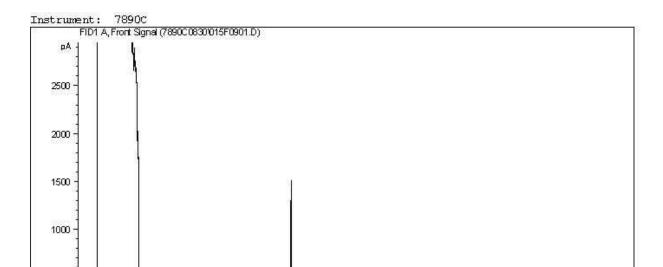
500

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-21B

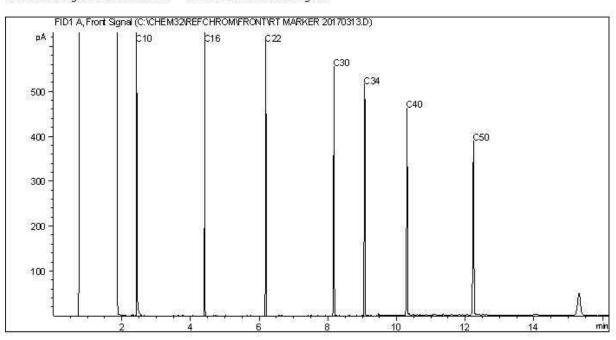
10

14

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

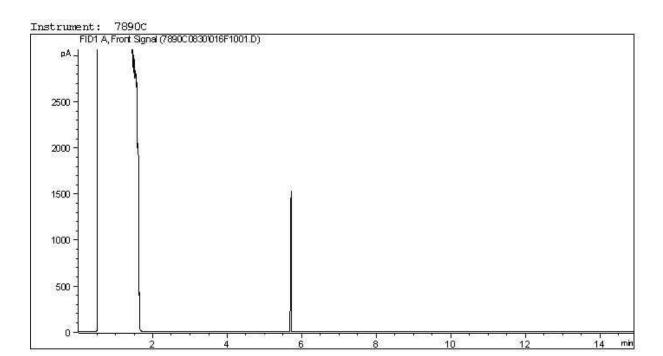
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

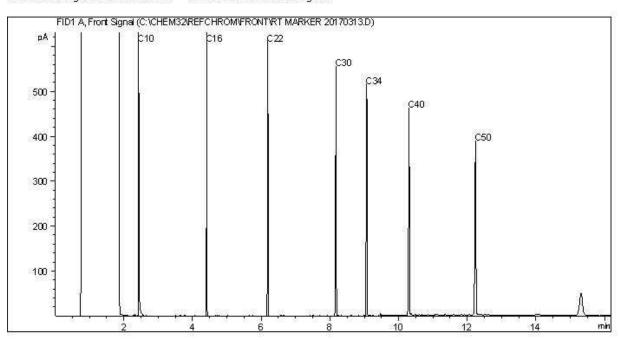
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-22A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

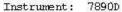


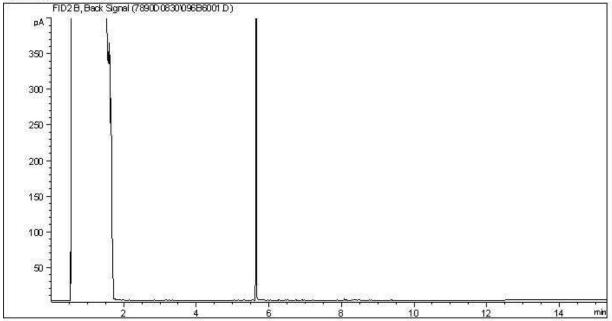
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

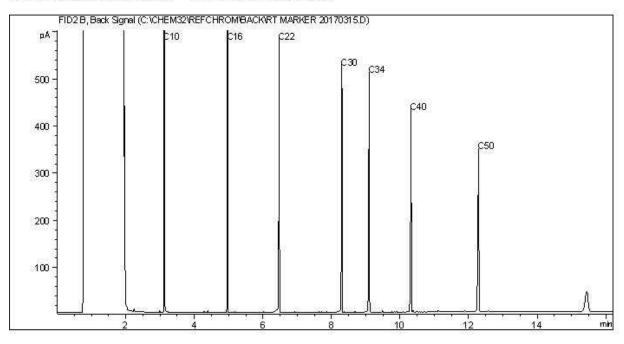
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-22B

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

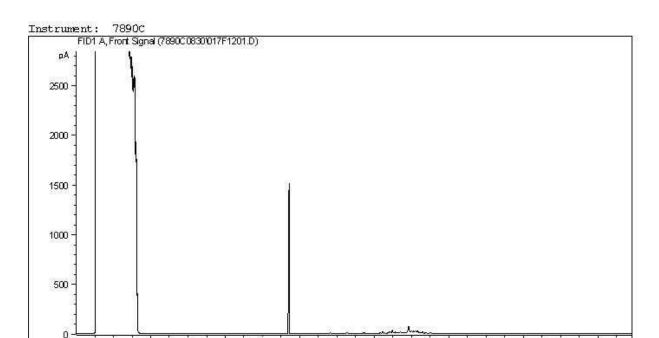


#### TYPICAL PRODUCT CARBON NUMBER RANGES

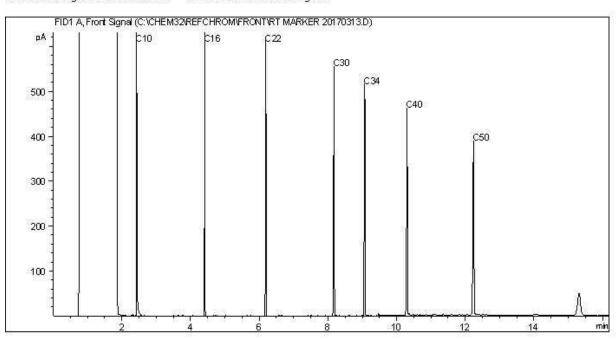
Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-23A

# CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram

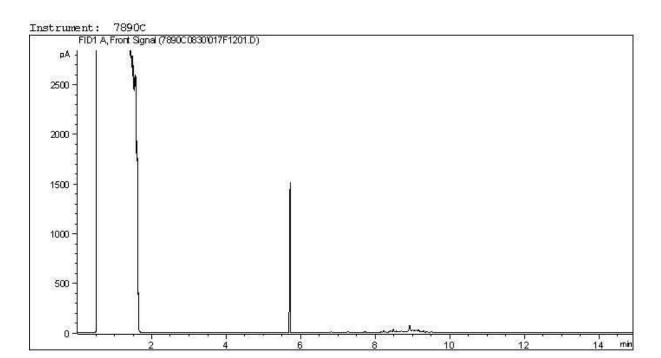


TYPICAL PRODUCT CARBON NUMBER RANGES

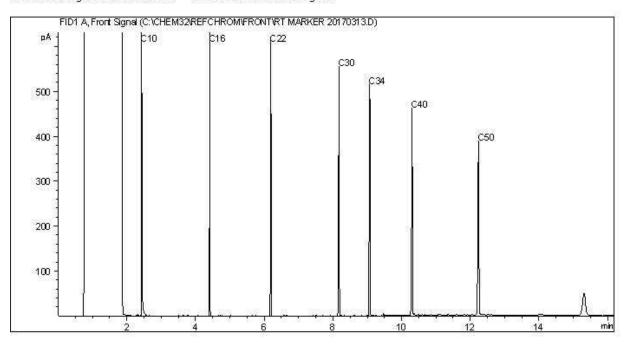
Gasoline:	C4	-	C12	Diesel:	cs -	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	c20 -	C40
Kerosene:	c7	=	C16	Crude Oils:	c3 -	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-23A

# CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram

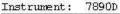


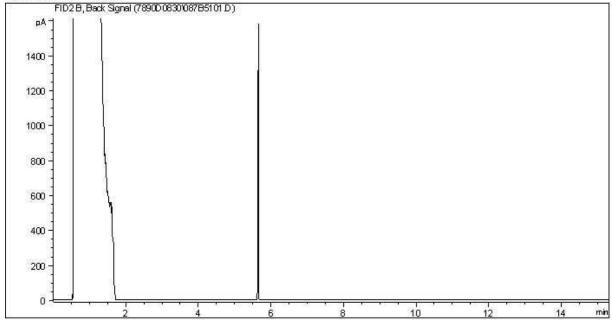
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	_	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	1	C60+

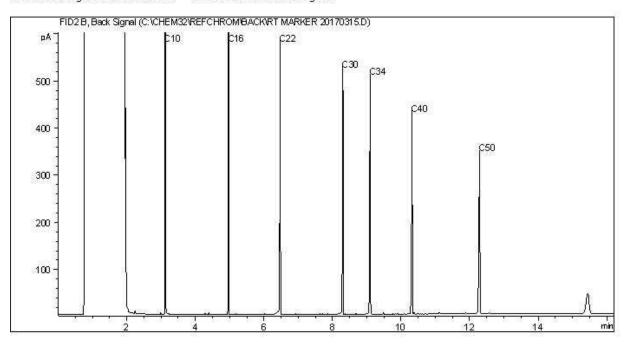
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-23B

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

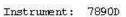


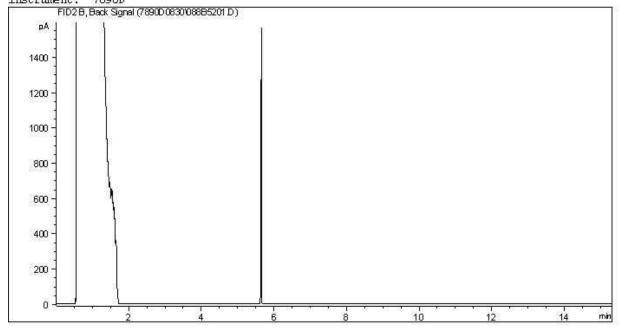
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1	C60+

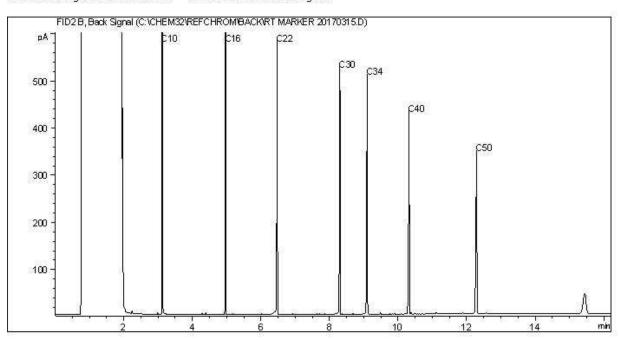
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-23B

CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

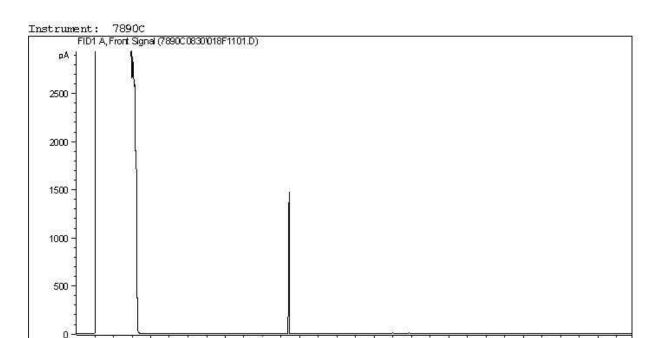
Gasoline:	C4		C12	Diesel:	c8	$\leftarrow$	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	C20	4	C40
Kerosene:	c7	=	C16	Crude Oils:	c3	<u> </u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-24A

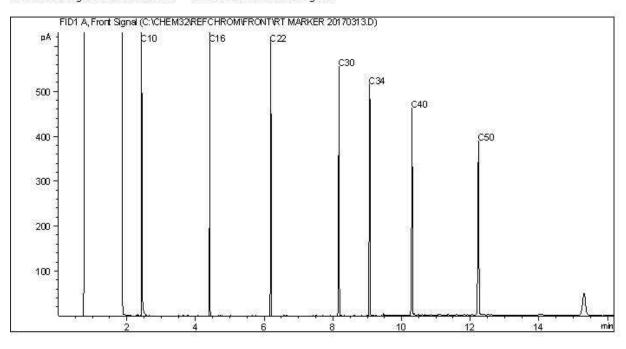
10

14

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

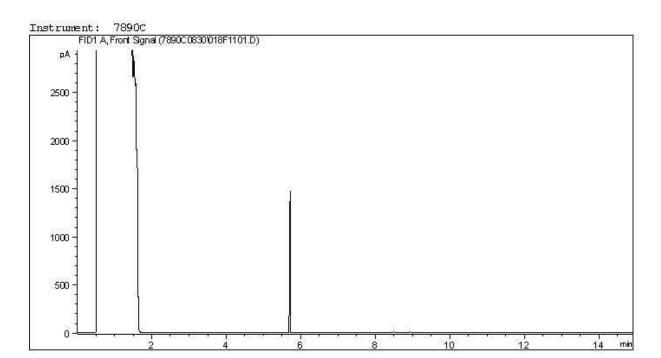
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

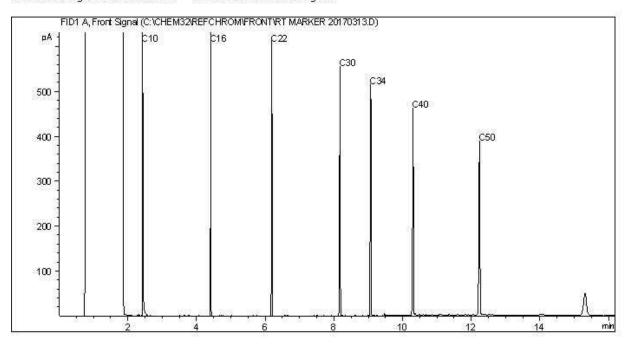
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-24A

# CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram

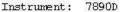


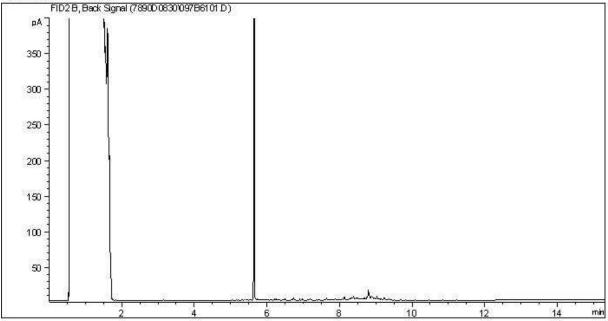
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

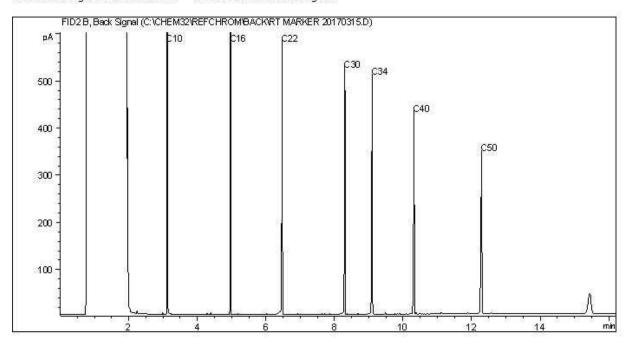
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-24B

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram

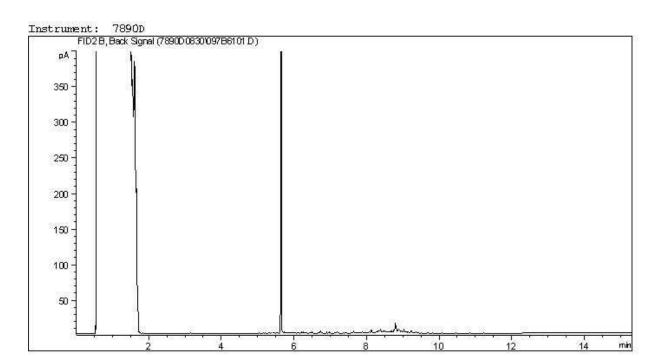


TYPICAL PRODUCT CARBON NUMBER RANGES

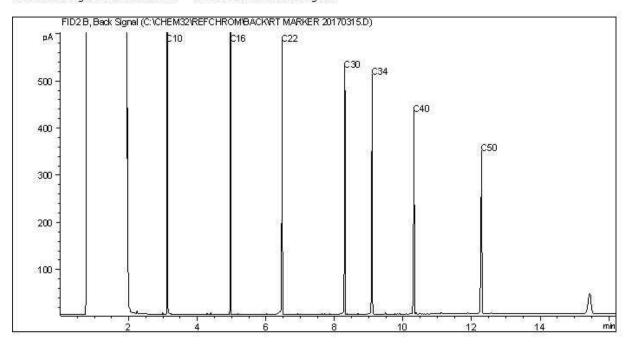
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-24B

# CCME Hydrocarbons (F2-F4)+F3A/B in soil Chromatogram



Carbon Range Distribution - Reference Chromatogram

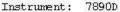


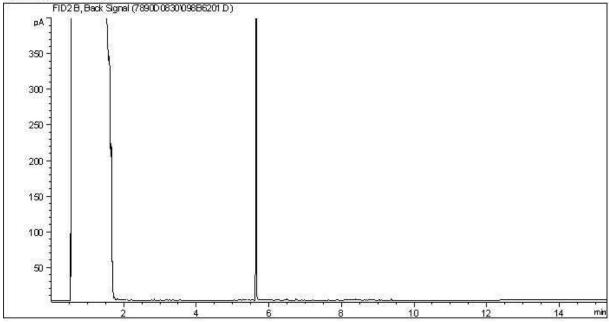
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1	C60+

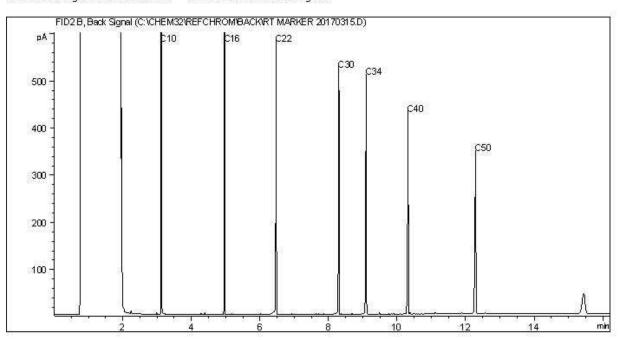
ARCADIS Canada Inc Client Project #: 30000251 Client ID: P4-27A

#### CCME Hydrocarbons (F2-F4 in soil) Chromatogram





Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

# **APPENDIX B2**

Laboratory QA/QC Reports and Certificates of Analysis – Groundwater



Your Project #: 30000251

Site#: PIN-4

Your C.O.C. #: 591565-01-01, 591565-13-01

**Attention: Elliott Holden** 

ARCADIS Canada Inc 1050 Morrison Drive Suite 201 Ottawa, ON Canada K2H 8K7

Report Date: 2019/12/02

Report #: R2818201 Version: 2 - Revision

# **CERTIFICATE OF ANALYSIS – REVISED REPORT**

BV LABS JOB #: B971616 Received: 2019/08/27, 10:23

Sample Matrix: Water # Samples Received: 12

		Date	Date		
Analyses	Quantity	Extracted	Analyzed	<b>Laboratory Method</b>	Analytical Method
BTEX/F1 in Water by HS GC/MS/FID	12	N/A	2019/08/30	AB SOP-00039	CCME CWS/EPA 8260d m
CCME Hydrocarbons (F2-F4 in water) (1)	10	2019/08/29	2019/08/29	AB SOP-00037 / AB SOP- 00040	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in water) (1)	2	2019/08/29	2019/08/30	AB SOP-00037 / AB SOP- 00040	CCME PHC-CWS m
Elements by ICPMS - Total	12	2019/08/30	2019/08/30	AB SOP-00014 / AB SOP- 00043	EPA 6020b R2 m

#### Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

- \* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
- (1) Silica gel clean up employed.



Your Project #: 30000251

Site#: PIN-4

Your C.O.C. #: 591565-01-01, 591565-13-01

**Attention: Elliott Holden** 

ARCADIS Canada Inc 1050 Morrison Drive Suite 201 Ottawa, ON Canada K2H 8K7

Report Date: 2019/12/02

Report #: R2818201 Version: 2 - Revision

# **CERTIFICATE OF ANALYSIS – REVISED REPORT**

BV LABS JOB #: B971616 Received: 2019/08/27, 10:23

**Encryption Key** 

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

Parminder Virk, Key Account Specialist Email: Parminder.Virk@bvlabs.com Phone# (403)735-2235

\_\_\_\_\_

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



# AT1 BTEX AND F1-F4 IN WATER (WATER)

BV Labs ID		WJ5486	WJ5486	WJ5487	WJ5488	WJ5490		
Sampling Date		2019/08/21 14:00	2019/08/21 14:00	2019/08/21 15:50	2019/08/21 17:00	2019/08/21 18:00		
COC Number		591565-01-01	591565-01-01	591565-01-01	591565-01-01	591565-01-01		
	UNITS	MW-01	MW-01 Lab-Dup	MW-02	MW-03	MW-04	RDL	QC Batch
Ext. Pet. Hydrocarbon								
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9568653
F3 (C16-C34 Hydrocarbons)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9568653
F4 (C34-C50 Hydrocarbons)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9568653
Volatiles								
F1 (C6-C10)	ug/L	35	N/A	<25	<25	<25	25	9569007
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	103	N/A	103	103	103	N/A	9569007
4-Bromofluorobenzene (sur.)	%	100	N/A	103	101	101	N/A	9569007
D4-1,2-Dichloroethane (sur.)	%	108	N/A	110	108	110	N/A	9569007
O-TERPHENYL (sur.)	%	98	101	102	113	98	N/A	9568653
DDI Danastalia Datastian II		•	•	•		•		

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

N/A = Not Applicable

BV Labs ID		WJ5491		WJ5492		WJ5493	WJ5494		
Sampling Date		2019/08/21 14:30		2019/08/24 11:20		2019/08/24 10:20	2019/08/24 12:10		
COC Number		591565-01-01		591565-01-01		591565-01-01	591565-01-01		
	UNITS	MW-09	QC Batch	MW-06	QC Batch	MW-07	MW-08	RDL	QC Batch
Ext. Pet. Hydrocarbon		•							
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	9568653	<0.10	9568653	<0.10	0.39	0.10	9568653
F3 (C16-C34 Hydrocarbons)	mg/L	<0.10	9568653	<0.10	9568653	<0.10	0.15	0.10	9568653
F4 (C34-C50 Hydrocarbons)	mg/L	<0.10	9568653	<0.10	9568653	<0.10	<0.10	0.10	9568653
Volatiles									
F1 (C6-C10)	ug/L	<25	9569094	<25	9569007	<25	<25	25	9569014
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	97	9569094	103	9569007	110	109	N/A	9569014
4-Bromofluorobenzene (sur.)	%	100	9569094	100	9569007	97	96	N/A	9569014
D4-1,2-Dichloroethane (sur.)	%	94	9569094	108	9569007	95	98	N/A	9569014
O-TERPHENYL (sur.)	%	99	9568653	102	9568653	97	96	N/A	9568653
		·		-		<del></del>	-		

RDL = Reportable Detection Limit

N/A = Not Applicable



AT1 BTEX AND F1-F4 IN WATER (WATER)

BV Labs ID		WJ5495	WJ5496	WJ5529	WJ5530		
Sampling Date		2019/08/24 12:30	2019/08/12	2019/08/23 18:00	2019/08/23 18:30		
COC Number		591565-01-01	591565-01-01	591565-13-01	591565-13-01		
	UNITS	FIELD BLANK	TRIP BLANK	EQUIPMENT BLANK 1	EQUIPMENT BLANK 2	RDL	QC Batch
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	<0.10	<0.10	<0.10	0.10	9568653
F3 (C16-C34 Hydrocarbons)	mg/L	<0.10	<0.10	<0.10	<0.10	0.10	9568653
F4 (C34-C50 Hydrocarbons)	mg/L	<0.10	<0.10	<0.10	<0.10	0.10	9568653
Volatiles	3'	•				•	
F1 (C6-C10)	ug/L	<25	<25	<25	<25	25	9569007
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	103	102	103	104	N/A	9569007
4-Bromofluorobenzene (sur.)	%	100	102	102	101	N/A	9569007
D4-1,2-Dichloroethane (sur.)	%	104	104	106	109	N/A	9569007
O-TERPHENYL (sur.)	%	99	97	99	94	N/A	9568653
RDL = Reportable Detection Lir N/A = Not Applicable	nit						



# **ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

BV Labs ID		WJ5486	WJ5487	WJ5488	WJ5490	WJ5491		
Sampling Date		2019/08/21 14:00	2019/08/21 15:50	2019/08/21 17:00	2019/08/21 18:00	2019/08/21 14:30		
COC Number		591565-01-01	591565-01-01	591565-01-01	591565-01-01	591565-01-01		
	UNITS	MW-01	MW-02	MW-03	MW-04	MW-09	RDL	QC Batch
Elements	•			•			•	
Total Arsenic (As)	mg/L	0.00054	0.0026	0.00041	0.00046	0.00045	0.00020	9569712
Total Cadmium (Cd)	mg/L	0.000048	<0.000020	0.000023	0.000054	0.000042	0.000020	9569712
Total Chromium (Cr)	mg/L	0.021	0.0011	<0.0010	0.012	0.018	0.0010	9569712
Total Cobalt (Co)	mg/L	0.00074	0.0081	0.0020	0.0017	0.00071	0.00030	9569712
Total Copper (Cu)	mg/L	0.0047	0.0012	0.013	0.0094	0.0051	0.00020	9569712
Total Lead (Pb)	mg/L	0.00022 (1)	0.00082 (1)	0.00013 (1)	0.00024 (1)	0.00010 (1)	0.00010	9569712
Total Nickel (Ni)	mg/L	0.12	0.025	0.019	0.050	0.11	0.00050	9569712
Total Zinc (Zn)	mg/L	0.024	0.81	0.97	0.57	0.024	0.0030	9569712
RDL = Reportable Detection	Limit			•				

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.

BV Labs ID		WJ5492	WJ5493	WJ5494	WJ5495	WJ5496		
Sampling Date		2019/08/24 11:20	2019/08/24 10:20	2019/08/24 12:10	2019/08/24 12:30	2019/08/12		
COC Number		591565-01-01	591565-01-01	591565-01-01	591565-01-01	591565-01-01		
	UNITS	MW-06	MW-07	MW-08	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Elements								
Total Arsenic (As)	mg/L	0.00040	<0.00020	0.00033	<0.00020	<0.00020	0.00020	9569712
Total Cadmium (Cd)	mg/L	<0.000020	<0.000020	0.000035	<0.000020	<0.000020	0.000020	9569712
Total Chromium (Cr)	mg/L	<0.0010	<0.0010	0.0073	<0.0010	<0.0010	0.0010	9569712
Total Cobalt (Co)	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	0.00030	9569712
Total Copper (Cu)	mg/L	0.0017	0.0019	0.0052	<0.00020	<0.00020	0.00020	9569712
Total Lead (Pb)	mg/L	0.00037 (1)	0.00015 (1)	0.00034 (1)	<0.00010 (1)	<0.00010 (1)	0.00010	9569712
Total Nickel (Ni)	mg/L	0.0010	0.0015	0.0054	<0.00050	<0.00050	0.00050	9569712
Total Zinc (Zn)	mg/L	0.0067	0.0095	0.0087	<0.0030	<0.0030	0.0030	9569712

RDL = Reportable Detection Limit

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.



# **ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)**

BV Labs ID		WJ5529	WJ5530		
Sampling Date		2019/08/23 18:00	2019/08/23 18:30		
COC Number		591565-13-01	591565-13-01		
	UNITS	EQUIPMENT BLANK 1	EQUIPMENT BLANK 2	RDL	QC Batch
Elements				<u></u>	
Total Arsenic (As)	mg/L	<0.00020	<0.00020	0.00020	9569712
Total Cadmium (Cd)	mg/L	<0.000020	<0.000020	0.000020	9569712
Total Chromium (Cr)	mg/L	<0.0010	<0.0010	0.0010	9569712
Total Cobalt (Co)	mg/L	<0.00030	<0.00030	0.00030	9569712
Total Copper (Cu)	mg/L	<0.00020	<0.00020	0.00020	9569712
Total Lead (Pb)	mg/L	<0.00010 (1)	<0.00010 (1)	0.00010	9569712
Total Nickel (Ni)	mg/L	<0.00050	<0.00050	0.00050	9569712
Total Zinc (Zn)	mg/L	<0.0030	<0.0030	0.0030	9569712

RDL = Reportable Detection Limit

<sup>(1)</sup> Detection limits calculated based on method detection limits (MDLs) at client request.



BV Labs Job #: B971616 ARCADIS Canada Inc
Report Date: 2019/12/02 Client Project #: 30000251
Sampler Initials: EH

# **GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.7°C
Package 2	4.3°C
Package 3	3.8°C
Package 4	3.0°C
Package 5	3.3°C
Package 6	2.9°C
Package 7	4.9°C

BTEXF1-4: Detection limits calculated based on method detection limits (MDLs) at client request. Report reissued with holding time note removed for Field Blank sample - Version 2 2019/12/02

Sample WJ5496 [TRIP BLANK]: Sample was analyzed past method specified hold time for CCME Hydrocarbons (F2-F4 in water). Sample was analyzed past method specified hold time for BTEX/F1 in Water by HS GC/MS/FID.

Results relate only to the items tested.



#### **QUALITY ASSURANCE REPORT**

ARCADIS Canada Inc Client Project #: 30000251

Sampler Initials: EH

			Matrix	Spike	Spiked	Blank	Method E	lank	RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9568653	O-TERPHENYL (sur.)	2019/08/29	103	60 - 140	101	60 - 140	101	%		
9569007	1,4-Difluorobenzene (sur.)	2019/08/30	96	50 - 140	99	50 - 140	102	%		
9569007	4-Bromofluorobenzene (sur.)	2019/08/30	101	50 - 140	100	50 - 140	98	%		
9569007	D4-1,2-Dichloroethane (sur.)	2019/08/30	102	50 - 140	103	50 - 140	104	%		
9569014	1,4-Difluorobenzene (sur.)	2019/08/30	103	50 - 140	105	50 - 140	109	%		
9569014	4-Bromofluorobenzene (sur.)	2019/08/30	98	50 - 140	96	50 - 140	95	%		
9569014	D4-1,2-Dichloroethane (sur.)	2019/08/30	98	50 - 140	97	50 - 140	100	%		
9569094	1,4-Difluorobenzene (sur.)	2019/08/30	102	50 - 140	103	50 - 140	97	%		
9569094	4-Bromofluorobenzene (sur.)	2019/08/30	100	50 - 140	99	50 - 140	100	%		
9569094	D4-1,2-Dichloroethane (sur.)	2019/08/30	99	50 - 140	103	50 - 140	95	%		
9568653	F2 (C10-C16 Hydrocarbons)	2019/08/29	103	60 - 140	111	60 - 140	<0.10	mg/L	NC	30
9568653	F3 (C16-C34 Hydrocarbons)	2019/08/29	104	60 - 140	113	60 - 140	<0.10	mg/L	NC	30
9568653	F4 (C34-C50 Hydrocarbons)	2019/08/29	97	60 - 140	106	60 - 140	<0.10	mg/L	NC	30
9569007	F1 (C6-C10)	2019/08/30	89	60 - 140	83	60 - 140	<25	ug/L	NC	30
9569014	F1 (C6-C10)	2019/08/30	81	60 - 140	90	60 - 140	<25	ug/L	NC	30
9569094	F1 (C6-C10)	2019/08/30	96	60 - 140	115	60 - 140	<25	ug/L	NC	30
9569712	Total Arsenic (As)	2019/08/30	96	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
9569712	Total Cadmium (Cd)	2019/08/30	97	80 - 120	96	80 - 120	<0.000020	mg/L		
9569712	Total Chromium (Cr)	2019/08/30	97	80 - 120	99	80 - 120	<0.0010	mg/L	NC	20
9569712	Total Cobalt (Co)	2019/08/30	97	80 - 120	98	80 - 120	<0.00030	mg/L	6.7	20
9569712	Total Copper (Cu)	2019/08/30	95	80 - 120	98	80 - 120	<0.00020	mg/L	10	20
9569712	Total Lead (Pb)	2019/08/30	94	80 - 120	95	80 - 120	<0.00020	mg/L	4.7	20
9569712	Total Nickel (Ni)	2019/08/30	95	80 - 120	96	80 - 120	<0.00050	mg/L	7.4	20
9569712	Total Zinc (Zn)	2019/08/30	92	80 - 120	95	80 - 120	<0.0030	mg/L	16	20

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

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



# **VALIDATION SIGNATURE PAGE**

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

Justin Geisel, B.Sc., Organics Supervisor

Roland Menard, Analyst II

Suwan Fock, B.Sc., QP, Inorganics Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BUREAU VERITAS		Bureau Veritas Laboratories 4000 19st N.E., Calgary, Alberta Canada 1	T2E 6P8 Tel:(403) 291-3	077 Toll-free:800-56	3-6266 Fax (4	03) 291-	-9468 www.bv	labs.com	13851	7)			CHAIN	DF CUSTODY RECORD	Page 1 of 2
WALSON MAKES		INVOICE TO:			REPORT	TO:				PROJE	ECT INFOR	RMATION:		Laboratory Use	Only:
Company Name:	#3269 ARCAI	DIS Canada Inc	Company Nar	ne: SAME	AS "	NV	CICE -	TO "	Quotation#	13	603	371		BV Labs Job #:	Bottle Order #:
Attention:	Elliott Holden		Attention:						P.O. #:					B971616	
Address:	1050 Morrison		Address:						Project:	300	00251				591565
	Ottawa ON K2I (613) 721-0555			(					Project Name:	PIN	1.4			COC #:	Project Manager:
Tel: Email:	Jacob.Holden@		Tel:	TPOY ALL	ETRINS	0	Fax:	>15. COM	Site #: Sampled By:			THOLDE	= N	C#591565-01-01	Parminder Virk
1		1		al Instructions	3,70,700	1	, , , , , , , , , , , , , , , , , , ,		SIS REQUESTED (PL			, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1	Turnaround Time (TAT) R	
ATI	CONTACT THERE QUESTI	METALS: ONL AS, Cd, Cr, ZINC PHCS: ONL E1, F2, F3,	Y REPORT	Pb, Ni,	2 (Y)	(No BETX)	C, ca	SIO NEQUESTED FL	EASE BE OF	-EGIFIG)		(will be Standar	Please provide advance notice for (Standard) TAT: applied if Rush TAT is not specified): d TAT = 5-7 Working days for most tests. note: Standard TAT for certain tests are > 5 days	rush projects	
	AMPLES MUST BE K	EPT COOL ( < 10°C ) FROM TIME OF SAMP	LING UNTIL DELIVERY		Matrix	Metals Field Filtered	FI - F4	w					Date Re	nfirmation Number:	(call lab for #)
1		MW-01	19/08/21	14:00	GW	N.	×>	<					5	GROUNDONATER NOT PRESERV	METALS
2		MW-02	19/08/21	15:50	GW	2	X >	<					5	NOT FIELD FICT	
3		MW-03	19/08/21	17:00	Gω	N	× >	<					5	METALS CHLY	TOTAL
4		MW-04	19/08/21	18:00	Gω	N	$\times$	<					5	ABOVE COMM	ENTS
5		MW-09	19/08/21	14:30	Gω	N	$\times$	$\prec$					5	APPLY TO AL	i siamples
6		MW-06	19/08/24	11:20	GW	N	$\times$	<					5	SAMPLE MW-06	NAS COLLECTED
7		MW-07	19/08/24	10:20	600	N	$\times$	<					5	Received in	Yellowknife
8		80-WM	19/08/24	12:10	GW	N	$\times$	$\times$					5	By: U.nit	
9		FIELD BLANK	19/08/24	12:30	w	2	$\times$	<					5	Å II O	72015
10		TRIP BLANK	19/08/12		w	N	$\times$	<					5		ACTR
- 4	RELINQUISHED BY:		YY/MM/DD) Time	1	RECEIVE		Signature/Pri		Date: (YY/MM/		Time	# jars used and _ not submitted	Time Sensitiv	Laboratory Use Only	•
294 1	ELLICTI It	CLDEN 19/C	25 10:0	0 1	0	X.Z	STC4 CC	2	2019083	5 0	9:0Z			Temperature (°C) on Receipt	Custody Seal Intact on Cooler?  Yes No
* IT IS THE RESPO	M/TERMS-AND-CONDITI NSIBILITY OF THE RELI	ITING, WORK SUBMITTED ON THIS CHAIN OF CUS ONS. NQUISHER TO ENSURE THE ACCURACY OF THE C AFTER SAMPLE RECEIPT, FOR SPECIAL REQUES	CHAIN OF CUSTODY RECOR	D. AN INCOMPLETE C						WLEDGMENT	AND ACCEP	TANCE OF OUR TERM	IS WHICH ARE A	AILABLE FOR VIEWING AT	White: BV Labs Yellow: Client

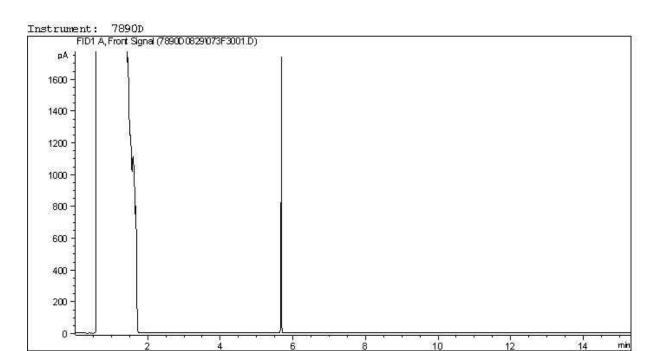
Bureau Veritas Canada (2019) Inc.

BUREAU		Bureau Veritas Laboratories 4000 19st N.E., Calgary, Alberta Can	ada T2E 6P8	Tel:(403) 291-3	077 Toll-free:800-56	3-6266 Fax:(	403) 29	91-9468 ww	w.bvlabs.co	om						CHAIN O	CUSTODY RECORD	PageZ of Z
VERITAS		INVOICE TO:				REPOR	T TO:						PROJECT IN	NFORMATION	l:		Laboratory Use	Only:
Company Name:	#3269 ARCAI	DIS Canada Inc		Company Na	ne: 5AME	AS &	INV	CIGE	E TO	)	Out	tation#:	360	371			BV Labs Job #:	Bottle Order #:
Attention:	Elliott Holden			Attention:							P.O.						B971616	
Address:	1050 Morrison			Address:						Proje	ect:	30000251					591565	
	Ottawa ON K2F (613) 721-0555		1029		-			-				ect Name:	PIN-4				COC #:	Project Manager:
Tel: Email:	Jacob.Holden@		3023	Tel: Email:	TROY, A	USTRI	US C	01		Site Sam	#: pled By:	ECCICIT HOLDE			N	C#591565-13-01	Parminder Virk	
Regulatory Crit	oria		1	Speci	al Instructions		1 1					JESTED (PLEAS	SE BE SPECIFI	IC)		1	Turnaround Time (TAT) Re	quired:
		1 0 DA 1						2	3								Please provide advance notice for ru	A. Carrier and Car
ATI	SAME	AS PAGE!					<u>-</u>	(7)	20			- 1					Standard) TAT:  uplied if Rush TAT is not specified):	
CCME			5,	ME	AS PAG	SE	(Y/N)	0 137	2 0								TAT = 5-7 Working days for most tests	Z.
Other							~	CNO	3,4							Please no details	te: Standard TAT for certain tests are > 5 days -	contact your Project Manager for
							Filtered	7	ÜŻ			1				Job Spec	ific Rush TAT (if applies to entire submissi	on)
							ield Fi	TT	\$ P							Date Req		
S	AMPLES MUST BE K	EPT COOL ( < 10°C ) FROM TIME OF S	AMPLING UN	IL DELIVERY	TO BV LABS		ш.	<u>+</u>	AL							Rush Confi	rmation Number:	call lab for #)
Sample	Barcode Label	Sample (Location) Identification	Da	te Sampled	Time Sampled	Matrix	Metals	$\overline{D}^{\cdot}$	101,							# of Bottle	Comments	5
1		BLANK 1	19	08/23	18:00	cu	2	X	X							5	SAME NO	PAGE
2		BLANK Z	19	08/23	18'30	نت	N	X	X							5		
3																		u Junifo
4							$\vdash$										Received in Y	ellowkine
		- 4 - 1					$\vdash$			-	-				_		By: J. MERC	10:30 Am
5																		7 9 0 4 0
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7																	N	1 T A 1
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	RELINQUISHED BY:	The state of the s	te: (YY/MM/DI	-1				: (Signatur				ite: (YY/MM/DD)		# jars u			Laboratory Use Only	
24	ELLICTT 1	HOLDEN 19	05/2	5 1010	0//	U	70	DICH	رحرح		20	190858	09:0	2 not sub	Dimitted	Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
· UNLESS OTHERW	ISE AGREED TO IN WR	ITING, WORK SUBMITTED ON THIS CHAIN OF	F CUSTODY IS S	UBJECT TO BY	ABS' STANDARD TERM	IS AND COND	TIONS	SIGNING OF	THIS CHAIN	I DE CUSTO	DY DOCUME	NT IS ACKNOWN E	DOMENT AND A	CCEPTANCE OF	OUR TERMS	WHICH ARE AVA	SEC ACTR	Yes No
* IT IS THE RESPON	M/TERMS-AND-CONDITION NOTICE THE RELIE		THE CHAIN OF C	USTODY RECOR	RD. AN INCOMPLETE CH												v	White: BV Labs Yellow; Client

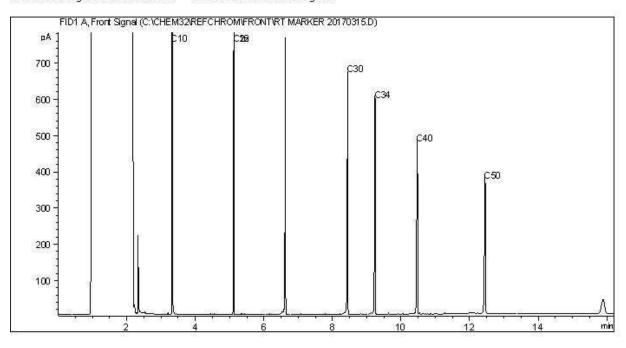
Bureau Veritas Canada (2019) Inc.

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-01

## **CCME Hydrocarbons (F2-F4 in water) Chromatogram**



Carbon Range Distribution - Reference Chromatogram

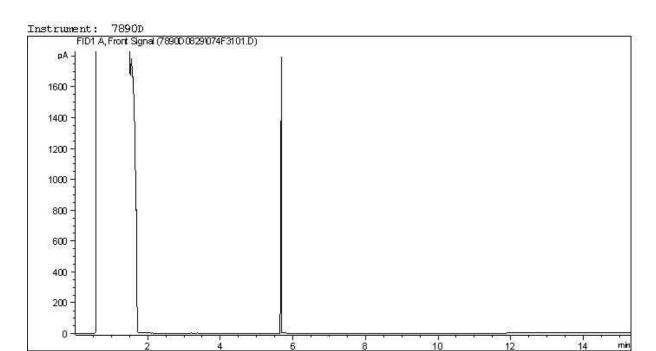


TYPICAL PRODUCT CARBON NUMBER RANGES

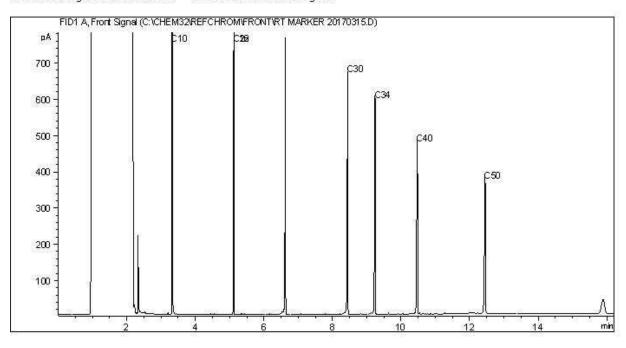
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-01

### CCME Hydrocarbons (F2-F4 in water) Chromatogram



Carbon Range Distribution - Reference Chromatogram

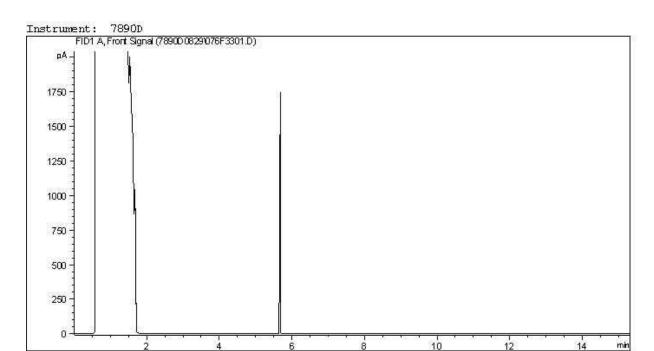


TYPICAL PRODUCT CARBON NUMBER RANGES

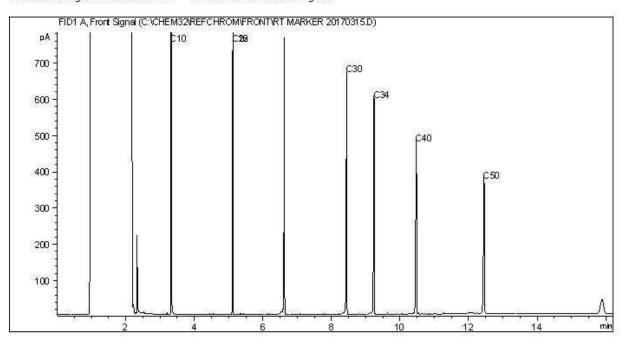
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Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-02

## CCME Hydrocarbons (F2-F4 in water) Chromatogram



Carbon Range Distribution - Reference Chromatogram

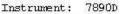


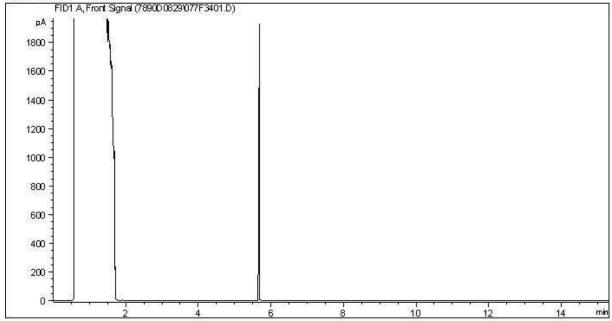
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	_	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	1	C60+

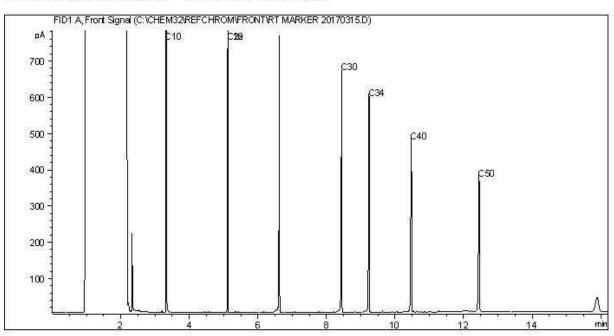
ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-03

**CCME Hydrocarbons (F2-F4 in water) Chromatogram** 





Carbon Range Distribution - Reference Chromatogram

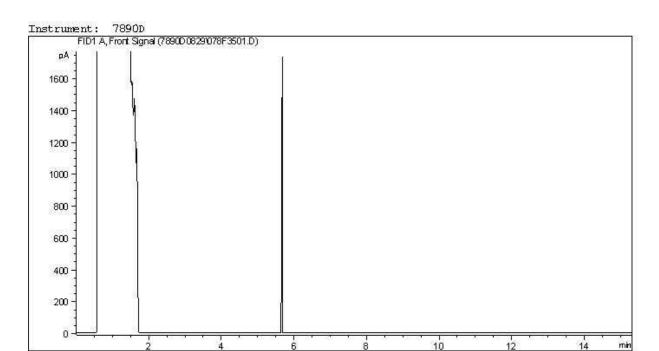


TYPICAL PRODUCT CARBON NUMBER RANGES

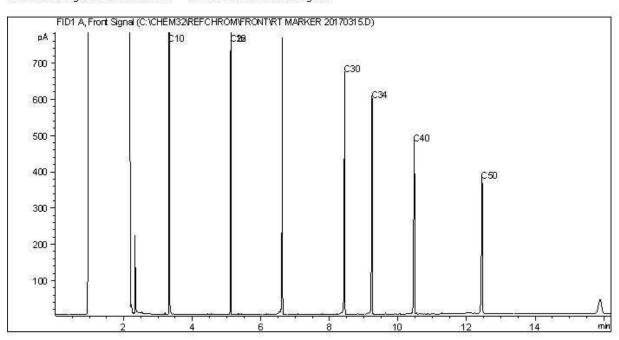
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	_	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	1	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-04

## **CCME Hydrocarbons (F2-F4 in water) Chromatogram**



Carbon Range Distribution - Reference Chromatogram



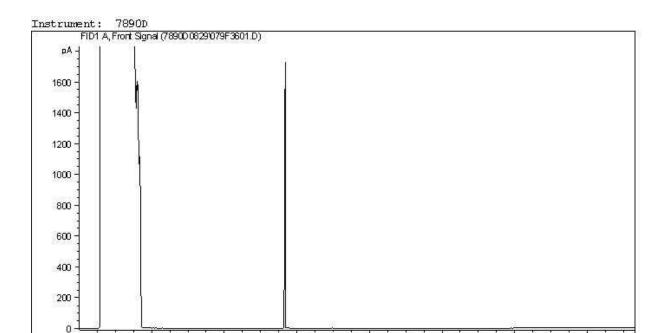
TYPICAL PRODUCT CARBON NUMBER RANGES

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Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

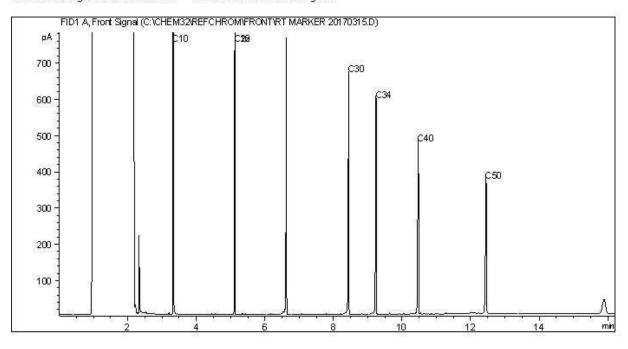
ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-09

10

## **CCME Hydrocarbons (F2-F4 in water) Chromatogram**



Carbon Range Distribution - Reference Chromatogram

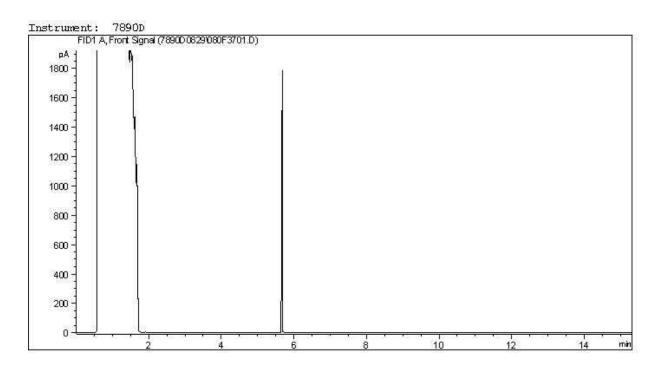


TYPICAL PRODUCT CARBON NUMBER RANGES

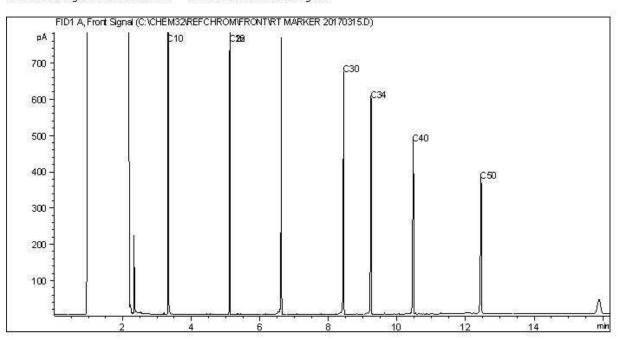
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-06

### CCME Hydrocarbons (F2-F4 in water) Chromatogram



Carbon Range Distribution - Reference Chromatogram

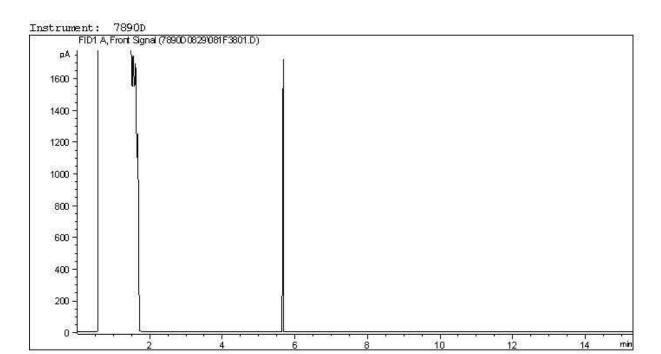


TYPICAL PRODUCT CARBON NUMBER RANGES

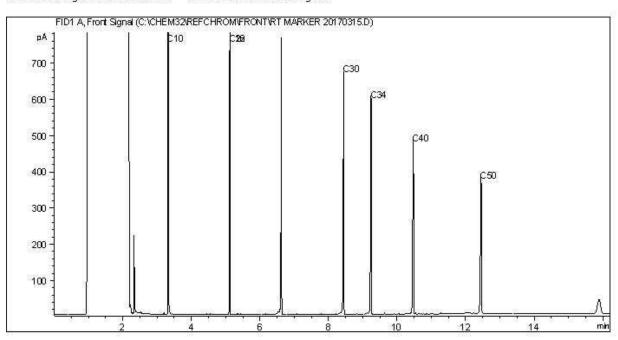
Gasoline:	C4	-	C12	Diesel:	cs -	C22
Varsol:	c8	$\equiv$	C12	Lubricating Oils:	c20 -	C40
Kerosene:	c7	=	C16	Crude Oils:	c3 -	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-07

## **CCME Hydrocarbons (F2-F4 in water) Chromatogram**



Carbon Range Distribution - Reference Chromatogram

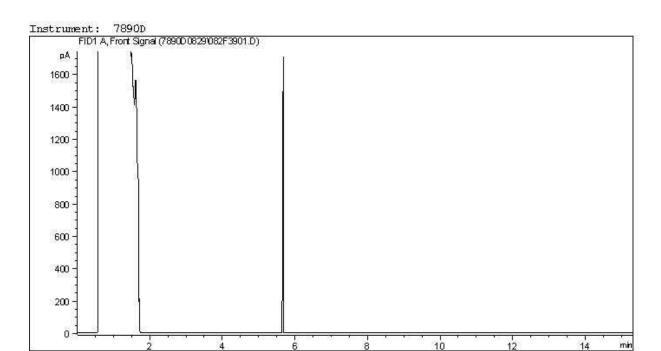


TYPICAL PRODUCT CARBON NUMBER RANGES

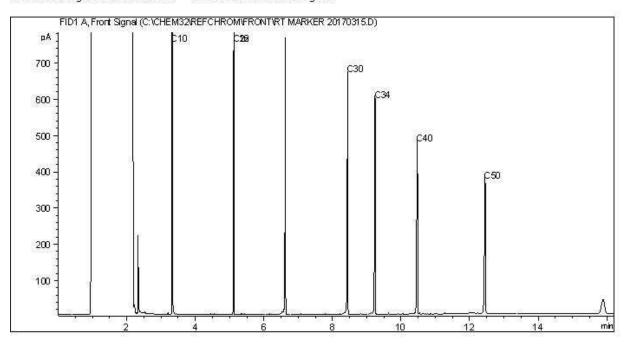
Gasoline:	C4		C12	Diesel:	c8	-	C22
Varsol:	c8	$= \frac{1}{2}$	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	_	C16	Crude Oils:	C3	1	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: MW-08

### CCME Hydrocarbons (F2-F4 in water) Chromatogram



Carbon Range Distribution - Reference Chromatogram

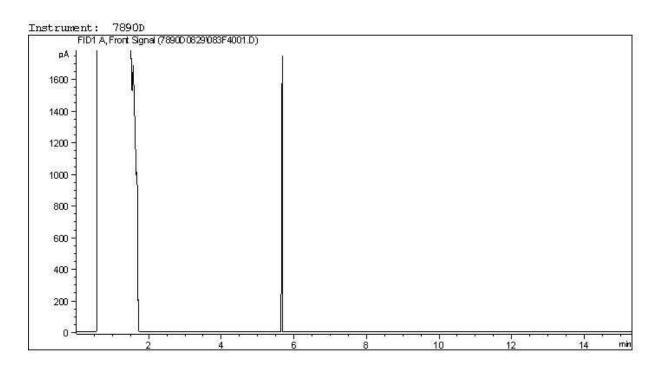


TYPICAL PRODUCT CARBON NUMBER RANGES

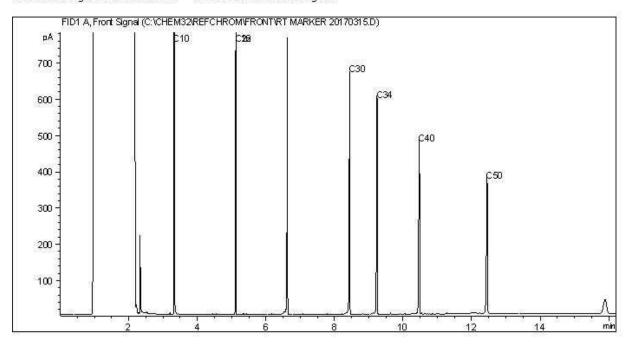
Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	_	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	1	C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: FIELD BLANK

### CCME Hydrocarbons (F2-F4 in water) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

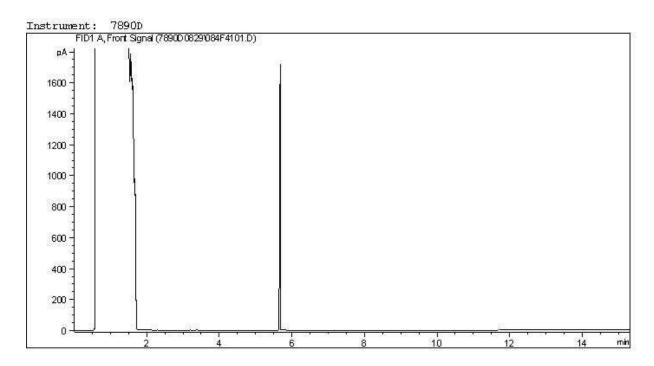
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

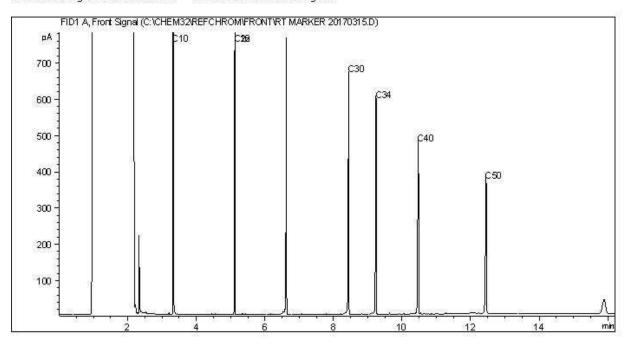
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: TRIP BLANK

### CCME Hydrocarbons (F2-F4 in water) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

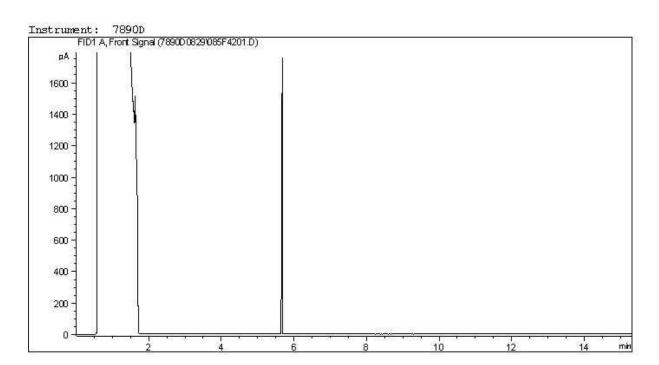
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

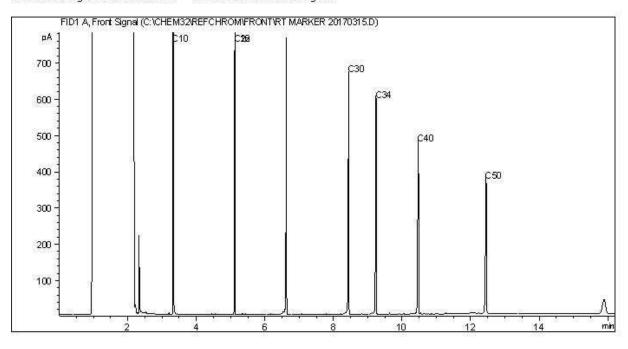
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: EQUIPMENT BLANK 1

### CCME Hydrocarbons (F2-F4 in water) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

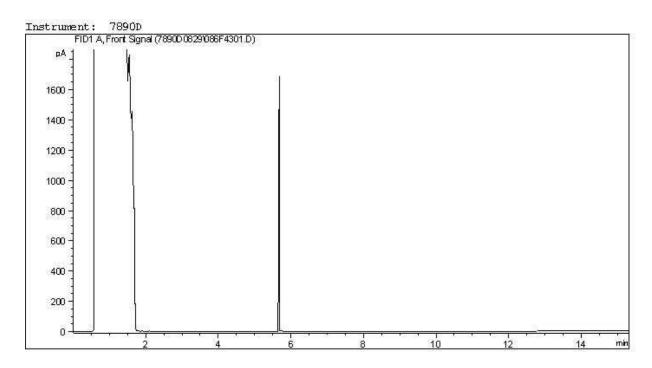
 Gasoline:
 C4 - C12
 Diesel:
 C8 - C22

 Varsol:
 C8 - C12
 Lubricating Oils:
 C20 - C40

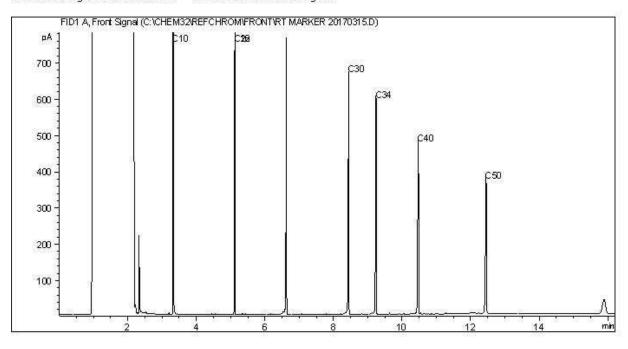
 Kerosene:
 C7 - C16
 Crude Oils:
 C3 - C60+

ARCADIS Canada Inc Client Project #: 30000251 Client ID: EQUIPMENT BLANK 2

## CCME Hydrocarbons (F2-F4 in water) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4	-	C12	Diesel:	c8	+	C22
Varsol:	c8	=	C12	Lubricating Oils:	C20		C40
Kerosene:	c7	$\equiv$	C16	Crude Oils:	c3	<u>- 1</u>	C60+

# **APPENDIX C**

**QA/QC Discussion of Results** 



#### QUALITY ASSURANCE/QUALITY CONTROL

A 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 ensure that sampling data and analytical results are complete, precise, representative and comparable.

Soil analyses were carried out by Bureau Veritas Laboratories (BV Labs, formerly Maxxam Analytics). The analysis of PHC and inorganic soil parameters listed above were conducted at BV Lab's facility in Edmonton, Alberta, while the analysis of PCB soil parameters were conducted at BV Lab's facility in Calgary, Alberta. Both Alberta laboratories are ISO 17025 certified. All results are presented in the table to this Appendix (Appendix C, Table 1 for soil and Table 2 for groundwater, and Table 3 for field, trip, and equipment blanks).

### SHIPPING AND TRANSPORTATION

Samples were kept in coolers and shipped to the BV's depot in Yellowknife, NT, within 24-hours after Arcadis field staff arrived back in Cambridge Bay, NU.

## **Sample Temperatures**

All BV Lab cooler temperatures were within the acceptable range of less than 10 degree Celsius.

## **Sample Holding Times**

Sample holding times were met for all samples except the Trip Blank sample. The Trip Blank sample was analyzed past the method specified hold time for BTEX/F1 in water. For more details refer to the discussion on the Trip Blank sample found in the 'Trip, Field, and Equipment Blanks' section of this report.

#### **Sample Containers**

All samples arrived in good condition and no breakages were reported. All soil and groundwater samples were collected in the sample containers both supplied and required by the project laboratory.

## **SAMPLING METHODOLOGIES**

#### Soil

Samples were collected from test pits that had been manually excavated with hand tools (pickaxe and stainless-steel shovel), which were decontaminated between locations using Alconox and distilled water. Each soil sample was collected in one laboratory supplied zip-top plastic bag, two

125 mL glass jars, and two 40 mL clear glass vials with methanol for preservation. All sample containers were pre-sterilized and supplied by the laboratory.

#### Groundwater

The purging and sampling of each monitoring well was completed using dedicated sampling equipment consisting of 6 mm diameter high density polyethylene (HDPE) tubing. Each well was purged and sampled using dedicated tubing supplies which were removed upon completion of sampling to prevent damage due to freezing. Other sampling equipment, such as the interface probe and the Horiba U-52 multi-parameter meter, were decontaminated between monitoring events using Alconox and distilled water.

## **Sample Preservation**

Soil samples for PHC F1 were preserved with methanol.

Groundwater samples for inorganics were not field preserved and were not field filtered, according to the TOR. Groundwater samples for PHCs were preserved with sodium bisulfate.

# SAMPLE METHOD DETECTION LIMITS (MDLS)

Arcadis made all attempts to meet every required DEW Line specific MDL, including contacting the contract laboratory and providing a copy of the TOR Annex I – Dew Line Clean-up for Soil and Minimum MDL Requirements during the bottle order process and again prior to the start of the program. In addition, Arcadis also included a printout of the Minimum MDL Requirements with the chains of custody in each cooler that accompanied the coolers to the contract laboratory. Furthermore, a note was added to each chain of custody stating that special MDLs were required. However, DEW Line Minimum MDLs were not met for all samples. Samples results with MDLs above the DEW Line Minimum MDLs are summaries below.

The MDLs for soil samples MW02A, MW-02B, P4-2A, P4-10A, P4-12A, P4-14A, P4-23A, P4-24A, P4-24B, and P4-25A were raised above the DEW Line Minimum MDLs for PHC F1 through F4 results due to the high moisture content of the samples (i.e., >50% moisture). In addition to the high moisture content, these samples contained a large amount of organic material (predominately peat) which resulted in PHC F3 concentrations that in many cases exceeded the PHC F3 'baseline plus three standard deviations' (BL+3SD) value. Although the raised MDLs on these samples for PHC F3 and F4 parameters were below their respective BL+3SD values, the MDLs for PHC F1 and F2 parameters exceeded their respective BL+3SD values. Furthermore, for many of these samples, PHC F1 and F2 concentrations were less than the raised MDLs. As such, these raised MDLs for PHC F1 and F2 parameters will likely impact the trend assessment

of the PHC F1 and F2 results at some of the site's landfills. Future interpretation of PHC F1 and F2 results should reference the raised MDLs as a potential source of bias.

The MDLs for soil samples MW-02A, MW-07A, MW-07B, MW-08A, MW-08B, MW-11A, P4-10A, P4-4B, P4-12A, P4-24A and P4-24B were raised for cadmium, cobalt, lead, and/or zinc results due to the sample's matrix; however, the raised MDLs of all six samples remained below the DEW Line Minimum MDLs. As such, these sample results should be considered as reliable.

The MDLs for soil samples MW02A, MW-02B, MW-05A, P4-2A, P4-10A, P4-12A, P4-14A, P4-14A, P4-16B, P4-23A, P4-24A, P4-24B, and P4-25A were raised for PCBs results due to the presence of high moisture content, dilution of the sample, or matrix interference; however, the raised MDLs of all 13 samples remained below the DEW Line Minimum MDLs. As such, these sample results should be considered as reliable.

## QA/QC RESULTS SAMPLE FOR FIELD DUPLICATES

All field duplicate samples were given IDs somewhat similar to the IDs used for all other samples in order to prevent the lab from knowing which samples were duplicates.

Blind field duplicates were obtained for at least 10% of the groundwater samples collected. However, duplicates were only obtained at a frequency of approximately 9% of the soil samples collected, due to an incorrect interpretation of the TOR QA/QC requirement

Sampling procedures and laboratory analytical precision are evaluated by calculating the relative percent difference (RPD) for a sample and duplicate pair according the following equation:

RPD = 
$$|X_1 - X_2|/X_{avg} \times 100$$
 where:  $x_1$  and  $x_1$  are the duplicate concentrations and  $x_{avg}$  is the mean of these two values.

The duplicate results were evaluated using criteria developed by Zeiner (1994), which draws from several data validation guidelines developed by the United States Environmental Protection Agency (USEPA).

RPDs are typically calculated only when both results are greater than 5x the laboratory Reliable Detection Limit (RDL) for each sample concentration. This alert criteria results in less uncertainty for concentrations that are very close to the RDL.

As discussed at the 2019 kick-off meeting, DND re-evaluated the acceptance criteria for field duplicates outlined in Section 1.2 in Annex K of the TOR. Accordingly, analyte RPDs less than 40% for water samples or less than 60% for soil samples were considered acceptable for the 2019 program.

Soil samples were compared against their respective duplicate samples. The following provides a summary of the duplicate analysis.

#### Soil

A total of six duplicate samples were collected and analyzed at the PIN-4 site. All calculable RPDs for all parent and duplicate soil samples were less than 60%. The analytical results are included in Table 1 in Appendix F following this text. It is Arcadis' opinion that the overall soil sample set should be considered reliable.

It should be noted that the RPD for many of the field duplicate data points were not calculated because one or both results were less than 5 x MDL or below the reportable detection limit. When the field duplicate sample and the parent sample had identical soil sample results, an RPD value was also not assigned.

Large relative percent difference numbers are often a result of low concentrations being measured and due to variation between samples likely due to heterogeneity of the substrate. The Arcadis field assessor alternated the placement of small amounts of sample into the primary and duplicated sampling jars; however, this does not guarantee equal allocation of sample, especially in gravel soils, making the collection of a true soil duplicate difficult. Small amounts of metal may have been collected with soil, despite the efforts to exclude debris by the field assessor.

Heterogeneity is common in surface soil samples and such surface samples results often have RPDs greater than 25%. Arcadis suspects that these discrepancies may also be a result of the use of the laboratory extraction method, which includes first drying the sample, then grinding the sample, and finally sieving the sample. The act of grinding the sample can create disproportionate amounts of metals based on the exact rock type present during the grinding process. The PIN-4 site is especially vulnerable to this, considering many of the collected samples were gravel with very coarse sand at best. A few selected photos are provided below as examples of the types of sample media encountered.

Photo 1 – Sample media at P4-1



Photo 2 – Sample media at MW-04



### Groundwater

One duplicate sample (MW-09) was submitted for groundwater at monitoring well MW-01. All analytes for the parent and duplicate groundwater sample reported RPDs less than 40%, as required under the TOR. The analytical results are included as Table 2 in Appendix C following this text. It is Arcadis' opinion that the overall groundwater sample set should be considered reliable and suitable for reference purposes.

# **Trip, Field, and Equipment Blanks**

One trip blank, one field blank, and two equipment blanks were collected as part of the 2019 QA/QC program. The analytical results are included as Table 3 in Appendix F following this text. The MDLs for all metal and PHC parameters associated with the four blank samples were below the DEW Line Minimum MDLs.

The field blank was collected in the field by transferring laboratory supplied water, guaranteed to be free of any organics and inorganics (based on analysis), into the appropriate laboratory supplied sampling containers.

Two sets of equipment blanks were collected. The first set (Equipment Blank 1) was collected by pumping laboratory-supplied reverse osmosis distilled (RODI) water, guaranteed to be free of any organic and inorganic contaminants (based on analysis), through new tubing from the same batch that was used to sample the groundwater wells and into laboratory supplied sample containers. The second set (Equipment Blank 2) was collected by pouring laboratory supplied RODI water over the stainless-steel shovel that was used to dig the test pits and allowing the water to drain into laboratory supplied sample containers.

### **Equipment Blank 1**

No detectable levels of the selected metals or PHC parameters were measured in Equipment Blank 1. As such, the groundwater sampling equipment and techniques employed at the site are not suspected to have impacted groundwater sample results.

## **Equipment Blank 2**

No detectable levels of the selected metals or PHC parameters were measured in Equipment Blank 2. As such, soil sampling equipment and techniques employed at the site are not suspected to have impacted soil sample results.

### Field Blank

No detectable levels of the selected metals or PHC parameters were measured in the Field Blank. As such, no form of contamination from bottles, collection methods, the site's atmosphere, or preservatives is suspected to have impacted sample results.

## **Trip Blank**

No detectable levels of the selected metals or PHCs parameters were measured in the Trip Blank. As such, no contamination from within the sample bottles or from volatile compounds is suspected to have impacted sample results. However, it should be noted that the Trip Blank sample was analyzed past the method specified hold time for BTEX/F1 in water which is set at 14 days. The trip blank was prepared by the laboratory on 12 August 2019. Due to the need for laboratory prepreparation, and the field delays encountered in getting to the PIN-4 site, and normal delays in the receipt of shipped samples at the Alberta laboratory, the inability to meet the required hold time on the trip blank was considered to be expected given the constraints of northern DEW Line field work.

## LABORATORY QA/QC REPORTING

Arcadis reviewed the internal laboratory QA/QC reporting presented in the Certificates of Analysis for both soil and groundwater samples. The following items of note were identified as part of this review.

- 1. The calculable RPDs for internal laboratory duplicates associated with PIN-4 soil samples were below the lab's quality control limit for all parameters except total chromium. The RPD for total chromium was calculated to be 54% which exceeded the lab's quality control limit of 30%. As noted previously, discrepancies between the concentration of inorganic parameters in parent and duplicate soil samples are often a result of the use the laboratory extraction method, which includes first drying the sample, then grinding the sample, and finally sieving of the sample. The act of grinding the sample can create disproportionate amounts of metals based on the exact rock type present during the grinding process.
- 2. All calculable RPDs for the internal laboratory duplicate associated with PIN-4 groundwater samples were below the laboratory QC limits of 20% and 30% for organic and inorganic parameters respectively.
- 3. The matrix spike recovery associated with total chromium for soil sample MW-08B (126%) exceeded the lab's quality control limit of 125%. The cause of the exceedance was likely due to matrix interference. All other results for the laboratory matrix spikes, spiked blanks,

and method blanks were within laboratory QC limits for both soil and groundwater sample batches.

Based on these findings, the internal laboratory QA/QC conducted was deemed acceptable by Arcadis.

## LABORATORY ACCREDITATION

The Scope of Accreditation certificates for both BV Labs analytical Calgary and Edmonton laboratories (as issued by the Standards Council of Canada), which were used to analyze samples obtained following from our 2019 PIN-4 field work are located in Appendix F3. Soil samples for PHCs and Inorganics were analyzed at the Edmonton BV facility while PCB analyses was conducted at the Calgary BV facility. Groundwater samples were analyzed at the Edmonton BV facility. All are ISO 17025 certified laboratories.

### CONCLUSION

Overall, the results of the quality assurance and quality control measures are considered acceptable and generally fall within the DEW Line criteria outline in the TOR Annex K. As such, Arcadis concluded that both the groundwater and soil data sets should be considered reliable and appropriate for reference purpose

# **APPENDIX C1**

**QA/QC Tables** 

Table 1: Summary of 2019 Soil Duplicate Analytical Data

Control   Cont						Summary	of 2019 S	oil Duplica	ate Analyt	ical Data							
DEW Line MDLs  ## MDL (BV Labs)  ## MDL (BV Labs	Sample ID	Location	Year	Depth	As	Cd	Cr	Со	Cu	Pb	Ni	Zn	PCBs				F4 C <sub>16</sub> -C <sub>34</sub>
MDL (8V Labs) Background  1.0 0.1-0.05 1.0 1.0-0.5 1.0 1.0-0.5 1.0 1.0 0.01-0.05 70-21 3.0-10 6.4-21 4 Background  1.5 1.0 2.0.0 5.0 19.0 10.0 9.2 16.1 0.10 N/A N/A N/A N/A  P4-28B (Dup) P4-28B (Dup) P4-29 P4-28B (Dup) P4-29 P4-28B (Dup) P4-29 P4				(cm)	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]
Background  P4-2B P4-2B P4-2B (Dup) R4-26B (Dup) Aceptable (Y/N)  P4-12A  P4-12A  P4-12A  P4-12A  P4-12A  P4-12A  P4-12A  P4-12A  Aceptable (Y/N)  P4-12  2019 P4-12A  RW-05A  RW-01A  RW-09A (Dup)  RW-09A  RW-09A  RW-09A  RW-09A  RW-09A  RW-09A  RW-09A  RW-09A  RWW-09A  RWW	DEW Line MDLs		_i		1	0.5	1	1	1	1	1	1	0.05	7	4	8	6
P4-2B P4-2B (Dup) P4-2 P4-2B (Dup) P4-12A (Dup) P4-2A (Dup) P4-2B		 	_l	<u> </u> 	1.0	0.1-0.05	1.0	1.0-0.5	1.0	1.0-0.5	1.0	1.0	0.01-0.05	7.0-21	3.0-10	6.4-21	4.7-15
P4-26B (Dup) RPD (Parent and Dup) Aceptable (Y/N)  P4-12A  P4-	Background	! !			1.5	1.0	20.0	5.0	19.0	10.0	9.2	16.1	0.10	N/A	N/A	N/A	N/A
P4-26B (Dup) RPD (Parent and Dup) Aceptable (Y/N)  P4-12A  P4-																	
RPD (Parent and Dup) Aceptable (Y/N)  P4-12A P4-12A P4-25A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-05A MW-01A RPD (Parent and Dup) Aceptable (Y/N)  MW-01A MW-01A MW-09A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-01A RPD (Parent and Dup) Aceptable (Y/N) Aceptable (Y/N) Aceptable (	P4-2B	<u>į</u>	ļ		2.7	<0.050	15.0	5.3	9.5	5.0	9.2	14.0	<0.01	<7.0	<4.0	9	<6.0
RPD (Parent and Dup) Aceptable (Y/N)  P4-12A  P4-12A  P4-12A  RPD (Parent and Dup) Aceptable (Y/N)  P4-12A  RPD (Parent and Dup) Aceptable (Y/N)  P4-12A  RPD (Parent and Dup) Aceptable (Y/N)  MW-05A  MW-01A  MW-01A  MW-01A  MW-09A (Dup)  MW-01  MW	P4-26B (Dup)	P4-2	2019	40-50	2.1	<0.050	17.0	5.7	10.0	4.7	11.0	17.0	<0.01	7.4	<3.0	21.0	5.1
P4-12A P4-25A (Dup) P4-25A (Dup) P4-12 P4-12A P4-25A (Dup) P4-12A P4-25A (Dup) P4-12 P4-12A P4-25A (Dup) P4-12 P4-12A P4-25A (Dup) P4-12 P4-12A P4-12A P4-25A (Dup) P4-12 P4-12A P4-25A (Dup) P4-12 P4-12A P4	RPD (Parent and Dup)	4	20.0	.0 00		i	12.5%	7.3%	5.1%	6.2%	17.8%	19.4%		i i	 		
P4-25 (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-05A  MW-05A  RPD (Parent and Dup) Aceptable (Y/N)  MW-01A  MW-01A  MW-01A  RPD (Parent and Dup)  MW-01A  RPD (Parent and Dup)  Aceptable (Y/N)  MW-01  RPD (Parent and Dup)  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  Aceptable	Aceptable (Y/N)				Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
P4-25 (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-05A  MW-05A  RPD (Parent and Dup) Aceptable (Y/N)  MW-01A  MW-01A  MW-01A  RPD (Parent and Dup)  MW-01A  RPD (Parent and Dup)  Aceptable (Y/N)  MW-01  RPD (Parent and Dup)  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  Aceptable																	
RPD (Parent and Dup) Aceptable (Y/N)  MW-05A  MW-05A  RPD (Parent and Dup) Aceptable (Y/N)  MW-05A  MW-01A  MW-01A  MW-01A  MW-01A  RPD (Parent and Dup) Aceptable (Y/N)  MW-01A  MW-01A  MW-01A  RPD (Parent and Dup) Aceptable (Y/N)  MW-01A  MW-01A  MW-01A  MW-01A  Aceptable (Y/N)  MW-01A  MW-01	P4-12A		į	ļ !	1.30	0.130	4.0	1.9	12.0	3.3	3.5	13.0	<0.02	<21	<10	90	<15
RPD (Parent and Dup) Aceptable (Y/N)  MW-05A  MW-05A  RPD (Parent and Dup) Aceptable (Y/N)  MW-05A  MW-01A  MW-09A (Dup)  Aceptable (Y/N)  MW-01A  RPD (Parent and Dup) Aceptable (Y/N)  MW-01A  RPD (Parent and Dup) Aceptable (Y/N)  MW-01A  MW-09A (Dup)  Aceptable (Y/N)  MW-01A  RPD (Parent and Dup) Aceptable (Y/N)  MW-01A  MW-09A (Dup)  Aceptable (Y/N)  MW-01A  MW-09A (Dup)  Aceptable (Y/N)  MW-01A  MW-09A (Dup)  Aceptable (Y/N)  MW-01A  MW-01	P4-25A (Dup)	D4-12	2010	0-15	1.30	0.099	4.5	1.7	7.4	3.5	3.4	10.0	<0.02	<16	<6.4	130	26.0
MW-05A MW-11A (Dup) RPD (Parent and Dup)  MW-01A MW-09A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-01  MW-01  Aceptable (Y/N)  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  Aceptable	RPD (Parent and Dup)	F 4-12	P4-12 2019	0-13					47.4%	5.9%		26.1%				36.4%	
MW-11A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-01A MW-09A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-01  RPD (Parent and Dup)  MW-01  MW-01  RPD (Parent and Dup)  MW-01  Aceptable (Y/N)  MW-01  RPD (Parent and Dup)  Aceptable (Y/N)  MW-01  RPD (Parent and Dup)  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  MW-01  MW-0	Aceptable (Y/N)		į		Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
MW-11A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-01A MW-09A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-01  RPD (Parent and Dup)  MW-01  MW-01  RPD (Parent and Dup)  MW-01  Aceptable (Y/N)  MW-01  RPD (Parent and Dup)  Aceptable (Y/N)  MW-01  RPD (Parent and Dup)  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  MW-01  MW-0																	
MW-05   2019   0-15       3.6%   5.4%   9.5%     11.9%   21.3%	MW-05A		-		1.6	0.058	8.2	3.6	10.0	12.0	6.3	26.0	0.150	<7.0	<4.0	18	<6.0
RPD (Parent and Dup) Aceptable (Y/N)  MW-01A  MW-09A (Dup)  RPD (Parent and Dup) Aceptable (Y/N)  MW-01Y  Aceptable (Y/N)  MW-01Y  Aceptable (Y/N)  MW-01A  RPD (Parent and Dup) Aceptable (Y/N)  MW-01A  MW-01A  MW-01A  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  Aceptable (Y/N)  MW-01  Aceptable (Y/N)  Aceptable (Y/	MW-11A (Dup)	M\V-05	2010	0-15	1.9	0.053	8.5	3.8	11.0	12.0	7.1	21.0	0.020	<7.0	<4.0	12	<6.0
MW-01A MW-09A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-01	RPD (Parent and Dup)	ivivv-05	2019	0-13			3.6%	5.4%	9.5%		11.9%	21.3%					
MW-09A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-01  ACEPTABLE (Y/N)  MW-01  ACEPTABLE (Y/N)  MW-01  ACEPTABLE (Y/N)  MW-01  ACEPTABLE (Y/N)  ACEPTABLE (Y	Aceptable (Y/N)				Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
MW-09A (Dup) RPD (Parent and Dup) Aceptable (Y/N)  MW-01  ACEPTABLE (Y/N)  MW-01  ACEPTABLE (Y/N)  MW-01  ACEPTABLE (Y/N)  MW-01  ACEPTABLE (Y/N)  ACEPTABLE (Y																	
Aceptable (Y/N)  MW-01  2019  0-15  2.5% 31.6% 22.2%	MW-01A	İ	į	i !	2.2	<0.050	12.0	7.8	33.0	4.5	12.0	26.0	<0.01	<7.0	<4.0	24	<6.0
RPD (Parent and Dup)            2.5%         31.6%         22.2%  <	MW-09A (Dup)	NNV 04 0040	0.15	2.1	<0.050	12.0	8.0	24.0	3.6	12.0	26.0	<0.01	<7.0	<4.0	20	<6.0	
	RPD (Parent and Dup)	MW-01 2019	0-15		ļ		2.5%	31.6%	22.2%								
	Aceptable (Y/N)	† ! !	ļ	i !	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
MW-04A       1.6   <0.050   10.0   6.0   19.0   2.5   9.3   18.0   <0.01   <7.0   3.1   23	MW-04A				1.6	<0.050	10.0	6.0	19.0	2.5	9.3	18.0	<0.01	<7.0	3.1	23	8.0
MW-10A (Dup)  NAM 04 2010 0.45 1.8 <0.050 11.0 6.9 19.0 2.8 11.0 20.0 <0.01 <7.0 <4.0 31	MW-10A (Dup)		0.15	1.8	<0.050	11.0	6.9	19.0	2.8	11.0	20.0	<0.01	<7.0	<4.0	31	<6.0	
RPD (Parent and Dup)	RPD (Parent and Dup)	MW-04 2019	U-15			9.5%	14.0%		11.3%	16.7%	10.5%						
Aceptable (Y/N)				 	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ

Arcadis Canada 1 of 2

Table 1: Summary of 2019 Soil Duplicate Analytical Data

					Summary	of 2019 S	oil Duplica	ate Analyti	ical Data							
Sample ID	Location	Year	Depth	As	Cd	Cr	Со	Cu	Pb	Ni	Zn	PCBs	F1 C <sub>6</sub> -C <sub>10</sub>	F2 C <sub>10</sub> -C <sub>16</sub>	F3 C <sub>16</sub> -C <sub>34</sub>	F4 C <sub>16</sub> -C <sub>34</sub>
			(cm)	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]
DEW Line MDLs			<u> </u>	1	0.5	1	1	1	1	1	1	0.05	7	4	8	6
MDL (BV Labs)				1.0	0.1-0.05	1.0	1.0-0.5	1.0	1.0-0.5	1.0	1.0	0.01-0.05	7.0-21	3.0-10	6.4-21	4.7-15
P4-22A				1.7	<0.050	10.0	5.9	13.0	2.7	8.7	15.0	<0.01	<7.0	<3.0	11	<4.7
P4-27A (Dup)	P4-22	2019	0.15	1.7	<0.050	10.0	6.4	14.0	3.0	9.2	16.0	<0.01	<7.0	<4.0	16	<6.0
RPD (Parent and Dup)	P4-22		0-15				8.1%	7.4%	10.5%	5.6%	6.5%					
Aceptable (Y/N)				Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ

#### Notes:

- -- Not calculated (nc) meets criteria (note that RPDs calculated only when both samples are greater than 5x MDL)
- Y Meets criteria (RPD <60% for soil)
- N Does not meet criteria

Table 2: Summary of 2019 Groundwater Duplicate Analytical Data

		Summary of 2019 Groundwater Duplicate Analytical Data														
Sample ID	Location	Year	As	Cd	Cr	Со	Cu	Pb	Ni	Zn	F1 C <sub>6</sub> -C <sub>10</sub>	F2 C <sub>10</sub> -C <sub>16</sub>	F3 C <sub>16</sub> -C <sub>34</sub>	F4 C <sub>16</sub> -C <sub>34</sub>		
			[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]		
DEW Line MDLs			0.001	0.0001	0.001	0.0005	0.005	0.0001	0.001	0.001	0.025	0.1	0.1	0.1		
MDL (BV Labs)			0.00020	0.000020	0.0010	0.00030	0.00020	0.00010	0.00050	0.0030	0.025	0.1	0.1	0.1		
MW-01			0.00054	0.000048	0.0210	0.0007	0.0047	0.0002	0.1200	0.0240	0.035	<0.10	<0.10	<0.10		
MW-09 (Dup)	MW-01	2019	0.00045	0.000042	0.0180	0.0007	0.0051	0.0001	0.1100	0.0240	<0.025	<0.10	<0.10	<0.10		
RPD (Parent and Dup)	10100-01	2019			15.4%		8.2%		8.7%							
Aceptable (Y/N)			Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ		

#### Notes:

Arcadis Canada 1 of 1

<sup>--</sup> Not calculated (nc) - meets criteria (note that RPDs calculated only when both samples are greater than 5x MDL)

Y Meets criteria (RPD <40% for groundwater)

Table 3: Field, Trip, and Equipment Blanks QA/QC Comparison

			5	Summary o	f 2019 Field,	Trip and Eq	uipment E	Blanks					
Sample ID	Year	As	Cd	Cr	Со	Cu	Pb	Ni	Zn	F1 C <sub>6</sub> -C <sub>10</sub>	F2 C <sub>10</sub> -C <sub>16</sub>	F3 C <sub>16</sub> -C <sub>34</sub>	F4 C <sub>16</sub> -C <sub>34</sub>
		[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]
DEW Line MDLs		0.001	0.0001	0.001	0.0005	0.005	0.0001	0.001	0.001	0.025	0.1	0.1	0.1
MDL (BV Labs)		0.00020	0.000020	0.0010	0.00030	0.00020	0.00010	0.00050	0.0030	0.025	0.1	0.1	0.1
Aceptable? (Y/N)		Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
Field, Trip and Equipme	nt Blank	Analyses -	BV Labs										
Field Blank		<0.00020	<0.000020	<0.0010	<0.00030	<0.00020	<0.00010	<0.00050	<0.0030	<0.025	<0.10	<0.10	<0.10
Aceptable? (Y/N)		Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
Trip Blank		<0.00020	<0.000020	<0.0010	<0.00030	<0.00020	<0.00010	<0.00050	<0.0030	<0.025	<0.10	<0.10	<0.10
Aceptable? (Y/N)	2019	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
Equipment Blank 1	2019	<0.00020	<0.000020	<0.0010	<0.00030	<0.00020	<0.00010	<0.00050	<0.0030	<0.025	<0.10	<0.10	<0.10
Aceptable? (Y/N)		Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
Equipment Blank 2		<0.00020	<0.000020	<0.0010	<0.00030	<0.00020	<0.00010	<0.00050	<0.0030	<0.025	<0.10	<0.10	<0.10
Aceptable? (Y/N)		Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ

#### Notes:

- -- Not calculated meets criteira
- Y Meets criteria
- N Does not meet criteria

Arcadis Canada 1 of 1

# **APPENDIX C2**

**Chains of Custody** 

(AUVE)														Page I of 7
		Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Canada T	2E 6P8 Tel (403) 291-	3077 Toll-free:800-563	3-6266 Fax:(	(403) 291-	9468 www.bvla	abs.com			СН	AIN OF CUST	TODY RECORD	
VERITAS.					REPOR	T TO:				PROJECT INFORMATION	V:		Laboratory Use C	nly:
		INVOICE TO:		ame: SAME A	A.S-41.0-01.	E.B. (12-12-12)	NETO	, ) !	Ouotation #:	B60371			BV Labs Job #:	Bottle Order #:
Company Name: Atterition:	#3269 ARCAD	DIS Canada Inc	Company Na Attention:	ame: SAPVE F	75 )	17000	710.0 10		P.O. #:	30000251		_ B9	171727	591565
Address:	1050 Morrison I		Address:	19-11-1					Project:	30000251			COC #:	Project Manager:
	Ottawa ON K2H		<u> </u>	-			ax:		Project Name:	PIN-4		1000		Parminder Virk
Tel:	(613) 721-0555 Jacob.Holden@		Tel:	TROY, A	USTRI			DISICON		ELLIOTT HO	CLDEN		C#591565-02-01	raminder virk
Email:	Jacob. Holderig	Jaroudiciosiii		cial Instructions		1 1			SIS REQUESTED (PLE	EASE BE SPECIFIC)			Turnaround Time (TAT) Red	uired:
Regulatory Ci	iteria:	HE LAB FOR REQUIRED !	METALS: 0	NLT REPOR	ET			5					Please provide advance notice for ru	sh projects
		PER THE ATTACHED FORT.  P. VIRK IFTHERE FOR AUESTICALS  UG MDLS				Itered ? ( Y / N )	(NO BETX	CC CC				Standard TAT = 5- Please note: Standa details	Rush TAT is not specified): -7 Working days for most tests lard TAT for certain tests are > 5 days - c	
		-			70 III II I	Field Filtere	7	35				Job Specific Rush Date Required: Rush Confirmation No		
	SAMPLES MUST BE K	KEPT COOL ( < 10°C ) FROM TIME OF SAMP	LING UNTIL DELIVER	Y TO BV LABS		Metals	1-	7000				# of Bottles	Comments	all lab for #)
Samp	le Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Me	正. 2	UN LU					COMMENTS	
1		MW-01A	19/08/21	13:00	5		$\times$ >	$\langle \times \rangle$				5		
2		MW-013	19/08/21	13:00	5		$\times$ >	$\times \times$				5	Received in Ye	ellowknife
3		MW-02A	19/08/21	14100	5		$\times$	$\times \times$				5	By: J. Mexco	10:30 AN
4		MW-02B	19/08/21	14:00	5		$\times$					5	AUG 27	
5		MW-03A	19/08/21	15:00	S		$\times$	$<$ $\times$				5		
6		MW-03B	19/08/21	15:00	S		×>	$\times \times$				5	Temp: AC	1 R /
7	100	MW-04A	19/08/2	4	5		$\times$	$\times$				5		
8		MW-G4B	19/08/21	16:00	5		$\times$	$\times$				5		

\*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BY LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BYLABS.COM/TERMS-AND-CONDITIONS.

RECEIVED BY: (Signature/Print)

S

6

White: BV Labs

Yes

Custody Seal Intact on Cooler?

No

5

5

Temperature (°C) on Receipt

see ACTR

# iars used and

not submitted

Time

50.00

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Date: (YY/MM/DD)

19/05/25

19/08/21

10:00

13:20

\*\* ALL SAMPLES ARE HELD FOR 50 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

MW-09A

\* RELINQUISHED BY: (Signature/Print)

ELLIOT HOLDEN

Bureau Veritas Canada (2019) Inc.

Date: (YY/MM/DD)

S0190858

BU REAU VERITAS	Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Canad	da T2E 6P8 Tel:(403) 291-3	3077 Toll-free:800-56:	3-6266 Fax:(40	03) 291-9468	3 www.bvlabs.co	om					CHAIN (	F CUSTODY RECORD	Page 2 of 7
VERITAS	INVOICE TO:			REPORT	TO:	===			PR	ROJECT INFOR	MATION:		Laboratory Use	Only:
Company Name: #3269 A	RCADIS Canada Inc	Company Na	me: SAM	E AS	PAG	たし		Quotation #:		B 60 3	371		BV Labs Job #:	Bottle Order #:
Attention: Elliott Ho		Attention:						P.O. #:					B971727	
Address: 1050 Mo	rison Drive Suite 201	Address:						Project:	3	30000251				591565
	N K2H 8K7		(Assessment)					Project Name:	-	PIN-4			COC #:	Project Manager:
100	-0555 Ext: 237 Fax: (613) 721-00		41111	uguayann <del>a</del>	Fax: _	NI=1011-1-1110		Site #:	-		HCLDEN	,	C#591565-03-01	Parminder Virk
Email: Jacob.Ho	olden@arcadis.com	Email:			-			Sampled By:			HELDEK	1	Parameter Recommended and	1
Regulatory Criteria:		Spec	ial Instructions				ANALY	SIS REQUESTED (PI	LEASE BE	E SPECIFIC)		15050000	Turnaround Time (TAT) R  Please provide advance notice for	
☐ ATI 5.7	LME AS PAGE!	SAME A	S PAGE	1	ed ?(Y/N)	METALS						(will be Standar Please r details	(Standard) TAT: spplied if Rush TAT is not specified): I TAT = 5-7 Working days for most tests vote: Standard TAT for certain tests are > 5 days	- contact your Project Manager for
SAMPLES MU	SAMPLES MUST BE KEPT COOL ( < 10°C ) FROM TIME OF SAMPLE		TO BV LABS		Ils Field Filtered		CBS					Date Re	ecific Rush TAT (if applies to entire submiss quired: nfirmation Number:	(call lab for #)
Sample Barcode Lab		Date Sampled	Time Sampled	Matrix	Metals $\mathcal{F}$	Total Cart	0					# of Bot	les Commen	ts
1	P4-6A	19/08/22	8:40	5	>	< X	X					5		
2	P4-6B	19/08/22	8:40	S	<b>&gt;</b>	X	X					5		
3	P4-7A	19/08/22	9:20	S	$\rightarrow$	$\langle \times \rangle$	X					5	By: J. MEZ	e1rDJ 10:32 M
4	P4-7B	19/08/22	9:20	S	X	$\langle \times \rangle$	$\times$					5	A 117 /	
5	P4-8A	19/08/22	10:00	S	>	$\langle \times \rangle$	X					5		
6	P4-83	19/08/22	10:00	S	>	$\langle \times \rangle$	X					5	TOHID: /	/T/2 /
7	P4-9A	19/08/22	10:40	5	\ \ \ \ \ \	$\langle X$	$\times$					5		· · ·
8	P4-9B	19/08/22	10:40	S	>	$\langle X \rangle$	X					5		
9	P4-10A	19/08/22	11:10	S	$\geq$	$\langle X$	$\times$					5		
10	P4-10B	19/08/22	11:10	5	$ \rangle$	$\langle \times$	$\times$					5		
* RELINQUISE	HED BY: (Signature/Print) Date	e: (YY/MM/DD) Tim	e g		D BY: (Sign			Date: (YY/MM		Time	# jars used and not submitted	Time Sensitive	Laboratory Use Only	Custody Seal latest as Cooler?

Bureau Veritas Canada (2019) Inc.

85809105

20:00

Temperature (°C) on Receipt

Custody Seal Intact on Cooler?

White: BV Labs

No.

Yellow: Client

\*\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BY LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BYLABS.COM/TERMS-AND-CONDITIONS.
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34 ELLIGHT HOLDEN

19/08/25

" ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

10:00

		Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Can	ada T2E 6P8 Tel:(403	291-3077	Toll-free:800-563-	6266 Fax:(403	3) 291-9	1468 www.b	ovlabs.com	100						CHAIN OF (	CUSTODY RECORD	Pa	age3of 7
BUREAU VERITAS		NVOICE TO:				REPORT T	0:		_			F	ROJECT INFO	ORMATION:			Laboratory Us	e Only:	
	#2000 ADCAD	CONTROL CO.	Comps	ny Name:	SAM	E A5	F	746	E		Quotation	#:	13603	371			BV Labs Job #:	Bottle (	Order #:
Company Name: Attention:	Elliott Holden	10 Ouridad III0	Attenti								P.O. #:				allemistella mutate		B971727	591	
Address.	1050 Morrison E		Addres	s:							Project:		30000251				COC#:	Project I	
	Ottawa ON K2H	I 8K7 Ext: 237 <sub>Fax:</sub> (613) 721-0	0029 Tel:			in the PONITION OF	E-	ax:			Project N Site #:	ame:	PIN-4					Parmin	der Virk
Tel: Email:	Jacob.Holden@		Email:				'	ш			Sampled	Ву:	ELLIG	T H	OLDEN		C#591565-04-01		
	-			Special In	nstructions					ANAL	YSIS REQUEST	ED (PLEASE	BE SPECIFIC)				Turnaround Time (TAT)		
Regulatory C ATI COM	SAME	AS PAGE	SAME	_ <u>\</u>	S PAGE	Ţ		+	DC5	S						(will be appl Standard TA Please note details Job Specifi	Please provide advance notice for andard) TAT: iled if Rush TAT is not specified): AT = 5-7 Working days for most tests Standard TAT for certain tests are > 5 day ic Rush TAT (if applies to entire submi	s - contact your Proj	ect Manager for
		EPT COOL ( < 10°C ) FROM TIME OF S	NAME OF THE OWNER.	NEW COLUMN	BV LABS	Matrix	S Field	アニア	MET	PCB						Date Requirements Rush Confirm	red: nation Number: Comme	(call lab for #)	
Sam	ple Barcode Label	Sample (Location) Identification	19/08		11:40	S	-	× ·	$\times$	X						5			
1						S	_	<del>\</del>	X.	$\times$						5			
2		P4-11 B	19/08/	-	11:40		-/									5	Received in	ellowknife	9
3		P4-12 A	19/08/	22	12:40	5	/			$\rightarrow$						_	By: J. MER	CITYI	:30 Am
4		P4-12 B	19/08	22	12:40	5		$\times$	$\times$	$\times$						5	17 to 20 "		( 5 V)
5		P4-25A	19/08	22	13:00	5		$\times$	$\times$	$\times$						5	AUG 27	2019	
6		P4-1A	19/08	122	13:30	5		X	X	X						5		in.	
ь						5	- /-			X						5	Temp: A(	TR	
7		P4-1 B	19/08		13:30		-									5			
8		P4-2A	19/08		14:00	5	-		X	$\langle \cdot \rangle$				_					
9		P4-2B	19/08	22	14:00	5		$\times$	$\times$	X						5			
10		P4-26B	19/08	122	14:20	5		$\times$	$\times$	$\times$						5			
	* RELINQUISHED BY	: (Signature/Print)	Date: (YY/MM/DD)	Time	1711			Signature/				YY/MM/DD)	Time	not an	sed and bmitted	Time Sensitive	Laboratory Use Only Temperature (°C) on Receipt		ntact on Cooler?
24	ECCIOT	HELDEN 19	9/08/25/	0:00	100	0 3	رد	ICA C	EE		2010	0858	04.02	-			See ACTIZ	Yes	☐ No
WWW.BVLABS.	COM/TERMS-AND-CONDIT	RITING, WORK SUBMITTED ON THIS CHAIN IONS. INQUISHER TO ENSURE THE ACCURACY O S AFTER SAMPLE RECEIPT, FOR SPECIAL R	F THE CHAIN OF CUSTOR	Y RECORD	. AN INCOMPLETE CH	AS AND CONDIT	IONS, SI	IGNING OF T	THIS CHAIN	OF CUSTO	DDY DOCUMENT I	S ACKNOWLED	GMENT AND ACC	CEPTANCE O	F OUR TERMS	WHICH ARE AVAIL	LABLE FOR VIEWING AT	White; BV Labs	Yellow: Client

Bureau Veritas Canada (2019) Inc.

BUREAU VERITAS	Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Canada	1 T2E 6P8 Tel:(40	03) 291-307	77 Toll-free:800-563	3-6266 Fax (	(403) 2	91-9468 w	ww.bviabs.	com							CHAII	N OF	CUSTODY RECORD	Page Hof 7
M. A.SILIA. A.S. M.	INVOICE TO:				REPOR	T TO:						F	ROJECT	INFORMA	TION:		1	Laboratory Use (	Only:
Company Name: #3269 A	RCADIS Canada Inc	Com	npany Name	5AME	AS	F	ZAG	E 1			Ouotation #:		B 60	037	- \			BV Labs Job #:	Bottle Order #:
Attention: Elliott Ho			ntion:	-							P.O. #:							B971727	
Mudicas.	rison Drive Suite 201 N K2H 8K7	Addr	ress:								Project:		300002	51			-	COC#:	591565
(040) 704	-0555 Ext: 237 Fax: (613) 721-002	9					-				Project Name:		PIN-4				+-		Project Manager:
101.	Iden@arcadis.com	Tel:		300-000-000-000-00			_ Fax:				Site #: Sampled By:		<u> </u>	CTT	HOLI	シミハ		C#591565-05-01	Parminder Virk
Regulatory Criteria:			Special	Instructions		1	1		ANA	ALYSIS R	EQUESTED (	PLEASE	BE SPECIF	FIC)		1		Turnaround Time (TAT) Red	quired:
Other	TBE KEPT COOL (< 10°C) FROM TIME OF SAM		ELIVERY TO		E	Metals Field Filtered ? ( Y / N )	F1-F4	METALS	PCBs							(will Starr Plea deta Job Date Rush	be apple ndard TA ase note: iils Specifi e Requir	ation Number:	contact your Project Manager for
1	P4-3A	19/08	122	14:40	5		×	X	X								5		
2	P4-3B	19/08	122	14:40	5		X	X	X								5	B	(-IIIIII
3	P4-4A	19/08		15:20	5		X	X	X								5	Received in Y	
4	P4-4B	19/08	122	15:20	5		X	X	X								5		10:30 AW
5	P4-5A	19/08	122	16:00	5		X	X	×								5	AUG Z	7 2019
6	P4-5B	19/08	122	16100	5		X	X	X							3	5	Temp: AC	ite
7	MW-OSA	19/08	123	10:00	5		X	X	X								5	1 Silips	
8	MW-05B	19/08	123	10:00	5		X	X	X								5		
9	MW-06A	19/08	123	10:40	5		X	X	X	,							5		
	CV 10m2	1	1		-			1 . 1	1 1	/									

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Date: (YY/MM/DD)

19/08/25

Time

" ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

\* RELINQUISHED BY: (Signature/Print)

ELCIOT HOLDEN

Bureau Veritas Canada (2019) Inc.

Date: (YY/MM/DD)

20190828 09:UZ

Time

# jars used and not submitted

Time Sensitive

Laboratory Use Only

Custody Seal Intact on Cooler?

No

Yellow: Client

Yes

Temperature (°C) on Receipt

See ACTR

RECEIVED BY: (Signature/Print)

BUREAU	Bureau Veritas Laboratories 4000 19st N.E., Calgary, Alberta Canada	a T2E 6P8 Tel:(403) 291-	3077 Toll-free:800-56	3-6266 Fax:(4	103) 29	91-9468 w	ww.bvlabs.	com			(	CHAIN OI	CUSTODY RECORD	Page 5of 7
VERITAS	INVOICE TO:			REPORT	TO:					PROJECT INFOR	RMATION:		Laboratory Use	Only:
#3269	ARCADIS Canada Inc	Company No	me: <u>SAM</u>	- 45	3	PA	GE	1	Quotation #:	B603	71		BV Labs Job #:	Bottle Order #:
Company Name: #3269 Attention: Elliott H		Attention:							P.O. #:				0.071707	
	orrison Drive Suite 201	Address:							Project:	30000251			B971727	591565
	ON K2H 8K7							- Nillesyn	Project Name:				COC #:	Project Manager:
	21-0555 Ext: 237 Fax: (613) 721-002	29 Tel:	:	MATERIAL INC.		Fax:			Site #:	PIN-4				Parminder Virk
Email: Jacob.H	lolden@arcadis.com	Email:	New York Commence						Sampled By:	ELCIC	IT HOLDEN	)	C#591565-07-01	
Regulatory Criteria:		Spec	ial Instructions					ANA	ALYSIS REQUESTED (PL	EASE BE SPECIFIC)			Turnaround Time (TAT) Re	quired:
□ ATI S	AME AS PAGE 1	SAME	AS PAG	El	?(Y/N)							(will be ap	Please provide advance notice for ru Standard) TAT: plied if Rush TAT is not specified):	ish projects
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Other					S pe	7	J					details	te. Standard TAT for Certain tests are 2 5 days 2	contact your Project Manager for
0.—					Filtered	TT	4	N					ific Rush TAT (if applies to entire submissi	on)
					P P	1	1-	N				Date Req		
SAMPLES M	UST BE KEPT COOL ( < 10°C ) FROM TIME OF SAM	PLING UNTIL DELIVERY	TO BV LABS		s Field	_	川川	U				Rush Conf	rmation Number:	call lab for #)
		Marie Control of the	SERVICE AND AND ASSESSMENT		Metals	TT	5	Δ,				# of Bottle	Comments	
Sample Barcode La	bel Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	2		. ,	-/				-	1	
1	MW-07A	19/08/23	11:20	5		$\times$	X	X				5		- H - 1 - 16-
2	MW-07B	19/08/23	11:20	5		X	X	X				5	Received in By: J mo	CCM 2
3	MW-CEA	19/08/23	12:00	S		X	X	X				5		10:30Um
4	MW-08B	19/08/23	12:00	S		X	X	X				5	AUG 2	7 2019
5	MW-11A	19/08/23	10:20	5		X	X	X				5	cogn A	- 10
6	P4-13A	19/08/23	16:10	5		X	X	X				5	Temp: A	CTR
7	P4-13 B	19/08/23	16:10	5		X	X	X				5		
8	P4-14A	19/08/23	13:50	5		X	X	X				5		
9	P4-14B	19/08/23	13;50	5		X	X	X				-5		
	10000000		100 100 100 100	0.000	1	1	1. /	/				_		

\*\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BY LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT 11 IS THE REPORTS AND CONDITIONS.

Time

10:00

IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Date: (YY/MM/DD)

19/08/25

" ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

\* RELINQUISHED BY: (Signature/Print)

EXECUTIT HOLDEN

Bureau Veritas Canada (2019) Inc.

Date: (YY/MM/DD)

20190828 DaiUZ

Time

# jars used and not submitted

Time Sensitive

Laboratory Use Only

Temperature (°C) on Receipt

Custody Seal Intact on Cooler?

No

Yes

White: BV Labs

RECEIVED BY: (Signature/Print)

BU REAU VERITAS		Bureau Veritas Laboratories 4000 19st N.E., Calgary, Alberta Canada	a T2E 6P8 Tel:(403) 291-	3077 Toll-free:800-56	53-6266 Fax;	(403) 29	91-9468 w	ww.bvlabs.com	m			CHAIN OF	F CUSTODY RECORD	Page C of 7
WALKER CALLED		INVOICE TO:			REPOR	T TO:					PROJECT INFORMATION:		Laboratory Use (	Only:
Company Name:	#3269 ARCA	DIS Canada Inc	Company Na	me: SAME	A5	PA	GE	1		Quotation #:	B60371		BV Labs Job #:	Bottle Order #:
Attention:	Elliott Holden	Drive Suite 201	Attention:	No. of the latest of the lates						P.O. #:	30000251		B971727	591565
Address:	Ottawa ON K2		Address:	***************************************						Project: Project Name:	00000201		COC #:	Project Manager:
Tel: Email:	(613) 721-055 Jacob.Holden	1000	Tel: Email:				Fax:			Site #: Sampled By:	PIN-4 ELCICTI HOLDE	7	C#591565-08-01	Parminder Virk
Regulatory Cri	teria:		Spec	ial Instructions					ANALY	SIS REQUESTED (PLE	ASE BE SPECIFIC)		Turnaround Time (TAT) Red	quired:
CCME			SAME	AS PA	GE	Field Filtered ? (Y/N)	<i>54-</i>	77565	Bs			Standard Please not details  Job Spec Date Requ		
s	AMPLES MUST BE	KEPT COOL ( < 10°C ) FROM TIME OF SAM	PLING UNTIL DELIVERY	TO BV LABS		als Fie	_	1 7 1	V			Rush Conn	irmation Number:	all lab for #)
Sample	Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Meta	1	<	Δ.			# of Bottle	Comments	
1		P4-15B	19/08/23	14:20	5		X	X	X			5	Received in Ye	llowknife
2		P4-16A	19/08/23	15:00	S		X	X	X			5	Received in the	Com
3		P4-16B	19/08/23	15100	5	14	X	X	X			5		10:20 AW
4		P4-17A	19/08/23	15:30	5		X	X	X			5	Allis 27	Z019
5		P4-17B	19/08/23	15:30	5		X	X	$\times$			5	Temp: AC	TR
6		P4-18A	19/08/23	16:40	5		X	X	X			5	temp. 7	

\* RELINQUISHED BY: (Signature/Print) Date: (YY/MM/DD) RECEIVED BY: (Signature/Print) # jars used and not submitted Date: (YY/MM/DD) 19/08/25 10:00 JESSTA LEC 50190858 09:02 Temperature (°C) on Receipt Custody Seal Intact on Cooler? ELCIOTT HOLDEN see ACTR \* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BY LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BYLABS.COM/TERMS-AND-CONDITIONS. White: BV Labs

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1 IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

19/08/23

19/08/23 16:40

19/08/23 17:10

19/08/23 17:10

Time

17:40

" ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

P4-18B

P4-19A

P4-19B

P4-20 A

8

9

Bureau Veritas Canada (2019) Inc.

Yes

No

Yellow: Client

5

5

5

5

Time

Laboratory Use Only

BUREAU VERITAS		Bureau Veritas Laboratories 4000 19st N.E. Calgary, Alberta Canada	a T2E 6P8 Tel:(403) 291-	3077 Toll-free:800-56	3-6266 Fax:(4	03) 291-	9468 ww	w bylabs co	om				CHAIN	OF CUSTODY RECORD	Page 7 of 7
VERLIAS		INVOICE TO:			REPORT	TO:					PROJECT II	NFORMATION:		Laboratory Use (	Only:
Company Name: '	#3269 ARCAI	DIS Canada Inc	Company Na	me: SAME	AS	PA	GE	1		Quotation #:	B6 9	0371		BV Labs Job #:	Bottle Order #:
Attention:	Elliott Holden		Attention:			- Constitution				P.O. #:				B971727	
Address:	1050 Morrison		Address:							Project:	3000025	51			591565
	Ottawa ON K2	23 23 25 25 25 25 25 25 25 25 25 25 25 25 25								Project Name:	DINI			COC #:	Project Manager:
Tel:	Jacob.Holden@	Ext: 237 Fax: (613) 721-002	Tel:	3 <del>102</del>		F	ах:			Site #:	PIN-4	ICTT HCL	DEAL	C#591565-09-01	Parminder Virk
Email:	Jacob. Holderig	yarcadis.com			1	· ·	*			Sampled By:			10=10		
Regulatory Crit	teria:	-	Spec	ial Instructions		-			ANAL	SIS REQUESTED (F	PLEASE BE SPECIF	IC)	1005636	Turnaround Time (TAT) Rec	
ATI CCME	SAME	E AS PAGE (	5 M	E AS PA	GE	red ? ( Y / N )	7	S					(will be Standa Please details	ir (Standard) TAT: applied if Rush TAT is not specified): rd TAT = 5-7 Working days for most tests note: Standard TAT for certain tests are > 5 days - 0	contact your Project Manager for
						Filtered	11	4	2					pecific Rush TAT (if applies to entire submission equired:	on)
						Field	1	加	C 13				140,000,000,000	onfirmation Number:	
S	AMPLES MUST BE K	EPT COOL ( < 10°C ) FROM TIME OF SAM	PLING UNTIL DELIVERY	TO BV LABS		als T	H	3	0						eall lab for #)
Sample	Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals	1	<	1/_				# of Bo	ttles Comments	
1		P4-20B	19/08/23	17:40	S	2	X	X	X				U)	D-colved in 18	lowknife
2		P4-21A	19/08/23	18:00	5		X	X	X				5	By: minu	m2
3		P4-21B	19/08/23	18:00	5		X	X	X				5		10, 30 AM
4		P4-22A	19/08/23	19:30	5		X	X	X				5	AUG 271	7019
5		P4-22B	19/08/23		S		X	X	X				E	Temp: AL	TL
6		P4-23A	19/08/23	20:00	S		X	X	×				E	) Temp.	
7	*	P4-23B	19/08/23	20:00	S		X	X	X				5	,	
8		P4-24A	19/08/23	20:30	S	9	X	X	X				Ę		
9		P4-24B	19/08/23	20:30	S		X	X	X				5		
10		P4-27A	19/08/23	19:50	5		X	X	X				L)	5	

\*\*UNILESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BY LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BYLABS.COM/TERMS.AND-CONDITIONS. \* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Time

Date: (YY/MM/DD)

19/08/25

\*\* ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

\* RELINQUISHED BY: (Signature/Print)

ELLICTT HOLDEN

Bureau Veritas Canada (2019) Inc.

Date: (YY/MM/DD)

20190828 09:02

Time

# jars used and not submitted

Laboratory Use Only

Custody Seal Intact on Cooler?

Yes White: BV Labs No

Yellow: Client

Temperature (°C) on Receipt

RECEIVED BY: (Signature/Print)

JUSTICA CEC

BUREAU VERITAS		Bureau Veritas Laboratories 4000 19st N.E., Calgary, Alberta Canada 1	T2E 6P8 Tel:(403) 291-3	077 Toll-free:800-56	3-6266 Fax (4	03) 291-	-9468 www.bv	labs.com	13851	7)			CHAIN	DF CUSTODY RECORD	Page 1 of 2
WALSON MAKES		INVOICE TO:			REPORT	TO:				PROJE	ECT INFOR	RMATION:		Laboratory Use	Only:
Company Name:	#3269 ARCAI	DIS Canada Inc	Company Nar	ne: SAME	AS "	NV	CICE -	TO "	Quotation#	13	603	371		BV Labs Job #:	Bottle Order #:
Attention:	Elliott Holden		Attention:						P.O. #:					B971616	
Address:	1050 Morrison		Address:						Project:	300	00251				591565
	Ottawa ON K2I (613) 721-0555			(					Project Name:	PIN	1.4			COC #:	Project Manager:
Tel: Email:	Jacob.Holden@		Tel:	TPOY ALL	ETRINS	0	Fax:	>15. COM	Site #: Sampled By:			THOLDE	= N	C#591565-01-01	Parminder Virk
1		1		al Instructions	3,70,700	1	- J /		SIS REQUESTED (PL			, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1	Turnaround Time (TAT) R	
ATI	CCNTAC THERE GUESTI	CHED DOWNENT.	METALS: ONL AS, Cd, Cr, ZINC PHCS: ONL E1, F2, F3,	Y REPORT	Pb, Ni,	2 (Y)	(No BETX)	C, ca	SIO NEQUESTED FL	EASE BE OF	-EGIFIG)		(will be Standar	Please provide advance notice for (Standard) TAT: applied if Rush TAT is not specified): d TAT = 5-7 Working days for most tests. note: Standard TAT for certain tests are > 5 days	rush projects
	AMPLES MUST BE K	EPT COOL ( < 10°C ) FROM TIME OF SAMP	LING UNTIL DELIVERY		Matrix	Metals Field Filtered	FI - F4	w					Date Re	nfirmation Number:	(call lab for #)
1		MW-01	19/08/21	14:00	GW	N.	×>	<					5	GROUNDONATER NOT PRESERV	METALS
2		MW-02	19/08/21	15:50	GW	2	X >	<					5	NOT FIELD FICT	
3		MW-03	19/08/21	17:00	Gω	N	× >	<					5	METALS CHLY	TOTAL
4		MW-04	19/08/21	18:00	Gω	N	$\times$	<					5	ABOVE COMM	ENTS
5		MW-09	19/08/21	14:30	Gω	N	$\times$	$\prec$					5	APPLY TO AL	i siamples
6		MW-06	19/08/24	11:20	GW	N	$\times$	<					5	SAMPLE MW-06	NAS COLLECTED
7		MW-07	19/08/24	10:20	600	N	$\times$	<					5	Received in	Yellowknife
8		80-WM	19/08/24	12:10	GW	N	$\times$	$\times$					5	By: U.nit	
9		FIELD BLANK	19/08/24	12:30	w	2	$\times$	<					5	Å II O	72015
10		TRIP BLANK	19/08/12		w	N	$\times$	<					5		ACTR
- 4	RELINQUISHED BY:		YY/MM/DD) Time	1	RECEIVE		Signature/Pri		Date: (YY/MM/		Time	# jars used and _ not submitted	Time Sensitiv	Laboratory Use Only	•
294 1	ELLICTI It	CLDEN 19/C	25 10:0	0 1	0	X.Z	STC4 CC	2	2019083	5 0	9:0Z			Temperature (°C) on Receipt	Custody Seal Intact on Cooler?  Yes No
* IT IS THE RESPO	M/TERMS-AND-CONDITI NSIBILITY OF THE RELI	ITING, WORK SUBMITTED ON THIS CHAIN OF CUS ONS. NQUISHER TO ENSURE THE ACCURACY OF THE C AFTER SAMPLE RECEIPT, FOR SPECIAL REQUES	CHAIN OF CUSTODY RECOR	D. AN INCOMPLETE C						WLEDGMENT	AND ACCEP	TANCE OF OUR TERM	IS WHICH ARE A	AILABLE FOR VIEWING AT	White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

BUREAU	4000 19st N.E., Calgary, Alberta Canada T2E 6P8. Tel:(403) 291-3077. Toll-free:800-563-6266. Fax:(403) 291-9468 www.bvlabs.com															CHAIN O	Page∠of Z. CHAIN OF CUSTODY RECORD		
INVOICE TO:					REPORT TO:							PROJECT INFORMATION:					Laboratory Use Only:		
Company Name: #3269 ARCADIS Canada Inc				Company Name: SAME AS "INVOICE TO"							Out	tation#:	1360	60371			BV Labs Job #: Bottle Order #:		
Attention:	Attention: Elliott Holden				Attention:							#:					B971616		
Address:					Address:						Proje	ect:	3000025	30000251				591565	
Ottawa ON K2H 8K7  (613) 721-0555 Ext: 237 Fax: (613) 721-0029				Tel: Fax:							ect Name:	PIN-4				COC #:	Project Manager:		
Tel: Email:								Fax: US@ARCADIS, C.CM			Site Sam	#: pled By:	ECCICIT HOLDE			N	C#591565-13-01	Parminder Virk	
Regulatory Criteria:												REQUESTED (PLEASE BE SPECIFIC)				1	Turnaround Time (TAT) Re	quired:	
					⊗ 3												Please provide advance notice for ru	A. Carrier and Car	
ATI SAME AS PAGE!				THE AS PAGE   (N) A STEEL OUT TO STEEL OUT T							- 1					Standard) TAT:			
CCME SA															(will be applied if Rush TAT is not specified):  Standard TAT = 5-7 Working days for most tests  Please note: Standard TAT for certain tests are > 5 days - contact your Project Manager for details				
Other																			
				# C C C C C C C C C C C C C C C C C C C												Job Spec	ic Rush TAT (if applies to entire submission)		
		1	E												Date Required:				
SAMPLES MUST BE KEPT COOL ( < 10°C ) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS									AL							Rush Confi	rmation Number:	call lab for #)	
Sample	Barcode Label	Sample (Location) Identification	Da	te Sampled	Time Sampled	Matrix	Metals	$\bar{\mathcal{L}}$	101,							# of Bottle	Comments	5	
1		BLANK 1	19	08/23	18:00	cu	2	X	X							5	SAME NO	PAGE	
2		BLANK Z	191	08/23	18'30	نت	N	X	X							5			
3																		u Junifo	
4																Received in Yellowknife  By: U. MERCANO  10: 59 Am			
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9							100												
10																			
* RELINQUISHED BY: (Signature/Print) Date: (YY/MM/DD) Time						4						ite: (YY/MM/DD)					Laboratory Use Only		
ZIL ELLICH HOLDEN 19/08/2			5 10100 M JOS				DJG	THE CEC ?			190858	09:0	2 not suit	Dimitted	Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?		
· UNLESS OTHERW	ISE AGREED TO IN WR	ITING, WORK SUBMITTED ON THIS CHAIN OF	F CUSTODY IS S	UBJECT TO BY	ABS' STANDARD TERM	IS AND COND	TIONS	SIGNING OF	THIS CHAIN	I DE CUSTO	DY DOCUME	NT IS ACKNOWN E	DOMENT AND A	CCEPTANCE OF	OUR TERMS	WHICH ARE AVA	SEC ACTR	Yes No	
* IT IS THE RESPON	M/TERMS-AND-CONDITION WISIBILITY OF THE RELI		THE CHAIN OF C	USTODY RECOR	RD. AN INCOMPLETE CH												v	White: BV Labs Yellow; Client	

Bureau Veritas Canada (2019) Inc.

## **APPENDIX C3**

**BV** Laboratory Accreditation





### CERTIFICAT D'ACCRÉDITATION

### Bureau Veritas Canada (2019) Inc.

Conseil canadien des normes

Calgary Laboratory
2021 – 41st Avenue, N.E., Calgary, Alberta, T2E 6P2, Canada

having been assessed by the Standards Council of Canada (SCC) and found to conform with the requirements of ISO/IEC 17025:2005 and the conditions for accreditation established by SCC is hereby recognized as an

#### ACCREDITED TESTING LABORATORY

for the specific tests or types of tests listed in the scope of accreditation approved by SCC and found on the SCC website at www.scc.ca.



ayant fait l'objet d'une évaluation du Conseil canadien des normes (CCN), et ayant été trouvé conforme aux exigences énoncées dans ISO/IEC 17025:2005 et aux conditions d'accréditation établies par le CCN, est de ce fait reconnu comme étant un

#### LABORATOIRE D'ESSAIS ACCRÉDITÉ

pour les essais ou types d'essais énumérés dans la portée d'accréditation approuvée par le CCN et figurant dans le site Web du CCN au www.ccn.ca.

Accredited laboratory number: / Numéro de laboratoire accrédité: 836

SCC file number: / Dossier du CCN nº: 151043

Initial accreditation date: / Date de la première accréditation : 2016-08-30

Vice-President – Accreditation Services / Vice-président – Services d'accréditation

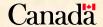
Issued on: / Délivré le : 2019-06-07

The validity of this certificate, including the date of last re-accreditation and its expiry can be confirmed by the accompanying Scope of Accreditation document in the Directory of Accredited Laboratories on the SCC website at www.scc.ca.

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. The accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-IAC-IAF communioué dated Aoril 2017).

Pour vérifier la validité du présent certificat, y compris la date de la dernière réaccréditation et la date d'expiration du certificat, consulter la portée d'accréditation qui se trouve dans le répertoire des laboratoires accrédités dans le site Web du CCN au www.cn.ca.

Ce laboratoire est accrédité conformément à la Norme internationale reconnue ISO/IEC 17025:2005. Cette accréditation démontre la compétence technique d'un organisme pour une portée définie et l'exploitation d'un système de management de la qualité de laboratoire (cf. communiqué conjoint ISO-ILAC-IAF date de avril 2017).



# CERTIFICATE OF ACCREDITATION



### CERTIFICAT D'ACCRÉDITATION

### Bureau Veritas Canada (2019) Inc.

Petroleum Technology Center 6744 - 50 Street NW, Edmonton, AB, T6B 3M9 and Edmonton Environmental, 9331 48 Street NW, Edmonton, AB, T6B 2R4, Canada

having been assessed by the Standards Council of Canada (SCC) and found to conform with the requirements of ISO/IEC 17025:2017 and the conditions for accreditation established by SCC is hereby recognized as an

ayant fait l'objet d'une évaluation du Conseil canadien des normes (CCN), et ayant été trouvé conforme aux exigences énoncées dans ISO/IEC 17025:2017 et aux conditions d'accréditation établies par le CCN, est de ce fait reconnu comme étant un

#### ACCREDITED TESTING LABORATORY

for the specific tests or types of tests listed in the scope of accreditation approved by SCC and found on the SCC website at www.scc.ca.



#### LABORATOIRE D'ESSAIS ACCRÉDITÉ

pour les essais ou types d'essais énumérés dans la portée d'accréditation approuvée par le CCN et figurant dans le site Web du CCN au www.ccn.ca.

Accredited laboratory number: / Numéro de laboratoire accrédité : 160

SCC file number: / Dossier du CCN nº: 15229

Initial accreditation date: / Date de la première accréditation : 1995-03-06

Vice-President – Accreditation Services / Vice-président – Services d'accréditation

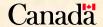
Issued on: / Délivré le : 2019-06-07

The validity of this certificate, including the date of last re-accreditation and its expiry can be confirmed by the accompanying Scope of Accreditation document in the Directory of Accredited Laboratories on the SCC website at www.scc.ca.

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. The accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-IAC-IAF communioué dated Aoril 2017).

Pour vérifier la validité du présent certificat, y compris la date de la dernière réaccréditation et la date d'expiration du certificat, consulter la portée d'accréditation qui se trouve dans le répertoire des laboratoires accrédités dans le site Web du CCN au www.cn.ca.

Ce laboratoire est accrédité conformément à la Norme internationale reconnue ISO/IEC 17025:2017. Cette accréditation démontre la compétence technique d'un organisme pour une portée définie et l'exploitation d'un système de management de la qualité de laboratoire (cf. communiqué conjoint ISO-ILAC-IAF date de avril 2017).



## **APPENDIX D**

**Soil and Groundwater Trend Analysis Graphs** 

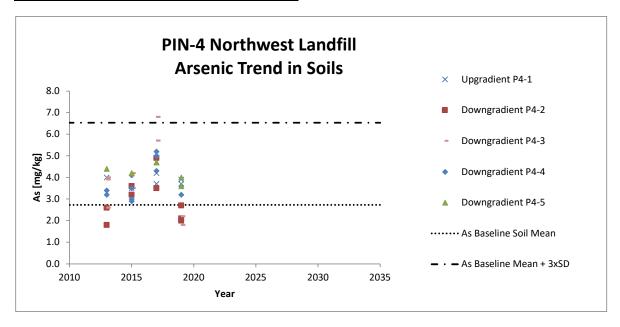
### **APPENDIX D1**

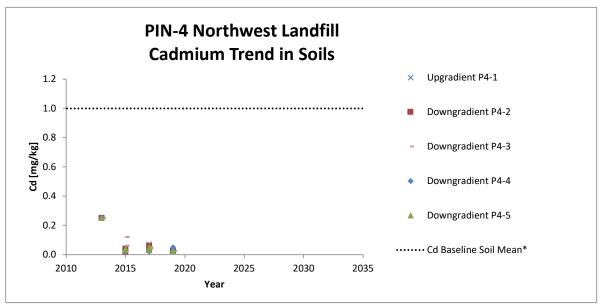
PIN-4 Northwest Landfill – Trends in Soil Inorganics, PCBs and PHCs

#### PIN-4 Northwest Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





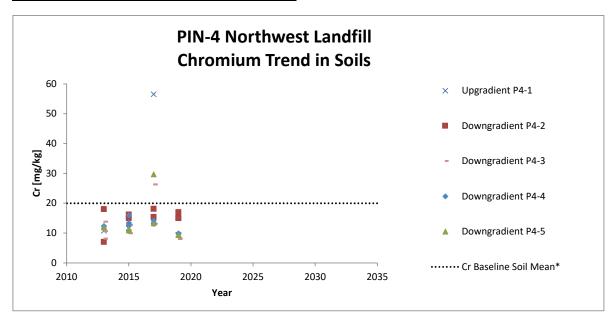
<sup>\*</sup> Cd baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Cd baseline standard deviation = 0

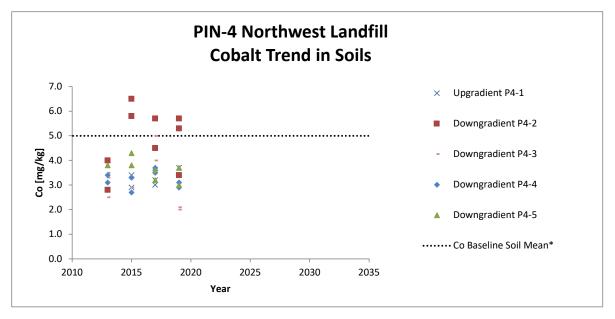
#### PIN-4 Northwest Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* Cr baseline arithmetic mean is equal to the baseline detection limit
- \* Cr baseline standard deviation = 0

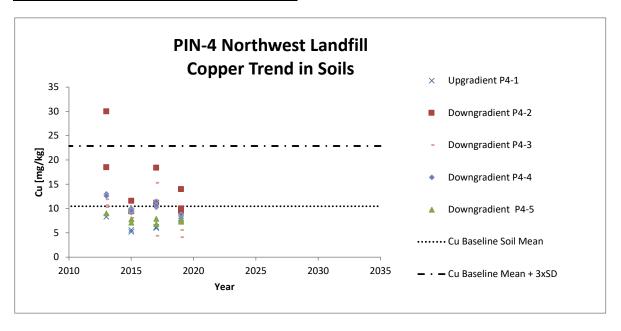


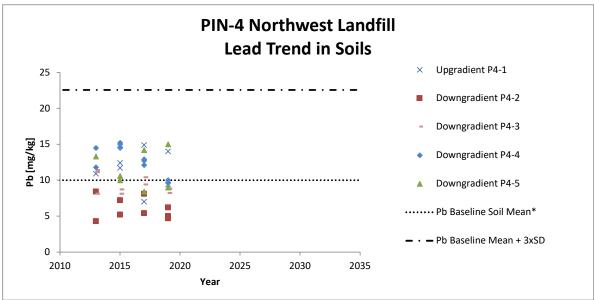
- $\ensuremath{^{*}}$  Co baseline arithmetic mean is equal to the baseline detection limit
- \* Co baseline standard deviation = 0

#### PIN-4 Northwest Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



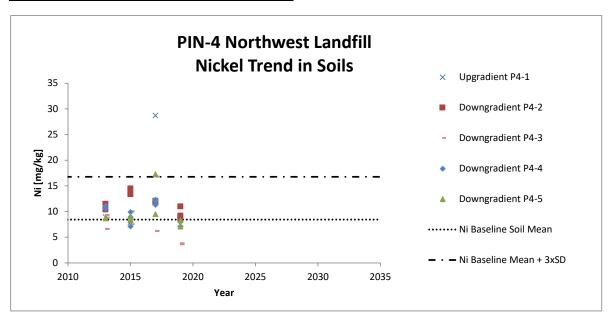


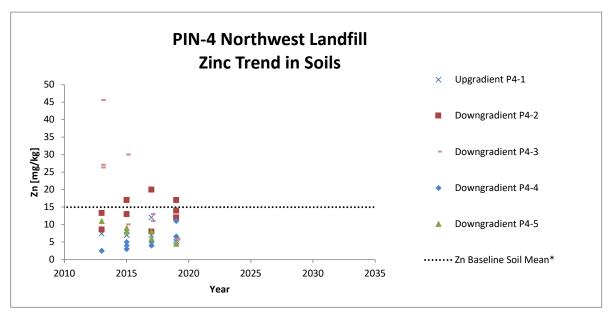
<sup>\*</sup> Pb baseline arithmetic mean is equal to the baseline detection limit

#### PIN-4 Northwest Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





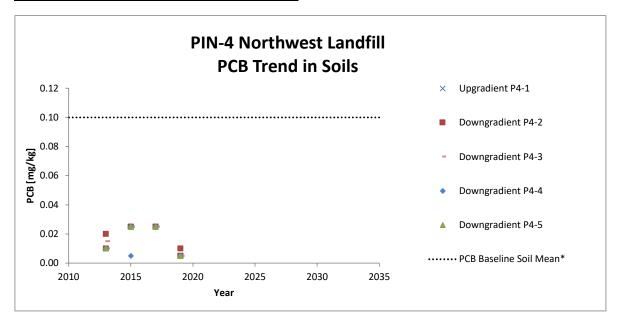
<sup>\*</sup> Zn baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Zn baseline standard deviation = 0

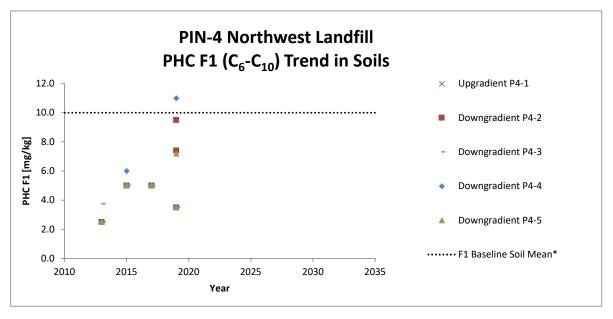
#### PIN-4 Northwest Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* PCB baseline arithmetic mean is equal to the baseline detection limit
- \* PCB baseline standard deviation = 0

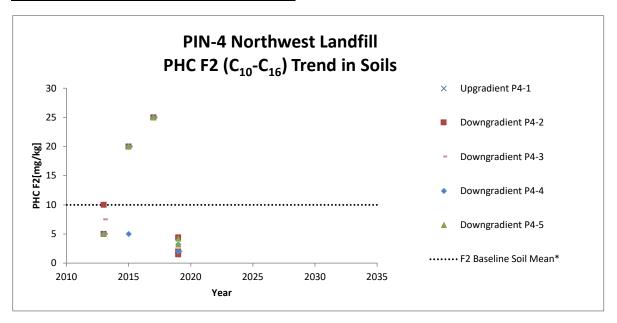


- \* F1 baseline arithmetic mean is equal to the baseline detection limit
- \* F1 baseline standard deviation = 0

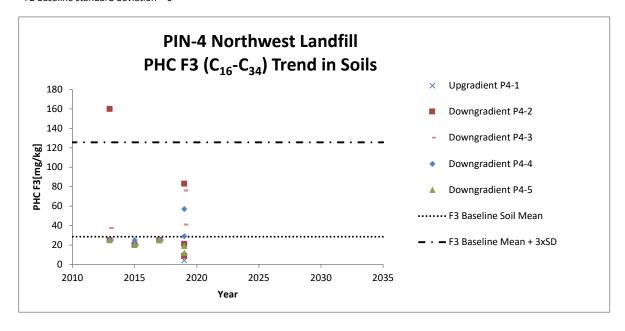
#### PIN-4 Northwest Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



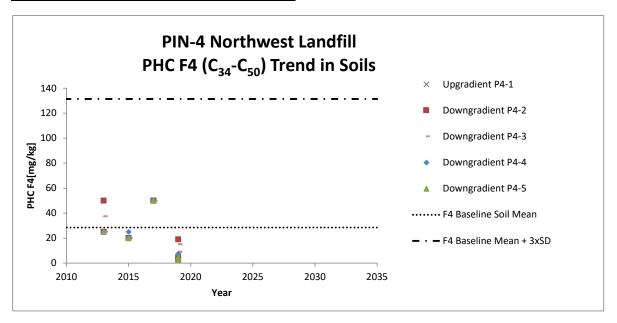
- \* F2 baseline arithmetic mean is equal to the baseline detection limit
- \* F2 baseline standard deviation = 0



#### PIN-4 Northwest Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



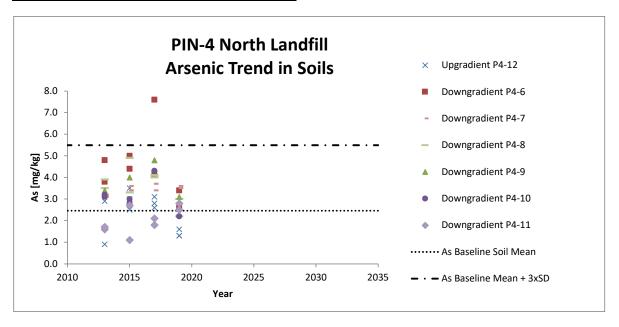
### **APPENDIX D2**

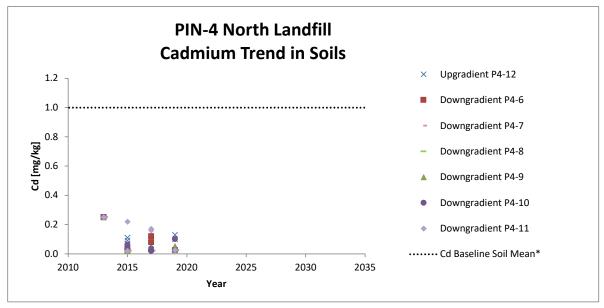
PIN-4 North Landfill – Trends in Soil Inorganics, PCBs and PHCs

#### PIN-4 North Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





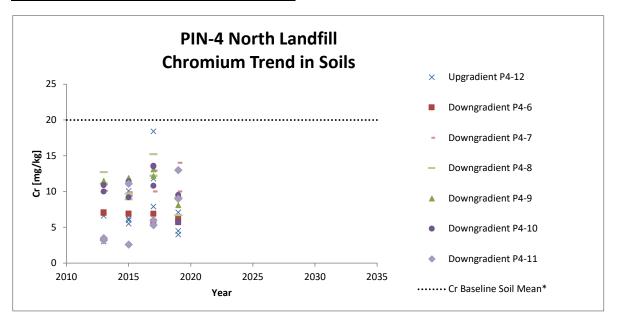
<sup>\*</sup> Cd baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Cd baseline standard deviation = 0

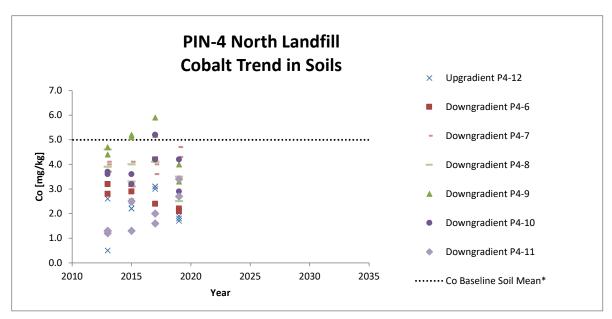
#### PIN-4 North Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* Cr baseline arithmetic mean is equal to the baseline detection limit
- \* Cr baseline standard deviation = 0

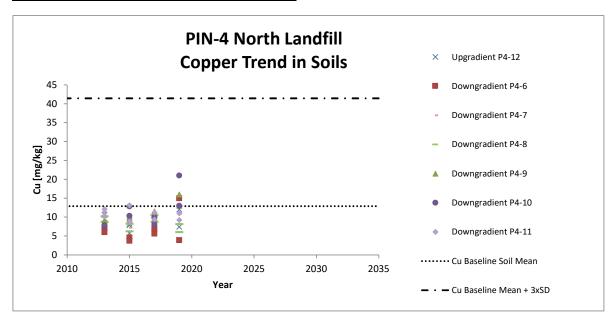


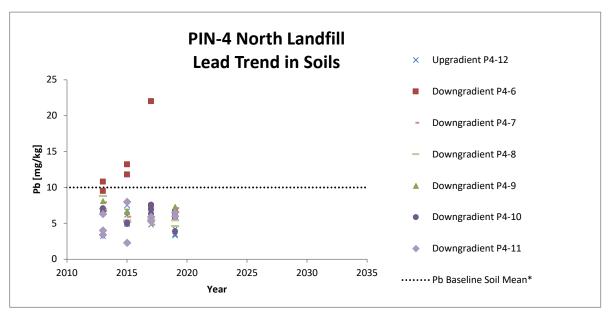
- \* Co baseline arithmetic mean is equal to the baseline detection limit
- \* Co baseline standard deviation = 0

#### PIN-4 North Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





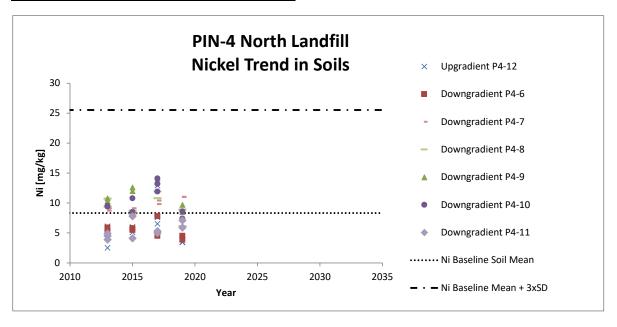
<sup>\*</sup> Pb baseline arithmetic mean is equal to the baseline detection limit

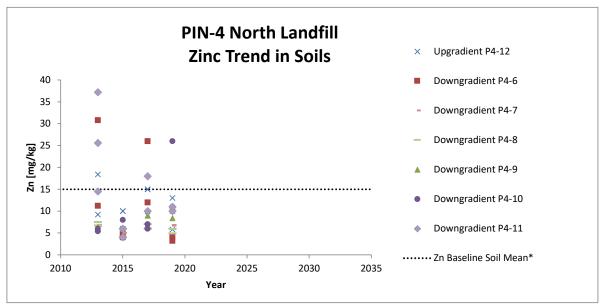
<sup>\*</sup> Pb baseline standard deviation = 0

#### PIN-4 North Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





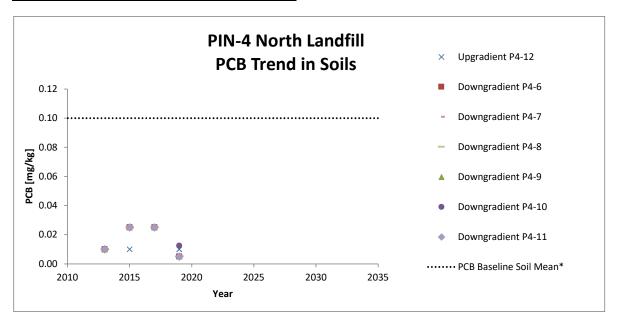
<sup>\*</sup> Zn baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Zn baseline standard deviation = 0

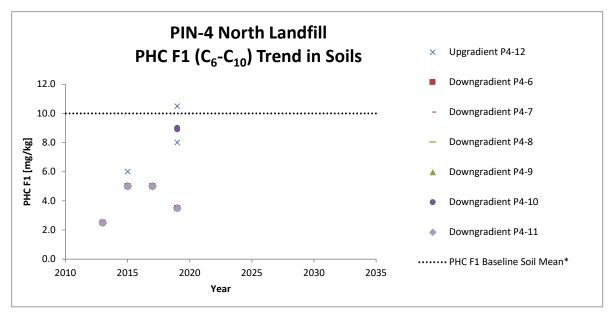
#### PIN-4 North Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* PCB baseline arithmetic mean is equal to the baseline detection limit
- \* PCB baseline standard deviation = 0



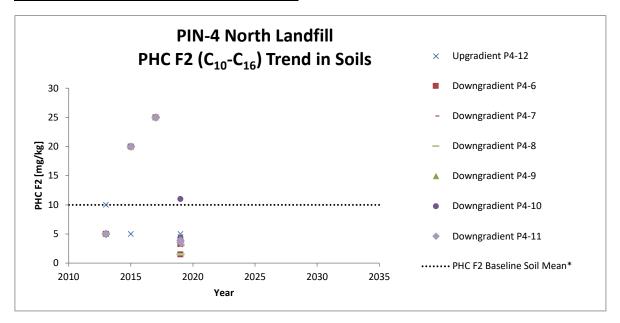
<sup>\*</sup> F1 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F1 baseline standard deviation = 0

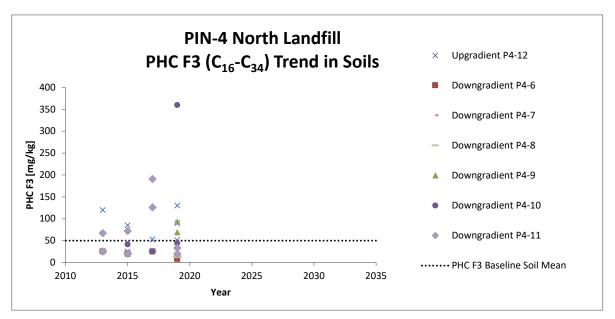
#### PIN-4 North Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* F2 baseline arithmetic mean is equal to the baseline detection limit
- \* F2 baseline standard deviation = 0



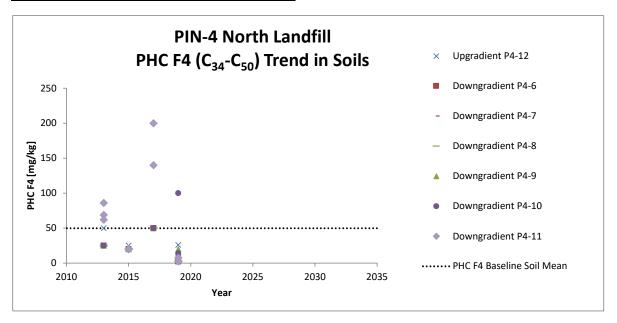
<sup>\*</sup> F3 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F3 baseline standard deviation = 0

#### PIN-4 North Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



<sup>\*</sup> F4 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F4 baseline standard deviation = 0

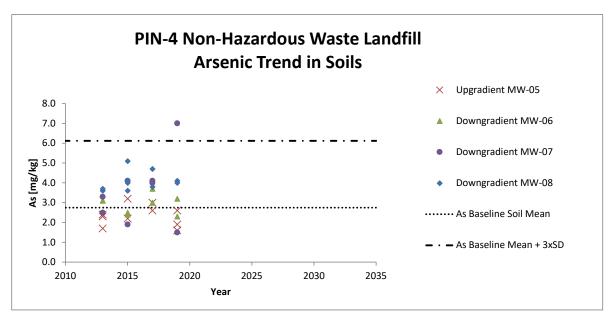
### **APPENDIX D3**

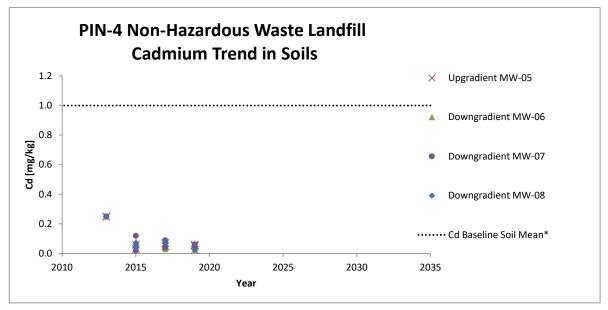
PIN-4 Non-Hazardous Waste Landfill – Trends in Soil Inorganics, PCBs and PHCs

#### PIN-4 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





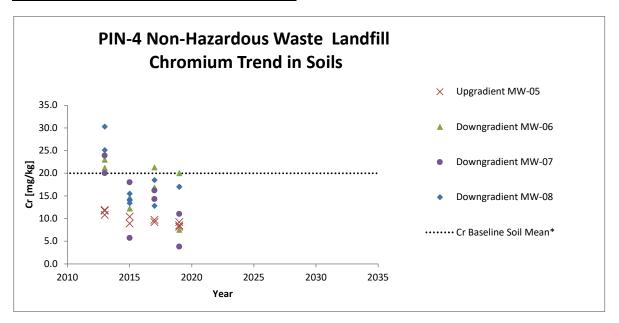
<sup>\*</sup> Cd baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Cd baseline standard deviation = 0

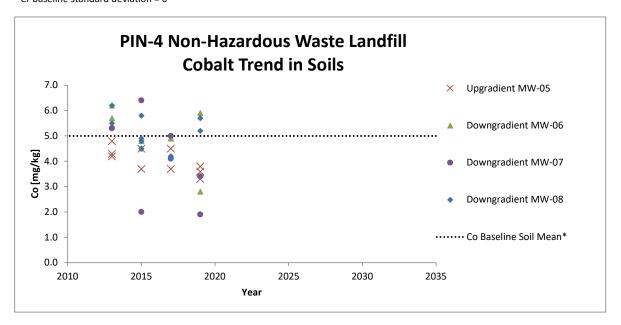
#### PIN-4 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* Cr baseline arithmetic mean is equal to the baseline detection limit
- \* Cr baseline standard deviation = 0



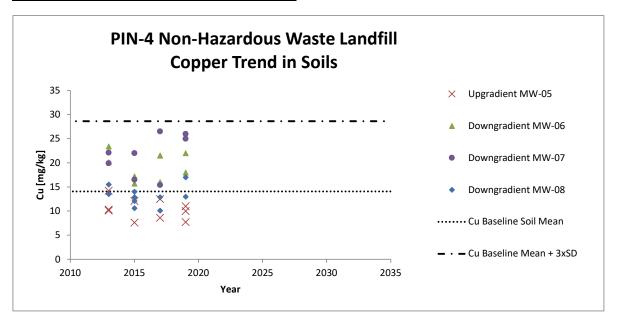
<sup>\*</sup> Co baseline arithmetic mean is equal to the baseline detection limit

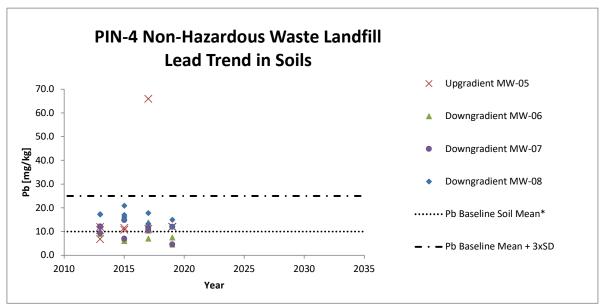
<sup>\*</sup> Co baseline standard deviation = 0

#### PIN-4 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



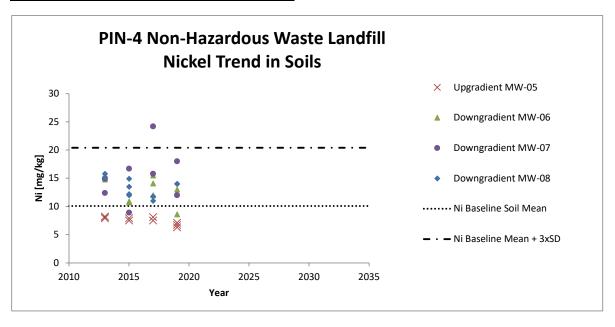


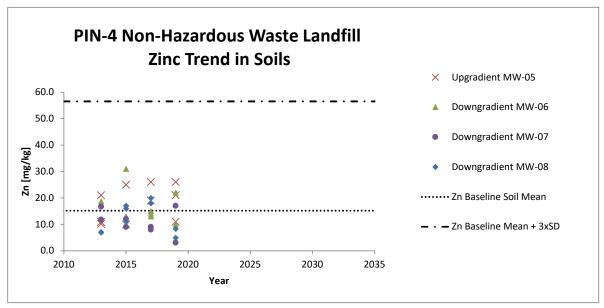
<sup>\*</sup> Pb baseline arithmetic mean is equal to the baseline detection limit

#### PIN-4 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

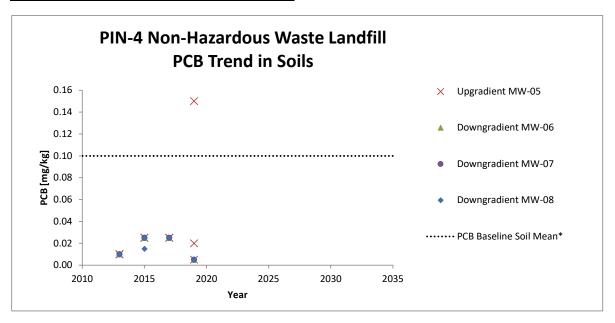




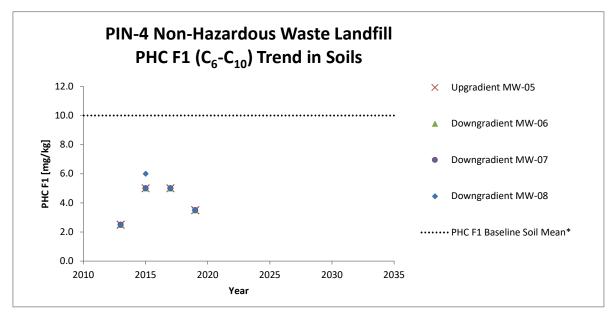
#### PIN-4 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* PCB baseline arithmetic mean is equal to the baseline detection limit
- \* PCB baseline standard deviation = 0



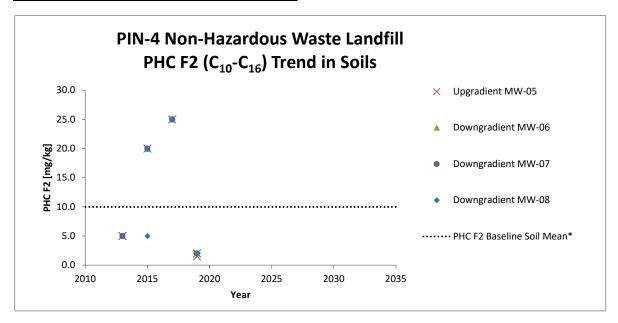
<sup>\*</sup> F1 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F1 baseline standard deviation = 0

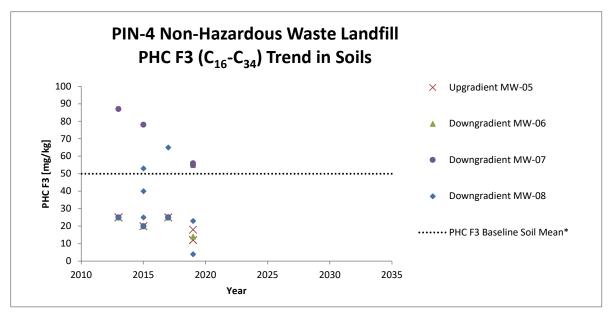
#### PIN-4 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* F2 baseline arithmetic mean is equal to the baseline detection limit
- \* F2 baseline standard deviation = 0

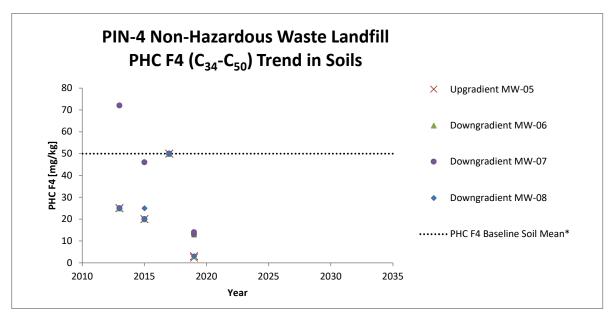


- \* F3 baseline arithmetic mean is equal to the baseline detection limit
- \* F3 baseline standard deviation = 0

#### PIN-4 Non-Hazardous Waste Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



<sup>\*</sup> F4 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F4 baseline standard deviation = 0

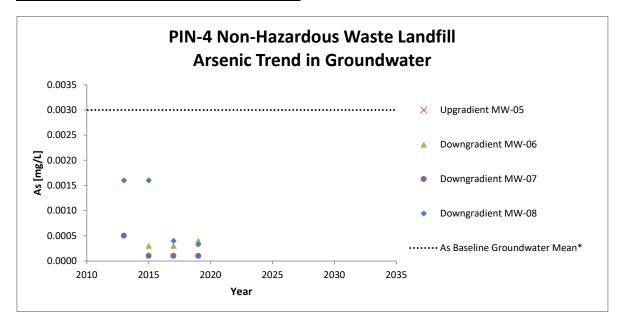
### **APPENDIX D4**

PIN-4 Non-Hazardous Waste Landfill – Trends in Groundwater Inorganics and PHCs

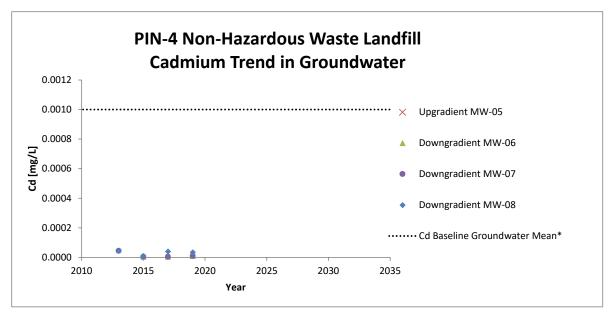
#### PIN-4 Non-Hazardous Waste Landfill Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* As baseline arithmetic mean is equal to the baseline detection limit
- \* As baseline standard deviation = 0

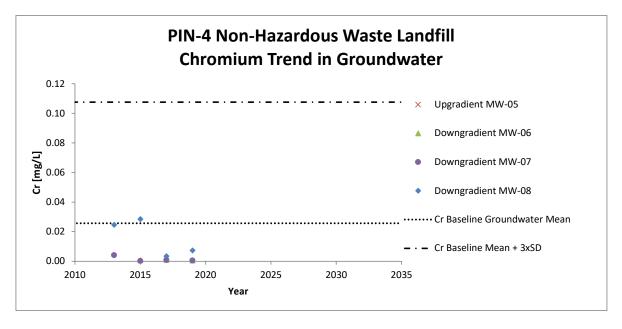


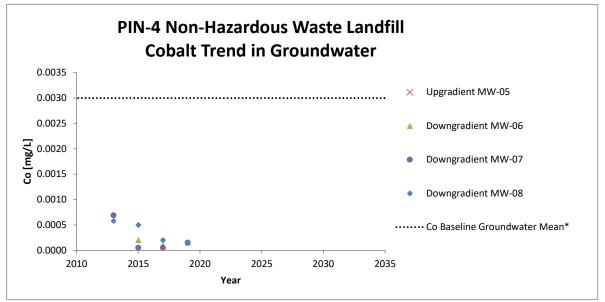
- $\ensuremath{^{*}}$  Cd baseline arithmetic mean is equal to the baseline detection limit
- \* Cd baseline standard deviation = 0

#### PIN-4 Non-Hazardous Waste Landfill Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





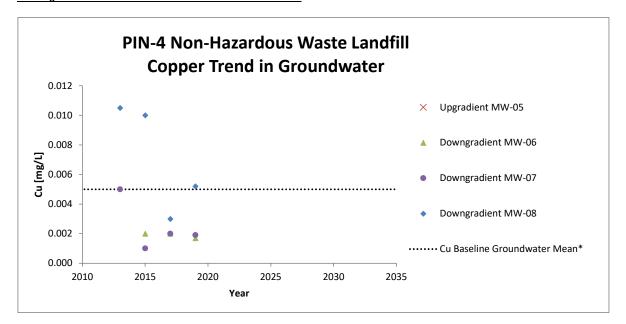
<sup>\*</sup> Co baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Co baseline standard deviation = 0

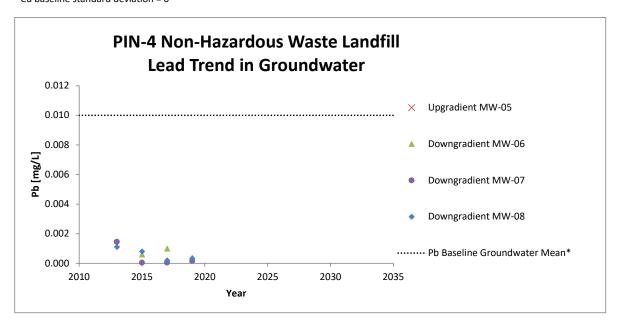
#### PIN-4 Non-Hazardous Waste Landfill Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* Cu baseline arithmetic mean is equal to the baseline detection limit
- \* Cu baseline standard deviation = 0

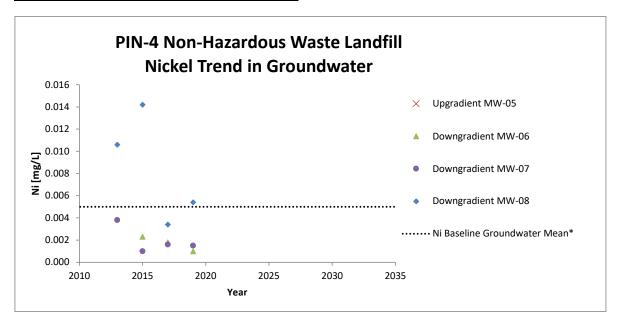


- \* Pb baseline arithmetic mean is equal to the baseline detection limit
- \* Pb baseline standard deviation = 0

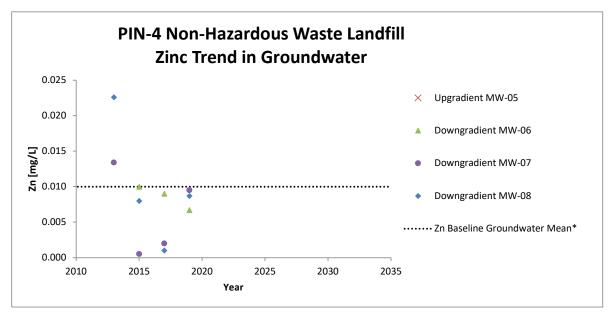
#### PIN-4 Non-Hazardous Waste Landfill Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* Ni baseline arithmetic mean is equal to the baseline detection limit
- \* Ni baseline standard deviation = 0

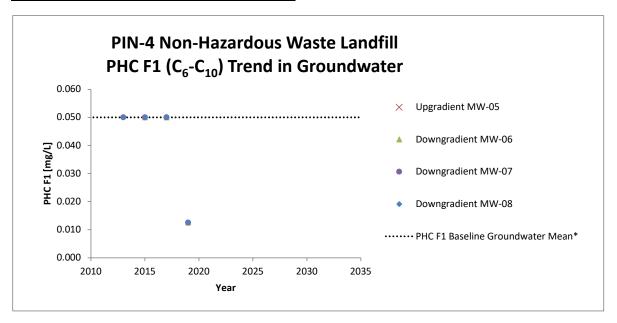


- \* Zn baseline arithmetic mean is equal to the baseline detection limit
- \* Zn baseline standard deviation = 0

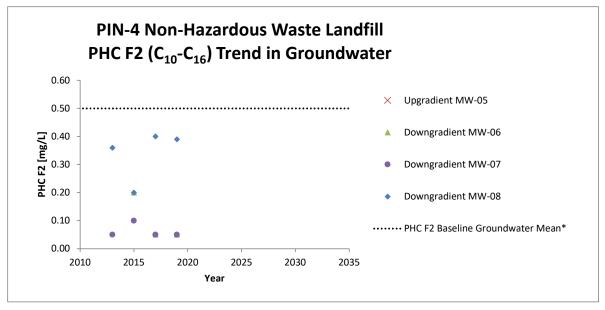
#### PIN-4 Non-Hazardous Waste Landfill Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* F1 baseline arithmetic mean is equal to the baseline detection limit
- \* F1 baseline standard deviation = 0



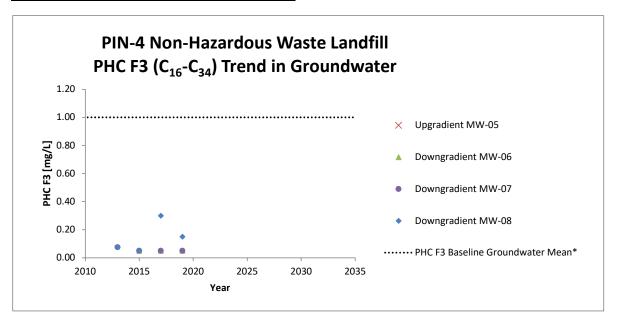
<sup>\*</sup> F2 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F2 baseline standard deviation = 0

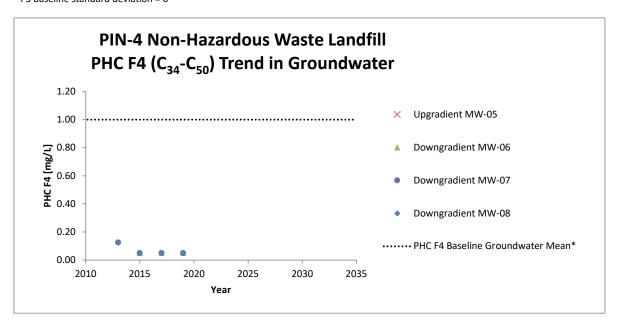
#### PIN-4 Non-Hazardous Waste Landfill Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* F3 baseline arithmetic mean is equal to the baseline detection limit
- \* F3 baseline standard deviation = 0



- \* F4 baseline arithmetic mean is equal to the baseline detection limit
- \* F4 baseline standard deviation = 0

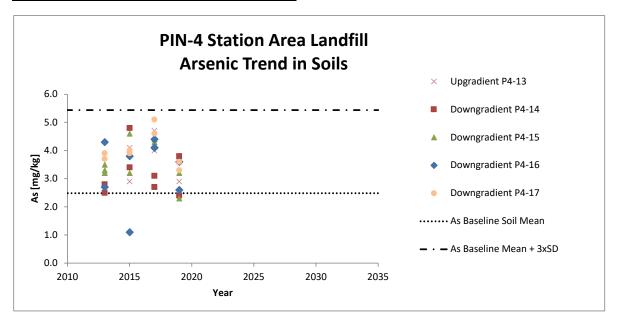
# **APPENDIX D5**

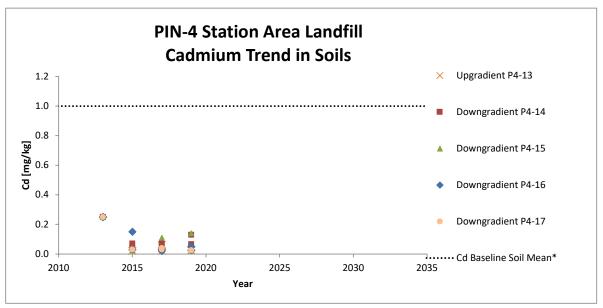
PIN-4 Station Area Landfill - West - Trends in Soil Inorganics, PCBs and PHCs

### PIN-4 Station Area Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





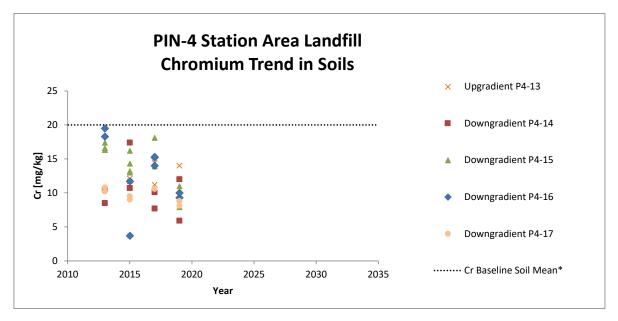
<sup>\*</sup> Cd baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Cd baseline standard deviation = 0

### PIN-4 Station Area Landfill Trends in Soil Inorganics, PCBs and PHCs

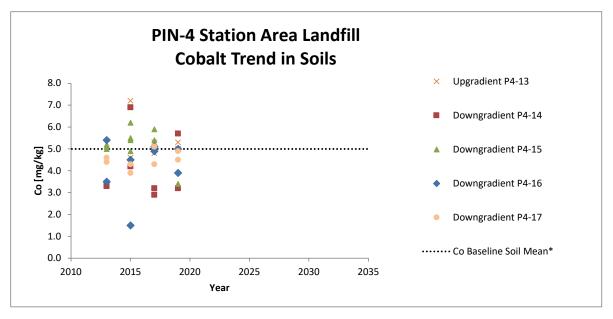
Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



<sup>\*</sup> Cr baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Cr baseline standard deviation = 0



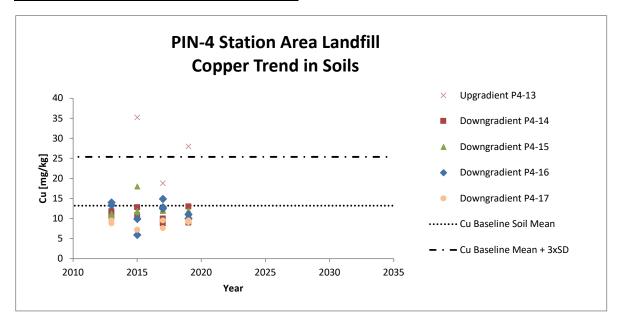
<sup>\*</sup> Co baseline arithmetic mean is equal to the baseline detection limit

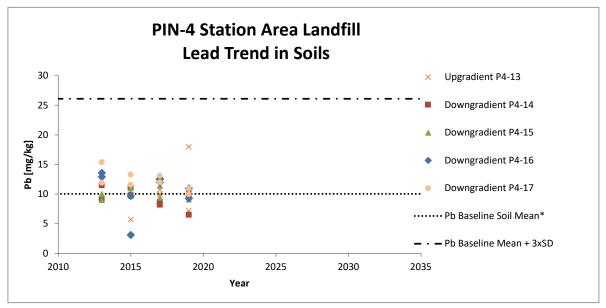
<sup>\*</sup> Co baseline standard deviation = 0

### PIN-4 Station Area Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



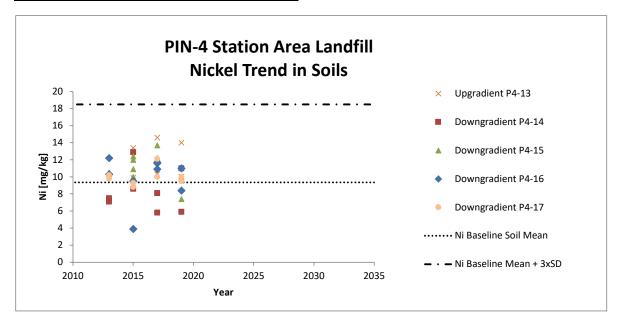


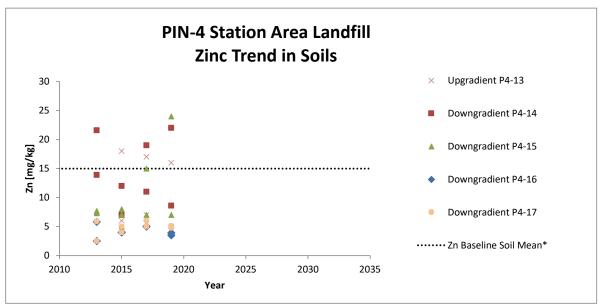
<sup>\*</sup> Pb baseline arithmetic mean is equal to the baseline detection limit

### PIN-4 Station Area Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





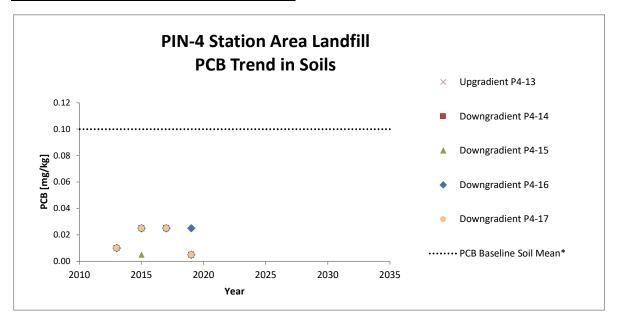
<sup>\*</sup> Zn baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Zn baseline standard deviation = 0

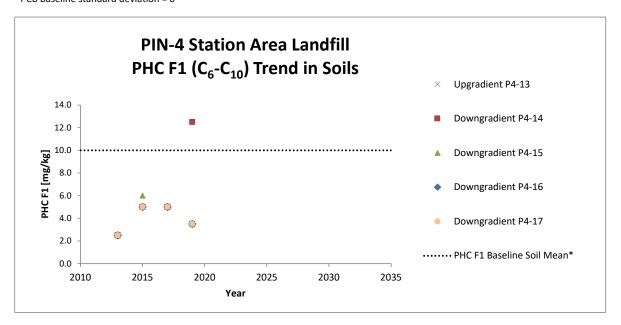
### PIN-4 Station Area Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* PCB baseline arithmetic mean is equal to the baseline detection limit
- \* PCB baseline standard deviation = 0



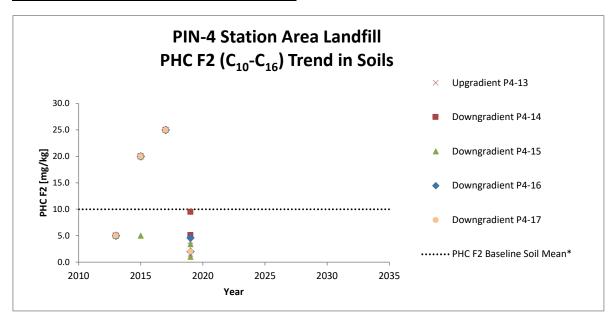
<sup>\*</sup> F1 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F1 baseline standard deviation = 0

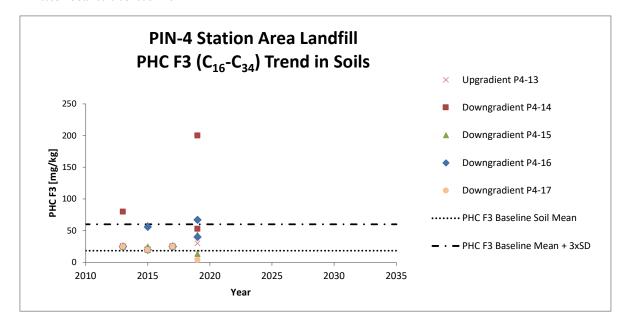
### PIN-4 Station Area Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



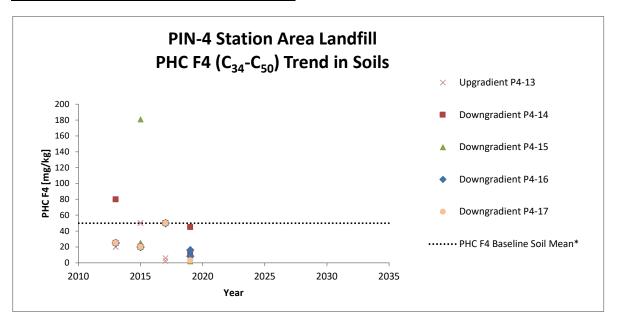
- \* F2 baseline arithmetic mean is equal to the baseline detection limit
- \* F2 baseline standard deviation = 0



### PIN-4 Station Area Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



<sup>\*</sup> F4 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F4 baseline standard deviation = 0

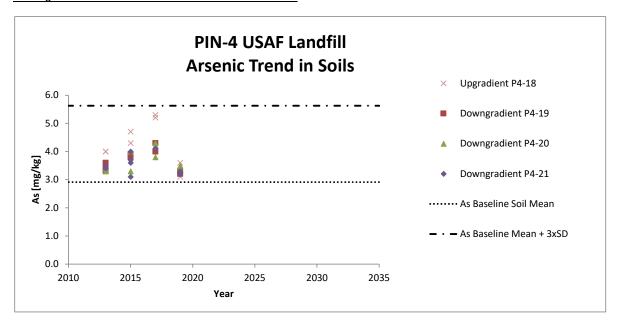
# **APPENDIX D6**

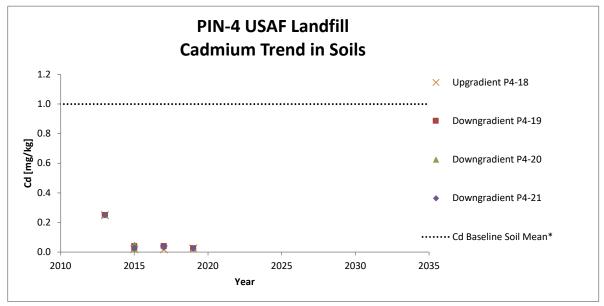
PIN-4 USAF Landfill – Trends in Soil Inorganics, PCBs and PHCs

### PIN-4 USAF Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





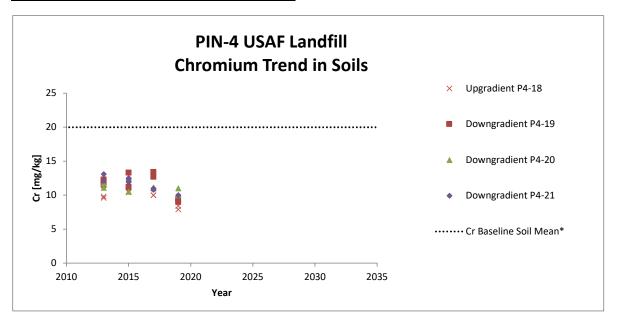
<sup>\*</sup> Cd baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Cd baseline standard deviation = 0

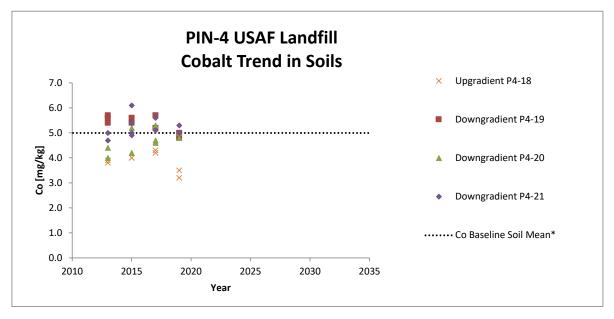
### PIN-4 USAF Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* Cr baseline arithmetic mean is equal to the baseline detection limit
- \* Cr baseline standard deviation = 0

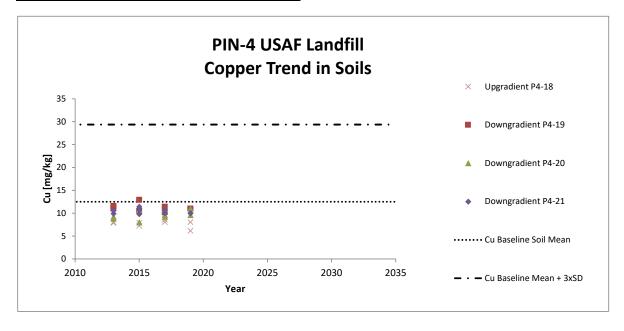


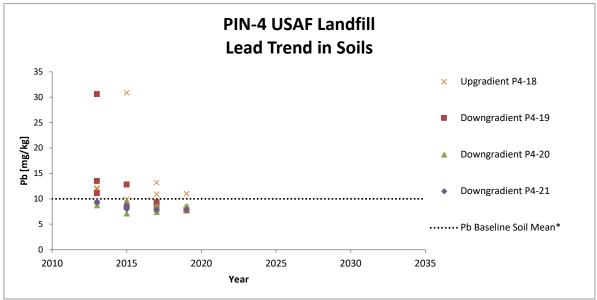
- $\ensuremath{^{*}}$  Co baseline arithmetic mean is equal to the baseline detection limit
- \* Co baseline standard deviation = 0

### PIN-4 USAF Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





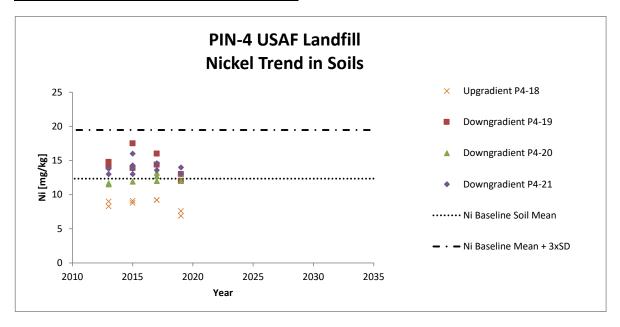
<sup>\*</sup> Pb baseline arithmetic mean is equal to the baseline detection limit

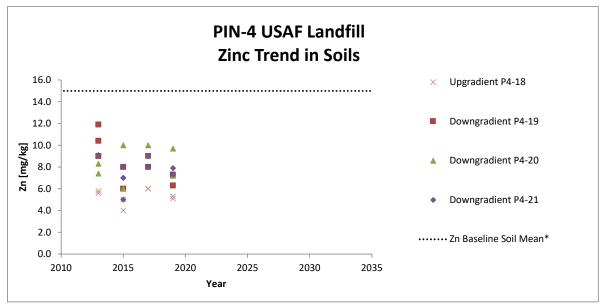
<sup>\*</sup> Pb baseline standard deviation = 0

### PIN-4 USAF Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





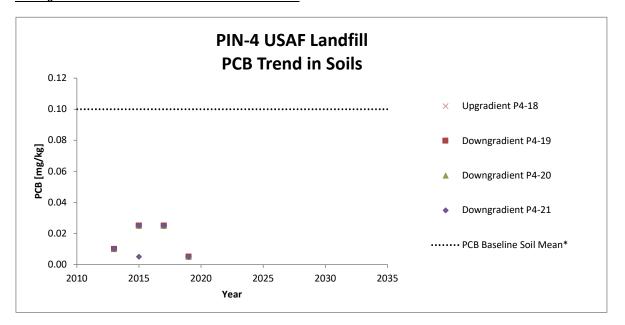
<sup>\*</sup> Zn baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Zn baseline standard deviation = 0

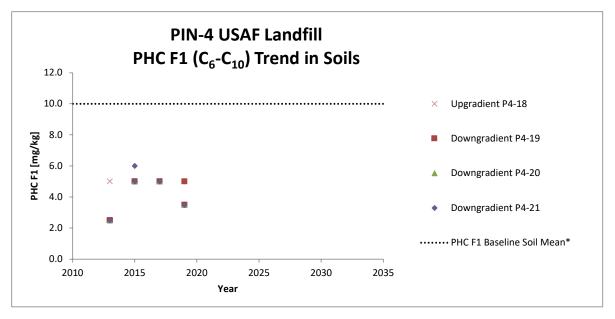
### PIN-4 USAF Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* PCB baseline arithmetic mean is equal to the baseline detection limit
- \* PCB baseline standard deviation = 0

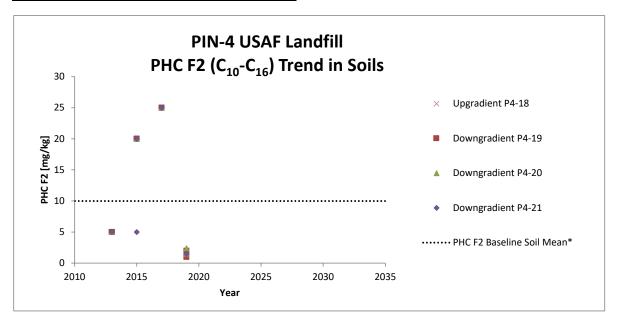


- \* F1 baseline arithmetic mean is equal to the baseline detection limit
- \* F1 baseline standard deviation = 0

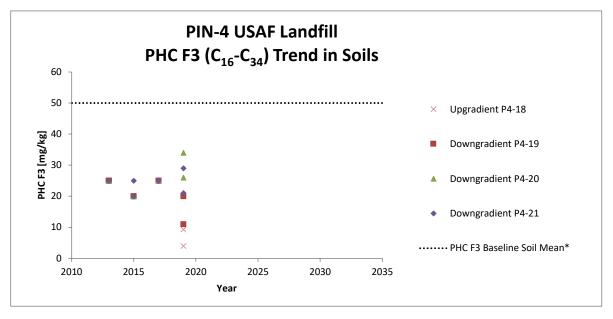
### PIN-4 USAF Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* F2 baseline arithmetic mean is equal to the baseline detection limit
- \* F2 baseline standard deviation = 0

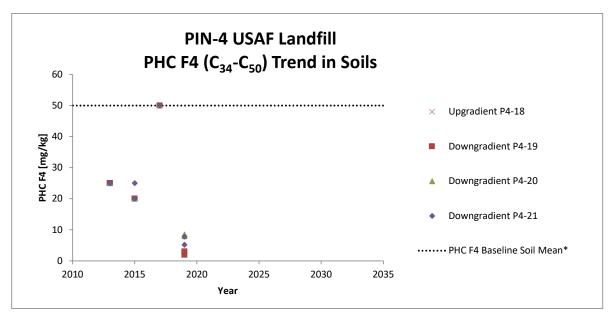


- \* F3 baseline arithmetic mean is equal to the baseline detection limit
- \* F3 baseline standard deviation = 0

### PIN-4 USAF Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



<sup>\*</sup> F4 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F4 baseline standard deviation = 0

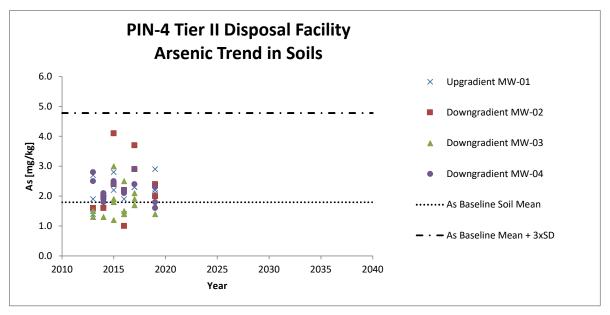
# **APPENDIX D7**

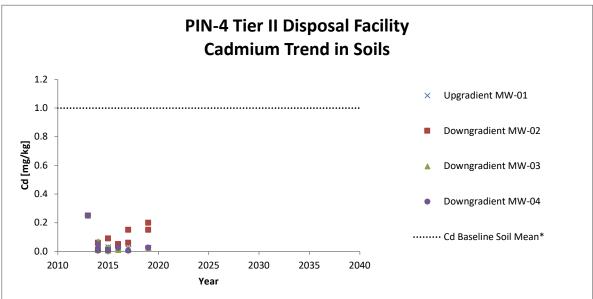
PIN-4 Tier II Soil Disposal Facility – Trends in Soil Inorganics, PCBs and PHCs

### PIN-4 Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





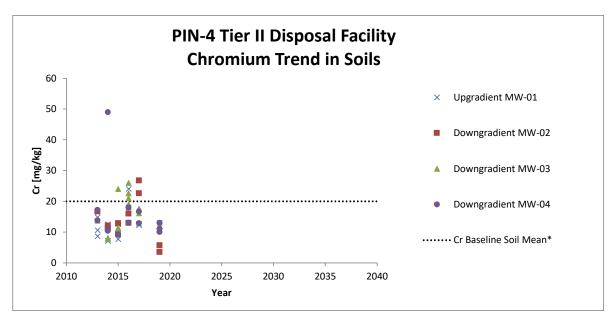
<sup>\*</sup> Cd baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Cd baseline standard deviation = 0

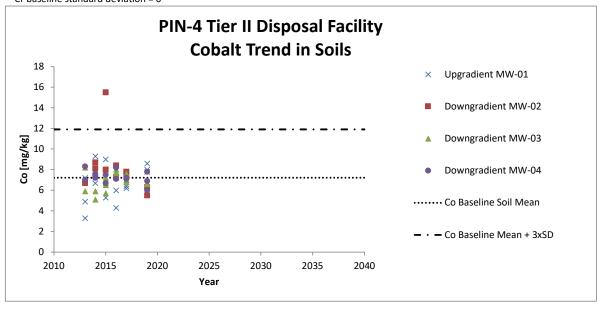
### PIN-4 Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



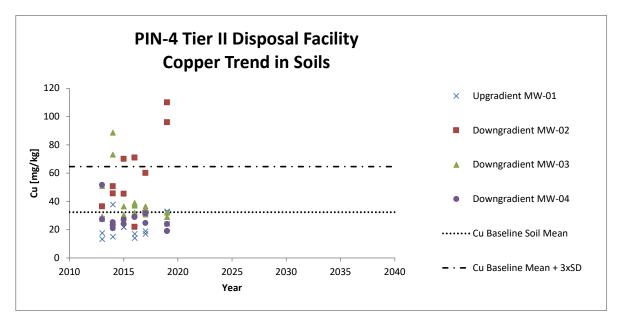
- \* Cr baseline arithmetic mean is equal to the baseline detection limit
- \* Cr baseline standard deviation = 0

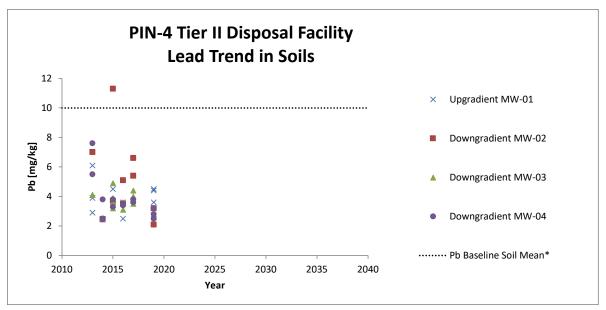


### PIN-4 Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





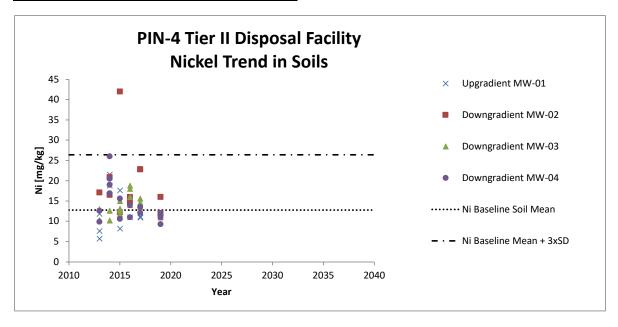
<sup>\*</sup> Pb baseline arithmetic mean is equal to the baseline detection limit

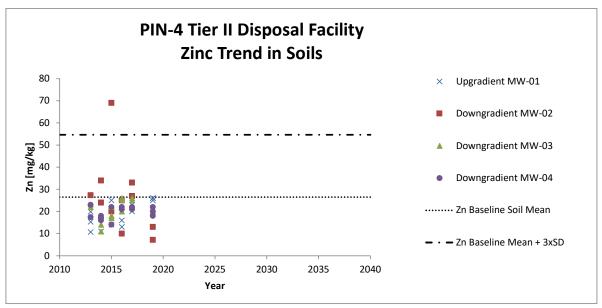
<sup>\*</sup> Pb baseline standard deviation = 0

### PIN-4 Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

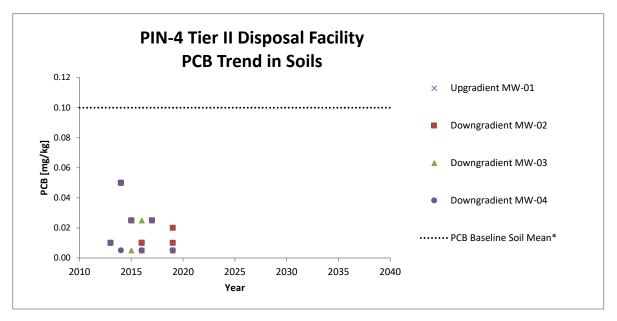




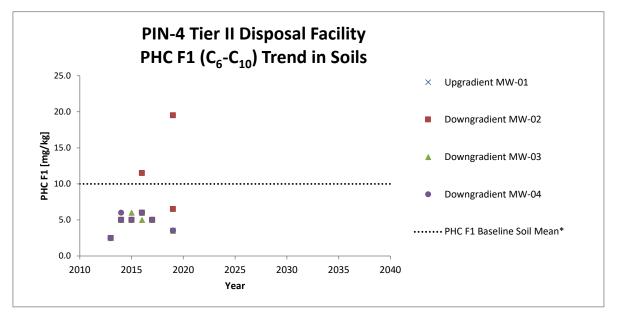
### PIN-4 Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* PCB baseline arithmetic mean is equal to the baseline detection limit
- \* PCB baseline standard deviation = 0

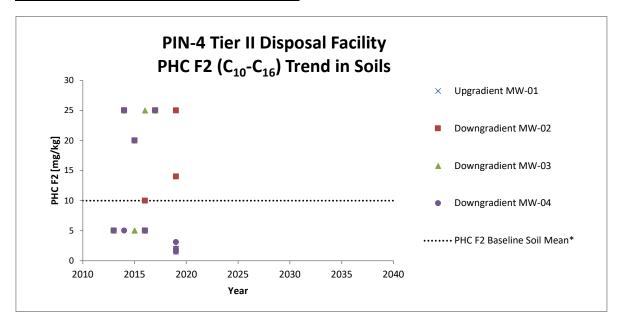


- \* F1 baseline arithmetic mean is equal to the baseline detection limit
- \* F1 baseline standard deviation = 0

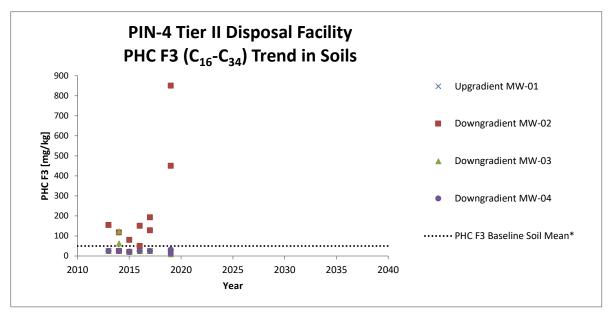
### PIN-4 Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* F2 baseline arithmetic mean is equal to the baseline detection limit
- \* F2 baseline standard deviation = 0

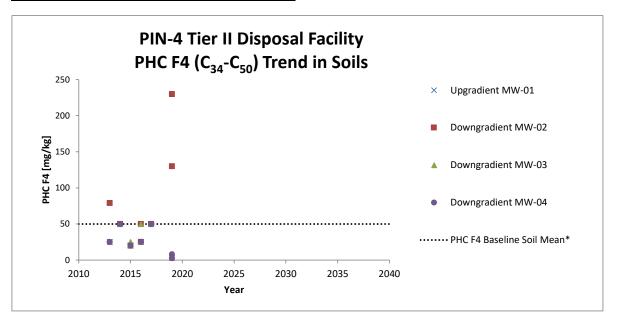


- \* F3 baseline arithmetic mean is equal to the baseline detection limit
- \* F3 baseline standard deviation = 0

### PIN-4 Tier II Disposal Facility Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



<sup>\*</sup> F4 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F4 baseline standard deviation = 0

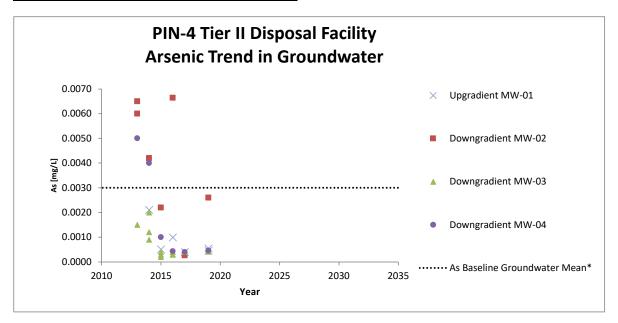
# **APPENDIX D8**

PIN-4 Tier II Soil Disposal Facility – Trends in Groundwater Inorganics and PHCs

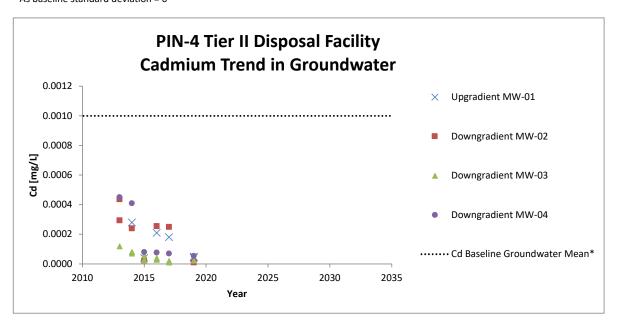
### PIN-4 Tier II Disposal Facility Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* As baseline arithmetic mean is equal to the baseline detection limit
- \* As baseline standard deviation = 0



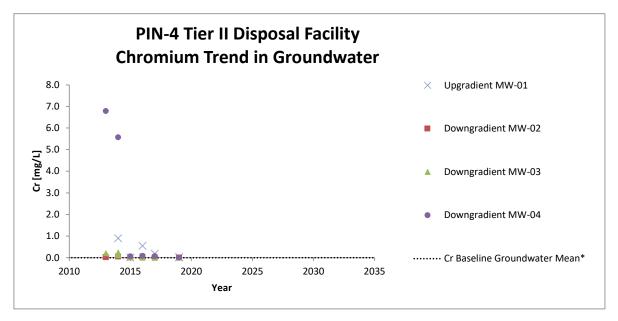
- $\ensuremath{^{*}}$  Cd baseline arithmetic mean is equal to the baseline detection limit
- \* Cd baseline standard deviation = 0

#### PIN-4 Tier II Disposal Facility Trends in Groundwater Inorganics and PHCs

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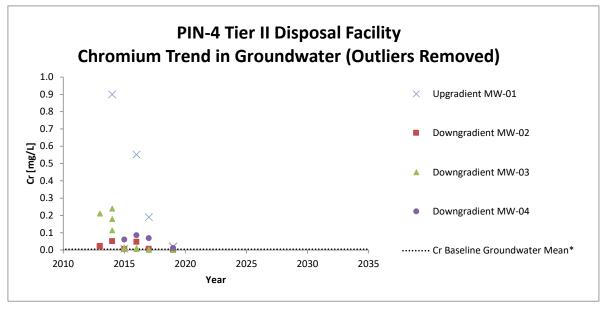
Where results are below detection, half of the detection limit has been used in the charts for the sample points.

<u>Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.</u>



<sup>\*</sup> Cr baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Cr baseline standard deviation = 0



<sup>\*</sup> Cr baseline arithmetic mean is equal to the baseline detection limit

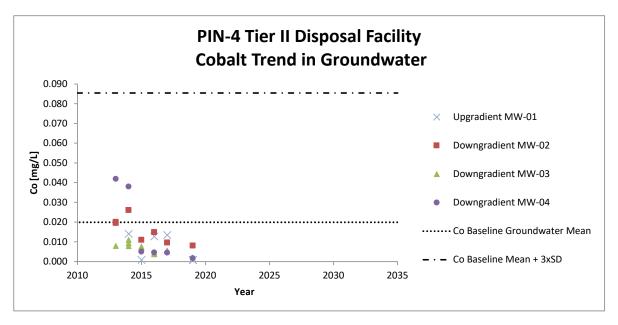
Cr results from downgradient location MW-04 in 2013 and 2014 are not shown on this chart

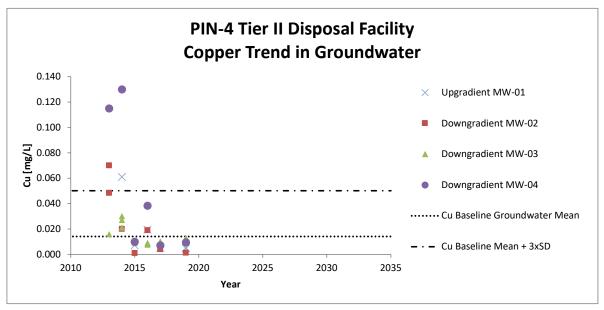
<sup>\*</sup> Cr baseline standard deviation = 0

### PIN-4 Tier II Disposal Facility Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

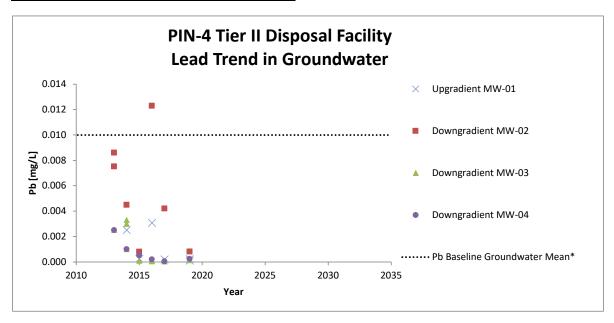




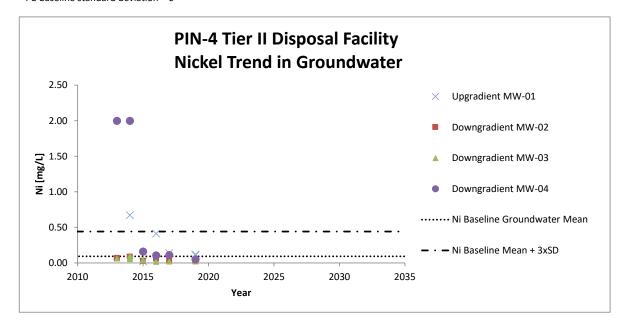
### PIN-4 Tier II Disposal Facility Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



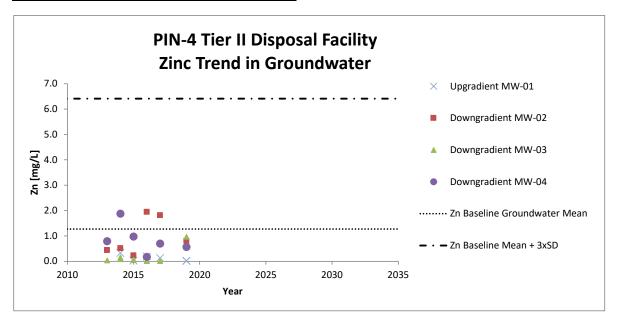
- \* Pb baseline arithmetic mean is equal to the baseline detection limit
- \* Pb baseline standard deviation = 0

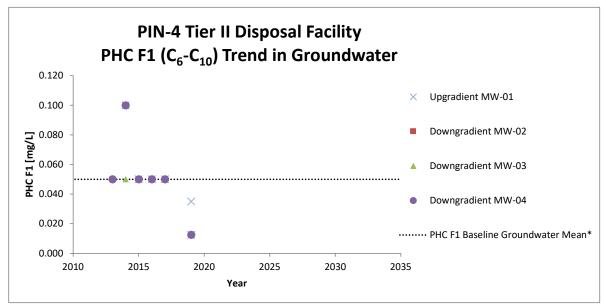


### PIN-4 Tier II Disposal Facility Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





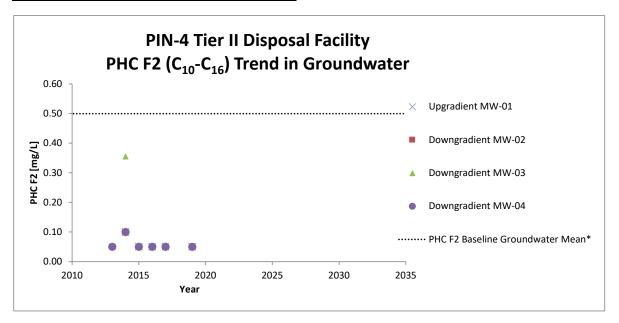
<sup>\*</sup> F1 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F1 baseline standard deviation = 0

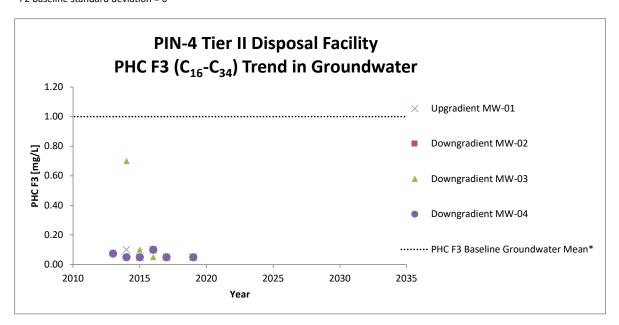
### PIN-4 Tier II Disposal Facility Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



- \* F2 baseline arithmetic mean is equal to the baseline detection limit
- \* F2 baseline standard deviation = 0

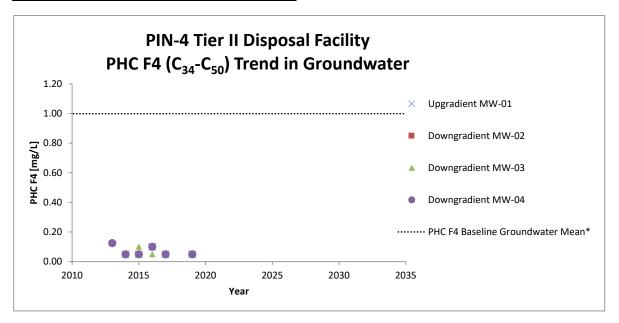


- \* F3 baseline arithmetic mean is equal to the baseline detection limit
- \* F3 baseline standard deviation = 0

### PIN-4 Tier II Disposal Facility Trends in Groundwater Inorganics and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



<sup>\*</sup> F4 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F4 baseline standard deviation = 0

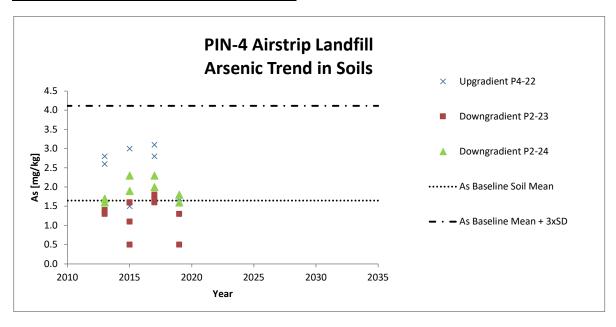
# **APPENDIX D9**

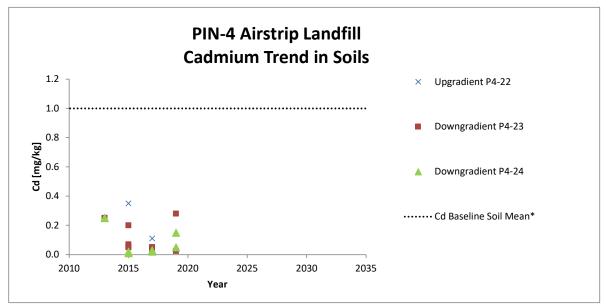
PIN-4 Airstrip Landfill – Trends in Soil Inorganics, PCBs and PHCs

### PIN-4 Airstrip Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





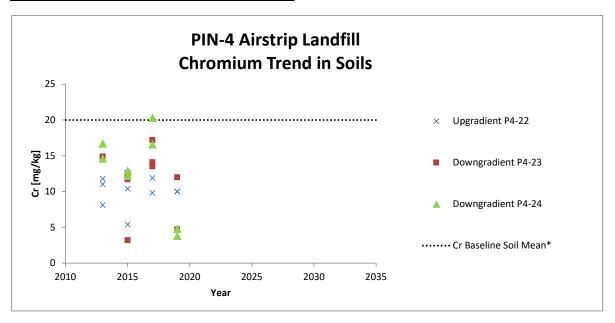
<sup>\*</sup> Cd baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> Cd baseline standard deviation = 0

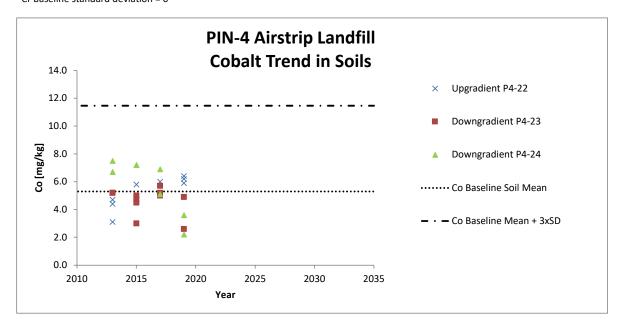
### PIN-4 Airstrip Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.



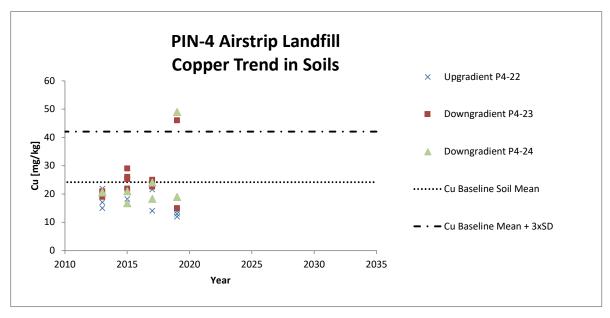
- \* Cr baseline arithmetic mean is equal to the baseline detection limit
- \* Cr baseline standard deviation = 0

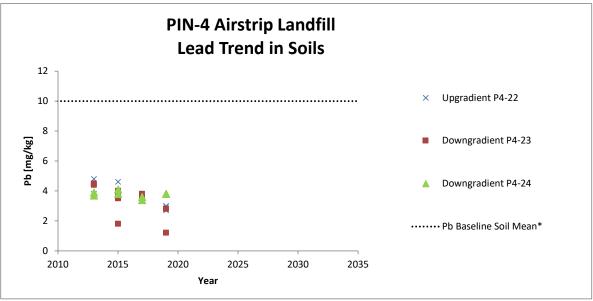


### PIN-4 Airstrip Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.





<sup>\*</sup> Pb baseline arithmetic mean is equal to the baseline detection limit

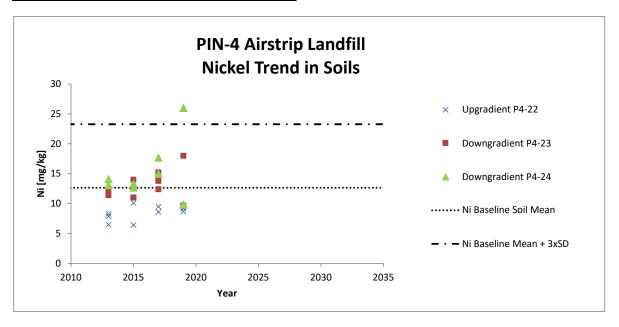
<sup>\*</sup> Pb baseline standard deviation = 0

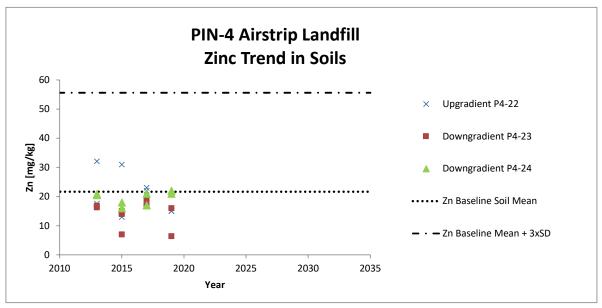
## PIN-4 Airstrip Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

<u>Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit.</u> Users should refer to data tables.



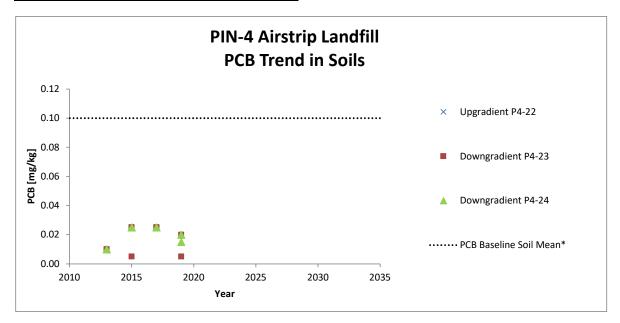


#### PIN-4 Airstrip Landfill Trends in Soil Inorganics, PCBs and PHCs

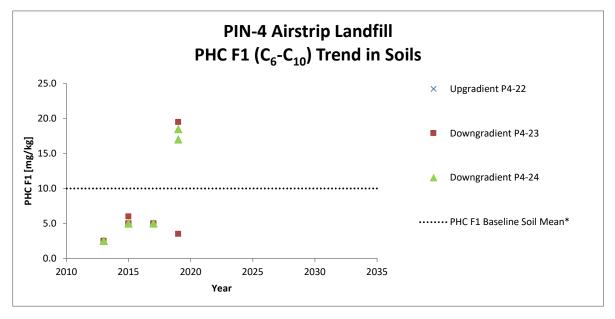
Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

<u>Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit.</u> Users should refer to data tables.



- \* PCB baseline arithmetic mean is equal to the baseline detection limit
- \* PCB baseline standard deviation = 0



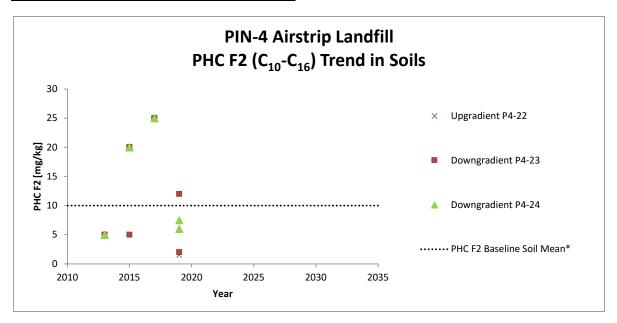
- \* F1 baseline arithmetic mean is equal to the baseline detection limit
- \* F1 baseline standard deviation = 0

#### PIN-4 Airstrip Landfill Trends in Soil Inorganics, PCBs and PHCs

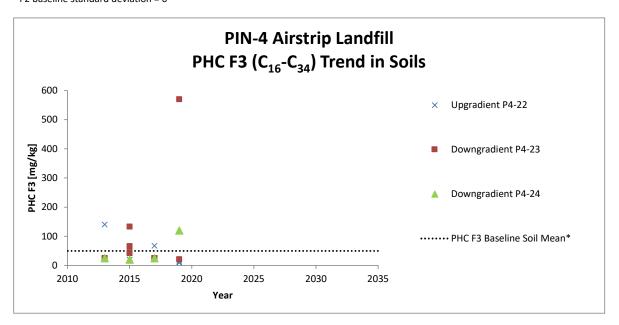
Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

<u>Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit.</u> Users should refer to data tables.



- \* F2 baseline arithmetic mean is equal to the baseline detection limit
- \* F2 baseline standard deviation = 0



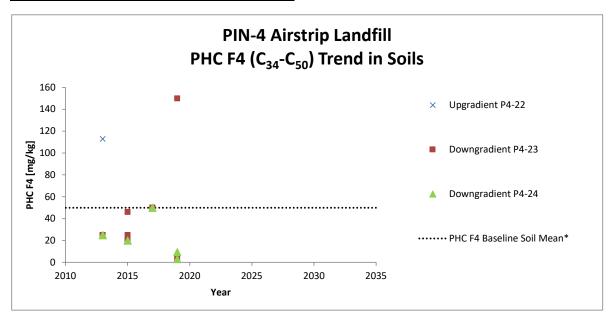
- \* F3 baseline arithmetic mean is equal to the baseline detection limit
- \* F3 baseline standard deviation = 0

#### PIN-4 Airstrip Landfill Trends in Soil Inorganics, PCBs and PHCs

Link To: Table of Contents

Where results are below detection, half of the detection limit has been used in the charts for the sample points.

<u>Trendlines are intended for visual interpretation of temporal trends. When all monitoring results are below detection, trendlines are a reflection of changes in detection limit. Users should refer to data tables.</u>



<sup>\*</sup> F4 baseline arithmetic mean is equal to the baseline detection limit

<sup>\*</sup> F4 baseline standard deviation = 0

# **APPENDIX E**

**Thermistor Inspection Reports** 

			ANNEX	( M: The	ermisto	r Inspec	tion Te	emplate			
I	nspector Name:					Inspection Date: 2019-08-24					
Insp	ector Signature:	= Mett Hald	22			*Previous Inspection Date: 2017-08-13					
<u>Thermi</u>	stor Information	<u>on</u>									
	*Site Name:	PIN-4						*Landfill:	Tier II Disposal I	Facility	
	*Thermistor #:	VT-1						Inclination:	☑ Vertical	□ Inc	lined
	*Northing:	7627991						*Easting:	576439.6		
*Installation Date: 2012-08-13							*Year 1 N	Monitoring Date:	2012-08-01		
Datalogger Model #: RX-16 Revision H-C						I	Datalogg	er Cable Model:	□ USB	☑ Se	erial Port
	alogger Serial #:							ble Too Short?:		ØN	
*E	levation (masl):	94.4				Extens	sion Cabl	e Required (m):		☑ N/	A
								_			
<u>Thermi</u>	stor Inspection	_		Good	Need	s Maintena	ance	Deta	ils		
			ng Integrity	$\square$							
			id Integrity	$\square$							
		Datalogger Fu		$\square$							
			unctionality	$\square$							
		Bead Fi	unctionality								
				V	NI.	N1/A		Date	1-		
<u>Lock</u>	10/			Yes	No	N/A		Deta	IIS		
		ng found locked up		$\overline{\square}$							
	•	rly functioning lock			$\overline{\square}$		16				
	was a new 70	000PS-KA3 lock pu	it in place?			$\overline{\checkmark}$	If no, m	lodei:			
Batteri	05			Yes	No	N/A		Deta	ile		
		ogger functional up	on arrival?	√ V		IN/A		Deta	115		
Batteries Found In Datalogger	was dataic		ery models:	V.			Main:	III R-15	Auxiliary	r III B.	.1
Foul		Battery install	•				2017-0		Auxiliary	. OLD-	
eries Oatal			tery levels:				Main:		Auxiliary	r 13 38	Rv.
Batt	Men	nory battery best b	•					w label			pel above COM plug)
	Men	Were batteries		$\overline{\square}$				models: ULB-15		yellow lat	lei above COIVI plug,
Battery Replacement			tery levels:	IV.			Main:		Auxiliary	. 12 76	
Bat eplad		Was desiccant	-	$\overline{\checkmark}$			iviaii i.	11.544	Auxiliary	. 13.70	, , , , , , , , , , , , , , , , , , ,
lal tus R	Expected	life of batteries in o					Years:	6	Replace by: 00	6	2026
Fina	•	er functional upon						rought south for		□Y	
•	vvas dataloggi	or ranctional aport	acpartare:				11 110, 101	Tought 30dth for	теранз:		E 14
Compi	ter Connectivi	tv							Yes		No
		n black internal dat	a logger glo	w bright re	ed when la	ntop attac	hed?		<u> </u>		
2000 11	ou otatuo ngiit oi	· Jack mornar dat	a legger gie		74	.p.top attac					
Manua	l Ground Temp	erature Readings	•								
Bead	kohms	°C					Bead	kohms	°C	7	
1	13.234	4.19					9	22.01	-5.7	1	
2	15.214	1.42					10	22.78	-6.3	1	
3	16.529	-0.20					11	23.21	-6.7	1	
4	17.137	-0.91					12	24.17	-7.4	1	
5	18.384	-2.26					13	24.47	-7.7	1	
6	19.319	-3.21					14	-	-		
7	20.26	-4.12					15	-	-	1	

**Datalogger Programming and Maintenance** 

-5.0

Data collection frequency: 12 hr Data collection time: Noon and Midnight Maintenance requirements: None

21.21

8

		ANNEX	( M: The	rmisto	r Inspec	tion T	emplate				
	Inspector Name:				Inspection Date: 2019-08-24						
Insp	ector Signature:	= Mutt Holis Z			*Previous Inspection Date: 2017-08-13						
<u>Therm</u>	istor Informatio										
	*Site Name:	PIN-4					*Landfill:	Tier II Disposal F	acility	/	
	*Thermistor #:	VT-2					Inclination:	☑ Vertical	□ Ind	clined	
	*Northing:	7627960.9						576441.6			
*Installation Date: 2012-08-13							Monitoring Date:				
Datalogger Model #: RX-16 Revision J-C					[	Datalogg	er Cable Model:	□ USB	ØS	erial Port	
	alogger Serial #:				Datalo	ogger Ca	able Too Short?:	□Y	ØN		
*	Elevation (masl):	93.9			Extens	ion Cab	le Required (m):		☑N	/A	
Thouse	intor Inopontion		Good	Nood	s Maintena	noo	Detai	lo.			
Inerm	istor Inspection	Casing Integrity	<u></u>	Neeu		ince	Detai	15			
		Cover/Lid Integrity	$\square$								
		Datalogger Functionality									
		Cable Functionality	<b>☑</b>								
		Bead Functionality	V								
Lock			Yes	No	N/A		Detai	ls			
LOUK	Was casir	ng found locked upon arrival?	<u> </u>		1471		20141				
		rly functioning lock removed?		$\overline{\mathbf{Q}}$							
	•	000PS-KA3 lock put in place?			$\overline{\mathbf{Q}}$	If no, m	odel.				
	Was a new re	our o rate took pat in place.	Ш	Ш	ت ــــــــــــــــــــــــــــــــــــ	11 110, 11	10401.				
Batteries			Yes	No	N/A	N/A Details					
드	Was datalo	gger functional upon arrival?	V								
und		Battery models:				Main:	ULB-15	Auxiliary	ULB	-1	
ss Fc aloge		Battery installation date:				2017-0	8-13				
Batteries Found In Datalogger		Battery levels:				Main:	11.34v	Auxiliary	ıry: 13.50v		
	Men	nory battery best before date:				expiry	October 2017	(Refer to	ellow la	bel above COM plug)	
Battery Replacement		Were batteries replaced?	V			If yes,	models: ULB-15	and ULB 1			
attery		New battery levels:				Main:	11.34v	Auxiliary	: 13.8	7v	
Repli		Was desiccant replaced?	$\overline{\checkmark}$			-		-			
	Expected	life of batteries in datalogger:				Years:	6	Replace by: 06	6	2026	
Final	Was datalogge	er functional upon departure?	$\overline{\checkmark}$			If no, b	rought south for		ΠΥ	☑N	
	uter Connectivi							Yes		No	
Does r	ed status light or	n black internal data logger glo	w bright re	d when la	ptop attacl	hed?		$\overline{\checkmark}$			
		erature Readings						_			
Bead	kohms	°C				Bead	kohms	°C			
1	11.221	7.52				9	19.166	-3.06	4		
2	11.979	6.19				10	19.771	-3.66	1		
3	12.194	5.83				11	20.81	-4.63	1		
4	13.468	3.84				12	21.57	-5.31			
5	14.856	1.89				13	22.40	-6.02	1		
6	16.266	0.11				14	-	-	1		

# **Datalogger Programming and Maintenance**

-0.89

-1.86

Data collection frequency: 12 hr Data collection time: Noon and Midnight Maintenance requirements: None

17.123

18.001

7

8

15

16

Inspector §  Thermistor II  *S  *The  *Installa  Datalogge  Datalogge  *Elevation  Thermistor II  Lock	, , , , , , , , , , , , , , , , , , , ,				Inclinatio	ill: Tier II Disposal in: ☑ Vertical g: 576398.7	Facility □ Inclined	t
*Thermistor II  *S  *The  *Installa  Datalogge  *Elevation  Thermistor II  Lock	ite Name: PIN-4 ermistor #: VT-3 *Northing: 7627952.9 tion Date: 2012-08-13 r Model #: RX-16 Revision J-C er Serial #: 07040011				*Landf Inclinatio *Eastin *Year 1 Monitoring Dat	ill: Tier II Disposal n: ☑ Vertical g: 576398.7	•	t
*S *The  *Installa Datalogge Datalogge *Elevatio  Thermistor In	ite Name: PIN-4 ermistor #: VT-3 *Northing: 7627952.9 tion Date: 2012-08-13 r Model #: RX-16 Revision J-C er Serial #: 07040011				Inclinatio *Eastin *Year 1 Monitoring Dat	n: ☑ Vertical ng: 576398.7	•	t
*The  *Installa  Datalogge  *Elevatio  Thermistor In	ermistor #: <b>VT-3</b> *Northing: 7627952.9 tion Date: 2012-08-13 r Model #: RX-16 Revision J-C er Serial #: 07040011				Inclinatio *Eastin *Year 1 Monitoring Dat	n: ☑ Vertical ng: 576398.7	•	t
*Installa Datalogge Datalogge *Elevation  Thermistor In	*Northing: 7627952.9  tion Date: 2012-08-13  r Model #: RX-16 Revision J-C  er Serial #: 07040011				*Eastin	g: 576398.7	□ Incline	d
*Installa Datalogger Datalogger *Elevation  Thermistor In  Lock	r Model #: RX-16 Revision J-C er Serial #: 07040011				*Year 1 Monitoring Dat	<u> </u>		
Datalogger Datalogger *Elevation  Thermistor In	r Model #: RX-16 Revision J-C er Serial #: 07040011					e 2012-08-01		
Datalogge *Elevation  Thermistor In	er Serial #: 07040011				Datalogger Cable Made	.c. 2012 00 01		
*Elevation  Thermistor II					Datalogger Cable Mode	el: 🗆 USB	☑ Serial	Port
Thermistor II	on (masl): 93.8			Data	logger Cable Too Short	:?: □ Y	⊠N	
Lock				Exten	sion Cable Required (m	า):	☑ N/A	
Lock								
		Good	Needs	Mainten	ance Det	tails		
	Casing Integrity	$\overline{Q}$						
	Cover/Lid Integrity	$\overline{Q}$						
	Datalogger Functionality	$\overline{\square}$			Time on logger did no	ot match local time		
	Cable Functionality	$\overline{Q}$						
	Bead Functionality	$\overline{\mathbf{A}}$						
		Yes	No	N/A	Dei	tails		
,	Was casing found locked upon arrival?	<u>√</u>		14// (		tano		
	Vas a poorly functioning lock removed?		$\overline{\square}$					
	s a new 7000PS-KA3 lock put in place?			$\overline{\checkmark}$	If no, model:			
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							
<u>Batteries</u>		Yes	No	N/A	Det	tails		
<u> </u>	Vas datalogger functional upon arrival?		V					
Batteries Found In Datalogger	Battery models:				Main: ULB-15	Auxiliary	y: ULB-1	
es Fo	Battery installation date:				2017-08-13			
Dat	Battery levels:				Main: 11.34v	Auxiliary	y: 13.50v	
å	Memory battery best before date:				no yellow label	(Refer to	yellow label ab	ove COM plug)
y nent	Were batteries replaced?	$\overline{\checkmark}$			If yes, models: ULB-1	15 and ULB 1		
Battery Replacement	New battery levels:				Main: 11.34v	Auxiliary	y: 13.63v	
B Repl	Was desiccant replaced?	$\overline{\checkmark}$						
Final Status Status					Years: 6	Replace by: 0	6 2	026
Stat Was	Expected life of batteries in datalogger:	$\overline{\mathbf{Q}}$			If no, brought south for		пΥ	☑N

Computer Connectivity	Yes	No
Does red status light on black internal data logger glow bright red when laptop attached?	$\overline{\checkmark}$	

#### **Manual Ground Temperature Readings**

Bead	kohms	°C
1	9.945	10.01
2	10.523	8.84
3	12.253	5.74
4	12.429	5.45
5	13.943	3.14
6	15.428	1.14
7	16.588	-0.27
8	17.410	-1.21

Bead	kohms	°C
9	18.529	-2.41
10	19.577	-3.47
11	20.35	-4.2
12	21.11	-4.9
13	21.89	-5.6
14	-	-
15	-	-
16	-	-

## **Datalogger Programming and Maintenance**

Data collection frequency: 12 hr
Data collection time: Noon and Midnight
Maintenance requirements: None

Note: An error was encountered when logger was connected to the field laptop. The cause of the error was suspected to be software related. Complete Memory Transfer was completed. Logger memory was then cleared and reprogrammed. Logger appeared functional upon departure.

			ANNEX	M: The	ermisto	r Inspec	tion Te	emplate			
	Inspector Name:					Inspection Date: 2019-08-24					
Insp	ector Signature:	= Mest Hable	2			*Previous Inspection Date: 2017-08-13					
Therm	istor Informatio								<del>-</del> :		
*Site Name: PIN-4							: Tier II Disposal	-			
	*Thermistor #:								: ☑ Vertical	□ Inc	clined
		7627922.6							: 576401.2		
*Installation Date: 2012-08-13					*Year 1 Monitoring Date: 2012-08-01						
		RX-16 Revision J-C	<u> </u>					er Cable Model		☑ Se	erial Port
	alogger Serial #:							able Too Short?		ØN	
*	Elevation (masl):	93.3				Extens	sion Cab	le Required (m)	<u> </u>	☑ N/	Α
Therm	istor Inspection	1		Good	Need	s Maintena	ance	Deta	ils		
	notor mopeotion	_	g Integrity	<u> </u>				2013			
		Cover/Lic		$\square$							
		Datalogger Fun		$\square$							
		Cable Fun	-	$\square$							
		Bead Fun	-	$\overline{\mathbf{Q}}$							
						ш					
Lock				Yes	No	N/A		Deta	ils		
	Was casir	ng found locked upor	n arrival?	$\overline{\checkmark}$							
	Was a poo	rly functioning lock re	emoved?		$\overline{\mathbf{V}}$						
	Was a new 70	000PS-KA3 lock put	in place?			$\overline{\checkmark}$	If no, m	nodel:			
Batteries			Yes	No	N/A		Deta	ils			
드	Was datalo	ogger functional upor	n arrival?	$\overline{\checkmark}$							
ound		Battery	y models:				Main:	ULB-15	Auxiliar	y: ULB-	-1
Batteries Found In Datalogger		Battery installat	tion date:				2017-0	8-13			
atteri Da		Batte	ry levels:				Main:	11.34v	Auxiliar	y: 13.50	Ov .
	Men	nory battery best bef	fore date:				no yello	ow label	(Refer to	yellow lat	bel above COM plug)
.y ment		Were batteries r	eplaced?	$\overline{\checkmark}$			If yes, ı	models: ULB-15	and ULB 1		
atter		New batte	ry levels:				Main:	11.34v	Auxiliar	y: 13.63	3v
Battery Replacement		Was desiccant r	eplaced?								
Final	Expected	life of batteries in da	talogger:				Years:	6	Replace by: 0	6	2026
Sta	Was datalogge	er functional upon de	eparture?	$\overline{\mathbf{A}}$			If no, b	rought south for	repairs?	□Y	⊠N
	uter Connectivi	t <u>y</u> n black internal data	logger alo	b = ab + = a	ما معطييا	unton ottoo	h a d O		Yes		No
Does	ed status light or	1 black internal data	logger glo	w bright re	ed when ia	рюр анас	neu?		$\overline{\checkmark}$		
Manus	al Ground Temp	erature Readings									
Bead		°C					Bead	kohms	°C		
1	10.315	9.25					9	19.151	-3.05		
2	11.983	6.19					10	20.03	-3.9		
3	12.725	4.97					11	10.73	8.4		
4	13.997	3.07					12	21.52	-5.3		
5	15.247	1.38					13	22.11	-5.8	7	
6	16.622	-0.31					14	22.66	-6.2		

## **Datalogger Programming and Maintenance**

-1.24

-2.24

Data collection frequency: 12 hr Data collection time: Noon and Midnight Maintenance requirements: None

17.437

18.357

7

8

15

16

22.83

23.44

-6.4

-6.9

# **APPENDIX F**

**Groundwater Monitoring Well Sampling Logs** 

S	ite Name:	PIN-4	Landfill Name:	Tier II Disposal Faci	lity	
	Date:			12:30		
	Weather:	Overcast, High 14 <sup>c</sup>	– °C. Low 6°C	-	<del>_</del>	
Monitorin			UTM Coordinates:	7628016.6 m	N	576448.1 m E
	Sample #:		_ Duplicate #:			
Bottles Filled (by Parame			_ ✓ Metals	☑ PHC F2-F4		
Preservatives Used for PHC Fr			☑ Sodium Bisulfate		□ None	
	` '	Elliott Holden	— Codidin Biodilato		- None	
Ponded Water, Snow De	•					
Well Condition/Repair Requ						
Lock Make/Model/Condition/F	Replaced:	Replaced (G. Hjuk	strom Limited, 7000PS	-KA3, 40mm)		
Pre-Measured Data (From Well Log)						
Depth of We	II (mbgs):	4.5	Diameter (cm):	5	(Pipe Diameter)	
Depth to Top of Scree	n (mbgs):	0.5	Screen Length (m):		_	
			_		_	
Field Measurements		<b>□</b> 1 ( p)	- Water Land Tare			
			☐ Water Level Tape	☐ Other		_
Well Stickup (Ground to Top of I	. , . ,			-		
Depth to Water (From Top of I	Pipe) (m):	1.317		<u>-</u>		
Calculated Static Water Leve	el (mbgs):	0.652		_		
Well Refusal D	epth (m):	2.166		(Measure Refusal A	fter Sampling)	
Thickness of Water Co	lumn (m):	0.849	Water Volume (L):		(Calculated)	
Free Product Thickne	ess (mm):	none	Sludge/Silt:	□Y ☑N		
Burging Information Summary						
Purging Information Summary  Purging/Sampling Equipment/To	echnique.		Tior I	I Disposal Facility		
Water Quality Parameter E	-			Field Calibrated 201	0.09.20	
Maintained Purge Rate at ≤ 100			_	✓ < Recharge Rat		te
Total Volume P			(Total Volume Over N	J	J	
	urged (L).		<u> </u>			
Time (Note Dates if Multiple Days Requ	irod\	рН	Conductivity	Turbidity	Tempera	
13:27	iii eu)	7.97	(uS/cm) 10400	(NTU) 0.7	(°C)	
13:32		8.07	9160	0.9	5.50	
13:37		8.22	8070	0.5	5.33	
13:42		8.25	7650	0.0	5.33	
13:47		8.25	7400	0.0	5.30	
13:52		8.25	7500	0.0	5.31	
13.32		6.25	7500	0.0	5.31	
Final Time: 13:52 Fi	naı	8.25	7500	0.0	5.31	
Values:			7500	0.0	5.3	
	Clear?		Colour:	slight brown colour	<u>_</u>	
PHO	C Sheen?		PHC Odour?	□ Y ☑ N		
Free Product/PHC (	Globules?	□Y ☑N	Other Odour?	none	<u> </u>	
Decontamination of Sampling Equip	ment					
All Equipment Dedicated/Sir		☑ Y □N	Decon Required?	□Y ☑N		
Type of Decontamination	J		# Washes/Rinses:			
Type of Decontamination	i i iuiu(S):	I N/ A	# vvasiies/Miises.	IN/A	<del>_</del>	
Photographic Poperds						
Photographic Records	boro/IDa					
Close Up/Wide Angle/Pa			Direction:			
· · · · · · · · · · · · · · · · · · ·	anoramic: ndicated?		Line of Sight:			
Scale II	iaioaiou:		Line or orgin.			

Site Name	: PIN-4	Landfill Name:	Tier II Disposal Facil	ity
Date	2018-08-21	- Time:	14:59	
Weather	: Overcast with Light	− t Rain, High 14°C, Low	6°C	_
Monitoring Well ID		UTM Coordinates:		V 576509.7 m E
Sample #		_ Duplicate #:		
Bottles Filled (by Parameter Type)		_ ✓ Metals	☑ PHC F2-F4	
Preservatives Used for PHC Fraction(s)		✓ Sodium Bisulfate		□ None
Name(s) of Sampler(s)		E Codium Disulate	- Other.	- None
		nd well (annuarimental)	40 am daan)	
Ponded Water, Snow Depth, etc.		, , , , , ,	ro cm deep)	
Well Condition/Repair Requirements				
Lock Make/Model/Condition/Replaced	: Replaced (G. Hjuks	strom Limited, 7000PS-	KA3, 40mm)	
Pre-Measured Data (From Well Log)				
Depth of Well (mbgs)	: 4.5	Diameter (cm):	4	(Pipe Diameter)
Depth to Top of Screen (mbgs)	: 0.6	Screen Length (m):		_
		_		_
Field Measurements	<b>7</b>	= ··· · · · -	= •	
Measurement Method	: 🗹 Interface Probe	□ Water Level Tape	☐ Other	
Well Stickup (Ground to Top of Pipe) (m)	: 0.635			
Depth to Water (From Top of Pipe) (m)	: 0.525	(distance from top of	pipe to ponded water)	
Calculated Static Water Level (mbgs)	:0.0			
Well Refusal Depth (m)	:1.645		(Measure Refusal Af	ter Sampling)
Thickness of Water Column (m)	:1.12	Water Volume (L):	2.24	_(Calculated)
Free Product Thickness (mm)	: none	Sludge/Silt:	☑Y □N	
Duraing Information Commons				
Purging Information Summary  Purging/Sampling Equipment/Technique		Low Fla	w Peristalltic Pump	
Water Quality Parameter Equipment			Field Calibrated 2019	2.00.20
Maintained Purge Rate at ≤ 100 mL/min	_			9-08-20 e □ > Recharge Rate
Total Volume Purged (L)		_	9	Ğ
		_(Total Volume Over M	iuitipie Events, ii App	iicabie)
Time	pН	Conductivity	Turbidity	Temperature
(Note Dates if Multiple Days Required) 15:12	7.70	(uS/cm) 2390	(NTU) 72.7	(°C) 5.02
15:22	7.40	2180	33.0	5.06
15:27	7.27	2140	10.7	5.58
15:32	7.18	2150	9.8	5.76
15:37	7.16	+		5.78
		2150	9.5	
15:42	7.17	2150	9.7	5.75
Final Time: 15:42 Final	7.17	2150	0.7	E 75
Values:	7.17	2150	9.7	5.75
Clear	P ☑ Y □ N	Colour:	slight brown colour	_
PHC Sheen?		PHC Odour?	□Y ☑N	
Free Product/PHC Globules?	P□Y ☑N	Other Odour?	metallic	_
Decontamination of Sampling Equipment				
All Equipment Dedicated/Single Use?	P ☑ Y □ N	Decon Required?	□Y ☑N	
		•		
Type of Decontamination Fluid(s)	: <u>N/A</u>	# Washes/Rinses:	N/A	_
Photographic Perceda				
Photographic Records				
Photo Numbers/IDs				
Close Up/Wide Angle/Panoramic Scale Indicated?		_ Direction:		
Scale mulcated:		Line of Sight:		

Site Name:	PIN-4	Landfill Name:	Tier II Disposal Facil	ity
Date:	2019-08-21	<del>-</del> Time:	16:11	
Weather:	Light Rain, High 14	– ₽°C, Low 6°C		_
Monitoring Well ID:		UTM Coordinates:	7627878.8 m N	N 576436.9 m E
Sample #:		Duplicate #:		
Bottles Filled (by Parameter Type):		_ ☑ Metals	☑ PHC F2-F4	
Preservatives Used for PHC Fraction(s):		☑ Sodium Bisulfate	☐ Other:	□ None
Name(s) of Sampler(s):				
Ponded Water, Snow Depth, etc.:				
Well Condition/Repair Requirements:		needed		
Lock Make/Model/Condition/Replaced:			-KA3 40mm)	
	Tropiacoa (C. Fijana	Strom Emittod, 70001 C	10.0, 1011111)	
Pre-Measured Data (From Well Log)				
Depth of Well (mbgs):			4	(Pipe Diameter)
Depth to Top of Screen (mbgs):	0.4	Screen Length (m):	3	_
Field Measurements				
Measurement Method:	☑ Interface Probe	☐ Water Level Tape	□ Other	
Well Stickup (Ground to Top of Pipe) (m):		•		
Depth to Water (From Top of Pipe) (m):			-	
Calculated Static Water Level (mbgs):			-	
Well Refusal Depth (m):			- (Measure Refusal Af	ter Sampling)
Thickness of Water Column (m):		Water Volume (L):	- `	(Calculated)
Free Product Thickness (mm):		Sludge/Silt:		_ `
		_		
Purging Information Summary				
Purging/Sampling Equipment/Technique:			ow Peristalltic Pump	
Water Quality Parameter Equipment:			Field Calibrated 201	
Maintained Purge Rate at ≤ 100 mL/min:			•	e □ > Recharge Rate
Total Volume Purged (L):	3	_(Total Volume Over M	Multiple Events, if App	licable)
Time	pH	Conductivity	Turbidity	Temperature
(Note Dates if Multiple Days Required)	7.50	(uS/cm)	(NTU)	(°C)
16:17	7.50	3300	1.5	4.10
16:27 16:32	7.60	3340	0.6 1.9	3.83 3.83
16:37	7.58	3220	1.9	3.80
16:42	7.53 7.50	3250 3290	0.6	3.75
16:47	7.50	3280	0.0	3.79
16:52	7.51	3280	0.0	3.80
10.32	7.52	3280	0.0	3.00
Final Time: 16:52 Final Values:	7.52	3280	0.0	3.80
				3.00
Clear?	_		slight brown colour	_
PHC Sheen?	_	PHC Odour?		
Free Product/PHC Globules?	□Y ☑N	Other Odour?	none	_
Decontamination of Sampling Equipment				
All Equipment Dedicated/Single Use?	$\square$ Y $\square$ N	Decon Required?	$\square$ Y $\square$ N	
Type of Decontamination Fluid(s):	N/A	# Washes/Rinses:	N/A	
		_		_
Photographic Records				
Close Up/Wide Angle/Panoramic:		Direction:		
Scale Indicated?		Line of Sight:		

Site Name:	PIN-4	Landfill Name:	Tier II Disposal Facil	ity
Date:	2019-08-21	<del>-</del> Time:	17:06	
Weather:	Light Rain, High 14	– ₽°C, Low 6°C		_
Monitoring Well ID:		UTM Coordinates:	7627928.6 m N	N 576345.4 m E
Sample #:		- Duplicate #:		
Bottles Filled (by Parameter Type):		_ ☑ Metals	☑ PHC F2-F4	
Preservatives Used for PHC Fraction(s):		☑ Sodium Bisulfate	□ Other:	□ None
Name(s) of Sampler(s):				
Ponded Water, Snow Depth, etc.:				
Well Condition/Repair Requirements:		needed		
Lock Make/Model/Condition/Replaced:	•		-KA3 40mm)	
	Tropiacea (C. Fijana	Strom Emittod, 70001 C	10.0, 1011111,	
Pre-Measured Data (From Well Log)				
Depth of Well (mbgs):		<del></del> '	4	(Pipe Diameter)
Depth to Top of Screen (mbgs):	0.5	Screen Length (m):	3	<u>_</u>
Field Measurements				
	✓ Interface Probe	□ Water Level Tape	□ Other	
Well Stickup (Ground to Top of Pipe) (m):		·		
Depth to Water (From Top of Pipe) (m):			-	
Calculated Static Water Level (mbgs):			-	
Well Refusal Depth (m):			- (Measure Refusal Af	ter Sampling)
Thickness of Water Column (m):		Water Volume (L):	• `	(Calculated)
Free Product Thickness (mm):		_ Sludge/Silt:		_(=====================================
, ,		_		
Purging Information Summary				
Purging/Sampling Equipment/Technique:			w Peristalltic Pump	
Water Quality Parameter Equipment:			Field Calibrated 2019	
Maintained Purge Rate at ≤ 100 mL/min:			•	e □ > Recharge Rate
Total Volume Purged (L):	3	_(Total Volume Over M	Iultiple Events, if App	licable)
Time	рН	Conductivity	Turbidity	Temperature
(Note Dates if Multiple Days Required)	· ·	(uS/cm)	(NTU)	(°C)
17:17	7.11	14400	1.8	4.51
17:23	7.59	14600	2.1	4.94
17:28	7.82	13500	1.9	5.10
17:33	7.92	12800	1.0	5.28
17:38	8.06	12000	0.0	5.37
17:43	8.07	12100	0.0	5.39
17:58	8.07	12100	0.0	5.37
Final Time: 17:58 Final	0.07	40400	0.0	5.07
Values:	8.07	12100	0.0	5.37
Clear?		Colour:	very slight brown col	<u>o</u> ur
PHC Sheen?		PHC Odour?	□Y ☑N	
Free Product/PHC Globules?	□ Y ☑ N	Other Odour?	none	<u>_</u>
Decontamination of Sampling Equipment				
All Equipment Dedicated/Single Use?	☑ Y □ N	Decon Required?	□Y ☑N	
Type of Decontamination Fluid(s):		# Washes/Rinses:	N/A	
. 750 0. 2000		_	. 1// 1	_
Photographic Records				
Close Up/Wide Angle/Panoramic:		Direction:		
Scale Indicated?		Line of Sight:		

Site Name:	PIN-4	Landfill Name:	Non-Hazardous Was	ste Landfill
Date:	2019-08-24	- Time:	11:28	
Weather:	Mixed Sun and Clo	- ud, Windy, High 11°C,	Low 5°C	_
Monitoring Well ID:		UTM Coordinates:		S 577296.1 m E
Sample #:	none	- Duplicate #:		
Bottles Filled (by Parameter Type):	□ PHC F1	_ □ Metals	□ PHC F2-F4	
Preservatives Used for PHC Fraction(s):		☐ Sodium Bisulfate	☐ Other:	□ None
Name(s) of Sampler(s):				
Ponded Water, Snow Depth, etc.:				
Well Condition/Repair Requirements:		eeded		
Lock Make/Model/Condition/Replaced:	•		KA2 40mm)	
Lock Make/Model/Condition/Neplaced.	Neplaceu (G. Fijuks	atom Limited, 7000F3	-NA3, 40IIIII)	
Pre-Measured Data (From Well Log)				
Depth of Well (mbgs):	4.5	Diameter (cm):	5	(Pipe Diameter)
Depth to Top of Screen (mbgs):	0.5	Screen Length (m):	3	_
Field Measurements				
Measurement Method:	✓ Interface Probe	□ Water Level Tane	□ Other	
		□ Water Level Tape	- Other	
Well Stickup (Ground to Top of Pipe) (m):			_	
Depth to Water (From Top of Pipe) (m):			-	
Calculated Static Water Level (mbgs):				
Well Refusal Depth (m):			(Measure Refusal Af	· -·
Thickness of Water Column (m):		Water Volume (L):		_(Calculated)
Free Product Thickness (mm):	none	Sludge/Silt:	$\square Y \square N$	
Purging Information Summary				
Purging/Sampling Equipment/Technique:		Low Flo	ow Peristalltic Pump	
Water Quality Parameter Equipment:		Calibration Details:		
Maintained Purge Rate at ≤ 100 mL/min:				□ > Recharge Rate
Total Volume Purged (L):	0	(Total Volume Over M	Multiple Events, if Appl	licable)
Time		Conductivity	Turbidity	Temperature
(Note Dates if Multiple Days Required)	рН	(uS/cm)	(NTU)	(°C)
	NOT SAMPLED - NO	O LIQUID WATER IN	WELL	
Final Time: Final Values:				
Clear?	□ Y □ N	Colour:		
PHC Sheen?		PHC Odour?		_
Free Product/PHC Globules?	□Y□N	Other Odour?		_
Decontamination of Sampling Equipment	_		_	
All Equipment Dedicated/Single Use?	☑ Y □ N	Decon Required?	□Y ☑N	
Type of Decontamination Fluid(s):	N/A	# Washes/Rinses:	N/A	_
Photographic Records				
Photo Numbers/IDs:				
Close Up/Wide Angle/Panoramic:		Direction:		
Scale Indicated?	$\sqcap Y  \sqcap N$	Line of Sight:		

Site Name:	PIN-4	Landfill Name:	Non-Hazardous Was	te Landfill
Date:		<del>-</del> Time:		
Weather:	Mixed Sun and Clo	— oud, Windy, High 11°C,	Low 5°C	_
Monitoring Well ID:		UTM Coordinates:		577230.7 m E
Sample #:		Duplicate #:	none	
Bottles Filled (by Parameter Type):	☑ PHC F1	 ✓ Metals	☑ PHC F2-F4	
Preservatives Used for PHC Fraction(s):		☑ Sodium Bisulfate	☐ Other:	□ None
Name(s) of Sampler(s):				
Ponded Water, Snow Depth, etc.:				
Well Condition/Repair Requirements:		ven and locking ring has	s a crack - no repair is	recommended at this time
Lock Make/Model/Condition/Replaced:	· · · · · · · · · · · · · · · · · · ·		·	, recommended at the time
	rtopiacoa (C. rijan	otrom Emitod, 7 ocor C	10.0, 10.1111)	
Pre-Measured Data (From Well Log)				
Depth of Well (mbgs):		Diameter (cm):	5	(Pipe Diameter)
Depth to Top of Screen (mbgs):	0.3	Screen Length (m):	3	_
Field Measurements				
Measurement Method:	☑ Interface Probe	☐ Water Level Tape	□ Other	
Well Stickup (Ground to Top of Pipe) (m):		•		
Depth to Water (From Top of Pipe) (m):			<u>-</u>	
Calculated Static Water Level (mbgs):			-	
Well Refusal Depth (m):	-		- (Measure Refusal Af	ter Sampling)
Thickness of Water Column (m):		Water Volume (L):	• •	(Calculated)
Free Product Thickness (mm):		Sludge/Silt:		_(Calcalated)
rios riodast mistricos (min).	110110	_ Gladge/Gilt.		
Purging Information Summary				
Purging/Sampling Equipment/Technique:			w Peristalltic Pump	
Water Quality Parameter Equipment:	$\overline{}$		Field Calibrated 2019	
Maintained Purge Rate at ≤ 100 mL/min:		Purge Rate:	✓ < Recharge Rate	e □ > Recharge Rate
Total Volume Purged (L):	2.8	_(Total Volume Over M	Iultiple Events, if Appl	icable)
Time	рН	Conductivity	Turbidity	Temperature
(Note Dates if Multiple Days Required)	· ·	(uS/cm)	(NTU)	(°C)
10:45	9.23	0.414	146	3.18
10:50	9.43	0.414	125	3.14
10:55	9.48	0.426	63	3.17
11:00	9.37	0.444	8	3.30
11:05	9.31	0.451	1.3	3.18
11:10	9.30	0.451	1.1	3.17
11:15	9.29	0.452	1.1	3.19
Final Time 11:15 Final Values:	9.29	0.452	1.1	3.19
Clear?	$\mathbf{\nabla} \mathbf{Y}  \Box \mathbf{N}$	Colour:	clear	
PHC Sheen?	□Y ☑N	PHC Odour?	□Y ☑N	_
Free Product/PHC Globules?	$\square$ Y $\square$ N	Other Odour?	none	_
Decontamination of Sampling Equipment				_
All Equipment Dedicated/Single Use?	☑Y □N	Decon Required?	□Y ☑N	
Type of Decontamination Fluid(s):		# Washes/Rinses:		
Type of Decontamination Fluid(s):	19/75	<u>π γγασιίσο/Ιλίποθδ.</u>	IN/A	_
Photographic Records				
Photo Numbers/IDs:				
Close Up/Wide Angle/Panoramic:		Direction:		

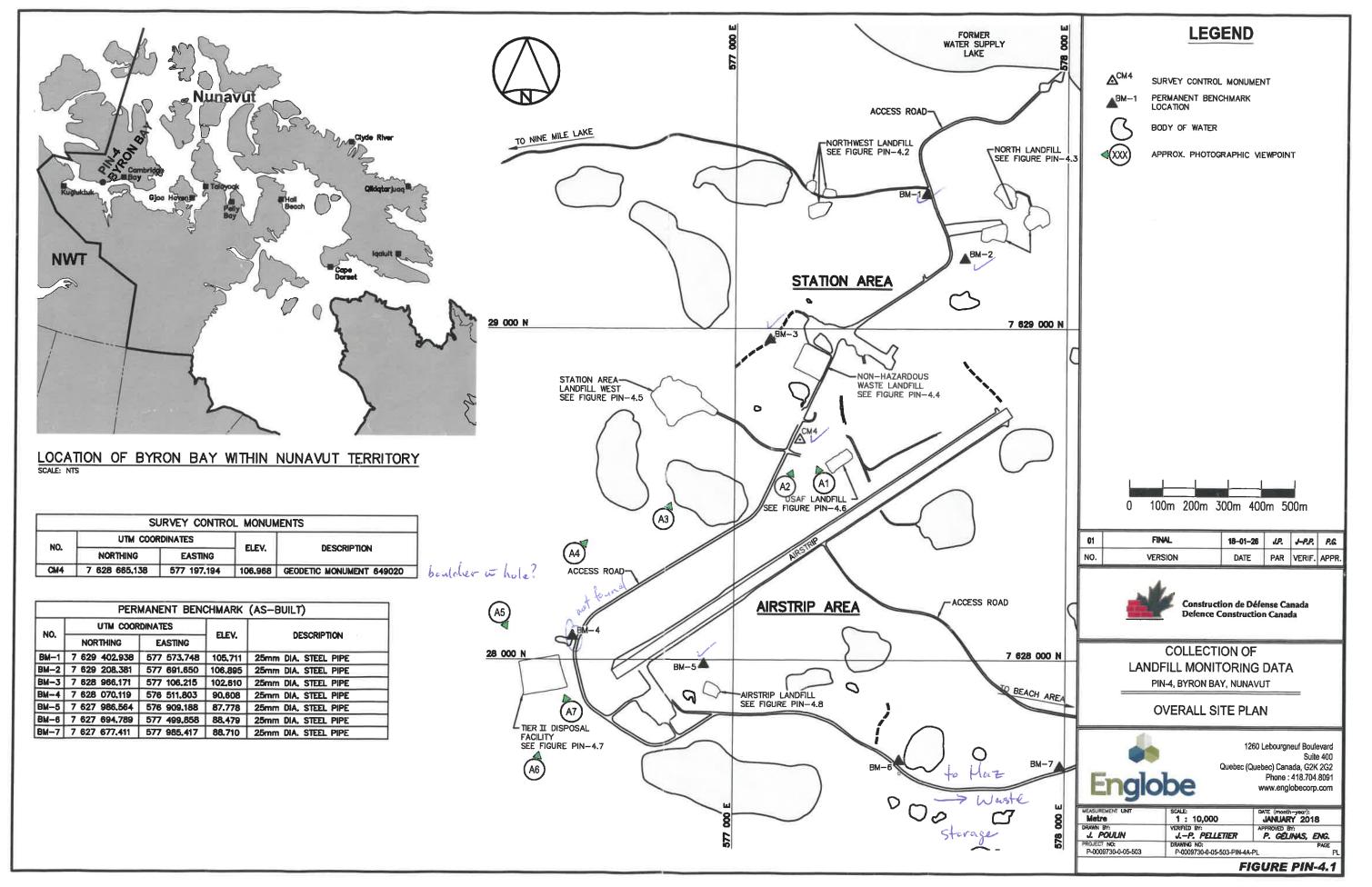
Site N	lame: PIN-4		Landfill Name:	Non-Hazardous Was	te Landfill	
	Date: 20	19-08-24	Time:	9:35		
We	ather: Mixed	Sun and Clo	ud, Windy, High 11°C,	Low 5°C	-	
Monitoring W	ell ID:	MW-07	UTM Coordinates:	7628874.6 m N	577163.2 m	ı E
Sam	ple #:	MW-07	Duplicate #:	none		
Bottles Filled (by Parameter 7	ype): 🗹 PH	C F1	■ Metals	☑ PHC F2-F4		
Preservatives Used for PHC Fracti	on(s):   Meth	nanol	☑ Sodium Bisulfate	☐ Other:	□ None	
Name(s) of Samp	er(s): Elliott	Holden				
Ponded Water, Snow Depth	, etc.: None					
Well Condition/Repair Requiren	nents: Good	- no repairs r	needed			
Lock Make/Model/Condition/Repl	aced: Repla	ced (G. Hjuk	strom Limited, 7000PS-	KA3, 40mm)		
Pre-Measured Data (From Well Log)						
Depth of Well (n	ipas).	45	Diameter (cm):	5	(Pipe Diameter)	
Depth to Top of Screen (n			Screen Length (m):	5	(Tipe Diameter)	
Deptil to Top of Screen (ii	ibgs).	0.5	_ Screen Length (III).		_	
Field Measurements	_					
Measurement Me	ethod: 🗹 Inte	rface Probe	☐ Water Level Tape	□ Other		
Well Stickup (Ground to Top of Pipe	) (m):	0.42		-		
Depth to Water (From Top of Pipe	) (m):	1.12		-		
Calculated Static Water Level (n	nbgs):	0.70		-		
Well Refusal Dept	n (m):	2.26		(Measure Refusal Aft	er Sampling)	
Thickness of Water Colum	n (m):	1.14	Water Volume (L):		(Calculated)	
Free Product Thickness	(mm):	none	Sludge/Silt:	□Y ☑N		
Purging Information Summary						
Purging/Sampling Equipment/Tech	niaue:		I ow Flo	ow Peristalltic Pump		
Water Quality Parameter Equip		U52-2		Field Calibrated 2019	9-08-20	
Maintained Purge Rate at ≤ 100 ml		□N		✓ < Recharge Rate		
Total Volume Purge	d (L):	3	(Total Volume Over M	Multiple Events, if Appl	icable)	
Time			Conductivity	Turbidity	Temperature	
(Note Dates if Multiple Days Required	)	pН	(S/cm)	(NTU)	(°C)	
9:50		9.00	0.572	3.4	2.58	
9:55		9.15	0.576	3.1	2.60	
10:00		9.42	0.586	4.9	2.62	
10:05		8.92	0.567	2.2	3.09	
10:10		8.70	0.546	2.1	3.14	
10:15		8.69	0.543	2.0	3.15	
10:20		8.68	0.542	2.0	3.15	
						_
Final Time: 10:20 Final Values		8.68	0.542	2.0	3.15	
C	lear? ☑ Y	$\square$ N	Colour:	clear		
PHC SI	neen? □ Y	✓N	PHC Odour?	□Y ☑N	-	
Free Product/PHC Glob	ules? □ Y	☑ N	Other Odour?	none	_	
Decontamination of Sampling Equipme	nt					
All Equipment Dedicated/Single		□N	Decon Required?	□Y ☑N		
Type of Decontamination Flu		N/A	# Washes/Rinses:			
. , , , , , , , , , , , , , , , , , , ,			_	14/1	_	
Photographic Records						
Photo Number	s/IDs:					
Close Up/Wide Angle/Panor			Direction:			_
Scale Indic		□N	Line of Sight:			
						_

Site Name:	PIN-4	Landfill Name:	Non-Hazardous Wast	te Landfill
Date:	2019-08-24	_ Time:		
Weather:	Mixed Sun and Clo	_ ud, Windy, High 11°C, l		-
Monitoring Well ID:	MW-08	UTM Coordinates:		577191.4 m E
Sample #:	MW-08	Duplicate #:		
Bottles Filled (by Parameter Type):		<b>-</b>	☑ PHC F2-F4	
Preservatives Used for PHC Fraction(s):		✓ Sodium Bisulfate		□ None
, ,		Socialii bisaliale	□ Otner	□ None
Name(s) of Sampler(s):				
Ponded Water, Snow Depth, etc.:	None			
Well Condition/Repair Requirements:	·			
Lock Make/Model/Condition/Replaced:	Replaced (G. Hjuks	strom Limited, 7000PS-	KA3, 40mm)	
Pre-Measured Data (From Well Log)				
Depth of Well (mbgs):	4.5	Diameter (cm):	5	(Pipe Diameter)
Depth to Top of Screen (mbgs):		Screen Length (m):		,
- span is not a constant (mage).				•
Field Measurements	<del></del>			
Measurement Method:	✓ Interface Probe	☐ Water Level Tape	□ Other	
Well Stickup (Ground to Top of Pipe) (m):	0.44			
Depth to Water (From Top of Pipe) (m):	1.694			
Calculated Static Water Level (mbgs):	1.254			
Well Refusal Depth (m):	2.160		(Measure Refusal Afte	er Sampling)
Thickness of Water Column (m):	0.466	Water Volume (L):	0.932	(Calculated)
Free Product Thickness (mm):	none	Sludge/Silt:	□Y ☑N	•
		_		
Purging Information Summary				
Purging/Sampling Equipment/Technique:			w Peristalltic Pump	
Water Quality Parameter Equipment:		-	Field Calibrated 2019	_
Maintained Purge Rate at ≤ 100 mL/min:			□ < Recharge Rate	•
Total Volume Purged (L):	2.8	_(Total Volume Over M	lultiple Events, if Application	cable)
Time	pH	Conductivity	Turbidity	Temperature
(Note Dates if Multiple Days Required)	<u>'</u>	(S/cm)	(NTU)	(°C)
9:20	8.58	0.582	3.6	2.68
9:25	8.64	0.572	2.1	2.72
	ELL WENT DRY - S	AMPLED DIRECTLY A	AT 11:55	Т
Final Time: Final Values:				
Clear?	☑Y □N	Colour:	clear	
PHC Sheen?	□ Y ☑ N	PHC Odour?	□Y ☑N	•
Free Product/PHC Globules?	□Y ☑N	Other Odour?	none	
		•		•
Decontamination of Sampling Equipment		Docon Bossiss -10		
All Equipment Dedicated/Single Use?		Decon Required?		
Type of Decontamination Fluid(s):	N/A	# Washes/Rinses:	N/A	
Photographic Records				
Photo Numbers/IDs:				
Close Up/Wide Angle/Panoramic:		Direction:		
Scale Indicated?	⊔Y ⊔N	Line of Sight:		

# **APPENDIX G**

**Field Notes** 





#### **DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING**

## **VISUAL INSPECTION CHECKLIST**

ANNEX J1: INSPECTION REPORT - PAGE 1 OF 3

SITE NAME: PIN-4 Byron Bay
LANDFILL DESIGNATION:
Northwest Landfull
LANDFILL TYPE (regraded, leachate contained, Tier II or NH):
regraded
DATE OF INSPECTION:
2019.08.22
WEATHER CONDITIONS:
Overcoust, cool, breezy. Intermittent precipitation.
DATE OF PREVIOUS INSPECTION:
2017.08.14
INSPECTED BY (name and signature):
Ryan Janzen Jun Jugar
REPORT PREPARED BY (name and signature):
Ryan Janzen Gunghyn
The inspector represents to the best of their knowledge that the following statements and observations are true and correct and that no material facts have been suppressed or misstated.

#### Notes:

- All Features must have UNIQUE and consistent identifiers:
  - o If a Feature is identified as Feature 'A' in 2013; then this same Feature 'A' must be followed up on as Feature 'A' in 2014 and all subsequent years. If it is not observed in a year, than it must be described as 'not observed'; Feature 'A' cannot be replaced to become a different Feature in later years.
  - o If a Feature was noted in a previous year, but in the Geotechnical Engineer's opinion is not relevant; you can explain why in your opinion it is not relevant.
  - o A new Feature must get its own unique identifier, in alphabetical order from where the previous list of Features left off; It should also be described as 'NEW' in the description column;
  - New Features can only be grouped together if they are very similar and located in close proximity;
  - o Feature names must be consistent in the Tables, Figures, Photos and text; All Feature referencing must be verified for consistency.
- All measurements must be metric units;
- GPS is in UTM coordinates (NAD83).

VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 2 OF 3

	VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 2 OF 3													
Checklist Item	Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at e and at a direction a	SPS coordinate: each 0.5m to 1r ny significant cl nd around circl of feature) centre of featu assible, and call Trimble ing/Northing/2	m interval, change in cumference ure (where	Length	Width	Depth	Extent relative to Area of Landfill (%)	A = acceptable  M = marginal  Description  (include stability rating for each feature)  S = Sightficant  U = unacceptable	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Settlement		Al -	Lohe B,	NWS	lope.		ا, ن	0.1	0.05	۷1	in-line of a nesstage A	consistent		NWLF_13,14
	Y		(								1	(ousis) eur		
	1	A2	3				0.2	6.1	کتہ ہ	41	minor depression. A	consistent		5
Settlement		Bl	(Lobe 1)	۵ ( ۱۰۰۰	+ < 1,00		ا , ن	0.1	0.05	۷ ا	miner depression. A	consistent	Pappear to be fines intiltration	7
		B2	) [882 1)	7 200	3.0	•	0.1	0,1	0.05	۷١	miner depression. A	eunsistent	infiltration.	NWL+_ 50, 31
Evos fen	<b>~</b>	С	Lobe B,	MW s	lope.		14	0.15	0-05	۷ (	miner linear exosion. A	consistent		NWLF_4,1Z
Frost Action				-										
	N													
Sloughing														
	N													
Cracking														
	N													
Animal Burrows														
	N													
							1							

VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 3 OF 3

Checklist Item	Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at e and at ar direction a Also take o fea	GPS coordinates each 0.5m to 1m interval, ny significant change in nd around circumference of feature) centre of feature (where asible, and call c) ing/ Northing/Zone	Length		Depth	Extent relative to Area of Landfill (%)	Description (include stability rating for each feature)	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Vegetation Establishment	Y	D1 D2			surfaces.		3 m2	NA	~15%	Sparse regetation. A	Larger than previously noted.		NWLF_4,6,7,10 NWLF_5
Staining Vegetation		D3	Lobe C (	(whole	thing). thing)		0 m <sup>2</sup>		~12%		previously noted.		NWLF_17,22 NWLF_34
Vegetation Stress									, , ,				
Seepage Points (or) Ponded Water							10						
Debris and/or Liner Exposed													
Presence & Condition of Monitoring Instruments													
Features of Note/ Other Relevant Observations (e.g. signs of activity, ruts)  The uslan  Crack	N	NA	Lobe D,	Nones	+	MA	NA	NA	NA	Not obserned.	consistent	Not observed in 2014, 2017. Noted in 2013.	None.

#### **DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING**

## **VISUAL INSPECTION CHECKLIST**

**ANNEX J1: INSPECTION REPORT - PAGE 1 OF 3** 

SITE NAME:
PIN-4 Byron Bay
LANDFILL DESIGNATION:
North Landfill
LANDFILL TYPE (regraded, leachate contained, Tier II or NH):
reg rouded
DATE OF INSPECTION:
2018.08.22
WEATHER CONDITIONS:
Overcost, coal, windy! Intermettent precipitation.
DATE OF PREVIOUS INSPECTION:
2017.08.14
INSPECTED BY (name and signature):
Ryan Janzen Grufyn
REPORT PREPARED BY (name and signature):
Ryan Janzen Grufyn
The inspector represents to the best of their knowledge that the following statements and observations are true and correct and that no material facts have been suppressed or misstated.

- All Features must have UNIQUE and consistent identifiers:
  - o If a Feature is identified as Feature 'A' in 2013; then this same Feature 'A' must be followed up on as Feature 'A' in 2014 and all subsequent years. If it is not observed in a year, than it must be described as 'not observed'; Feature 'A' cannot be replaced to become a different Feature in later years.
  - o If a Feature was noted in a previous year, but in the Geotechnical Engineer's opinion is not relevant; you can explain why in your opinion it is not relevant.
  - A new Feature must get its own unique identifier, in alphabetical order from where the previous list of Features left off; It should also be described as 'NEW' in the description column;
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  - o Feature names must be consistent in the Tables, Figures, Photos and text; All Feature referencing must be verified for consistency.
- All measurements must be metric units;
- GPS is in UTM coordinates (NAD83).

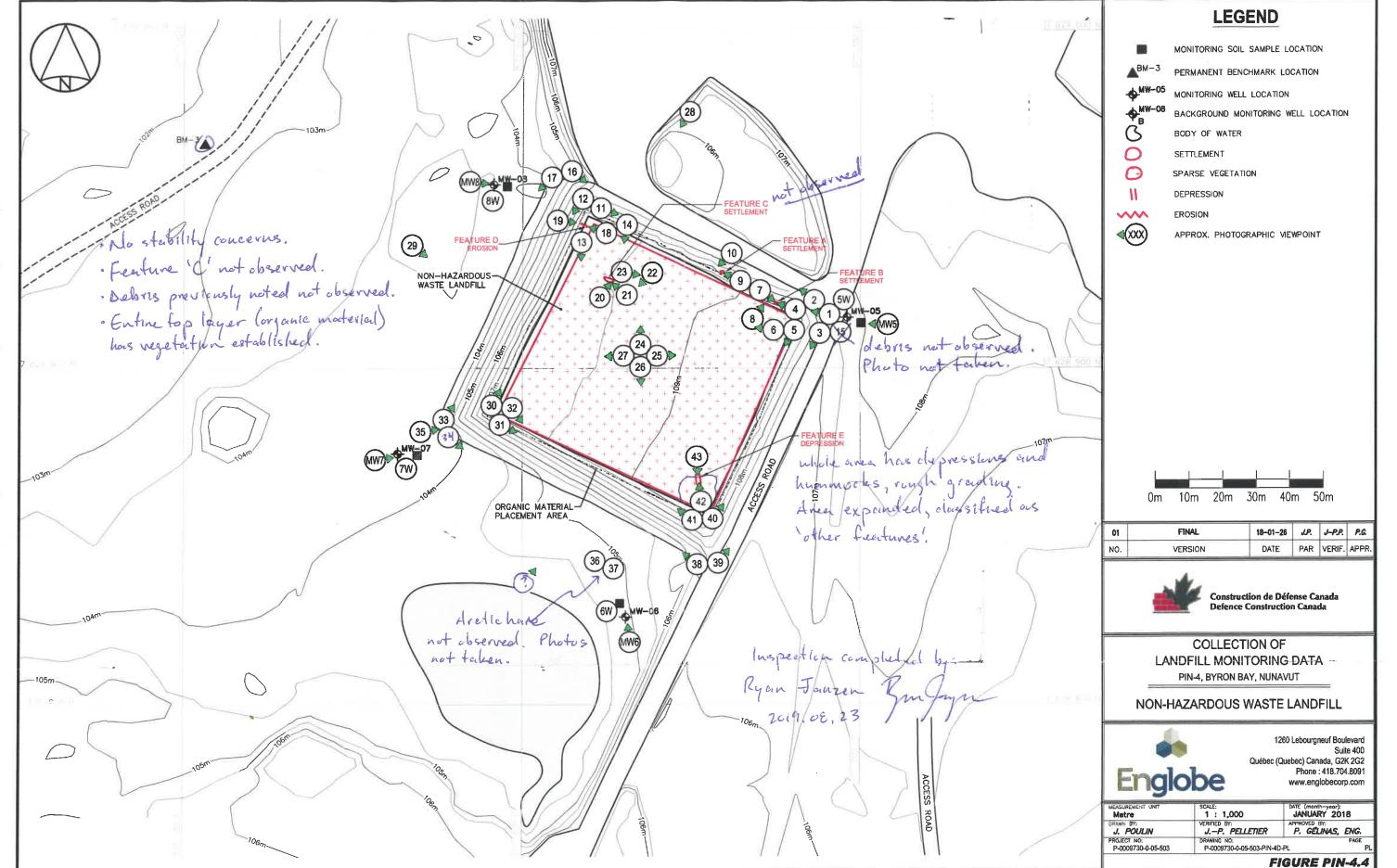
Notes:

## VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 2 OF 3

Checklist Item	Present Yes/No	Feature Number (Feature A, B, C - Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	GPS coo (Taken at each 0.5 and at any signi direction and arou of fea Also take centre feasible, a See Trimb Easting/ No	m to 1m interval, icant change in nd circumference ture) feature (where nd call c)	e Length	Width		Extent relative to Area of Landfill (%)	A = ecceptable  M = marginal  Description  (include stability rating for each feature)  S = significent  U = magginal	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Settlement	Y	A	Lohe A, 5	ide slope E			5 m Z	0.2	21	Miner depression in large rocks		Not in landfill feetprint. Not landfill material.	NLF-8
Eroston Settlement		ゎ		NW point			n2	0.1	21	Monor depression. A.	consistent.		NLF-14,15 NLF-32,33
		K	Lube B,	SE slope		0.8	5m2	0.05	۷ ا	menor settlement. A	consistent.		NLF_41,42
Evo slav		B C1 C2	0	top area, S SE point co		€.5 3.5 4.5		0.02	<1	/	slightly smaller than prev. noted.  Tronsistent, slightly smaller.	Across crest to wards toe.	NLF_16,17 NLF_29,30
Frost Action Eves low		D E F	7	IW corner.		2.8 4 3	0-1	0.05		minor existen. A uninor existen. A uninor existen. A	Slightly longer than prev.  Soloun slope at highest growlient area.	Erosian from crost to toe.	NLF_59,60 NLF_51,52 NLF_53-S5
Sloughing Eresion		G H		east side with side		not	چو مان −	rved.		Pnot observed A.	Noted in 2017, but not observed in 2019. Not observed in 2017.		NLF_43,44 (anea photos) NLF_35,36 (anea photos)
Cracking	N												1
Animal Burrows	N												

## VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 3 OF 3

Checklist Item	Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at e and at ar direction a Also take o	ny significan nd around c of feature	o 1m interval, t change in ircumference ) ature (where all c)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description (include stability rating for each feature)	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Vegetation Establishment	Y	L	Lohe A,	organic	mate	rial zone	<i>i</i> છ	00 m <sup>2</sup>	NA	28%	Vegetation on erganic material layer. A.	cans is tent		NLF-7,12
Staining	N													
Vegetation Stress	2													
Seepage Points (or) Ponded Water	N													
Debris and/or Liner Exposed	И													
Presence & Condition of Monitoring Instruments	N													
Features of Note/ Other Relevant Observations (e.g. signs of activity, ruts)	И													



**DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING** 

## **VISUAL INSPECTION CHECKLIST**

**ANNEX J1: INSPECTION REPORT - PAGE 1 OF 3** 

SITE NAME:
PINI-4 Byron Bay
LANDFILL DESIGNATION:
Non-Hazardous Waste Landfill
LANDFILL TYPE (regraded, leachate contained, Tier II or NH):
nen-hazardous
DATE OF INSPECTION:
2019.08.23
WEATHER CONDITIONS:
Overagest, raining, cloudy/feggy. Cool, calm.
DATE OF PREVIOUS INSPECTION:
2017.08.14
INSPECTED BY (name and signature):
Ryon Janzen Jungan
REPORT PREPARED BY (name and signature):
Ryan Janzen Gunfeage
The inspector represents to the best of their knowledge that the following statements and observations are true and correct and that no material facts have been suppressed or misstated.

- All Features must have UNIQUE and consistent identifiers:
  - o If a Feature is identified as Feature 'A' in 2013; then this same Feature 'A' must be followed up on as Feature 'A' in 2014 and all subsequent years. If it is not observed in a year, than it must be described as 'not observed'; Feature 'A' cannot be replaced to become a different Feature in later years.
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- All measurements must be metric units;
- GPS is in UTM coordinates (NAD83).

Notes:

# VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 2 OF 3

Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at early and at ar direction at ar direction at a large feat as the second at a large feat at a large f	each 0.5m to my significant and around ci of feature) centre of fea asible, and co Trimble	1m interval, t change in recumference ture (where all c)	Length	Width	Depth	Extent relative to Area of Landfill (%)	A = acceptable  M = marginal  Description (include stability rating for each feature)  S = significant  U = unacceptable	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
	Α	NE slope,	medper	nt heri	zental.	Ġ	n 2	6.3	۷1	minor depression. A.			NHWLF_9,10
Y	ß	NE slope,	toward	€ CC	orner.	1.2	0.2	6.05	41	moner depression. A	consistent.		NHWLF_ 7,8
	C	Top surface	e close	to N	peint.	20+	obser	red ?	2019.	not observed.			NHWLF_20,21 (ana photos)
Y	D	(35)	9							minor eroston, linear. A.	larger than previously noted.	Crest to amidpoint of slope.	NHWLF_18,19
N													
N													
													_
N													
N													
N													
	Present Yes	(Feature A, B, C – Keep name from historical observations, where appropriate)  A  C  V  N  N  N  (Feature A, B, C – Keep name from historical observations, where appropriate)	Feature Number (Feature A, B, C - Keep name from historical observations, where appropriate)  A HE slope, C To p surface  Y  N  N  N  Feature Number (Feature A, B, C - Keep name from historical observations, where appropriate)  A HE slope, C To p surface  N  N  N  N  N  N  N  N  N  N  N  N  N	Feature Number (Feature A, B, C)  - Keep name from historical observations, where appropriate)  A NE slope, mulad poil to permiss, toe)  A NE slope, toward of the slope, toward	Feature Number (Feature A, B, C - Keep name from historical observations, where appropriate)  A A LE slupe, mild point herrist C C Top surface, close to N	Feature Number (Feature A, B, C, — Keep name from historical observations, where appropriate)  A NE slupe, tewards the sating Northing/Zone  NE slupe, tewards the covers.  C Top surface e close to N point.	Feature Number (Feature A, B, C)  - Keep name from historical observations, where appropriate)  A  A  A  B  A  B  C  C  C  C  C  C  A  C  C  C  C  C  C	Feature Number (Feature A, B, C)—Keep name from historical observations, where appropriate)  A NE slupe, teworrels Recorner.  C Top surface close to No count.  N  C Top surface close to No count.  N  N  N  N  N  (Describe relative to relative to relative to landfill design in iteration and around circumference of feature)  Also take centre of feature (where featible, and call c)  Sel Trimble close to the No count.  Easting/Northing/Zone  NE slupe, teworrels Recorner.  Top surface close to No count.  N  C Trest at N corner.  Y  N  N  N  N  N  N  N  N  N  N  N  N	Feature Number (Feature A, B, C or and the relative to evisiting monuments) for mistorical observations, where appropriate)  A NE slope, tewarels Recorner.  A NE slope, tewarels Recorner.  C To psurface close to M ocive.  Y  N  N  N  N  N  N  N  N  N  N  N  N	Feature Number (Feature A, B, C)  - Keep name from historical sole-various, where appropriate)  A  A  A  B  C  Taken at each 0.5m to Im to Imiterval, and at any significant change in direction and army	Feature A. B. C.  Feature A. B.  Feature A. B. C.  Feature A.  Feature A. B. C.  Feature A. B. C.  Feature A. B. C.  Feature A. B.  Feature A.  Feature A. B.  Feature A.  Feature A. B.  Feature A. B.  Feature A. B.  Feature A. B.  Fea	For the status of the status o	Formula by the control of the contro

VISUAL INSPECTION CHECKLIST - INSPECTION REPORT — PAGE 3 OF 3

Checklist Item	Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at a and at a direction a Also take	GPS coordinate ach 0.5m to ny significant nd around cire of feature) centre of feat asible, and cand ng/ Northing	1m interval, change in rcumference ture (where ill c)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description (include stability rating for each feature)	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Vegetation Establishment	Y	F	Entire te	p sur	ace.		75	So Etsm	z NA	75%	Moderate regetation. A.	consistent.		NHWLF_13,22,32
Staining	N													
Vegetation Stress	N													
Seepage Points (or) Ponded Water	N													
Debris and/or Liner Exposed	M													
Presence & Condition of Monitoring Instruments	Y		ontside l close to a	and fill	feetp	rut,	-			_	MW-05 through-08. A.	consistent.	greund moter menitoring mells.	environmenta/mantering photos.
Features of Note/ Other Relevant Observations (e.g. signs of activity, ruts)	γ	E	S corner		ce corpaterial		51	lm <sup>2</sup>	-	a 1%	Rough grouding. A.	consistent.	Construction relic. Tread/blade marks visible.	

ables\0\_LivrClient\1\_OTP\_1\PIN-4\2017\Revised Fina\\D\

**DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING** 

# **VISUAL INSPECTION CHECKLIST**

ANNEX J1: INSPECTION REPORT - PAGE 1 OF 3

SITE NAME:
PIN-4 Byran Bay
LANDFILL DESIGNATION:
Station Area West
LANDFILL TYPE (regraded, leachate contained, Tier II or NH):
regraded
DATE OF INSPECTION:
2019.08.23
WEATHER CONDITIONS:
Windy, mixed sun and cloud. Cool. Intermittent precipitation.
DATE OF PREVIOUS INSPECTION:
2017.08.14
INSPECTED BY (name and signature):
Ryan Janzen Gu Jan
REPORT PREPARED BY (name and signature):
Ryan Janzen Grufeger
The inspector represents to the best of their knowledge that the following statements and observations are true and correct and that no material facts have been suppressed or misstated.

- All Features must have UNIQUE and consistent identifiers:
  - o If a Feature is identified as Feature 'A' in 2013; then this same Feature 'A' must be followed up on as Feature 'A' in 2014 and all subsequent years. If it is not observed in a year, than it must be described as 'not observed'; Feature 'A' cannot be replaced to become a different Feature in later years.
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- GPS is in UTM coordinates (NAD83).

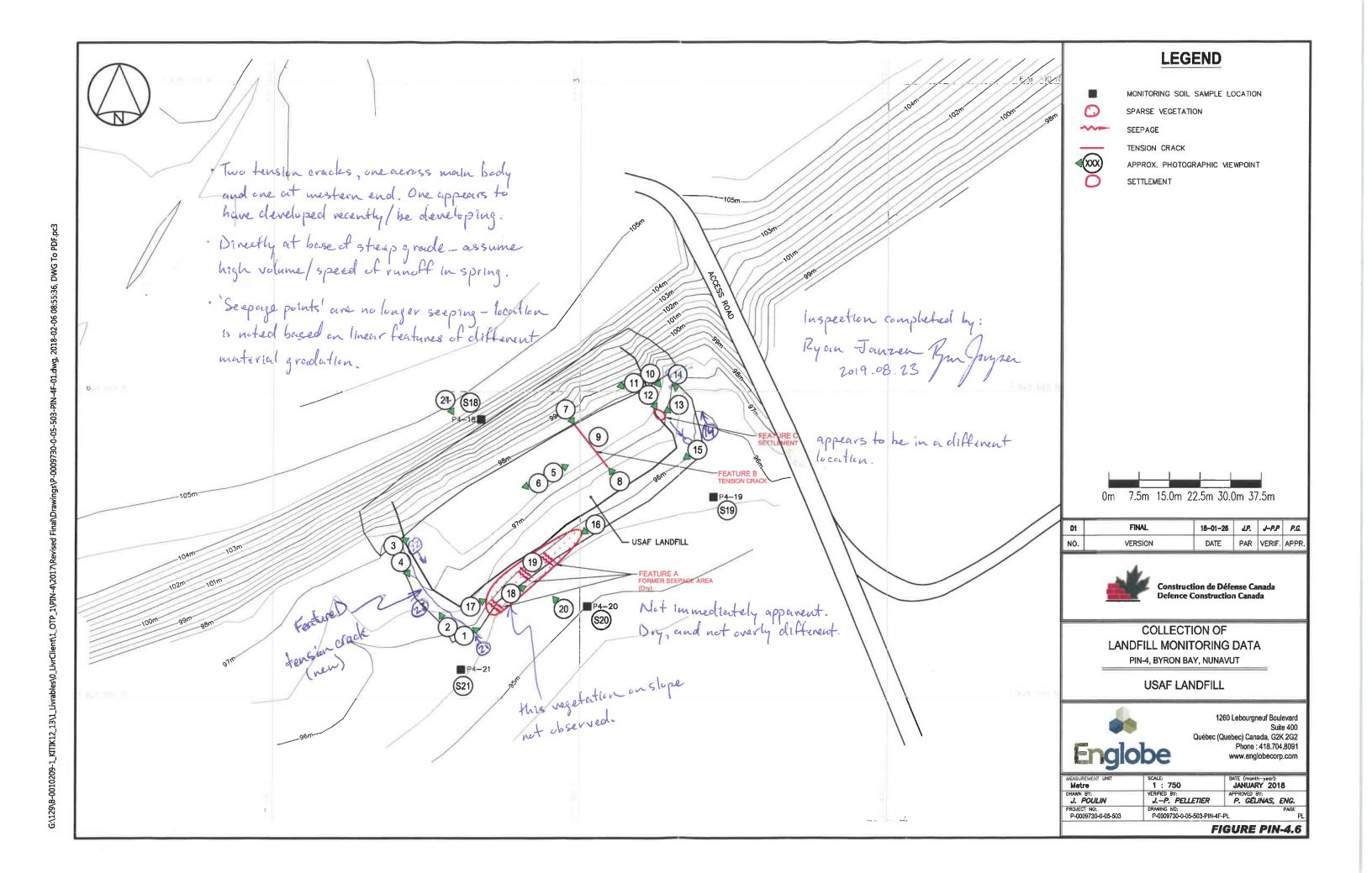
Notes:

VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 2 OF 3

ř	VISUAL INSPECTION CHECKLIST - INSPECTION REPORT — PAGE 2 OF 3											
Checklist Item	Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	GPS coordinates (Taken at each 0.5m to 1m interva and at any significant change in direction and around circumference of feature) Also take centre of feature (where feasible, and call c) See Trimble data Easting/ Northing/Zone	e Length	Width	Depth	Extent relative to Area of Landfill (%)	A = ecceptable  N = marginal Description (include stability rating for each feature) S = significant U = unacceptable	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Settlement		Al	7		10	4m2	6.2	21		consistent	appears times infil. (pothole)	SWLF_19,20
	Y	42	& N centre	al anest		5m <sup>2</sup>	0.2	41	minor depression. A	consistant	Unear	SWLF_ 17,18
		В	S point,	out crest.	(2)	5 m²	0,1	41	miner depression. A	consistent		SWLF_ 34, 35
Settlement		С	Surface	cap, access path.	06	0.5	6,1	۷.	minor depression. A	cons is hent		SWLF_3,4
		GI	W porut.	lope, near crest.	1	m2	0.05	< (	minor depression. A	consistent		SWLF_ 23, 24
		Н	'	, midpoint horizonto	d. 1.	n Z	o <sub>a</sub> i	41	minor depression. A	consistant		SWLF_ 28,29
Settlement		11	٥	ce, on sloped area.	4.4	0.2	0,1	< 1 < 1	Zmmor linear settlement. A.	Zoonsletent		38-40
		K	North slo	'		sm <sup>2</sup>	0.1	۷ (	minor depression. A	consistent.		SWLF_14,15
FrostAction		Dí	Down slop	se, M & Tale near monn	d note	bsern	ed	alte.	not observed.	\tage		SWLF_7,8 (amen photos)
0.000		02	Across sla	re, N role rear moun	d 16	0.15	0.05	۷ ا	linear eroston. A.	consistent.		SWLF_12,13
		E	Down slope	1   1		bserve	el		not observed.	Hoted to have decreased po	or inspection (2017).	SWLF_37 (anea photo)
Settlement	Ą	E J	Access va	mp surface.	1	0,6	o.i	4	minor depression. A.	consistent		SWLF-9,10
Cracking												,
	N											
Animal Burrows												
	N											

## VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 3 OF 3

Checklist Item	Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at e and at ar direction a Also take e fea Easti	GPS coordinates each 0.5m to 1m interval, ny significant change in nd around circumference of feature) centre of feature (where asible, and call c) ing/ Northing/Zone	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description (include stability rating for each feature)	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Vegetation Establishment	Y	L	Entine sur Except bol	face o	type 1 material.	¢3	o m²	MA	50%	Sparse vegetatlen-A.	Larger them previously noted.	Quite sparse.	SWLF_1,2,8,13
Staining	N	F	N crest, to	eworels	: NW queed.	not	cbserv	ed.	_	net observed.	previously noted as a single dark stain.		SWLF-16 (area photo)
Vegetation Stress	И												
Seepage Points (or) Ponded Water	N							_					
Debris and/or Liner Exposed	И												
Presence & Condition of Monitoring Instruments	И												
Features of Note/ Other Relevant Observations (e.g. signs of activity, ruts)	7												



**DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING** 

### **VISUAL INSPECTION CHECKLIST**

ANNEX J1: INSPECTION REPORT - PAGE 1 OF 3

SITE NAME: PIN-4 Byron Bay
LANDFILL DESIGNATION:
USAF
LANDFILL TYPE (regraded, leachate contained, Tier II or NH):
negranded
DATE OF INSPECTION:
2019, 08.23
WEATHER CONDITIONS:
Intermittent sun. Windy, cool.
DATE OF PREVIOUS INSPECTION:
2017.08.14
INSPECTED BY (name and signature):
Ryan Janzen Gun Jagur
REPORT PREPARED BY (name and signature):
Ryan Janeer You Janya
The inspector represents to the best of their knowledge that the following statements and observations are true and correct and that no material facts have been suppressed or misstated.

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- All measurements must be metric units;
- GPS is in UTM coordinates (NAD83).

Notes:

## VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 2 OF 3

							-		JUAL II	13F ECTIO	A CHECKLIST - INSPECTION REPORT - I	AGE Z OF S		
Checklist Item	Present Yes/No	Feature Number (Feature A, B, C — Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at e and at ar direction a	EPS coordinate each 0.5m to 3 my significant of around circontre of feature) centre of feat asible, and cally fing/ Northing/	Im interval, change in cumference ure (where	Length	Width	Depth	Extent relative to Area of Landfill (%)	A = acceptable  M = moving med  Description  (include stability rating for each feature)  S = significant  U = unacoceptable	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Settlement	Υ	С	NE sid	e crest	, towar	els E er.	2-	1m²	0.1	۷.	(include stability rating for each feature)  S = significant  U = unacoceptable  minor depression. A.	consistent, though location appears somewhat shifted		USAF_ 12,13
Erosion	И													
Lateral Movement	Ŋ													
Frost Action	И													
Sloughing	N													
Cracking	Y	3 D	Across ma SW slope orient	in bod paralle	y, orlent NW-> I to che N-> SE	ed SE st.	12.5	0,05	?. 7.	۷۱	tension crack orthogonal to if long axis. M. tension crack orthogonal to LF long axis. On slope. M.	consistent MEW OBS	these are listed as marginal due to the increase in number.	USAF_21-23
Animal Burrows	N													

## VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 3 OF 3

Checklist Item	Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at a and at a direction a Also take	ny significan nd around ci of feature	o 1m interval, t change in ircumference ) iture (where all c)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description (include stability rating for each feature)	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Vegetation Establishment	N													
Staining	И													
Vegetation Stress	N													
Seepage Points (or) Ponded Water	Y	А	Slope to SESIO	vards le.	the S	point,	NA	MA	NA	41	"dry" seepage points. A. No nater noted.	consistent, not observed coepage in 2017.	Only mentioned to maintain consistency with previous reports. Unremarkable	USAF_18-20
Debris and/or Liner Exposed	N													
Presence & Condition of Monitoring Instruments	N													
Features of Note/ Other Relevant Observations (e.g. signs of activity, ruts)	N													

### **DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING**

### VISUAL INSPECTION CHECKLIST

ANNEX J1: INSPECTION REPORT - PAGE 1 OF 3

SITE NAME:
PIN-4 Byren Bay
LANDFILL DESIGNATION:
Tier 11
LANDFILL TYPE (regraded, leachate contained, Tier II or NH):
Ther 11
DATE OF INSPECTION:
2019.08.21
WEATHER CONDITIONS:
Breezy, sunny.
DATE OF PREVIOUS INSPECTION:
2017.08.14
INSPECTED BY (name and signature):
Ryon Janzen Jungen
REPORT PREPARED BY (name and signature):
Ryan Janzen Gulyn
The inspector represents to the best of their knowledge that the following statements and observations are true and correct and that no material facts have been suppressed or misstated.

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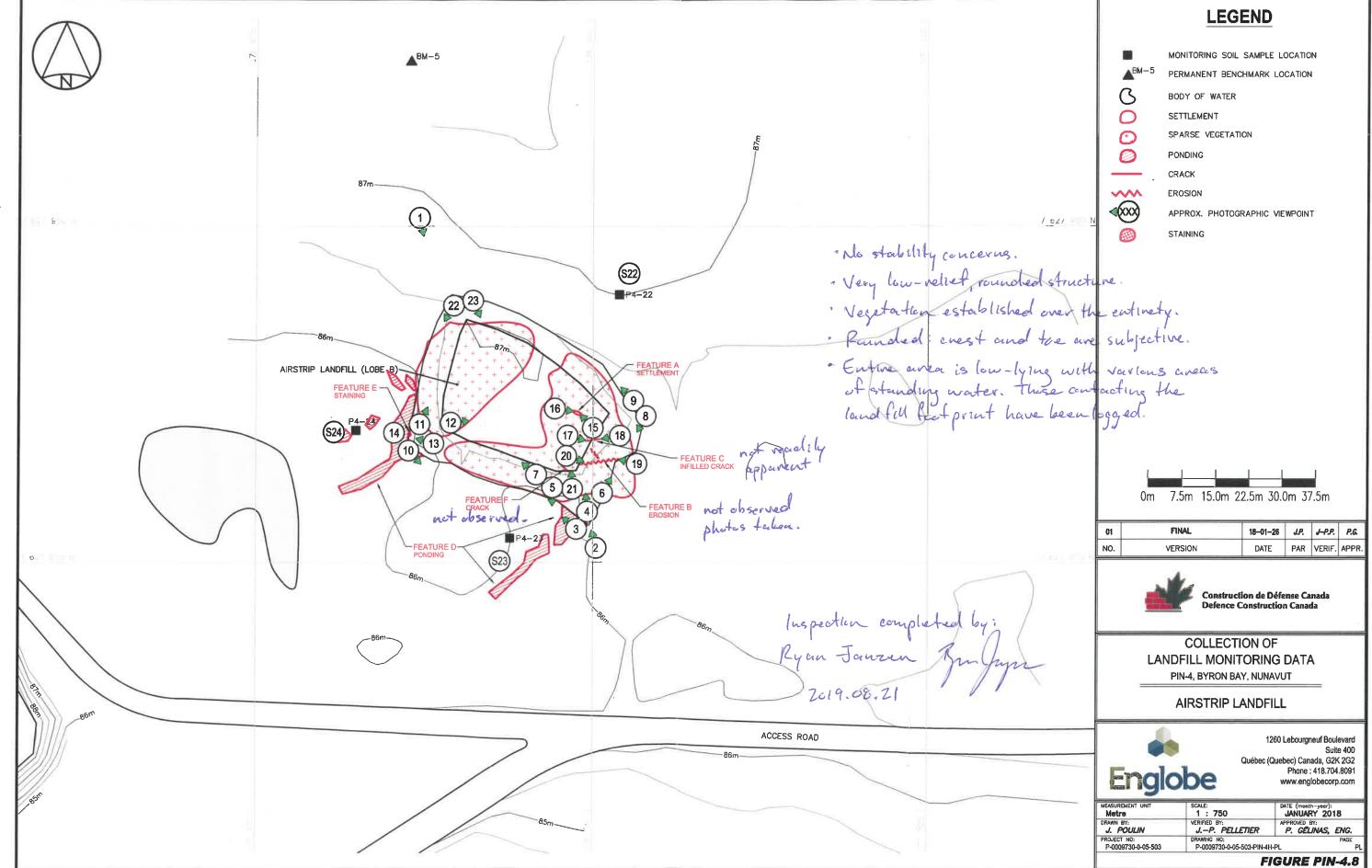
Notes:

## VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 2 OF 3

Checklist Item	Present Yes/No	Feature Number (Feature A, B, C - Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at a and at a direction a	GPS coordina each 0.5m to ny significant and around ci of feature) centre of fea assible, and ca ing/ Northing	1m interval, t change in ircumference ture (where all c)	Length	Width		Extent relative to Area of Landfill (%)	Description (include stability rating for each feature)	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Settlement		Α	SE corne	slope	*		4.	5m2	6.1	4	minor depression. A.	consistent.		T11_29,30
	Y	B	W side e	rest.			i-	5m2	0.1	<1	mner depression. A.	slightly larger than prev.		Tu_ 51,52
		€1	7 Ed side	crest	close +	NE	L	6m2	0 . 1	۷ (	2		Partuatially construction	7+11 17-19
Erosion Settlement		EZ	corner.				fo.	8 m	0.1	41	Eminor de pressions. A	Econs18tent	Spotantially constructions relices/grading	
Semember		Gi	S crest	roughl	mide	ornt.		5m2	0.1	٤١	consistant A	minor depression.	potential construction relie	T11 31 32
		H	E crest	0	,					,	not observed. A	not observed.	1	T11_20,21 (area photos)
Lateral Movement		1		<u> </u>	1 :							NEW OBS.	appears to be fines infil.	
Settlement		L.	W slope horlf way	toway	nels Mu	corner	1.5	ک)₁ن	0,1	<	linear depression. A.	NEW 083.	applairs to be times in!!!.	(1-55,56
			7	ur.										
Frost Action			8		1									
Eroslon			Eslope,						0.05		minor exosion. A	consistent		T11-19
		1	Ecrest, +	oward	SEC	rner.	5.5	6.05	0.05	۷ ۱	minor erosion. A	eous 1steat		T11-20,21
Claushing														
Sloughing														
	N													
Cracking														
	N													
Animal Burrows														
	N													
	'													

VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 3 OF 3

							4/	VI	SUAL II	13PECTIO	N CHECKLIST - INSPECTION REPORT - I	PAGE 3 OF 3	W. ————————————————————————————————————	
Checklist Item	Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at e and at a direction a Also take	ny significan nd around c of feature	o 1m interval, t change in ircumference ) ature (where all c)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description (include stability rating for each feature)	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Vegetation Establishment	Y	1_	Entine +	psur	face.		86	61	NA	~45%	Adodevate regetertien. A	coness tent		711_3,5,28
Staining	Y	F	SE cornellandfill.	, besic	le toe	- ef	15.	5m2	NA	۷1	Rust coloured starning inside pended water location/extent.	larger than previously noted.		T11-46,47
Vegetation Stress														
Seepage Points (or) Ponded Water	Y	D	SE corne	e, best	de toe land	Fill	292	0 m <sup>2</sup>	№6.3	~10%	Anen of standing wester (morshy terrain) adjusent	larger than previously noted. Area is not entirely water, however. Hummocles and mairsh.	Persists beyond noted anea - just instance touching LF footprint has been noted.	T11-42,47
Debris and/or Liner Exposed	N													
Presence & Condition of Monitoring Instruments	Y		_	_	_	-			-	_	VT-1,2,3,4 MW-1,2,3,4	consistant	goed condition.	+11_1,3,5,7 monitoring photos
Features of Note/ Other Relevant Observations (e.g. signs of activity, ruts)	事Y	J	Cap surf	cice, oic	voss ei	stine.	-	-	NA	~40%	Rough greating (violges and depressions are vehicle track/blade marks).	consistent.	Area not identifical as a expecific carea in particular Persists across entire cap	
	Æ	K	Capsurfa	ee, Sin	Jerne	r.	132	2 m 2	NA	~2%	Very rough grading. Hummacks, depressions are particularly large.	NEW OBS	Area of particularly rough grading (>10 am in height tread marks) atc.	T11_8,33,4



G:\129\B-0010209-1\_KTIK12\_13\1\_Livrables\0\_LivrClient\1\_OTP\_1\PIN-4\2017\Revised Fina\\Drav

### **DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING**

## **VISUAL INSPECTION CHECKLIST**

ANNEX J1: INSPECTION REPORT - PAGE 1 OF 3

SITE NAME:
PIN-4 Byron Bay
LANDFILL DESIGNATION:
Airstrip Landfull
LANDFILL TYPE (regraded, leachate contained, Tier II or NH):
regraded
DATE OF INSPECTION:
2019.08.21
WEATHER CONDITIONS:
Calm, overcast, cool.
DATE OF PREVIOUS INSPECTION:
2017.08.14
INSPECTED BY (name and signature):
Ryon Janzen Ym Jegn
REPORT PREPARED BY (name and signature):
Ryan Janzen Gungan
The inspector represents to the best of their knowledge that the following statements and observations are true and correct and that no material facts have been suppressed or misstated.

# Notes:

- All Features must have UNIQUE and consistent identifiers:
  - o If a Feature is identified as Feature 'A' in 2013; then this same Feature 'A' must be followed up on as Feature 'A' in 2014 and all subsequent years. If it is not observed in a year, than it must be described as 'not observed'; Feature 'A' cannot be replaced to become a different Feature in later years.
  - o If a Feature was noted in a previous year, but in the Geotechnical Engineer's opinion is not relevant; you can explain why in your opinion it is not relevant.
  - A new Feature must get its own unique identifier, in alphabetical order from where the previous list of Features left off; It should also be described as 'NEW' in the description column;
  - New Features can only be grouped together if they are very similar and located in close proximity;
  - o Feature names must be consistent in the Tables, Figures, Photos and text; All Feature referencing must be verified for consistency.
- All measurements must be metric units;
- GPS is in UTM coordinates (NAD83).

## VISUAL INSPECTION CHECKLIST - INSPECTION REPORT - PAGE 2 OF 3

Checklist Item	Present Yes/No	Feature Number (Feature A, B, C — Keep name from historical observations, where appropriate)	Location (Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	(Taken at e and at ar direction a Also take	SPS coordinates each 0.5m to 1m my significant chand around circum of feature) centre of feature asible, and call cong/ Northing/Zo	interval, ange in mference e (where )	Length	Width	Depth	Extent relative to Area of	A = acceptable  M = marginal Description (include stability rating for each feature)  S = significent  u = unacceptable  minor depression. A	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Settlement	Y	А	Surface	eap, cen	tral/SE		1.4	m <sup>2</sup>	0.15	۷1	minor depression. A	consistent		ALF_15,16
Erosion	И	B.	SW Glope	/59 de.			not o	bserv	ed		not observed. A.	not observed.		ALF-19,20 (anea photos)
Lateral Movement	N													
Frost Action	N													
Sloughing	N													
Cracking	N		E side c SE crest		`		2.6	o.l	1	۷1	'infilled crack'-lineation. A not observed A.	consistent.	thes is not readily visible, and is not really a feature. No depression/actual crack	ALF_17,18  ALF_21 (area photo)
Animal Burrows	N													

## VISUAL INSPECTION CHECKLIST - INSPECTION REPORT — PAGE 3 OF 3

Checklist Item	Present Yes/No	Feature Number (Feature A, B, C – Keep name from historical observations, where appropriate)	Location {Describe relative to existing monuments/ features and relative to landfill design i.e. surface, berms, toe)	GPS coordinates (Taken at each 0.5m to 1r and at any significant ch direction and around circu of feature) Also take centre of featul feasible, and call	n interval, nange in umference re (where c)	Length	Width	Depth	Extent relative to Area of Landfill (%)	Description (include stability rating for each feature)	Comparison with historical observations	Additional Comments	Photographic Records Photo Reference, Focal length, location, view point & direction (relative to magnetic north) Feature of note Scale
Vegetation Establishment	Y	Gı	Entire 1	cendfill.		all of	14.		100%	Sparse regetation.	larger than previously note	d.	ALF_ 19,12
Staining	Y	E	SE corner LF footp	, adjacent to ce	Accord	1.2	0,3	N4	۷.	Rust coloured staining.	constatent.		ALF-13,14
Vegetation Stress	N												
Seepage Points (or) Ponded Water	Y	D1 D2	Adjacent Adjacents	SE corner of law	nolfill. Lfill.	16	5 m <sup>2</sup>	0.3	~5%	Ponded water in margh terrain.	consistent	Surrounding terrain is marshy -not unique to the immediate area.	ALF_13
Debris and/or Liner Exposed	N												
Presence & Condition of Monitoring Instruments	N												
Features of Note/ Other Relevant Observations (e.g. signs of activity, ruts)	N												

Site Name:		ng Well Sampling		hv
		_	: Tier II Disposal Facilit	.y
	2019:08 - 2	_	12: 30	0 -
Monitoring Well ID:		5	ر <u>دوس 6, 3</u> 7628016.6 m N	
		UTM Coordinates:		576448.1 m I
Sample #:	MW-01	_	1	
Bottles Filled (by Parameter Type):		Metals	PHC F2-F4	- N
Preservatives Used for PHC Fraction(s):		Sodium Bisultate	Other. Na. HSON	□ None
Name(s) of Sampler(s):			614	
Ponded Water, Snow Depth, etc.:				
Well Condition/Repair Requirements:		·		
Lock Make/Model/Condition/Replaced:	G. Hjukstrom Limited	, 7000PS-KA3, 40mm	, LOCK WAS	5 REPLACED
Pre-Measured Data (From Well Log)				
Depth of Well (mbgs):	4.5	Diameter (cm):	5	(Pipé Diameter)
Depth to Top of Screen (mbgs):		Screen Length (m):	3	, , , , , , , , , , , , , , , , , , , ,
Field Measurements				
Measurement Method:		☐ Water Level Tape	□ Other	
Well Stickup (Ground to Top of Pipe) (m)				
Depth to Water (From Top of Pipe) (m):				
Calculated Static Water Level (mbgs):				
Well Refusal Depth (m):			(Measure Refusal Afte	er Sampling)
Thickness of Water Column (m):		Water Volume (L):	1. 698	(Calculated)
Free Product Thickness (mm):	O N/A	Sludge/Silt:	□ Y XN	
Purging Information Summary				
Purging/Sampling Equipment/Technique:		Tion II	Disease Facility	
Water Quality Parameter Equipment:	Horiba (152.2		Disposal Facility	
Maintained Purge Rate at ≤ 100 mL/min:		Purae Pate:	Y - Poshara Pata	PATED 2019-08-21
Total Volume Purged (L):			Recharge Rate	
-			lultiple Events, if Applic	able)
Time	рН		Turbidity	Temperature
(Note Dates if Multiple Days Required)		(uS/cm)	(NTU)	(°C)
13:27	7,97	10400	0.7	5, 66
13:32	8.07	9160	0.9	5,50
13:37	8.22	8070	0.5	5, 33
13:42	8.25	7650	0.0	5 : 33
13:47	8,25	7400	0.0	5,30
13:52	8.25	7500	0.0	5.31
Final Time: 13;52 Final Values:	8,25	7500	0,0	5, 31
Clear?	XY □N	Colour:	SLIGHT BREE	N CELOUR
PHC Sheen? [		PHC Odour?		
Free Product/PHC Globules? [		Other Odour?	, .	
December in the of Complian Equipment		\ <del>-</del>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Decontamination of Sampling Equipment  All Equipment Dedicated/Single Use?	<b>7</b>	Doop Boguired?		
		Decon Required?		
Type of Decontamination Fluid(s): _	N/A	# Washes/Rinses:	N/A	
Photographic Records				
Phote Numbers/IDs:				
Close U / Wide Angle/Panoramic:	7		NESC	
Scale Indicated?	\$Y □N	Line of Sight:	FROM WEL	L TO LANDFILL

Line of Sight: FROM WELL TO LANDFILL

		ıng well Sampling i	_	
Şite Name	: PIN-4	Landfill Name: T	ier II Disposal Faci	lity
Date	2018.08-	2( Time: ]	14:59	<u> </u>
Weather	CUERCAST &	WITH LIGHT RAI	N HIGH 1	4°C, LCW 6°C
Monitoring Well ID	: MW-02	UTM Coordinates:	7627906.3 m I	N 576509.7 m E
Sample #	MW-CZ	Duplicate #:	NCHE	
Bottles Filled (by Parameter Type)	PHC F1	Metals	PHC F2-F4	"
Preservatives Used for PHC Fraction(s)	: 🗆 Methanol	Sodium Bisulfate	1 Other:	□ None
Name(s) of Sampler(s)	: Elliott Holden			
Ponded Water, Snow Depth, etc.	PONDED	WATER ARC	UND CUFLE	- (MO CM DEEP
Well Condition/Repair Requirements			,,,,	
Lock Make/Model/Condition/Replaced		d. 7000PS-KA3. 40mm	1 GCK C	AS REPLACED
		, , , , , , , , , , , , , , , , , , , ,	200,70	
Pre-Measured Data (From Well Log)				
Depth of Well (mbgs)		Diameter (cm):	4	_(Pipe Diameter)
Depth to Top of Screen (mbgs)	0.6	_ Screen Length (m): _	3	_
Field Measurements				
	☑ Interface Probe	☐ Water Level Tape ☐	1 Other	
Well Stickup (Ground to Top of Pipe) (m):		· ·	6	PIPE TO PONDED WATE
Depth to Water (From Top of Pipe) (m):				
Calculated Static Water Level (mbgs):				
Well Refusal Depth (m):			Accoura Dational Att	den Complian)
Thickness of Water Column (m):	-		Measure Refusal Af	• •
Free Product Thickness (mm):		Water Volume (L):		_(Calculated)
Tree Freduct Filekness (Hill).	ONA	Sludge/Silt:	Y DN SCME SIL	7
Purging Information Summary				
,				
Purging/Sampling Equipment/Technique:		Low Flow	Peristalltic Pump	
•				BRATED 7019-8-20
Purging/Sampling Equipment/Technique:	Horiba U52-2	Calibration Details: F	IELD CALL	BRATED 7c)9-E-20 □ > Recharge Rate
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment:	Horiba U52-2  ☑ Y □ N	Calibration Details: F	Recharge Rate	□ > Recharge Rate
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):	Horiba U52-2  Y □ N	Calibration Details: Purge Rate: Control Volume Over Mult	Recharge Rate	□ > Recharge Rate cable)
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min:	Horiba U52-2  ☑ Y □ N	Calibration Details: F Purge Rate: 5	Recharge Rate tiple Events, if Appli	□ > Recharge Rate cable)  Temperature
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L): Time	Horiba U52-2  Y □ N  pH	Calibration Details: Purge Rate: Conductivity (uS/cm)	Recharge Rate tiple Events, if Appli Turbidity (NTU)	□ > Recharge Rate cable)  Temperature (°C)
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)	Horiba U52-2  Y	Calibration Details: Purge Rate: Conductivity (uS/cm)	Recharge Rate tiple Events, if Appli Turbidity (NTU)	□ > Recharge Rate cable)  Temperature (°C)  5 02
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12 15:22	Horiba U52-2  ☑ Y □ N  □ PH  7.70  7.40	Calibration Details: Purge Rate: Conductivity (uS/cm)  2 390 2 180	Recharge Rate (Secharge Rate tiple Events, if Applied Turbidity (NTU) 72.7 33.0	Temperature (°C)  5.02
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12 15:27	Horiba U52-2  ☑ Y □ N  □ DH  ☐ 7.70  ☐ 7.40 ☐ 7.27	Calibration Details: Purge Rate: Question Conductivity (uS/cm)  2 390 2 180 2 14-0	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0	Temperature (°C)  5.02 5.58
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12 15:27 15:27	PH 7.70 7.40 7.27 7.18	Calibration Details: Purge Rate: Conductivity (uS/cm)  2 390 2 180 2 14-0 2 1 50	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8	Temperature (°C)  5.02  5.06  5.76
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12 15:27 15:27 15:37	PH 7.70 7.40 7.27 7.18 7.16	Calibration Details: F Purge Rate: 5  (Total Volume Over Multi Conductivity (uS/cm) 2390 2180 2180 2180 2150	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8	Temperature (°C)  5.06  5.78
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12 15:27 15:27	PH 7.70 7.40 7.27 7.18	Calibration Details: Purge Rate: Conductivity (uS/cm)  2 390 2 180 2 14-0 2 1 50	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8	Temperature (°C)  5.02  5.06  5.76
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12  15:27  15:37	PH 7.70 7.40 7.27 7.18 7.16	Calibration Details: F Purge Rate: 5  (Total Volume Over Multi Conductivity (uS/cm) 2390 2180 2180 2180 2150	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8	Temperature (°C)  5.06  5.78
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12  15:27  15:27  15:37  15:42	Horiba U52-2  ✓ Y □ N  ¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬¬	Calibration Details: Purge Rate: Square (Total Volume Over Multi (uS/cm)  2 390  2 180  2 14-0  2 1 50  2 1 50	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5	Recharge Rate
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12  15:22  15:27  15:37  15:37  15:42  Final Time: 15:42 Final Values:	Horiba U52-2  Y	Calibration Details: Purge Rate: Square (Total Volume Over Multi (uS/cm)  2 390  2 180  2 14-0  2 1 50  2 1 50  2 1 50	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5  9.7	Recharge Rate   Cable
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  1 5: 12  1 5: 27  1 5: 37  1 5: 37  1 5: 42  Final Time: 15: 42 Final Values:  Clear?	PH  7.70  7.17  Y	Calibration Details: Purge Rate: Conductivity (uS/cm)  2 390 2 180 2 14-0 2 1 50 2 1 50 2 1 50 2 1 50 Colour: 5	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.7	Recharge Rate
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12  15:27  15:27  15:37  15:37  15:42  Final Time: 15:42 Final Values:  Clear? PHC Sheen?	Horiba U52-2  Y	Calibration Details: Purge Rate: Square (Total Volume Over Multi (uS/cm)  2 390  2 180  2 14-0  2 1 50  2 1 50  2 1 50	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.7	Recharge Rate   Cable
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12  15:27  15:37  15:37  15:42  Final Time: 15:42 Final Values:  Clear?	Horiba U52-2  Y	Calibration Details: Purge Rate: Conductivity (uS/cm)  2 390 2 180 2 14-0 2 1 50 2 1 50 2 1 50 2 1 50 Colour: 5	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5  9.7	Recharge Rate   Cable
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12 15:27 15:27 15:37 15:37 15:42 Final Time: 15:42 Final Values:  Clear? PHC Sheen? Free Product/PHC Globules?	Horiba U52-2  Y	Calibration Details: Purge Rate: Question Conductivity (uS/cm)  2 390  2 180  2 180  2 1 50  2 1 50  2 1 50  Colour: SPHC Odour?	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5  9.7	Recharge Rate   Cable
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12  15:27  15:27  15:37  15:37  15:42  Final Time: 15:42 Final Values:  Clear?  PHC Sheen?  Free Product/PHC Globules?  Decontamination of Sampling Equipment	Horiba U52-2  Y	Calibration Details: Purge Rate: Question Conductivity (uS/cm)  2 390  2 180  2 180  2 1 50  2 1 50  2 1 50  Colour: SPHC Odour?	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5  9.7	Recharge Rate   Cable     Temperature (°C)     5
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12  15:27  15:27  15:37  15:37  15:42  Final Time: 15:42 Final Values:  Clear?  PHC Sheen?  Free Product/PHC Globules?  Decontamination of Sampling Equipment  All Equipment Dedicated/Single Use?	Horiba U52-2  Y	Calibration Details: Purge Rate: Quickey (Total Volume Over Multi Conductivity (uS/cm)  2 390  2 180  2 14-0  2 150  2 150  Colour: Substitution of the Podour? Decon Required?	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5  9.7  LIGHT BROY  NETAL 15	Recharge Rate   Cable     Temperature (°C)     5
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12  15:27  15:27  15:37  15:37  15:42  Final Time: 15:42 Final Values:  Clear?  PHC Sheen?  Free Product/PHC Globules?  Decontamination of Sampling Equipment	Horiba U52-2  Y	Calibration Details: Purge Rate: Quickey (Total Volume Over Multi Conductivity (uS/cm)  2 390  2 180  2 180  2 150  2 150  2 150  Colour: Selection of the Odour? Other Odour?	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5  9.7	Recharge Rate   Cable     Temperature (°C)     5
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  1 5: 12  1 5: 27  1 5: 37  1 5: 37  1 5: 42  Final Time:   S: 42 Final Values:  Clear? PHC Sheen? Free Product/PHC Globules?  Decontamination of Sampling Equipment All Equipment Dedicated/Single Use? Type of Decontamination Fluid(s):	Horiba U52-2  Y	Calibration Details: Purge Rate: Quickey (Total Volume Over Multi Conductivity (uS/cm)  2 390  2 180  2 14-0  2 150  2 150  Colour: Substitution of the Podour? Decon Required?	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5  9.7  LIGHT BROY  NETAL 15	Recharge Rate   Cable     Temperature (°C)     5
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12 15:27 15:27 15:37 15:37 15:42  Final Time: 15:42 Final Values:  Clear? PHC Sheen? Free Product/PHC Globules?  Decontamination of Sampling Equipment All Equipment Dedicated/Single Use? Type of Decontamination Fluid(s):  Photographic Records	Horiba U52-2  Y	Calibration Details: Purge Rate: Quickey (Total Volume Over Multi Conductivity (uS/cm)  2 390  2 180  2 14-0  2 150  2 150  Colour: Substitution of the Podour? Decon Required?	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5  9.7  LIGHT BROY  NETAL 15	Recharge Rate   Cable     Temperature (°C)     5
Purging/Sampling Equipment/Technique:  Water Quality Parameter Equipment:  Maintained Purge Rate at ≤ 100 mL/min:  Total Volume Purged (L):  Time (Note Dates if Multiple Days Required)  15:12  15:27  15:27  15:37  15:37  15:42  Final Time: 15:42 Final Values:  Clear?  PHC Sheen?  Free Product/PHC Globules?  Decontamination of Sampling Equipment  All Equipment Dedicated/Single Use?	Horiba U52-2  Y	Calibration Details: Purge Rate: Quickey (Total Volume Over Multi Conductivity (uS/cm)  2 390  2 180  2 180  2 150  2 150  2 150  2 150  Colour: Supply Phi Codour? Decon Required?	Recharge Rate tiple Events, if Appli Turbidity (NTU)  72.7  33.0  10.7  9.8  9.5  9.7  LIGHT BROY  NETAL 15	Recharge Rate   Cable     Temperature (°C)     5

•	PIN-4: Wonitori	ng well Sampling	l Log	
Site Name	e: PIN-4	Landfill Name:	Tier II Disposal Fac	cility
Date	2019-8-21	— Time:	16:11	1
	LICHT PAIN		1 600 6	eC.
Monitoring Well ID		UTM Coordinates:	7	
Sample #	- MW-03	 Duplicate #:	NCNE	
Bottles Filled (by Parameter Type)	PHC F1		PHC F2-F4	
Preservatives Used for PHC Fraction(s)	:   Methanol	Sodium Bisulfate		_ □ None
Name(s) of Sampler(s)	: Elliott Holden			_
Ponded Water, Snow Depth, etc.	NONE			
Well Condition/Repair Requirements				
Lock Make/Model/Condition/Replaced		1. 7000PS-KA3. 40mm	I ack cal	SPEDIACED
	-		1	
Pre-Measured Data (From Well Log)				
Depth of Well (mbgs)			4	(Pipe Diameter)
Depth to Top of Screen (mbgs)	:0.4	Screen Length (m):	3	_
Field Measurements				
Measurement Method	: Interface Probe	☐ Water Level Tape	□ Other	
Well Stickup (Ground to Top of Pipe) (m)	0.545			
Depth to Water (From Top of Pipe) (m)				
Calculated Static Water Level (mbgs)				
Well Refusal Depth (m):			(Measure Refusal A	ofter Sampling)
Thickness of Water Column (m):			2.278	. 0,
Free Product Thickness (mm):			□ Y N	
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment: Maintained Purge Rate at ≤ 100 mL/min: Total Volume Purged (L):	Horiba U52-2  ☑ Y □ N	Calibration Details:	Recharge Rate	IBRATED 2019-8.72( □ > Recharge Rate
Time	The Message and Constant			,
(Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
16:17	7.50	3300	1.5	4.10
16:27	7,60	3340	0.6	3.63
16:32	7.58	3220	1.9	3.83
16:37	7.53	3250	1.2	3.80
16:4.2	7.50	3290	0.6	3,75
16147	7.51	3280	0.0	3.79
16: 52	7.52	3280	0.0	3. 80
Final Time:  6:52 Final Values:	7.52	3280	0.0	3.80
Clear?	XY DN	Colour:	SLIGHT BR	
PHC Sheen?		PHC Odour?		
Free Product/PHC Globules?		Other Odour?		
			1000,7	_
Decontamination of Sampling Equipment		Danas Bassinad2		
All Equipment Dedicated/Single Use?		Decon Required? [		
Type of Decontamination Fluid(s):	N/A	# Washes/Rinses: _	N/A	_
Photographic Records				
Photo Numbers/IDs:				
Close Vp/Wide Angle/Panoramic:	-0.v	Direction:	NES	<i>ω</i>
Scale Indicated?	<b>2</b> (Y □ N	Line of Sight:_		

	PIN-4: Monitorii	ng Well Sampling	Log	
Site Name	: PIN-4	Landfill Name:	Tier II Disposal Faci	lity
Date	2019 . 8 - 2	Time:	17:06	
	LIGHT RAIN		ec, Lew	6°6
Monitoring Well ID	MW-04	UTM Coordinates:	7627928.6 m	
Sample #	MW-OL	_ Duplicate #:		
Bottles Filled (by Parameter Type):	_	- 1	PHC F2-F4	
Preservatives Used for PHC Fraction(s):	□ Methanol	Sodium Bisulfate	☐ Other:	□ None
Name(s) of Sampler(s):	Elliott Holden			
Ponded Water, Snow Depth, etc.:	NONE			
Well Condition/Repair Requirements:	GOOD			
Lock Make/Model/Condition/Replaced:	G. Hjukstrom Limited	l, 7000PS-KA3, 40mm	, Lock a	JAS REPLACED
Pre-Measured Data (From Well Log)	(90		,	
Depth of Well (mbgs):	4.5	Diameter (cm):	4	(Pipe Diameter)
Depth to Top of Screen (mbgs):		Screen Length (m):		_(i ipe biameter)
· · · · · · · · · · · · · · · · · · ·		_ Screen Length (III).	<u> </u>	-
Field Measurements				
Measurement Method:	✓ Interface Probe	□ Water Level Tape	☐ Other	
Well Stickup (Ground to Top of Pipe) (m):	0,485			
Depth to Water (From Top of Pipe) (m):	0.823			
Calculated Static Water Level (mbgs):	0.338			
Well Refusal Depth (m):			(Measure Refusal Af	
Thickness of Water Column (m):		_ Water Volume (L):_		_(Calculated)
Free Product Thickness (mm):		Sludge/Silt:	DY N	
Purging Information Summary				
Purging/Sampling Equipment/Technique:		Low Flov	w Peristalltic Pump	
Water Quality Parameter Equipment:	Horiba U52-2			BRATE ON 2019.6.20
Maintained Purge Rate at ≤ 100 mL/min:				□ > Recharge Rate
Total Volume Purged (L):	3	(Total Volume Over Mu		
Time		Conductivity	Turbidity	Temperature
(Note Dates if Multiple Days Required)	рН	(uS/cm)	(NTU)	(°C)
17:17	7.11	14400	1.8	4.51
17:23	7.59	14600	2.	4.94
17:28	7.82	13500	1.9	8.10
17:33	7.92	12800	F- 0	5,28
17:38	8.06	12000	0.0	5 37
17: 43	€.07	12100	O, O	5.39
17:58	8.07	12100	0.0	5.37
Final Time: 17:58 Final Values:	8,07	12100	CC	5.37
Clear?	XY DN	Colour:	VERY SLIGHT	T BROWN COLCUR
PHC Sheen?		PHC Odour?		
Free Product/PHC Globules?		Other Odour?		
Decontamination of Sampling Equipment		_		•
All Equipment Dedicated/Single Use?	☑Y □N	Decon Required?	JY ØN	
•				
Type of Decontamination Fluid(s):	N/A	# Washes/Rinses: _	N/A	
Photographic Records				
Photo Numbers/IDs:				
Close Up/Vide Angle Panoramic:		Direction:	NESC	1)
Scale Indicated?	ZY □N	Line of Sight:	N L GO	

	PIN-4: Monitorin	ng Well Sampling	Log		
Site Name:	PIN-4	Landfill Name:	Non-Hazardous	Waste Landfill	
Date	2019.08-24	Time:	9:35		
				c, LOW SOC, E	54 km/h
Monitoring Well ID:		UTM Coordinates:			77163.2 m E
		- Duplicate #:			
Bottles Filled (by Parameter Type):					
Preservatives Used for PHC Fraction(s):		•		□ None	
Name(s) of Sampler(s):					
Ponded Water, Snow Depth, etc.:					
Well Condition/Repair Requirements:					
Lock Make/Model/Condition/Replaced:		. 7000PS-KA3, 40mm	1 GCK 1	WAS REPLACE	<u> </u>
		, , , , , , , , , , , , , , , , , , , ,	2007		
Pre-Measured Data (From Well Log)					
Depth of Well (mbgs):				(Pipe Diameter)	
Depth to Top of Screen (mbgs):	0.5	Screen Length (m):	3		
Field Measurements					
Measurement Method:	☑ Interface Probe	☐ Water Level Tape	□ Other		
Well Stickup (Ground to Top of Pipe) (m):					
Depth to Water (From Top of Pipe) (m):					
Calculated Static Water Level (mbgs):			/Manager Dafe	I Affan Oaman (bara)	
Well Refusal Depth (m):			(Measure Refusa	,	
Thickness of Water Column (m): Free Product Thickness (mm):			Z, 20	(Calculated)	
riee Floduct Hilckness (IIIII).		Sludge/Slit:	DY XM		
Purging Information Summary					
Purging/Sampling Equipment/Technique:		Low Flov	v Peristalltic Pum	np	
Water Quality Parameter Equipment:	Horiba U52-2			LIBRATED 20	19.8.23
Maintained Purge Rate at ≤ 100 mL/min:	ØY □N			ate □ > Recharge Rate	
Total Volume Purged (L):	3	(Total Volume Over Mu			
Time (Note Dates if Multiple Days Required)	рН	Conductivity (yS/cm)	Turbidity (NTU)	Temperatu (°C)	ire
9:50	9.00	0.572	3,4	2.58	
9:55	9.15	0,576	3.1	2,6C	
10:00	9,42	C,586	4.9	2,62	
JC; C5	8.92	0.567	2.2	3.09	
10:10	2,70	0.546	2.1	3,14	
10:15	8,69	0.543	2.0	3,15	
10:20	8.68	0,542	2.0	3,15	
,					
Final Time: 10: 20 Final Values:	2.68	0,542	2.0	3.15	
Clear?	XY ON	Colour:	CLEAR		
PHC Sheen?		PHC Odour?			
Free Product/PHC Globules?	· , >		NCNE		
		_	,,,,,,		
Decontamination of Sampling Equipment		D D			
All Equipment Dedicated/Single Use?		Decon Required?			
Type of Decontamination Fluid(s):	N/A	# Washes/Rinses: _	N/A		
Photographic Records					
Photo Numbers/IDs:					
Close Up/Wide Angle/Panoramic:		Direction:			
Scale Indicated?	× □N	Line of Sight:			

Site Name	e: PIN-4	Landfill Name:	Non-Hazardous Wa	aste Landfill	
Date	2019-08-2	_	10:30		
	9			- , LCW 5°C, WIND 54	Kr
		UTM Coordinates:			
Sample #	mw-06	Duplicate #:			
Bottles Filled (by Parameter Type)					
Preservatives Used for PHC Fraction(s)	•		·	_ □ None	
Name(s) of Sampler(s)				-	
Ponded Water, Snow Depth, etc.					_
Well Condition/Repair Requirements		15 LIVENEN L	CEKING RING	HAS A CRACK	
Lock Make/Model/Condition/Replaced		,			
Pre-Measured Data (From Well Log)	4.0	<b>m</b>	-	(D) D) ( )	
	4.3		5	(Pipe Diameter)	
Depth to Top of Screen (mbgs)	:0.3	_ Screen Length (m):	3	_	
Field Measurements					
Measurement Method	: Interface Probe	☐ Water Level Tape	☐ Other		
Well Stickup (Ground to Top of Pipe) (m)	C.52				
Depth to Water (From Top of Pipe) (m)	1.46				
Calculated Static Water Level (mbgs)	0.94				
Well Refusal Depth (m)	1,91		(Measure Refusal A	After Sampling)	
				·	
	0.45	Water Volume (L):	0.9	(Calculated)	
Thickness of Water Column (m) Free Product Thickness (mm)		Water Volume (L): Sludge/Silt:	<u>0,9</u> □Y 7€N	(Calculated)	
Thickness of Water Column (m) Free Product Thickness (mm)		Water Volume (L): Sludge/Silt:	0,9 DY XN	(Calculated)	
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary	: <u>O</u>			(Calculated)	
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique	: <u>8</u>	Low Flo	w Peristalltic Pump		
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment	: Horiba U52-2	Low Flo	w Peristalltic Pump FIEとう こふし	IBRATED 2019-08.	<u>-23</u>
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min	: Horiba U52-2	Low Flo Calibration Details: Purge Rate:	w Peristalltic Pump F)Eとう cみし ズ <recharge rate<="" th=""><th>USITATED 2019-08.</th><th><u></u></th></recharge>	USITATED 2019-08.	<u></u>
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min  Total Volume Purged (L)	: Horiba U52-2	Low Flo Calibration Details: Purge Rate: (Total Volume Over M	w Peristalltic Pump ドミとう こみし ズ <recharge rate<br="">ultiple Events, if App</recharge>	ココルマミン 2019・08・ □ > Recharge Rate Dicable)	-23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min  Total Volume Purged (L)	: Horiba U52-2	Low Flo Calibration Details: Purge Rate: (Total Volume Over M	w Peristalltic Pump F) E とう こふし	DISTATED 2019 - CS.  Recharge Rate  Dicable)  Temperature	.23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique Water Quality Parameter Equipment Maintained Purge Rate at ≤ 100 mL/min Total Volume Purged (L)  Time (Note Dates if Multiple Days Required)	Horiba U52-2  V D N  2 . 8	Low Flo Calibration Details: Purge Rate: (Total Volume Over M Conductivity ( S/cm)	w Peristalltic Pump  FIELD CAL  Recharge Rate  ultiple Events, if App  Turbidity (NTU)	DISTATED 2019-08.  Recharge Rate plicable)  Temperature (°C)	.23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min  Total Volume Purged (L)  Time  (Note Dates if Multiple Days Required)	Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M Conductivity (#S/cm) C . 4 J 4	w Peristalltic Pump  FIELD CAC  Recharge Rate  ultiple Events, if App  Turbidity (NTU)  1 4 6	Temperature (°C)	.23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique Water Quality Parameter Equipment Maintained Purge Rate at ≤ 100 mL/min Total Volume Purged (L)  Time (Note Dates if Multiple Days Required)  10145	Horiba U52-2  Horiba U52-2  N  2 . 8  pH  9.23  9.43	Low Flocation Details: Purge Rate: (Total Volume Over M  Conductivity (LS/cm)  C. 4 J 4	w Peristalltic Pump  FIELD CAL  Recharge Rate  ultiple Events, if App  Turbidity (NTU)  146  125	Temperature (°C) 3.18	.23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min  Total Volume Purged (L)  Time  (Note Dates if Multiple Days Required)  10:55	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  0.414  0.414  0.426	w Peristalltic Pump  FIELD CAL  Recharge Rate ultiple Events, if App  Turbidity (NTU)  146  125  63	Temperature (°C) 3.18 3.14 3.17	
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique Water Quality Parameter Equipment Maintained Purge Rate at ≤ 100 mL/min Total Volume Purged (L)  Time (Note Dates if Multiple Days Required)  10:55  10:55	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  C. 4 1 4  C, 4 1 4  C, 4 2 6  C, 4 44	w Peristalltic Pump  FIELD CAL  Recharge Rate  ultiple Events, if App  Turbidity (NTU)  125  63	STATED 2019-08.	-23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique Water Quality Parameter Equipment Maintained Purge Rate at ≤ 100 mL/min Total Volume Purged (L)  Time (Note Dates if Multiple Days Required)  IC: 4 S  IC: 55  II: CC  II: CS	Horiba U52-2  Horiba U52-2  N 2.8  pH 9.23 9.43 9.48 9.37 9.31	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  O. 414  O. 414  C. 426  C. 444  O.451	w Peristalltic Pump  FIELD CAL  Recharge Rate ultiple Events, if App  Turbidity (NTU)  146  125  63  8	Temperature (°C)   3.18   3.17   3.30   3.18	723
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min  Total Volume Purged (L)  Time  (Note Dates if Multiple Days Required)  10:45  10:55  11:00	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  C. 4 1 4  C, 4 2 6  C, 4 44  C, 4 5 1  C, 4 5 1	w Peristalltic Pump  FIELD CAC  Recharge Rate ultiple Events, if App  Turbidity (NTU)  1 4 6  12 5  63  8  1. 3	Temperature (°C)   3.18   3.17   3.30   3.18   3.17	-23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique Water Quality Parameter Equipment Maintained Purge Rate at ≤ 100 mL/min Total Volume Purged (L)  Time (Note Dates if Multiple Days Required)  IC: 4 S  IC: 55  II: CC  II: CS	Horiba U52-2  Horiba U52-2  N 2.8  pH 9.23 9.43 9.48 9.37 9.31	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  O. 414  O. 414  C. 426  C. 444  O.451	w Peristalltic Pump  FIELD CAL  Recharge Rate ultiple Events, if App  Turbidity (NTU)  146  125  63  8	Temperature (°C)   3.18   3.17   3.30   3.18	
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min  Total Volume Purged (L)  Time  (Note Dates if Multiple Days Required)  10:45  10:55  11:00	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  C. 4 1 4  C, 4 2 6  C, 4 44  C, 4 5 1  C, 4 5 1	w Peristalltic Pump  FIELD CAC  Recharge Rate ultiple Events, if App  Turbidity (NTU)  1 4 6  12 5  63  8  1. 3	Temperature (°C)   3.18   3.17   3.30   3.18   3.17	
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique Water Quality Parameter Equipment Maintained Purge Rate at ≤ 100 mL/min Total Volume Purged (L)  Time (Note Dates if Multiple Days Required)    C   4     C   5	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  0.414  0.414  0.426  0.444  0.451  0.452	w Peristalltic Pump  FIELD CAL  Recharge Rate ultiple Events, if App  Turbidity (NTU)  146  125  63  8  1.3  1.1	Temperature (°C)   3.18   3.17   3.30   3.18   3.17   3.19	-23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique Water Quality Parameter Equipment Maintained Purge Rate at ≤ 100 mL/min Total Volume Purged (L)  Time (Note Dates if Multiple Days Required)    C   4   S     C   5   S     I   C   S	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  0.414  0.414  0.426  0.444  0.451  0.452	w Peristalltic Pump  FIELD CAL  Recharge Rate ultiple Events, if App  Turbidity (NTU)  1 4 6  12 5  63  8  1. 3  1. 1  1. 1	Temperature (°C)   3.18   3.17   3.30   3.18   3.17   3.19	
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min  Total Volume Purged (L)  Time  (Note Dates if Multiple Days Required)  10:45  10:55  11:00  11:15  Final Time: 11:15 Final Values:  Clear?	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  C. 414  C. 414  C. 426  C. 444  C.451  C. 452  C.452  Colour:	w Peristalltic Pump  FIELD CAL  Recharge Rate ultiple Events, if App  Turbidity (NTU)  146 125 63 8 1.3 1.1 1.1 64EAR	Temperature (°C)   3.18   3.17   3.30   3.18   3.17   3.19	-23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min  Total Volume Purged (L)  Time  (Note Dates if Multiple Days Required)    C   4   S     C   5   S     I   C	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (\$\insty\\$S/cm)  0.414  0,414  0,426  0,444  0,451  0,452  Colour: PHC Odour?	w Peristalltic Pump  FIELD CAL  Recharge Rate ultiple Events, if App  Turbidity (NTU)  1 4 6  12 5  63  8  1. 3  1. 1  1. 1	Temperature (°C)   3.18   3.17   3.30   3.18   3.17   3.19	-23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique Water Quality Parameter Equipment Maintained Purge Rate at ≤ 100 mL/min Total Volume Purged (L)  Time (Note Dates if Multiple Days Required)    C   4   5     C   5   5     I   C     I   C     I   C     I   C     I   C     Final Time:   I   I   5     Final Values:  Clear?  PHC Sheen?  Free Product/PHC Globules?  Decontamination of Sampling Equipment	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (#S/cm)  0.414  0.414  0.426  0.451  0.451  0.452  Colour: PHC Odour? Other Odour?	w Peristalltic Pump  FIELD CAL  Recharge Rate ultiple Events, if App  Turbidity (NTU)  146  125  63  8  1.3  1.1  1.1  GLEAR	Temperature (°C)   3.18   3.17   3.30   3.18   3.17   3.19	-23
Thickness of Water Column (m) Free Product Thickness (mm)  Purging Information Summary  Purging/Sampling Equipment/Technique  Water Quality Parameter Equipment  Maintained Purge Rate at ≤ 100 mL/min  Total Volume Purged (L)  Time  (Note Dates if Multiple Days Required)    C   4   S     C   5   S     I   C	Horiba U52-2  Horiba U52-2  Y	Low Flo Calibration Details: Purge Rate: (Total Volume Over M  Conductivity (\$\insty\\$S/cm)  0.414  0.414  0.426  0.444  0.451  0.452  Colour: PHC Odour?	w Peristalltic Pump  FIELD CAL  Recharge Rate ultiple Events, if App  Turbidity (NTU)  146  125  63  8  1.3  1.1  1.1  GLEAR	Temperature (°C)   3.18   3.17   3.30   3.18   3.17   3.19	-23

Direction:

Line of Sight:

Photo Numbers/IDs:

 $\square$  N

Close Up/Wide Angle/Panoramic:
Scale Indicated?

## PIN-4: Monitoring Well Sampling Log

Site Name: PIN-4	Landfill Name	Non-Hazardous Waste Lan	ndfill
Date: 2019	- 08 . 24 Time	: 11:28	
Weather: MIXED	SUN AND CLOUD W	111 HOLH TOWN	C, Lew S'C, WIND
Monitoring Well ID: MV	7-05 UTM Coordinates	7628915.1 m N	577296.1 m E
Sample #:	E Duplicate #		
Bottles Filled (by Parameter Type):   PHC F1	☐ Metals	□ PHC F2-F4	
Preservatives Used for PHC Fraction(s):   Methan	ol □ Sodium Bisulfate	□ Other: □ No	one
Name(s) of Sampler(s): Elliott	Holden		
Ponded Water, Snow Depth, etc.:	UE		
Well Condition/Repair Requirements: 6 c			
Lock Make/Model/Condition/Replaced: G. Hjukstro	om Limited, 7000PS-KA3, 40mm	, LOCK WAS	REPLACED
Pre-Measured Data (From Well Log)			
Depth of Well (mbgs):4.	5 Diameter (cm):	5 (Pine	Diameter)
	5 Screen Length (m):	5(Pipe	Diameter)
	Screen Length (III).		
Field Measurements			
Measurement Method: 🗹 Interfac	e Probe    Water Level Tape	□ Other	
Well Stickup (Ground to Top of Pipe) (m):O, _5	J		
Depth to Water (From Top of Pipe) (m): N こん	E - NO LIGHID	CATER	
Calculated Static Water Level (mbgs):			
Well Refusal Depth (m):		(Measure Refusal After San	npling)
Thickness of Water Column (m):	Water Volume (L):	(Calc	ulated)
Free Product Thickness (mm):	Sludge/Silt:	$\square$ Y $\square$ N	
	Calibration Details:  N Purge Rate:	☐ < Recharge Rate ☐ > F	•
Total Volume Purged (L):	(Total Volume Over M	Iultiple Events, if Applicable)	
Time (Note Dates if Multiple Days Required)	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
NO WATER IN CO	ELL NO SA	MPLE COLL	ECTED,
Final Time: Final Values:			
012 E V = E	N Colour:		
	N PHC Odour?	□ Y □ N	
Tiee Floudcorfic Globules! Life	N Other Odour?		
Decontamination of Sampling Equipment			
All Equipment Dedicated/Single Use? 🗹 Y	N Decon Required?	□Y ØN	
Type of Decontamination Fluid(s):N/	# Washes/Rinses:	N/A	
Photographic Records  Photo Numbers/IDs:			
Close Up/Wide Angle/Panoramic:	Direction:	ı	
Scale Indicated?™ Y □	N Line of Sight:		

	DIN 4: Monitorin	aa Wall Samplina	ul og	
Site Name:		ng Well Sampling Landfill Name:	Non-Hazardous Was	ste Landfill
	2019-08-2	<del>-</del>		
		-		ew 5°C, 54 km/hr
Monitoring Well ID:	MW-08	UTM Coordinates:	7628954.4 m I	V 577191.4 m E
Sample #:	mn-08	Duplicate #:	NONE	
Bottles Filled (by Parameter Type):		Metals	PHC F2-F4	
Preservatives Used for PHC Fraction(s):	☐ Methanol	Sodium Bisulfate	☐ Other:	□ None
Name(s) of Sampler(s):				
Ponded Water, Snow Depth, etc.:	NONE			
Well Condition/Repair Requirements:	GCED			
Lock Make/Model/Condition/Replaced:	G. Hjukstrom Limited	, 7000PS-KA3, 40mm	, LOCK W	AS REPLACED
Pre-Measured Data (From Well Log)			r.	
Depth of Well (mbgs):	4.5	Diameter (cm):	5	(Pipe Diameter)
Depth to Top of Screen (mbgs):		Screen Length (m):		_ ` '
Field Measurements				-
Measurement Method:	▼ Interface Probe	□ Water Level Tane	□ Other	
Well Stickup (Ground to Top of Pipe) (m):		- Water Lever Tape		
Depth to Water (From Top of Pipe) (m):			•	
Calculated Static Water Level (mbgs):				
Well Refusal Depth (m):			(Measure Refusal Af	ter Sampling)
Thickness of Water Column (m):			0.932	,
Free Product Thickness (mm):			□ Y XN	_(
Purging Information Summary				
Purging/Sampling Equipment/Technique: Water Quality Parameter Equipment:	Horiba LIE2 2		w Peristalltic Pump	10.00
Maintained Purge Rate at ≤ 100 mL/min:			Recharge Rate	BRATED 2019 - 8.23
Total Volume Purged (L):		(Total Volume Over M	~ 541	
Time	ESIL Traines of the Co	Conductivity	Turbidity	Temperature
(Note Dates if Multiple Days Required)	рН	(AS/cm)	(NTU)	(°C)
9:20	<b>8</b> 258	0,582	3,6	2,68
9:25	€.64	0.572	2.1	2.72
WELL WENT	DRY -			
SAMPLED DIRE	CTZ5 A	T 11:55		
Final Time: Final Values:				
Clear?	XY DN	Colour:		
PHC Sheen?	•	PHC Odour?	CLEAR	-
Free Product/PHC Globules?		Other Odour?	NEWE	
		Strict Oddul!	10002	•
Decontamination of Sampling Equipment		Doorn Barrian do		
All Equipment Dedicated/Single Use?		Decon Required?		
Type of Decontamination Fluid(s):				
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	N/A	# Washes/Rinses: _	N/A	-
Photographic Records	N/A	# Washes/Rinses: _	N/A	

Direction: \_\_\_\_ Line of Sight: \_\_\_

Close Up/Wide Angle Panoramic:

Scale Indicated? XY

 $\;\square\; N$ 

Site Name: PIN-4

Landfill Name: Tier II Disposal Facility

Date & Time of Sampling Event: 2019 - 08 - 21

Weather: OVERCAST, MICH 14°C, LCW 6°C,

Name of Sampling Staff: Elliott Holden

Soil Sampling	UTM Coordinates	ordinates	Sample	Notes: Including (but not limited to): visual/olfactory observations (colour, odour, evidence of contamination),	AND CONTROL STATE STA
Location ID	North (m)	East (m)	Depth	deputration of PHC samples (type of preservative used for more achieved, any preservation of PHC samples (type of preservative used for which fraction(s) of PHC)	view direction relative to magnetic north; line of sight (looking from X to Y); include indication of scale
MW-01	7628016.6	576/19 1	510-0	LOAMY SAUD, SOME GRANEL, ORGANICS AND ROCTLETS, BROWN, MOIST	
13:00 B	0.020010.0	7.0440.7	0.4-0.5		
MW-02	7627906.3	576509 7	0-0.15	14	TOWER AT SAFEKE
14:00 B			0.4-0.5	ORGANICS, SANDY LEAM, SEME ORANEU BLAKISH BROWN, SATURATED	
MW-03	7627878.8	576436 9	0 -0,15	U - 0,15 TRACE CREADICS, RESTETS, BECWN, MCIST	
151co B			0.4-0.5	CHONNICS BECOME ORANEL TRACE	20 H
MW-04	7627928	576345 4	J.0 - 0	CREADICS, BROWN, MOIST, ROSTLETS	0
0	- 1	1.00	0,4.0.5	SANDY LOAM, SCHE GRAVEC, TRACE OF WATER AT #8 0.46 m 6	* 30750 NT 10 0.46 5 6
MW-09.	DUPULC ATE		OF MW-01 A		
MW-10A	MW-10A DUSCICATE 16:20	NTE OF	0-MW-	A Ho	
				* PHC FI SAMPLES CUERE	** CUIDE ANGLE
				PRESERVED WITH METHANCL	AND SLESS OF PACTOS
		£.			

Site Name: PIN-4

Landfill Name: North Landfill

Date & Time of Sampling Event: 2019 - 08 - 22

Kr /2 24 SUND 0 Ŋ 10cm U HIGH 15 Weather: OVER CAST, WINDY

Name of Sampling Staff: Elliott Holden

Sampling Equipment and Decontamination Methods: (1) Steel shovel used to dig hole (2) Alconox and distilled water used for decontamination

	UTM Coc	UTM Coordinates		Notes: Including (but not limited to): visual/olfactory	Photos: number/ID;
Soil Sampling			Sample	observations (colour, odour, evidence of contamination),	ciose up/wide angle/panoramic; location relative to monument/feature
Location ID	North (m)	East (m)	Depth	ed depth not admissed, be of preservative used if PHC)	view direction relative to magnetic north; line of sight (looking from X to Y); //mclude indication of scale
P4-6	7629341 6	577822 5	0-0.15	ROOTLETS, GRETISH BROWN, MOIST	
8:40 B		27.022.3	0.2 - 0.3	SAUD AND GRANEL, TRACE SILT AND COBSLES, GRETISH BROWN, MOIST, REFUSAL ON BEDROCK	NEDROCK K
P4-7	7629443 6	577797 3	0 - 0.15	ROCTLETS, GRETISH BROWN, MOIST	\$ 400 mg 120 mg
9:20 B			0.4-0.5	GRAVEL, GREYISH BROWN, MOIST	TAY POTOTO TAY
P4-8	7629449.5	577887 1	0-0.15	GRANELAND LCAMT SAND, TRACE COBRE RECTLETS, GRETISH BROWN, MCIST	1
000	2		0,4-0,5		
A ► 6-4-9	7629392 1	577943 6	0-0,15	LCANT SAND OFTH OPENNICS, SOME GRAVEL DARK BROWN, ROUTLETS, MOIST	
10:40 B			0.25-0.35	LOAMY SAND WITH ORGANICS, SCME GRAVE CAND COBBLES, DARK BROWN, MOIST	THE SOLVE OF THE POOL OF THE P
P4-10	7629356 2	5779623	0-0.15	GRANEL AND CORRE, ROUTLETS, DARK BOOWN, MOIST	2
11:10 B		6.300	0.4-0.5	GRAVEL AND CCBBLE, SEME LLAMY SAND CONH ORCHNICS, GREENSH BROWN, MOIST	
P4-11	7.20307.7	577858 3	0-0,15	ROCTLESS, BROWN, MOIST	
14 HO B			0,2-0.3	CORNE JAND AND GRAVEL, SOME	AN REPROCK
P4-17 A	7629282 2	577777 3	0-0,15	LOAMY SAND WITH ORG ANICS, SOME GRANEL AND COBS LE, DAZK BROWN, ROCTETS, MANS	
12:40 B		C:-37.7.C	0.4-0.5	LOAMY SAND AND GRAVEL, TRAGECRAVEL AND COBBLE, BROWN, MOIST, TRACE OF ORN ICS	SAN 16 S
P4-25A	15 A Dat	とICATE	P4-25A 15 A DUPLICATE OF P4-12		
13:00					

R PITC FI SAMPLES CERE PRESERVED CITY METHANOL AT ALL SAMPLE LOCATIONS

Site Name: PIN-4

Landfill Name: Northwest Landfill

Date & Time of Sampling Event: 2019 . 08 - 22

Km/h 245 1000 B HIGH 15°C Weather: LIGHT ZAIN, WINDS

Name of Sampling Staff: Elliott Holden

UTM Coordinates Sample Observations (both not limited to): visualioitacoty observation of cose upwide angle/penoranic Depth any preservation of PHC samples (type of preservative used observations); close upwide angle/penoranic observations (colour, evidence of preservative used obtains if required togeth not echieved.  North (m) East (m)						
East (m)  Depth and reason for feutas in required depth not achieved, view direction relative for which fraction(s) of PHC)  S772414  C. C. C. S. CARAY SAND AND GRAVEL, TRACE  S77235.6  C. C. C. S. CREANILES, SCARE CARAY SAND Include indication relative to the control of the		UTM Coo		Sample	Notes: Including (but not limited to): visual/olfactory observations (colour, odour, evidence of contamination),	Photos: number/ID; close up/wide angle/panoramic; location relative to monument/feature
5772414  O. 4-C.5 GREAN! CS, SCHOE L, TRACE  O. 4-C.5 GREAN! CS, SCHOE L, CALMY SAND  AND CORSIES, SCHOE LOANY SAND  AND CORSIES, SCHOE  S77235.6  O. 4-C.5 LOANY SAND AND CORSIES, ROCALETS, DARK BROWN, MOIST  O. 4-C.5 LOANY SAND AND SECOND, MOIST  O. 4-C.5 LOANY SAND AND CREANICS, SCHOE  S77205.9  O. 4-C.5 LOANY SAND AND CREANICS, CONT.  S77205.9  O. 4-C.5 GREANICS, CREATSH BROWN, MOIST  O. 4-C.5 GREANIC AND CORSIES, SCHOE LAND SAND  S77205.9  O. 4-C.5 GREANIC AND CORSIES, SCHOE LAND SAND  O. 4-C.5 GREANIC AND CORSIES IS CHOCKED, MOIST  O. 4-C.5 GRANEL AND CORSIES IS CHOCKED.  STATEST  O. 4-C.5 GRANEL AND CORSIES IS CHOCKED.  O. 4-C.5 GRANEL AND CORSIES IS CHOCKED.  STATEST  O. 4-C.5 GRANEL AND CORSIES IS CHOCKED.  O. 4-C.5 GRANEL AND CORSIES IS CHOCKED.  D. 4-C.5 GRANEL AND CORSIES IS CHOCKED.  SOUND CORSIES IS CHOCKED.  D. 4-C.5 GRANEL AND CORSIES OF CHOCKED.	8	rth (m)		Depth	deptin and reason for refusal it required depth not achieved, any preservation of PHC samples (type of preservative used for which fraction(s) of PHC)	view direction relative to magnetic north; line of sight (looking from X to Y); include indication of scale
577335.6 O. 4-C.5 GRENVEL AND CORRIES, SOME CORMY SAND  CO.4-C.5 GRENVEL AND CORRIES FOUTERS PARK BROWN  S77335.6 O. 4-C.5 GRENVEL AND CORRIES FOUTERS PARK BROWN  CO.4-C.5 GRANEL AND CORRIST RACE  S77393.3 O. 4-C.5 GRENVEL AND CORRIST ROCCUM, MOIST  CO.6-C.15 GRENVEL AND CORRISTS FOR CORNEC,  S77251.2 O. 4-C.5 GRENVEL AND CORRISES, TRACE CORNICS, COLOURS  CO.6-C.15 GRENVEL AND CORRISTS FOR CORNICS, COLOURS  S77251.2 O. 4-C.5 GRENVEL AND CORRISES, TRACE CORNICS, COLOURS  CO.6-C.15 GRENVEL AND CORRISES, TRACE CORNICS CORNICS  CO.6-C.15 GRENVEL AND CORRISES, TRACE CORNICS CONTING  CO.6-C.15 GRENVEL AND CORRISES  CO.6-C.15	76.	10000	A 14CTT3		CRGANT SAND GRAVEL, TRACE	
57735.6 C-C.15 LEANY SAND AND ERGANICS, SENE C.4-C.5 GRAVEL AND CEPTIFES, RECTRETS, PARK BREEN, MEIST S77199.3 C-C.15 GRAVEL AND CERTIFF, SOWER BREEN, MEIST C-C.15 GRAVEL AND CERTIFF GRAVEL S77205.9 C-C.15 GRAVEL AND CERTIFF GRAVEL S77205.9 C-C.15 GRAVEL AND CERTIFF GRAVEL S77212 C-C.15 GRAVEL AND CERTIFF GRAVEL S77212 C-C.15 GRAVEL AND CERTIFF GRAVEL S77251.2 C-C.15 GRAVEL AND CERTIFF GRAVEL STANDS GRAVEL AND CERTIFF GRAVEL SANDLES, TEAR E CAMPS GRAVEL SANDLES, TEAR E CAMPS GRAVEL THE FILE C T D.L. 2 GRAVEL CAMPS GRAVEL THE SANDLES GREATING GRAVEL THE SANDLES GREATING GRAVEL THE SANDLES GREATING GRAVEL THE SANDLE CONTITUNE THE CECANTICUS T	8	T.00463	977241.4	0,4-0.5	GRAVEL AND CORGEE, SCAR COAMY SOND GREYISH BROWN, MOIST	
577199.3 O-0.15 LEALMY SALUD AND RECEIVED RESECUTION MEIST  577199.3 O-0.15 DEALMY SALUD AND CREADING SCHOLLS, SCHOLL  577205.9 O.4-0.5 LEALMY SALUD AND CREADING SCHOLL, TRACE  CO-0.15 CRANEC AND CREATES PROCESS, SCHOLL  CO-0.15 CRANEC AND CREATES, DARK BECOME, MOIST  CO-0.15 CRANEC AND CREATES, SCHOLLOWN SALUD  TRACE CREADING, CREATES, SCHOLLOWN SALUD  CO-0.15 SCHOLL CAND CREATES, TRACE CREADING, ROSTERS,  CO-0.15 SCHOLL AND CREATES, TRACE CREADING, ROSTERS,  CO-0.15 SCHOLL AND CREATES, TRACE CREADING, ROSTERS,  CO-0.15 SCHOLLOWS TRACE CREATES,  CO-0.15 SCHOLLOWS TRACE  CO-0.15 S	76	7 66200	577735 6		GRAVEL AND GODSLES ESTRETS PART	1
577199.3  O - 0.15 GRAVEL AND GREADILES, SEME  STATOS.9  O. 4 - 0.5 GRAVEL AND GREADILES, DARK BROWN, MOIST  C- 0.15 GRAVEL AND GREATS ROOMLS, TO WE  C- 0.15 GRAVEL AND CREATER, DARK BROWN, MOIST  O. 4-0.5 GRAVEL AND CREATER, DARK BROWN, MOIST  O. 4-0.5 GRAVEL AND CREATER, DARK BROWN, MOIST  O. 4-0.5 GRAVEL AND CREATER ROOMLS, GREATS ROOMLS, GREATS ROOMLS, GREATS ROOMLS, GREATS ROOTLES, GREATS ROOMLS, GREATS ROOMLS, GREATS ROOTLES, TRACE CAMPS SAND,  A DOUPLI CATE OF DH - 2.5  PHO FIRST SAMDLES CUERE  PHO FIRST SAMDLES CUERE  PHO FIRST SAMDLES CUERE  AND CREATS WELL SAMDLES CUERE  TO HE SAMDLES CUERE  PHO FIRST SAMDLES CUERE  TO HE SAMDLES COURSE  TO HE SAMDLES	?	2325.1	0.12.00	0.4-0.5	TRACE ORGANICS GRASIA GOLD MIST	
577205.9 C.4-C.5 LOAMY SAND AND CRANEL, TRACE  C-C.15 CRANICS, GRESTSH BROOW, MOIST  C-C.15 CRANEL AND C-BRLES, SCHE CANASSALD  C-C.15 SCHE C-EGAMCS, GRESTSH BROOW, MOIST  C-C.15 SCHESTSH BROOW, MOIST CONTIST METSAND, MOIST  C-C.C.SE  C-C.C.S	7	\$203\$1	577100 2	0-0.15	SKAVEL AND CARGANICS, SOME	J. Meist
577205.9 O-0.19 GRANEL AND COBRE ROCTETS, DARKIEROWN, MOIST  0.14-0.5 GRANEL AND CORRES SCHE LOANT SALD  TRACE OFFORMS GRESTSH SECOND, MOIST  0.4-0.5 GRANEL AND CORRES OFFORMS RULLETS, OFFORMS		153331 1	277129.3	5.0-4.0	CROANS SAUD AND GRAVEL, TRACE	
A DUPLICATE OF PLACE CARAMES, SCHE LCAMP SALLS  O. 4-0,5 GRANES, GRESTS # BROWN), MOIST  O. 4-0,5 SCHE CARAMES, GRESTS # BROWN, O. 4-0,5 SCHE CARAMES, GRESTS # BROWN, O. 4-0,5 SCHE CARAMES, TRACE CRAMPES, TRACE CAMP SAND, CO. 4-0,5 SCHOOL AND CORRES, TRACE CAMP SAND, O. 4-0,5 SCHOOL AND CORRES, TRACE CAMP SAND, D. 4-0,5 SCHOOL AND CORRESS, TRACE	27	CAAAAC	0 3000	0-0.15	170004	5
577251.2  O. 4-0.5 SCANEL AND CERAMICS RECTLERS, GENERAL BECOME  A DUPLICATE OF PH-2 B  PH-E FISAMPLES CONTRACT  PH-E FISAMPLES CONTRACT  PH-E FISAMPLES CONTRACT  TAKES  LECATTOMS	۱ ۲	25444.5	977703.9	6,4-0,5	31	
A DOUPLICATE OF PH-2B CORRESTERCE CORMTSWD.  A DOUPLICATE OF PH-2B CORRESTER CORMTSWD.  PHC FI SAMPLES CUERE  PRESERVED CUITH METHANCL  CLOSE  TAICELLE CATHOLES CUERE  AT ALL SAMPLE LOCATIONS  LOCATIONS	76	20421 8	577751 2	0-0,15	COBRES TRACE CREADICS RULLETS	THE DESCRIPTION OF THE PROPERTY OF THE PROPERT
A DOUPLICATE OF PH-2B  TO PH-2B  TO PRESERVED CUTTO METHANCL  PRESERVED CUTTO METHANCL  TAKEN  TAKEN  LECATIONS  LECATIONS		0.17	7:107.110	0.4-0,5	BECOM, Meist	
A DOUPLICIALE OF PH-25  ** PH-25  ** COUNTY						
SAMPLES EVERE RANCE SAMPLE CECATIONS TAKEN	74.70010	- 1			4	
SAMPLES CUERE  RX CUIDE  RVED CUITITIONED CLOSE  SAMPLE (CCATICNS  TAICE  LCCATICNS						
SAMPLE LECATIONS TAKEN		ı	e.		3人人かって らしかがら	1
LEGATICAS						のこののでしている。
						.0

Site Name: PIN-4

Landfill Name: Non-Hazardous Waste Landfill

Date & Time of Sampling Event: 2019 - 08 - 23

Ŋ O 00 土のエ X V VN/3 EXTREME WINDY Weather: CVER CAST

Name of Sampling Staff: Elliott Holden

Soil Sampling	UTM Coc	UTM Coordinates	Sample	Notes: Including (but not limited to): visual/olfactory observations (colour, odour, evidence of contamination),	A Photos: number/ID; close up/wide angle/panoramic; location relative to monument/feature
Location ID	North (m)	East (m)	Depth	any preservation of PHC samples (type of preservative used for which fraction(s) of PHC)	view direction relative to magnetic north; line of sight (tooking from X to Y); include indication of scale
A	7628915 1	577396 1	0-0.15	GRANE L, SCME SAND AND COBBLES GRENSA BROWN, MOIST TRACE ROOTLETS AND COCKNICS, AND SICT	LID CLANCS, AUG SICH
10:00 B	1.02021	11.230.1	0,4-0,5		
A 30-WW	7670075	7 06642	O -0,15	ORGANGSONESSONE GRANTEL AND ORGANGS SI ROCTLETS, BROCK D. ANDIS TO	
10:40 B		3//230./	0,4-0,5	BROWN, MOIST	
AW-07	9 1/28697	577162 7	0-015	LEAMY SAUD AND GRANEL, SCME ORGANICS, RCOTCETS, DADE BROWN, MCIST	
11:20 B		711703.5	0.4-0.5	GRENEL, SCME LCANY SAND, GEEVISH BROWN, MOIST	
A 80-WM	7628954 4	577191 4	0-0-15	LOAMY SAND, SOME GRANT C AND COBSE, BROWNSH GREY, ROOTETS, MOIST	
12:00 B		1.17	0.4-0.5	CORNY SAUD AND GRAVEL, SELLID SCME	
mw-11	A 15 A	MW-112 13 A DUDLICATE	ATE OF		
				* PHC FI SAMPLES WERE	** 6017 AV62E AV5
				PRESERVED WITH METHANCL	
				AT ALL SAMPLE LOCATIONS	LCCATIONS

Site Name: PIN-4

Landfill Name: Station Area Landfill - West

Date & Time of Sampling Event: 2019 -08 -23

707 W ナット X 70 VX13 MIND 7 CUERCAST Weather:

Name of Sampling Staff: Elliott Holden

Soil Sampling	UTM Coo	UTM Coordinates	Sample		close up/wide angle/panoramic;
Location ID	North (m)	East (m)	Depth	depth and reason for refusal if required depth not achieved, any preservation of PHC samples (type of preservative used for which fraction(s) of PHC)	view direction relative to magnetic north; line of sight (looking from X to Y); include indication of scale
P4-13	7628816.9	576961.7	0-0,15	LCAMY SAND CABORITES, SOME GRANEL AND COBBIE, RESTLETS, BROWN, MCIST LCAMY SAND, SCALE GRANE CAND CORRECT TRACE GRANICA GREAT GRANE CORRECT TRACE GRANICA GREAT GRANE CORRECT TRACE GRANICA GREAT GRANICA CORRECT TRACE GRANICA GREAT GRANICA CORRECT TRACE GRANICA GREAT GRANICA CORRECT TRACE GRANICA GRANICA GRANICA CORRECT TRACE GRANICA GRANICA GRANICA CORRECT TRACE GRANICA GRANIC	
P4-14 A	7628781.4	576825.9	0.0.00	34	15.57 15.03.7
P4-15 A 14520 B	7628774.2	576787.1	0-0.15	GRAVEL AND CCANT SAND WITH GRAVICS, RECTLETS, DARK BROWN, MCIS! GRAVEL AND SANDY COAM, SCHE GEBRUE, TRACE ORGANICS, ORETISH PROC. IN	SIS   Aciv
P4-16 15:00 B	7628812.4	576796.2	0 -0.15	Me)3	F. C.
P4-17 A 15:30 B	7628854.8	576871	6-0.15	LCANT SAND AND GRAVEL, SEME CESSUE, RECTLESS GRETISH BROWN, MCIS LCANT SAND AND GRAVEL, SEME CEDBLE GRETISH BROWN, MCIST,	MCIST PLE
				WETHANCL STICKS	**  ENIDE ANGLE AND  GLESE-UP PHOTOS  TRICEN  ALC LECATION S

Site Name: PIN-4

Landfill Name: USAF Landfill

Date & Time of Sampling Event: 2019 . CB - 23

とって 400 80 H91+ WIND 76 KM/Pr YOUN'S CVERCAST Weather:

Name of Sampling Staff: Elliott Holden

Soil Sampling	UTM Coordinates	rdinates	Sample	1.0	Photos: number/ID; close up/wide angle/panoramic;
Location ID	North (m)	East (m)	Depth	depth and reason for rejusal if required depth not achieved, any preservation of PHC samples (type of preservative used for which fraction(s) of PHC)	view direction relative to magnetic north; line of sight (looking from X to Y); include indication of scale
P4-18	7628618 2	577300 7	6 - 6.15	LOAMT SAND AND GRAVEL, SOME COBBLE, GRETISH BECCON, MOIST	
16: 40 B	- 1	7.200.7	0,4-0.5	SAME AS ABOVE	
A A	7630500 2	2 736273	0-0.15	COBBUT TRACE ORGANICS POSTLETS GRENISH RELIED	100 mm
17:10 B	7.550707	5//55//5	0,4-0,5	GRAVEL, SCME CEBSLES, TRACE SANDY LCAM, GRETISH BROWN, MUST	
A 02-70	7628587 2	£77336	0-0.15	CROANY SAND, SOME GRAVEL AND GRAVELEY CORDILE	LCH COBBALE
17:40B	1.000		0.4-0.5	COBSIE, GRETIS H BROWN, MCIST	
P4-71	7628565 3	577286 2	0-0.15	LCAMY SAND, SCHE GRAVEL AND CCRBLES ORGANICS I ROCT LETS, OREXIST BROWN, MCST	S. Acivi
18; @ B		7.0	5.0-4.0	GREYISH DROGEN, MOIST, SCHE CERT OF	# C.
			*	PHOFI SAMPLES WERE	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
			Δ	PRESERVED CITT METHANOL	ALCOSE - W PHOTOS
			₹	AT ALL SAMPLE LOCATIONS	LECAT 16WS
			5		

PIN-4 Site Name: Airstrip Landfill Landfill Name:

2019-08:23 Date & Time of Sampling Event:

S 99 76 Km/25 SWA Weather: PARTLY CLCCUDY, WINDY

Elliott Holden Name of Sampling Staff:

Soil Sampling Location ID						r
Location ID	UTM Coordinates	rdinates	Sample	A-Notes: Including (but not limited to): visual/olfactory observations (colour, odour, evidence of contamination),	close up/wide angle/panoramic;	
<	North (m)	East (m)	Depth	deptin and reason for refusal if required deptin not achieved, any preservation of PHC samples (type of preservative used for which fraction(s) of PHC)	view direction relative to magnetic north; line of sight (looking from X to Y): Include indication of scale	
P4-22	7677943	576931 2	0 - 0.15	COBBUE TRACE CREANCY COSTLETS, GREYSH	SH BROWN, MASS	_
19:30 B	212.7	7:1000	0.4-0.5	CORRECTIONS SOME GRANEL AND CORRECTE GRENISH BROWN MOIST		_
P4-73	7637883 5	576037	0 -0,15	CRCANICS, SAME SAUDY LCAN AND GRAVEL, RUGGLETS, DARK BROWN, SATURATED	AND AT SUBENCE	_
20:00 B	027.002.3	0.126010	0.4-0.5	CRANGS SAND SOME GRANEL TRACE		_
P4-74	7627910 1	576803.8	0-0.15	ORGANICS, SCATE SANDT LOAM AND GRAVEL, RECTLETS, DARK BROWN, SARBATED	CUNTER AT SURBACE	_
20,30 B	1		0.4-0.5	1,4-0,5 LEAMY SAND, SAME ORGANICS	A I	_
P4-27A		15 A DUPLICATE	TE OF	P4-22A		
				PHC EI SAMPLES WERE	* CUDE ANGLE	
				PRESERVED WITH METHANGE		
		1		AT ALL SAMPLE LOCATIONS	Locations	

ANNEX M: Thermistor Inspection Template Inspector Name: ELLIOTT Inspection Date: HOLDEN 2019,08.24 \*Previous Inspection Date: Inspector Signature: 2017 - 08 - 13 Thermistor Information \*Site Name: PIN - 4. \*Landfill: TIER !! DISPOSAL FA \*Thermistor #: VT-1 Inclination: XVertical □ Inclined \*Northing: 7627991 576439.6 \*Easting: 2012-08-13 \*Installation Date: \*Year 1 Monitoring Date: 2012-08 . 0 Datalogger Model #: RX -16 REV1610N Datalogger Cable Model: DUSB Serial Port Datalogger Serial #: 108090 Datalogger Cable Too Short?: DY ZN \*Elevation (masl): 94.4 Extension Cable Required (m): > 0 □ N/A **Thermistor Inspection** Good **Needs Maintenance Details** Casing Integrity X Cover/Lid Integrity X **Datalogger Functionality** Cable Functionality **Bead Functionality** NO STABLE READINGS ON BEADS 14-Lock Yes No N/A **Details** Was casing found locked upon arrival? X Was a poorly functioning lock removed? X Was a new 7000PS-KA3 lock put in place? If no, model: **Batteries** N/A Yes No **Details** Was datalogger functional upon arrival? Batteries Found In Datalogger Battery models: Main: ULB 15 Auxiliary: CLB 1 Battery installation date: 2017-08-13 Battery levels: Main: 11.34V Auxiliary: 13,3EV Memory battery best before date: (Refer to yellow label above COM plug) NO YELLOW STICKER Were batteries replaced? If yes, models: ULB 15 AUD ULB New battery levels: Main: 11, 34 V Auxiliary: 13,75 V Was desiccant replaced? B Expected life of batteries in datalogger: Years: Replace by: MOE 2026 Was datalogger functional upon departure? If no, brought south for repairs? **Computer Connectivity** No Does red status light on black internal data logger glow bright red when laptop attached? - 16.529

Manual Ground Temperature Readings

Bead	ohms	°C
1	13.234	
2	15.214	
3	16.529	
4.	17.137	
5	18,384	
2	19,319	
7	20.26	
8	21.21	

Bead	ohms	°C
9	22.01	
10	22.78	
()	23,21	
12	24.17	
13	24.47	
14	3.445	
15	1.866	
16	1.832	

Datalogger Programming and Maintenance

Data collection frequency: PROGRAMMUG NOT CHANGED

Data collection time: MIDNIGHT

Maintenance requirements:

CLA6=2,35 M

ANNEX	X M: The	ermisto	r Inspec	ction 1	Template			
Inspector Name: ELLICIT HOLDEN			Inspection Date: 2019.08 - 24					
Inspector Signature: 24			*Previous Inspection Date: 2017 - 08 · 13					
					-			
Thermistor Information								
*Site Name: PIN - 4					*Landfill:		DISPOSAL FAC	
*Thermistor #: VT - 2			Man (S)	1114	Inclination:		□ Inclined	
*Northing: 7627960, 9						5764	141,6	
*Installation Date: 2012 / 08 / 13					Monitoring Date:		28 (0)	
Datalogger Model #: ZX ~ 16 REVIS	ICN 3	J-C			ger Cable Model:		Serial Port	
Datalogger Serial #: 0706 CC12		ter's all			able Too Short?:		XN	
*Elevation (masl): 93.9			Extens	sion Cat	ole Required (m):	NO	□ N/A	
Thermistor Inspection	Good	Needs	s Maintena	ance	Detai	le		
Casing Integrity	N.	110000		1100	Detail	13		
Cover/Lid Integrity	X					Market Services		
Datalogger Functionality	×			100 NV3				
Cable Functionality	<u>X</u>			-			ALICE TO THE PARTY OF THE PARTY	
Bead Functionality	X			100 0	TARIE DOIL	MIC C -	DEADE IN 13	
Dodd i andiorianty				NO 3	ADEL JEEN	MOS CA	13EADS 14-16	
Lock	Yes	No	N/A		Detail	s		
Was casing found locked upon arrival?	R							
Was a poorly functioning lock removed?		X						
Was a new 7000PS-KA3 lock put in place?			×	If no, r	model:			
			,					
<u>Batteries</u>	Yes	No	N/A		Detail	s		
Was datalogger functional upon arrival?	×							
Battery models:					ULB-15		iry: ULBI	
Battery installation date:				20	17-8-	13		
Battery models:  Battery installation date:  Battery levels:  Battery hest before date:					11. 34 V		iry: 13,50V	
Welliory battery best before date.				0	ct. 201	7 (Refer	to yellow label above COM plug	
Were batteries replaced?  New battery levels:  Was desiccant replaced?	×			If yes,	models: ULI3	15 AL	D ULBI	
New battery levels:	,			Main:	11,34	Auxilia	ry: 13.87	
Was desiccant replaced?	X							
Expected life of batteries in datalogger:  Was datalogger functional upon departure?				Years:		Replace	by:Mc6 20_26	
್ ಜಿ Was datalogger functional upon departure?	X			If no, b	rought south for i		□Y ₹N	
Computer Connectivity  Does red status light on black internal data logger glo	la et e la A. e e	de la company		10		Yes	No	
boes red status light on black internal data logger glo	w bright re	d when lap	otop attaci	nea?		X		
Manual Ground Temperature Readings								
Bead ohms °C				Bead	ohms	°C		
! 11.221				9	19.166			
2 11.979				10	19.771		311	
3 12.194				11	20.81		7	
4 13.468				12	21,57		10	
5 14.856				13	22.40		-115	
6 16.266			*		-		20	
7 17.123			45	-				
8 18 001				16				

**Datalogger Programming and Maintenance** 

Data collection frequency: PROGRAMNING WAS NOT CHANGED 12 HRS

Data collection time: MID NIGHT-

Maintenance requirements:

CLAG = 3.7 M

	Inspector Name:	ELLIGHT HOLD	EN			Inspection Date: 2019 - 08 - 24					
Ins	pector Signature:	247	5-10/11/0		*F	Previous	Inspection Date:	2017 -			
Thorn	nistor Informatio	//									
mem	*Site Name:	PIN - 4					*I andfill:	TIER!! DI	SDES	AL FAC	
10.115	*Thermistor #:	P10 T		TESTS.		I UTV	Inclination:		رری وی Incli 🗆		
	*Northing:	7627952.	9		The state of	OF ILL SERV		576398		neu	
*	Installation Date:	2012-08-13	HO HUMAN		1251-110	*Vear 1	Monitoring Date:			- 1	
= 0 18	alogger Model #:	RX-16 REVISK	5-C			ger Cable Model:		Seri			
	alogger Serial #:	07040011					able Too Short?:		XN	all of	
	Elevation (masl):	93.8				le Required (m):		XN/A			
							(1.17)				
Therm	istor Inspection		Good	Needs	Maintena	ance	Details	S			
		Casing Integrity	A							h te et e f	
		Cover/Lid Integrity	X								
		Datalogger Functionality	×			de El f					
		Cable Functionality	XXXX								
J. L.		Bead Functionality	X	100		Ne S	STABLE IZEAL	oines en	BEA	DS 14-	
_ock			Yes	No	N/A		Details	3			
	Was casing	g found locked upon arrival?	543								
	Was a poorl		A		THE ST				LE ELLE		
	Was a new 700			X	If no, n	nodel:					
Batteri	26		Yes	No	N/A		Details				
		gger functional upon arrival?		X	N/A	A PAGE 1	Details				
Batteries Found In Datalogger		Battery models:		1		Main:	ULBIS	Auxiliary	CULE	2 1	
s For		Battery installation date:						5 (W) (1 ) (A)	CIL	21	
Data		Battery levels:				Main:	11.34 V	Auxiliary	: 13	,50V	
Ba	Mem	ory battery best before date:					ELICO LA			above COM plug	
듈		Were batteries replaced?	叉				models: (AL)3		UL		
acen t		New battery levels:	~	_		Main:	11.34V	Auxiliary		63V	
Replacemen t		Was desiccant replaced?	X				131 0 1 0		, 10,	60 V	
	Expected li	fe of batteries in datalogger:		TO THE PARTY	TRIPIES	Years:		Replace by	:MO6	2026	
Final	Was datalogger	functional upon departure?	S			If no, b	rought south for re		ΒY	o N	
	ter Connectivity							Yes		No	
oes re	ed status light on	black internal data logger glov	v bright re	ed when lap	otop attacl	hed?		×			
fanus.	Cround Tomas	reture Beedings									
Bead	ohms			LOGGE		Pood	ohms	• • • • • • • • • • • • • • • • • • • •	1		
Seau		was	مرسومت د	FREN		Bead		°C	-		
2	9.945	100	~ T	7ME: 1:41 A	M	9	18.529		-		
3	10,523		4			10	19.577		4		
4	12.253	LOGG	ERTIN	NE' GI	00	12	20,35		-		
5	12.429	20 08	116)	2017			21.11		4		
6	13,943	EDRED	UAS	S EN COL	WIEDED	13	21, 89		-		
7	15.428	"THERE C	JAS A	N ERRC	R	· · ·			-		
8	16.588	CALCU	LLAT	ING	E	16		1917 3111 22	-		
0	17.410	THE D	フヘブグ	コレラー リ	米	16			J		
atalo	ager Programmi	ng and Maintenance	/ <b>.</b>	-16-	*	NC E	TABLE RI	EAD)NG			

Data collection time: MD NIGHT

CLAG = 3,75 M

Maintenance requirements:

**ANNEX M: Thermistor Inspection Template** Inspector Name: ELLIGIT HCLDEN Inspection Date: 2019-08-24 \*Previous Inspection Date: Inspector Signature: 2017 - 08 - 13 Thermistor Information \*Site Name: PIN - 4 \*Landfill: TIER 11 DISPOSAL FAC \*Thermistor #: VT-4 Inclination: Vertical □ Inclined \*Northing: 5764012 7627922-6 \*Easting: \*Installation Date: 012/08/13 \*Year 1 Monitoring Date: 08 Datalogger Model #: REVISION J-C Datalogger Cable Model: USB Serial Port Datalogger Serial #: 07060014 Datalogger Cable Too Short?: - Y MN \*Elevation (masl): Extension Cable Required (m): □ N/A **Thermistor Inspection** Good **Needs Maintenance Details** Casing Integrity X Cover/Lid Integrity X **Datalogger Functionality** X Cable Functionality 赵 **Bead Functionality Lock** Yes No N/A **Details** Was casing found locked upon arrival? X Was a poorly functioning lock removed? X Was a new 7000PS-KA3 lock put in place? If no, model: **Batteries** Yes No N/A Details Was datalogger functional upon arrival? Batteries Found In Datalogger 又 Battery models: Main: ULB - 15 Auxiliary: ULB Battery installation date: 2017-18 Battery levels: Main: 11 - 34 Auxiliary: Memory battery best before date: (Refer to yellow label above COM plug) N YELLOW LABLE Were batteries replaced? If yes, models: ULB-15 New battery levels: Main: Auxiliary: 23 11,34 Was desiccant replaced? Expected life of batteries in datalogger: Years: Replace by: MG 2026 Was datalogger functional upon departure? If no, brought south for repairs? **Computer Connectivity** Yes No Does red status light on black internal data logger glow bright red when laptop attached?

Manual	Ground	Tem	nerature	Readings
manuai	Olouliu	I GIIII	perature	IVEGUIIIMS

Bead	ohms	°C
1	10.315	
2	11.983	
3	12.725	
4	13.997	
5	15,247	
6	16.622	
7	17.437	
8	18.357	

Bead	ohms	°C
9	19,151	
10	20.03	
30	20,73	
12	21,52	
13	22. 11	
14	22.66	
15	22.83	
16	23,44	

### **Datalogger Programming and Maintenance**

WAS NOT CHLUGED Data collection frequency: PRCGAMMING 12 HRS

Data collection time: MIDNIGHT

Maintenance requirements:

# **APPENDIX H**

**Site Photographic Logs** 

# **APPENDIX H1**

Aerial Photograph Log

### Appendix H: PIN-4 Photographic Log 2019

Photo ID	Figure ID	View Direction	Feature ID	Feature of Note	UTM		Photo Size KB	Date of Photo	Camera Information	
					Northing Easting					
Aerial Photographs										
No Photo	-	-	-	Northwest Landfill	-	-	-	-	-	
A1	4.1	west	A1	North Landfill	7629352.621	578004.189	3978	2019-08-24	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel	
A2	4.1	north-northwest	A2	Non-Hazardous Waste Landfill	7628654.896	577394.428	4096	2019-08-24	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel	
А3	4.1	north-northeast	А3	Station Landfill	7628534.136	577221.866	3981	2019-08-24	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel	
A4	4.1	northeast	A4	USAF Landfill	7628630.006	576739.337	4248	2019-08-24	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel	
A5	4.1	south - southwest	A5	Tier II Disposal Facility	7628200.200	576580.354	4003	2019-08-24	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel	
A6	4.1	southwest	A6	Airstrip Landfill	7627979.700	577005.619	3906	2019-08-24	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel	

Arcadis Project # 30000251

# **APPENDIX H2**

Sample Station Photograph Log

### Appendix H: PIN-4 Photographic Log 2019

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Description	U	UTM		Date of Photo	Camera Information
						Northing	Easting	(KB)		
	,				Sample Station Ph	otographs - Northw	est Landfill			
P4-1-1		NA			Close-up of test pit			6715	2019-08-22	Panasonic DMC-TS25, Aspect
P4-1-2	S1	west-southwest	Sample station P4-1	P4-1	Test pit location	7629386.983	577292.381	6572	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-1-3	]	NA			Test pit backfilled			6726	2019-08-22	15.9 Mpixel
P4-2-1		NA			Close-up of test pit			6824	2019-08-22	Panasonic DMC-TS25, Aspect
P4-2-2	S2	east-northeast	Sample station P4-2	P4-2	Test pit location	7629321.874	577232.021	6820	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-2-3	1	NA	Ī		Test pit backfilled			6608	2019-08-22	15.9 Mpixel
P4-3-1		NA			Close-up of test pit			6198	2019-08-22	Panasonic DMC-TS25, Aspect
P4-3-2	S3	northeast	Sample station P4-3	P4-3	Test pit location	7629342.702	577203.860	6462	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-3-3	1	NA			Test pit backfilled			6837	2019-08-22	15.9 Mpixel
P4-4-1		NA	Sample station P4-4		Close-up of test pit			6509	2019-08-22	Danasania DMC TS2E Aspast
P4-4-2	S4	east-southeast		P4-4	Test pit location	7629449.566	577210.698	6441	2019-08-22	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm,
P4-4-3	1	NA				Test pit backfilled			6897	2019-08-22
P4-5-1		NA			Close-up of test pit			6128	2019-08-22	Panasonic DMC-TS25, Aspect
P4-5-2	<b>S</b> 5	east	Sample station P4-5	P4-5	Test pit location	7629421.112	577249.055	6914	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-5-3	]	NA				Test pit backfilled			6785	2019-08-22
					Sample Station	Photographs - Nort	h Landfill			
P4-6-1		NA			Close-up of test pit			6383	2019-08-22	Panasonic DMC-TS25, Aspect
P4-6-2	S1	south	Sample Station P4-6	P4-6	Test pit location	7629343.03	577817.205	6341	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-6-3		NA			Test pit backfilled			6539	2019-08-22	15.9 Mpixel
P4-7-1		NA			Close-up of test pit			6447	2019-08-22	Panasonic DMC-TS25, Aspect
P4-7-2	S2	south	Sample Station P4-7	P4-7	Test pit location	7629449.984	577808.506	6598	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-7-3		NA			Test pit backfilled			6234	2019-08-22	15.9 Mpixel
P4-8-1		NA			Close-up of test pit			6687	2019-08-22	Panasonic DMC-TS25, Aspect
P4-8-2	S3	south	Sample Station P4-8	P4-8	Test pit location	7629438.625	577836.315	6860	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-8-3		NA			Test pit backfilled			6196	2019-08-22	15.9 Mpixel

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Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Description	U	тм	Photo Size (KB)	Date of Photo	Camera Information
		Direction	Location			Northing	Easting	(ND)		
P4-9-1		NA			Close-up of test pit			6785	2019-08-22	Panaconic DMC TS2E Acnost
P4-9-2	S4	southwest	Sample Station P4-9	P4-9	Test pit location	7629367.102	577946.227	6798	2019-08-22	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm,
P4-9-3	1	NA			Test pit backfilled			6227	2019-08-22	15.9 Mpixel
P4-10-1		NA			Close-up of test pit			6965	2019-08-22	Panasonic DMC-TS25, Aspect
P4-10-2	S5	southwest	Sample Station P4-10	P4-10	Test pit location	7629347.648	577964.775	6115	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-10-3		NA			Test pit backfilled			6300	2019-08-22	15.9 Mpixel
P4-11-1		NA			Close-up of test pit			9197	2019-08-22	Panasonic DMC-TS25, Aspect
P4-11-2	S6	north	Sample Station P4-11	P4-11	Test pit location	7629259.766	577814.233	6450	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-11-3	]	NA			Test pit backfilled			6274	2019-08-22	15.9 Mpixel
P4-12-1		NA			Close-up of test pit			6660	2019-08-22	Panasonic DMC-TS25, Aspect
P4-12-2	<b>S</b> 7	north	Sample Station P4-12	P4-12	Test pit location	7629248.712	577765.323	6649	2019-08-22	Ratio 4:3, Focal Length 4 -25mm,
P4-12-3	1	NA			Test pit backfilled			6280	2019-08-22	15.9 Mpixel
				San	nple Station Photogra	phs - Non-Hazardo	ous Waste Landfill			
MW-05-1		NA			Close-up of test pit			6316	2019-08-23	<ul> <li>Panasonic DMC-TS25, Aspect</li> </ul>
MW-05-2	S1	west-northwest	Sample Station MW-05	MW-05	Test pit location	7628912.596	577305.443	6562	2019-08-23	Ratio 4:3, Focal Length 4 -25mm,
MW-05-3		NA			Test pit backfilled			6573	2019-08-23	- 15.9 Mpixel
MW-06-1		NA			Close-up of test pit			6672	2019-08-23	
MW-06-2	S2	east-northeast	Sample Station MW-06	MW-06	Test pit location	7628826.202	577224.664	6629	2019-08-23	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm,
MW-06-3	1	NA			Test pit backfilled			6339	2019-08-23	- 15.9 Mpixel
MW-07-1		NA			Close-up of test pit			6301	2019-08-23	
MW-07-2	S3	east	Sample Station MW-07	MW-07	Test pit location	7628874.107	577154.059	6789	2019-08-23	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm,
MW-07-3	1	NA	11111 07		Test pit backfilled			6758	2019-08-23	15.9 Mpixel
MW-08-1		NA			Close-up of test pit			6199	2019-08-23	
MW-08-2	<b>S4</b>	east	Sample Station MW-08	MW-08	Test pit location	on 7628951.885	577183.244	6370	2019-08-23	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm,
MW-08-3	1	NA			Test pit backfilled		85 577183.244	6674	2019-08-23	15.9 Mpixel

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Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Description	U	тм	Photo Size (KB)	Date of Photo	Camera Information
						Northing	Easting			
					Sample Station Pho	tographs - Station	Area Landfill			
P4-13-1		NA			Close-up of test pit			6422	2019-08-23	Panasonic DMC-TS25, Aspect
P4-13-2	<b>S1</b>	southwest	Sample Station P4-13	P4-13	Test pit location	7628770.269	576957.002	6538	2019-08-23	Ratio 4:3, Focal Length 4 -25mm,  15.9 Mpixel
P4-13-3		NA			Test pit backfilled			6878	2019-08-23	25.5p.//ci
P4-14-1		NA			Close-up of test pit			6322	2019-08-23	
P4-14-2	S2	north-northeast	Sample Station P4-14	P4-14	Test pit location	7628718.219	576768.638	6734	2019-08-23	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel
P4-14-3	1	NA			Test pit backfilled			6394	2019-08-23	13.9 Wpixei
P4-15-1		NA			Close-up of test pit			6476	2019-08-23	
P4-15-2	<b>S</b> 3	northeast	Sample Station P4-15	P4-15	Test pit location	7628769.923	576731.397	6587	2019-08-23	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel
P4-15-3	1	NA	P4-15		Test pit backfilled			6786	2019-08-23	13.9 Wpixei
P4-16-1		NA			Close-up of test pit			6604	2019-08-23	Degracacia DMC TC25, Acquest
P4-16-2	S4	northeast	Sample Station P4-16	P4-16	Test pit location	7628830.539	576757.884	6764	2019-08-23	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm 15.9 Mpixel
P4-16-3		south			Test pit backfilled			6179	2019-08-23	15.9 Mpixei
P4-17-1		NA			Close-up of test pit			6532	2019-08-23	
P4-17-2	<b>S</b> 5	south- southwest	Sample Station P4-17	P4-17	Test pit location	7628852.697	576817.908	6497		Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel
P4-17-3		NA			Test pit backfilled			6769	2019-08-23	13.3 Wpixei
					Sample Station	Photographs - USA	F Landfill			
P4-18-1		NA			Close-up of test pit			6634	2019-08-23	Panasonic DMC TS25 Assart
P4-18-2	S1	southwest	Sample Station P4-18	<u> </u>	Test pit location	<del>-</del>	577304.960	6775	2019-08-23	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel
P4-18-3		NA			Test pit backfilled			6581	2019-08-23	13.3 WIPIXEI

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Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Description	U	тм	Photo Size (KB)	Date of Photo	Camera Information
						Northing	Easting			
P4-19-1		NA			Close-up of test pit			6715	2019-08-23	Panasonic DMC-TS25, Aspect
P4-19-2	S2	northwest	Sample Station P4-19	P4-19	Test pit location	7628602.84	577360.535	6628	2019-08-23	Ratio 4:3, Focal Length 4 -25mm,
P4-19-3		NA			Test pit backfilled			6699	2019-08-23	15.9 Mpixel
P4-20-1		NA			Close-up of test pit			6517	2019-08-23	Democratic DNAC TC2F Accept
P4-20-2	S3	northwest	Sample Station P4-20	P4-20	Test pit location	7628573.700	577328.594	6510	2019-08-23	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm,
P4-20-3	]	NA			Test pit backfilled			6629	2019-08-23	15.9 Mpixel
P4-21-1		NA			Close-up of test pit			9462	2019-08-23	Danasania DMC TS2E Aspect
P4-21-2	S4	north	Sample Station P4-21	P4-21	Test pit location	7628556.057	577296.308	6461	2019-08-23	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm,
P4-21-3	]	NA			Test pit backfilled			6443	2019-08-23	15.9 Mpixel
					Sample Station Photo	tographs - Tier II Di	posal Facility			
MW-01-1		NA			Close-up of test pit			6462	2019-08-21	Panasonic DMC-TS25, Aspect
MW-01-2	S1	south	Sample Station MW-01	MW-01	Test pit location	7628021.749	576445.335	6667	2019-08-21	Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel
MW-01-3		NA			Test pit backfilled			6748	2019-08-21	15.9 Mpixei
MW-02-1		NA			Close-up of test pit			6823	2019-08-21	Panasonic DMC-TS25, Aspect
MW-02-2	S2	north-northwest	Sample Station MW-02	MW-02	Test pit location	7627903.251	576513.832	6633	2019-08-21	Ratio 4:3, Focal Length 4 -25mm, 15.9 Mpixel
MW-02-3	]	NA			Test pit backfilled			6582	2019-08-21	15.9 Mpixei
MW-03-1		NA			Close-up of test pit			6399	2019-08-21	Democratic DNAC TC2F Accept
MW-03-2	S3	north	Sample Station MW-03	MW-03	Test pit location	7627876.563	576434.576	6285	2019-08-21	Panasonic DMC-TS25, Aspect Ratio 4:3, Focal Length 4 -25mm,
MW-03-3	]	NA			Test pit backfilled			6529	2019-08-21	15.9 Mpixel
MW-04-1		NA			Close-up of test pit			6273	2019-08-21	Danasania DMC TS2E Accept
MW-04-2	S4	north	Sample Station MW-04	MW-04	Test pit location	7627923.75	576348.644	6546	2019-08-21	, ,
MW-04-3		NA			Test pit backfilled			6698	2019-08-21	15.9 Mpixel

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Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Description	U	тм	Photo Size (KB)	Date of Photo	Camera Information
						Northing	Easting			
					Sample Station P	hotographs - Airst	rip Landfill			
P4-22-1		NA			Close-up of test pit			6570	2019-08-23	Panasonic DMC-TS25, Aspect
P4-22-2	S1	southwest	Sample Station P4-22	P4-22	Test pit location	7627936.319	576960.656	6324	2019-08-23	Ratio 4:3, Focal Length 4 -25mm,
P4-22-3		NA	1 4 22		Test pit backfilled			6936	2019-08-23	15.9 Mpixel
P4-23-1		NA			Close-up of test pit			6196	2019-08-23	Panasonic DMC-TS25, Aspect
P4-23-2	S2	north	Sample Station P4-23	P4-23	Test pit location	7627876.281	576929.966	6371	2019-08-23	Ratio 4:3, Focal Length 4 -25mm,
P4-23-3		NA			Test pit backfilled			6743	2019-08-23	15.9 Mpixel
P4-24-1		NA			Close-up of test pit			6062	2019-08-23	Panasonis DMC TS2E Aspect
P4-24-2	<b>S</b> 3	northeast	Sample Station P4-24	P4-24	Test pit location	on 7627910.391	576898.599	6336	2019-08-23	· ·
P4-24-3		NA			Test pit backfilled			6327	2019-08-23	15.9 Mpixel

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# **APPENDIX H3**

**Visual Inspection Photograph Log** 

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UT		Photo Size KB	Date of Photo	Camera Information
						NORTHWEST LANDFILL	Northing	Easting			
NWLF_1	1	w	NE corner of Lobe B	-	Landfill structure	View along N toe of Landfill.	7629381.415	577287.072	3607	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_2	2	sw	NE corner of Lobe B	-	Landfill structure	View along E toe of Landfill.	7629383.343	577287.196	3872	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_3	3	NE	SE corner of Lobe B	-	Landfill structure	View along E toe of Landfill.	7629342.379	577266.808	3779	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_4	4	sw	SE corner of Lobe B	-	Landfill structure	View along S toe of Landfill.	7629342.845	577269.462	4201	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_5	5	NW	SE corner of Lobe B	-	Landfill structure	View across Landfill cap.	7629341.618	577265.901	4155	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_6	6	E	SW corner of Lobe B	-	Landfill structure	View along S toe of Landfill.	7629329.340	577220.508	3842	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_7	7	NW	SW corner of Lobe B	-	Landfill structure	View along W toe of Landfill.	7629327.950	577221.704	3573	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_8	8	NE	SW corner of Lobe B	-	Landfill structure	View across Landfill cap.	7629332.564	577223.655	3971	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_9	9	s	NW corner of Lobe B	-	Landfill structure	View along W toe of Landfill.	7629373.813	577213.000	3644	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_10	10	E	NW corner of Lobe B	-	Landfill structure	View along N toe of Landfill.	7629372.480	577213.395	3801	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_11	11	E	NW corner of Lobe B	С	Minor linear erosion	Detail of Feature C.	7629370.059	577219.827	4103	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_12	12	sw	NW corner of Lobe B	С	Minor linear erosion	Detail of Feature C.	7629378.451	577237.540	4215	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_13	13	s	NW corner of Lobe B	А	Minor depression	Detail of Feature A.	7629371.277	577227.162	4336	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_14	14	w	NW corner of Lobe B	А	Minor depression	Detail of Feature A.	7629371.045	577229.776	4361	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_15	15	E	SW corner of Lobe C	-	Landfill structure	View along S toe of Landfill.	7629399.387	577258.817	3576	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_16	16	N	SW corner of Lobe C	-	Landfill structure	View along W toe of Landfill.	7629399.490	577258.209	4004	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_17	17	NE	SW corner of Lobe C	-	Landfill structure	View across Landfill cap.	7629401.911	577263.328	4088	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_18	18	sw	NW corner of Lobe C	-	Landfill structure	View along W toe of Landfill.	7629423.632	577264.549	3733	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_19	19	E	NW corner of Lobe C	-	Landfill structure	View along N toe of Landfill.	7629423.448	577262.947	4175	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_20	20	w	NE corner of Lobe C	-	Landfill structure	View along N toe of Landfill.	7629418.670	577296.407	4130	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_21	21	s	NE corner of Lobe C	-	Landfill structure	View along E toe of Landfill.	7629419.653	577296.091	4128	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_22	22	sw	NE corner of Lobe C	-	Landfill structure	View across Landfill cap.	7629412.989	577293.283	4095	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_23	23	N	SE corner of Lobe C	-	Landfill structure	View along E toe of Landfill.	7629398.274	577299.631	4348	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_24	24	w	SE corner of Lobe C	-	Landfill structure	View along S toe of Landfill.	7629398.544	577299.743	4105	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_25	25	SE	SW corner of Lobe D	-	Landfill structure	View along S toe of Landfill.	7629425.458	577208.625	3750	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_26	26	N	SW corner of Lobe D	-	Landfill structure	View along W toe of Landfill.	7629428.225	577205.519	4037	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_27	27	E	NW corner of Lobe D	-	Landfill structure	View along N toe of Landfill.	7629445.517	577210.036	3619	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_28	28	w	NE corner of Lobe D	-	Landfill structure	View along N toe of Landfill.	7629446.114	577238.676	3992	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_29	29	s	NE corner of Lobe D	-	Landfill structure	View along E toe of Landfill.	7629445.327	577238.704	3866	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_30	30	w	NE corner of Lobe D	B1, B2	Minor depressions	Detail of Features B1, B2	7629443.677	577234.654	4340	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_31	31	s	NE corner of Lobe D	B1, B2	Minor depressions	Detail of Features B1, B2	7629446.459	577231.555	4232	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_32	32	N	SE corner of Lobe D	-	Landfill structure	View along E toe of Landfill.	7629408.000	577232.182	3774	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_33	33	NW	SE corner of Lobe D	-	Landfill structure	View along S toe of Landfill.	7629407.484	577230.278	4003	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NWLF_34	34	NW	SE corner of Lobe D	-	Landfill structure	View across Landfill cap.	7629414.741	577229.318	3848	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UT	М	Photo Size KB	Date of Photo	Camera Information
						NORTH LANDFILL	Northing	Easting			
NLF_1	1	s	N of Lobe A	-	Landfill structure	View up N slope of Landfill.	7629391.830	577889.913	3695	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_2	2	E	NW point of Lobe A	-	Landfill structure	View along N toe of Landfill.	7629371.100	577881.956	3787	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_3	3	s	N toe of Lobe A	-	Landfill structure	View up N slope of Landfill. Along border of organic cover material.	7629369.307	577924.358	4198	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_4	4	SE	N toe of Lobe A	-	Landfill structure	View along N toe of Landfill.	7629369.721	577924.264	4128	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_5	5	sw	NE of Lobe A	-	Landfill structure	View up N slope of Landfill.	7629363.707	577958.578	4006	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_6	6	NW	E toe of Lobe A		Landfill structure	View along N toe of Landfill.	7629336.245	577954.895	3635	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_7	7	w	E toe of Lobe A	-	Landfill structure	View up E slope of Landfill.	7629332.520	577954.076	4038	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_8	8	sw	E toe of Lobe A	A	Minor depression	Detail of Feature A.	7629320.595	577945.209	4179	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_9	9	E	SE toe of Lobe A	-	Landfill structure	View down SE slope (E toe) of Landfill.	7629314.261	577918.582	3988	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_10	10	NW	SE of Lobe A	-	Landfill structure	View along crest of Landfill.	7629304.057	577925.261	4075	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_11	11	sw	SE toe of Lobe A	-	Landfill structure	View along SE toe of Landfill.	7629317.243	577919.766	4083	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_12	12	E	Crest of Lobe A	-	Landfill structure	View down slope of Landfill. Detail of organic cover material.	7629335.174	577911.733	4207	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_13	13	sw	Crest of Lobe A	-	Landfill structure	View across cap of Landfill.	7629336.055	577910.159	3596	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_14	14	w	Crest of Lobe A	ı	Minor depression	Detail of Feature I.	7629337.342	577913.059	4258	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_15	15	N	Crest of Lobe A	I	Minor depression	Detail of Feature I.	7629337.342	577913.059	4301	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_16	16	SE	Lobe A, central	В	Minor erosion	Detail of Feature B.	7629322.359	577893.882	3643	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_17	17	NW	SE slope of Lobe A	В	Minor erosion	Detail of Feature B.	7629309.609	577901.095	3981	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_18	18	NE	S point of Lobe A	-	Landfill structure	View along SE toe of Landfill.	7629293.972	577883.293	3603	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_19	19	NW	S point of Lobe A	-	Landfill structure	View along SW toe of Landfill.	7629293.615	577884.564	4199	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_20	20	SE	SW point of Lobe A	-	Landfill structure	View along SW toe of Landfill.	7629321.890	577861.576	3639	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_21	21	NE	SW point of Lobe A		Landfill structure	View along W toe of Landfill.	7629321.975	577861.814	4209	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_22	22	E	SW point of Lobe A		Landfill structure	View across cap of Landfill.	7629322.193	577866.316	3997	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_23	23	sw	NW toe of Lobe A		Landfill structure	View along W toe of Landfill.	7629350.320	577882.137	4275	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_24	24	SE	NW toe of Lobe A	-	Landfill structure	View along crest of Landfill.	7629345.306	577882.379	3905	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_25	25	N	NW toe of Lobe A		Landfill structure	View down slope (along W toe) of Landfill.	7629349.053	577885.237	4020	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_26	26	NE	S point of Lobe B	·	Landfill structure	View along NE toe of Landfill.	7629363.738	577836.760	4310	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_27	27	NW	S point of Lobe B		Landfill structure	View along NW toe of Landfill.	7629360.184	577830.697	4171	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_28	28	N	Crest of Lobe B, S end		Landfill structure	View down N slope (across cap) of Landfill.	7629374.467	577826.687	3991	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_29	29	E	Crest of Lobe B, S end	С	Minor erosion	Detail of Feature C.	7629373.658	577828.230	4250	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_30	30	N	Crest of Lobe B, S end	С	Minor erosion	Detail of Feature C.	7629367.463	577830.902	4115	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_31	31	SE	W point of Lobe B	-	Landfill structure	View along SW toe of Landfill.	7629408.356	577774.243	3877	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_32	32	NE	W point of Lobe B	-	Landfill structure	View down slope (along NW toe) of Landfill.	7629408.843	577773.883	4220	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_33	33	Е	W point of Lobe B	J	Minor depression	Detail of Feature J.	7629413.125	577781.589	4332	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_34	34	SE	N point of Lobe B, at crest	-	Landfill structure	View across cap of Landfill.	7629422.835	577795.004	3574	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_35	35	NW	N point of Lobe B, at crest	н	Construction Relic	Detail of Feature H.	7629424.510	577795.160	4113	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_36	36	SE	N point of Lobe B, at crest	н	Construction Relic	Detail of Feature H.	7629431.380	577786.145	4345	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_37	37	sw	N of Lobe B	-	Landfill structure	View up slope (along NW toe) of Landfill.	7629443.257	577794.730	4182	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_38	38	SE	N of Lobe B	-	Landfill structure	View of Landfill slope (N side).	7629451.160	577785.704	3608	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UT	M	Photo Size KB	Date of Photo	Camera Information
							Northing	Easting			
NLF_39	39	s	N of Lobe B	-	Landfill structure	View of Landfill slope (NE side).	7629451.160	577785.704	3971	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_40	40	NW	NE of Lobe B	-	Landfill structure	View along N toe of Landfill.	7629415.821	577845.011	4100	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_41	41	s	E toe of Lobe B	К	Minor depression	Detail of Feature K.	7629410.713	577842.264	4251	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_42	42	NW	E toe of Lobe B	К	Minor depression	Detail of Feature K.	7629405.182	577842.909	4295	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_43	43	sw	E of Lobe B	G	Minor erosion	Area of former Feature G (not observed).	7629402.300	577848.033	4061	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_44	44	SE	E side of Lobe B	G	Minor erosion	Area of former Feature G (not observed).	7629399.255	577831.549	4183	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_45	45	NW	E side of Lobe B	-	Landfill structure	View across cap of Landfill.	7629397.472	577835.672	3863	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_46	46	s	E of Lobe B	-	Landfill structure	View along E toe of Landfill.	7629400.243	577847.552	4208	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_47	47	w	E of Lobe B	-	Landfill structure	View of E side of Landfill.	7629385.597	577844.479	3922	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_48	48	w	NE corner of Lobe C	-	Landfill structure	View along N toe of Landfill.	7629319.091	577807.505	3914	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_49	49	s	NE corner of Lobe C	-	Landfill structure	View along E toe of Landfill.	7629316.258	577816.623	4091	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_50	50	NW	Cap of Lobe C, NE quadrant	E	Minor erosion	Detail of Feature E.	7629298.466	577807.532	4264	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_51	51	SE	Cap of Lobe C, NE quadrant	E	Minor erosion	Detail of Feature E.	7629306.136	577802.654	4066	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_52	52	NW	Lobe C slope, NE corner	F	Minor erosion	Detail of Feature F.	7629302.208	577812.966	4341	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_53	53	SE	Lobe C slope, NE corner	F	Minor erosion	Detail of Feature F.	7629308.159	577810.586	4234	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_54	54	sw	Lobe C slope, NE comer	F	Landfill structure	View across cap of Landfill.	7629306.785	577814.585	4350	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_55	55	E	NW corner of Lobe C	-	Landfill structure	View along N toe of Landfill.	7629301.763	577739.168	4039	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_56	56	s	NW corner of Lobe C	-	Landfill structure	View along W toe of Landfill.	7629301.441	577738.950	3985	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_57	57	SE	NW corner of Lobe C	-	Landfill structure	View across cap of Landfill.	7629297.193	577743.683	4324	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_58	58	sw	NW corner of Lobe C	D	Minor erosion	Detail of Feature D.	7629303.036	577751.913	4229	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_59	59	SE	NW corner of Lobe C	D	Minor erosion	Detail of Feature D.	7629306.316	577746.927	4032	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_60	60	N	SW corner of Lobe C	-	Landfill structure	View along W toe of Landfill.	7629259.959	577736.102	4133	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_61	61	E	SW corner of Lobe C	-	Landfill structure	View along S toe of Landfill.	7629257.940	577732.476	3903	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_62	62	SE	S crest of Lobe C	-	Landfill structure	View along S toe of Landfill.	7629274.718	577764.095	4047	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_63	63	w	SE comer of Lobe C	-	Landfill structure	View along S toe of Landfill.	7629261.628	577810.036	3683	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_64	64	N	SE comer of Lobe C	-	Landfill structure	View along E toe of Landfill.	7629259.316	577807.790	3608	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NLF_65	65	NW	SE comer of Lobe C	-	Landfill structure	View across cap of Landfill.	7629264.455	577807.875	3572	22-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UT	М	Photo Size KB	Date of Photo	Camera Information
						NON-HAZARDOUS WASTE LANDFIL	Northing .L	Easting			
NHWLF_1	1	SW	NE of Landfill	-	Landfill structure	View of E point of Landfill.	7628928.654	577304.412	3856	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NHWLF_2	2	NW	E point of Landfill, at toe	-	Landfill structure	View along NE toe of Landfill.	7628920.973	577289.746	4232	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NHWLF_3	3	sw	E point of Landfill, at toe	-	Landfill structure	View along SE toe of Landfill.	7628920.387	577291.037	3716	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NHWLF_4	4	NW	E point of Landfill, at crest	-	Landfill structure	View along NE crest of Landfill.	7628915.273	577282.074	4043	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NHWLF_5	5	sw	E point of Landfill, at crest	-	Landfill structure	View along SE toe of Landfill.	7628916.149	577281.266	3812	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NHWLF_6	6	w	E point of Landfill, at crest	-	Landfill structure	View across Landfill cap.	7628916.149	577281.266	4179	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_7	7	w	NE slope of Landfill, towards E corner	В	Minor depression	Detail of Feature B.	7628920.337	577276.083	4036	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_8	8	s	NE slope of Landfill, towards E corner	В	Minor depression	Detail of Feature B.	7628922.713	577274.905	4142	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_9	9	NW	NE slope of Landfill	А	Minor depression	Detail of Feature A.	7628926.091	577260.132	4326	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_10	10	sw	NE slope of Landfill	А	Minor depression	Detail of Feature A.	7628928.871	577259.937	4147	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_11	11	SE	N point of Landfill, at crest	-	Landfill structure	View along NE crest of Landfill.	7628946.612	577218.017	3610	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_12	12	SW	N point of Landfill, at crest	-	Landfill structure	View along NW crest of Landfill.	7628947.335	577218.040	4330	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_13	13	s	N point of Landfill, at crest	-	Landfill structure	View across Landfill cap.	7628946.530	577217.820	3840	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_14	14	S	N point of Landfill, at crest	-	Landfill structure	View across Landfill cap.	7628940.560	577224.253	4155	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_15	15	SE	N point of Landfill, at toe	-	Landfill structure	View along NE toe of Landfill.	7628957.148	577215.523	4278	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_16	16	SW	N point of Landfill, at toe  N point of Landfill,	-	Landfill structure	View along NW toe of Landfill.	7628958.336	577207.880	3869	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_17	17	SE	midslope  N point of Landfill, at	D	Minor erosion	Detail of Feature D.	7628946.629	577211.996	4016	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_18	18	NW	crest  Landfill cap, towards N	D	Minor erosion	Detail of Feature D.	7628943.355	577219.134	4096	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_19	19	NE NW	corner  Landfill cap, towards N	С		Area of former Feature C (not observed).	7628925.856	577222.003	3601	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_20	20		corner  Landfill cap, towards N	С -		Area of former Feature C (not observed).  Area of former 'pushed stone' feature	7628926.911	577230.406	4029 3599	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_21	21	SE	corner  Landfill cap, towards N	•	Landfill structure	(not observed).  Area of former 'pushed stone' feature	7628926.210	577224.097		23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_22	22	NE	corner		Landfill structure	(not observed).  View across Landfill cap.	7628921.183	577226.715 577230.853	4081 3634	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_23 NHWLF_24	23	N E	Landfill cap, centre		Landfill structure	View across Landfill cap.	7628903.329 7628903.040	577231.155	3634	23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130
NHWLF_24	25	S	Landfill cap, centre		Landfill structure	View across Landfill cap.	7628902.844	577231.130	4301	23-Aug-19 23-Aug-19	Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_26	26	w	Landfill cap, centre		Landfill structure	View across Landfill cap.	7628902.994	577230.732	3730	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_27	27	s	N of Landfill	-	Landfill structure	View of NE side of Landfill.	7628980.758	577253.174	3739	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_28	28	SE	W of Landfill		Landfill structure	View of NW side of Landfill.	7628937.654	577156.238	3822	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_29	29	NE	W point of Landfill, at	_	Landfill structure	View along NW crest of Landfill.	7628887.128	577188.471	3700	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_30	30	SE	W point of Landfill, at	-	Landfill structure	View along SW crest of Landfill.	7628887.404	577189.171	3670	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_31	31	E	crest W point of Landfill, at crest	-	Landfill structure	View across Landfill cap.	7628888.300	577189.539	3589	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_32	32	NE	crest W point of Landfill, at toe	-	Landfill structure	View along NW toe of Landfill.	7628885.393	577171.779	4293	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_33	33	SE	W point of Landfill, at toe	-	Landfill structure	View along SW toe of Landfill.	7628884.978	577171.855	3749	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_34	34	E	W point of Landfill, at toe	-	Landfill structure	View up slope at W point of Landfill.	7628882.749	577170.233	3983	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
NHWLF_35	35	NW	S point of Landfill, at toe	-	Landfill structure	View along SW toe of Landfill.	7628838.825	577253.657	4207	23-Aug-19	25mm, 16.4 MP Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to
										-	25mm, 16.4 MP

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UT	М	Photo Size KB	Date of Photo	Camera Information
							Northing	Easting			
NHWLF_36	36	NE	S point of Landfill, at toe	-	Landfill structure	View along SE toe of Landfill.	7628838.950	577253.431	4247	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NHWLF_37	37	NE	S point of Landfill, at crest	-	Landfill structure	View along SE crest of Landfill.	7628854.277	577251.855	3580	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NHWLF_38	38	NW	S point of Landfill, at crest	-	Landfill structure	View along SW crest of Landfill.	7628855.563	577252.594	3868	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NHWLF_39	39	N	S point of Landfill, at crest	-	Landfill structure	View across Landfill cap.	7628855.234	577251.884	4091	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
NHWLF_40	40	s	Landfill cap, towards S corner	E	Rough grading	Detail of Feature E.	7628865.879	577248.735	3994	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UT	·M	Photo Size KB	Date of Photo	Camera Information
						STATION AREA LANDFILL - WEST	Northing	Easting			
SWLF_1	1	NW	N side of Access Road, at entrance to Landfill	-	Landfill structure	View along NE toe of Landfill.	7628754.037	576945.760	3588	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_2	2	NW	S side of Access Road, at entrance to Landfill	-	Landfill structure	View along SE toe of Landfill.	7628740.187	576938.204	3644	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_3	3	NW	Landfill cap, along Access Road	С	Minor depression	Detail of Feature C.	7628777.307	576881.291	4254	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_4	4	s	Landfill cap, along Access Road	С	Minor depression	Detail of Feature C.	7628779.739	576879.460	4280	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_5	5	SE	NE toe of Landfill	-	Landfill structure	View along NE toe of Landfill.	7628792.397	576895.888	3689	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_6	6	NW	NE toe of Landfill	-	Landfill structure	View along NE toe of Landfill.	7628792.456	576898.272	3647	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_7	7	E	NE toe of Landfill	D1	Minor erosion	Area of former Feature D1 (not observed).	7628791.077	576882.213	3641	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_8	8	w	NE toe of Landfill	D1	Minor erosion	Area of former Feature D1 (not observed).	7628792.384	576900.687	4000	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_9	9	E	Landfill cap, along Access Road	J	Minor depression	Detail of Feature J.	7628770.647	576890.541	3955	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_10	10	s	Landfill cap, along Access Road	J	Minor depression	Detail of Feature J.	7628771.637	576894.006	4261	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_11	11	sw	NE of Landfill	-	Landfill structure	View of N side of Landfill.	7628769.228	576893.363	3635	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_12	12	NW	N toe of Landfill	D2	Minor erosion	Detail of Feature D2.	7628813.695	576889.446	3610	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_13	13	SE	N toe of Landfill	D2	Minor erosion	Detail of Feature D2.	7628831.337	576874.563	4267	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_14	14	SE	N slope of Landfill	к	Minor depression	Detail of Feature K	7628826.296	576861.440	4137	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_15	15	NE	N slope of Landfill	к	Minor depression	Detail of Feature K	7628823.812	576862.761	4043	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_16	16	SE	N toe of Landfill	-	Landfill structure	View along N toe of Landfill	7628844.823	576817.432	3953	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_17	17	NW	N side of Landfill, towards W end	A2	Minor depression	Detail of Feature A2.	7628836.275	576810.718	4145	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_18	18	NE	N side of Landfill, towards W end	A2	Minor depression	Detail of Feature A2.	7628834.900	576807.467	4340	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_19	19	E	N side of Landfill, central	A1	Minor depression	Detail of Feature A1.	7628822.765	576847.175	4113	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_20	20	N	N side of Landfill, central	A1	Minor depression	Detail of Feature A1.	7628820.226	576848.315	4177	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_21	21	SE	NW point of Landfill	-	Landfill structure	View along N toe of Landfill	7628849.970	576790.480	3618	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_22	22	sw	NW point of Landfill	-	Landfill structure	View along NW toe of Landfill.	7628848.998	576786.723	3910	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_23	23	NE	W point of Landfill	G	Minor depression	Detail of Feature G.	7628804.555	576753.741	4141	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_24	24	NW	W point of Landfill	G	Minor depression	Detail of Feature G.	7628804.854	576756.967	4090	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_25	25	NE	W point of Landfill	-	Landfill structure	View along NW toe of Landfill.	7628808.718	576752.454	3904	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_26	26	SE	W point of Landfill	-	Landfill structure	View along SE toe of Landfill.	7628799.758	576742.641	3797	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_27	27	E	W point of Landfill	-	Landfill structure	View across Landfill cap.	7628800.753	576747.267	3740	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_28	28	NE	SW side of Landfill	Н	Minor depression	Detail of Feature H.	7628763.430	576764.354	4155	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_29	29	NW	SW side of Landfill	Н	Minor depression	Detail of Feature H.	7628762.435	576768.473	4163	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_30	30	NE	SW side of Landfill	-	Landfill structure	View along NW toe of Landfill.	7628745.637	576784.980	3615	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_31	31	NW	SW side of Landfill	-	Landfill structure	View up W slope (across Landfill cap).	7628745.977	576783.380	4288	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_32	32	NE	S point of Landfill	-	Landfill structure	View along SE toe of Landfill.	7628701.973	576806.561	3795	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_33	33	NW	S point of Landfill	-	Landfill structure	View along SW toe of Landfill.	7628703.009	576799.789	3755	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_34	34	NW	S point of Landfill	В	Minor depression	Detail of Feature B.	7628712.371	576800.751	4068	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UT	м	Photo Size KB	Date of Photo	Camera Information
•							Northing	Easting			
SWLF_35	35	NE	S point of Landfill	В	Minor depression	Detail of Feature B.	7628714.146	576796.648	4322	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_36	36	sw	SE side of Landfill		Landfill structure	View along SE toe of Landfill.	7628736.282	576844.166	4211	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_37	37	NW	SE side of Landfill		Landfill structure	View across Landfill cap. Detail of cover material transition.	7628728.637	576847.287	4173	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_38	38	sw	Landfill cap, W of cover material transition line	11, 12	Minor depression	Detail view of Feature I1, I2.	7628764.768	576823.789	4124	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_39	39	NE	Landfill cap, W of cover material transition line	11	Minor depression	Detail view of Feature I1.	7628759.727	576816.482	4011	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
SWLF_40	40	NE	Landfill cap, W of cover material transition line	12	Minor depression	Detail view of Feature I2.	7628761.637	576814.635	4080	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UT	М	Photo Size KB	Date of Photo	Camera Information
						USAF LANDFILL	Northing	Easting			
USAF_1	1	NW	S point of Landfill	-	Landfill structure	View along SW toe of Landfill.	7628579.659	577292.980	3618	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_2	2	NE	S point of Landfill	-	Landfill structure	View along SE toe of Landfill.	7628579.911	577294.519	4254	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_3	3	SE	W point of Landfill	-	Landfill structure	View along SW toe of Landfill.	7628593.963	577284.073	4141	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_4	4	NE	W point of Landfill		Landfill structure	View along NW edge of Landfill.	7628594.872	577284.523	3774	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_5	5	sw	Centre of structure	-	Landfill structure	View across Landfill cap.	7628608.377	577316.355	4067	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_6	6	NE	Centre of structure	-	Landfill structure	View across Landfill cap.	7628607.597	577315.054	4046	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, Foc.4 MP
USAF_7	7	SE	NW edge of Landfill	В	Tension crack	Detail of Feature B.	7628619.204	577323.465	4359	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_8	8	NW	SE side of Landfill	В	Tension crack	Detail of Feature B.	7628607.595	577330.257	4221	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_9	9	sw	Landfill cap, towards E end	В	Tension crack	Detail of Feature B.	7628611.790	577328.869	4354	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_10	10	SE	N point of Landfill	-	Landfill structure	View along NE toe of Landfill.	7628630.860	577344.546	4004	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_11	11	sw	N point of Landfill	-	Landfill structure	View along NW edge of Landfill.	7628626.608	577342.977	3868	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_12	12	SE	NE side of Landfill	С	Minor settlement	Detail of Feature C.	7628620.853	577345.948	4238	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_13	13	sw	NE side of Landfill	С	Minor settlement	Detail of Feature C.	7628618.917	577350.308	4083	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_14	14	NW	E point of Landfill		Landfill structure	View along NE toe of Landfill.	7628609.706	577352.220	3637	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_15	15	sw	E point of Landfill	-	Landfill structure	View along SE toe of Landfill.	7628616.038	577349.187	4001	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_16	16	sw	SE side of Landfill	Α	Seepage points	View of former Feature A area.	7628601.198	577325.527	4073	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_17	17	NE	SE side of Landfill, towards S corner	Α	Seepage points	View of former Feature A area.	7628582.222	577301.668	4228	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_18	18	NE	SE side of Landfill, towards S corner	А	Seepage points	View of former Feature A area.	7628588.545	577309.068	4157	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_19	19	NW	SE side of Landfill, towards S corner	А	Seepage points	Detail of former Feature A.	7628587.006	577306.529	4168	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_20	20	NW	S of Landfill	А	Seepage points	View of former Feature A area.	7628577.543	577313.787	3654	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_21	21	NW	S point of Landfill	D	Tension crack	Detail of Feature D.	7628580.176	577292.406	4281	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_22	22	SE	W point of Landfill	D	Tension crack	Detail of Feature D.	7628592.508	577284.998	4180	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_23	23	NE	SW side of Landfill	D	Tension crack	Detail of Feature D.	7628586.731	577288.227	4074	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
USAF_24	24	SE	NW of Landfill		Landfill structure	View of Landfill structure from atop adjacent slope.	7628604.200	577264.521	3890	23-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UT	М	Photo Size KB	Date of Photo	Camera Information
						TIER II LANDFILL	Northing	Easting			
TIILF_1	1	NE	N crest of Landfill, toward NE corner	VT-1	Thermistor	Detail of VT-1.	7627987.559	576437.539	3694	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_2	2	w	Landfill cap, central	VT-2	Thermistor	Detail of VT-2.	7627961.829	576445.442	3633	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_3	3	s	Landfill cap, central	VT-3	Thermistor	Detail of VT-3.	7627958.340	576397.051	3981	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_4	4	E	S crest of Landfill, toward SW corner	VT-4	Thermistor	Detail of VT-4.	7627921.760	576394.486	4197	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_5	5	sw	NE of Landfill	-	Landfill structure	View of Landfill N side.	7628047.513	576471.610	4166	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_6	6	w	NE corner of Landfill, at toe	-	Landfill structure	View along N toe of Landfill.	7628015.295	576470.635	3888	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_7	7	s	NE corner of Landfill, at toe	-	Landfill structure	View along E toe of Landfill.	7628016.454	576469.187	3985	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_8	8	w	NE corner of Landfill, midslope	-	Landfill structure	View along N slope of Landfill.	7628006.003	576462.968	4059	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_9	9	s	NE corner of Landfill, midslope	-	Landfill structure	View along E slope of Landfill.	7628005.857	576463.016	4273	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_10	10	w	NE corner of Landfill, at crest		Landfill structure	View along N crest of Landfill.	7627996.534	576456.046	3882	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_11	11	s	NE corner of Landfill, at crest	-	Landfill structure	View along E crest of Landfill.	7627996.642	576455.689	3923	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_12	12	sw	NE corner of Landfill, at crest		Landfill structure	View across Landfill cap.	7627996.617	576455.620	4219	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_13	13	NE	NE corner of Landfill, at crest	E1	Minor depression	Detail of Feature E1.	7627986.859	576456.538	4235	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_14	14	w	NE corner of Landfill, at crest	E1	Minor depression	Detail of Feature E1.	7627987.549	576459.925	4345	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_15	15	sw	NE corner of Landfill, at crest	E2	Minor depression	Detail of Feature E2.	7627987.165	576460.049	4110	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_16	16	N	Landfill cap, toward NE corner	н	Minor depression	Area of former Feature H (not observed).	7627976.083	576456.284	4136	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_17	17	E	Landfill cap, toward NE corner	н	Minor depression	Area of former Feature H (not observed).	7627977.968	576449.379	4189	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_18	18	N	E side of Landfill, midslope	-	Sparse vegetation	Area of former noted vegetation feature (not observed).	7627976.412	576470.902	4339	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_19	19	w	E crest of Landfill	С	Minor erosion	Detail of Feature C.	7627961.115	576465.607	4223	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_20	20	E	E crest of Landfill	ı	Minor erosion	Detail of Feature I.	7627952.806	576461.034	3999	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_21	21	w	E crest of Landfill	I	Minor erosion	Detail of Feature I.	7627954.798	576472.402	3949	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_22	22	N	SE corner of Landfill, at crest	-	Landfill structure	View along E crest of Landfill.	7627935.188	576466.644	3585	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_23	23	w	SE corner of Landfill, at crest	-	Landfill structure	View along S crest of Landfill.	7627935.486	576467.262	3846	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_24	24	NW	SE corner of Landfill, at crest	-	Landfill structure	View across Landfill cap.	7627935.225	576466.310	3885	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_25	25	s	SE corner of Landfill, at crest	А	Depression	Detail of Feature A.	7627934.385	576471.165	4213	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_26	26	E	SE corner of Landfill, at crest	А	Depression	Detail of Feature A.	7627930.457	576467.697	4078	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_27	27	Е	SW corner of Landfill, at crest	G	Minor depression	Detail of Feature G.	7627922.380	576401.228	4206	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_28	28	s	SW corner of Landfill, at crest	G	Minor depression	Detail of Feature G.	7627925.615	576404.000	4187	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_29	29	Е	SW corner of Landfill, at crest	-	Landfill structure	View along S crest of Landfill.	7627918.594	576381.134	3600	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_30	30	N	SW corner of Landfill, at crest	-	Landfill structure	View along W crest of Landfill.	7627918.425	576381.147	3807	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_31	31	NE	SW corner of Landfill, at crest	-	Landfill structure	View across Landfill cap.	7627919.261	576381.833	3683	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_32	32	sw	Landfill cap, SW corner	к	Rough grading	Detail of Feature K.	7627926.009	576385.522	4129	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_33	33	Е	SW corner of Landfill, midslope	-	Landfill structure	View along S slope of Landfill.	7627906.242	576367.834	3769	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_34	34	N	SW corner of Landfill, midslope	-	Landfill structure	View along W crest of Landfill.	7627909.356	576371.614	3787	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_35	35	Е	SW corner of Landfill, at toe	-	Landfill structure	View along S toe of Landfill.	7627890.834	576353.941	4061	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

Photo ID	Figure ID	View Direction	Photo Location	Feature ID	Feature of Note	Caption	UTM		Photo Size KB	Date of Photo	Camera Information
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TIILF_36	36	N	SW corner of Landfill, at toe		Landfill structure	View along W toe of Landfill.	7627901.849	576361.006	3688	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_37	37	NE	SW corner of Landfill, at toe	-	Landfill structure	View up SW corner slope.	7627835.100	576429.538	3915	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_38	38	N	S of Landfill	-	Landfill structure	View of Landfill S side.	7627835.100	576429.538	3649	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_39	39	SE	SE comer of Landfill, at toe	D	Ponded water	Detail of Feature D.	7627918.932	576488.802	3988	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_40	40	N	SE corner of Landfill, at toe	-	Landfill structure	View along E toe of Landfill.	7627915.604	576496.687	3907	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_41	41	w	SE corner of Landfill, at toe	-	Landfill structure	View along S toe of Landfill.	7627914.264	576495.756	3860	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_42	42	NW	SE comer of Landfill, at toe		Landfill structure	View up SE corner slope.	7627914.407	576498.518	4341	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_43	43	Е	SE comer of Landfill, at toe	F	Orange staining	Detail of Feature F.	7627918.884	576494.888	4293	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_44	44	s	SE comer of Landfill, at toe	F	Orange staining	Detail of Feature F.	7627925.719	576496.226	4166	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_45	45	N	SE corner of Landfill, midslope		Landfill structure	View along E slope of Landfill.	7627923.825	576482.538	3881	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_46	46	w	SE corner of Landfill, midslope	٠	Landfill structure	View along S slope of Landfill.	7627924.093	576485.705	4022	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_47	47	SE	SE corner of Landfill, midslope	D	Ponded water	Detail of Feature D.	7627930.320	576475.594	3674	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_48	48	N	W crest of Landfill	В	Minor depression	Detail of Feature B.	7627955.676	576374.761	4057	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_49	49	w	W crest of Landfill	В	Minor depression	Detail of Feature B.	7627959.175	576376.777	4242	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_50	50	s	NW corner of Landfill, at crest	٠	Landfill structure	View along W crest of Landfill.	7627980.886	576370.661	4007	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_51	51	Е	NW corner of Landfill, at crest	٠	Landfill structure	View along E crest of Landfill.	7627980.284	576369.987	4035	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_52	52	SE	NW corner of Landfill, at crest	٠	Landfill structure	View across Landfill cap.	7627980.377	576370.874	4146	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_53	53	s	NW corner of Landfill, midslope		Landfill structure	View along W slope of Landfill.	7627988.036	576359.541	4084	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_54	54	E	NW corner of Landfill, midslope		Landfill structure	View along N slope of Landfill.	7627988.121	576359.789	4015	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_55	55	s	NW corner of Landfill, at toe	-	Landfill structure	View along W toe of Landfill.	7627995.799	576345.672	4239	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_56	56	E	NW corner of Landfill, at toe	-	Landfill structure	View along N toe of Landfill.	7627995.711	576345.469	4108	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_57	57	s	W side of Landfill	L	Minor depression	Detail of Feature L.	7627969.979	576362.921	4343	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_58	58	Е	W side of Landfill	L	Minor depression	Detail of Feature L.	7627967.410	576361.393	4135	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_59	59	SE	NW corner of Landfill, at toe	-	Landfill structure	View up NW corner slope.	7627997.291	576346.335	4351	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_60	60	s	N of Landfill	-	Landfill structure	View of N side of Landfill.	7628066.041	576407.289	3698	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_61	61	Е	W of Landfill		Landfill structure	View of W side of Landfill.	7627934.574	576292.717	3809	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
TIILF_62	62	w	E of Landfill		Landfill structure	View of E side of Landfill.	7627970.406	576531.484	3738	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

Photo ID	Figure ID	View	Photo Location	Feature	Feature of Note	Caption	UTM		Photo Size	Date of Photo	Camera Information
T HOLD ID	rigure ib	Direction	Thoto Education		reactive or reoce	оарион	Northing	Easting		Date of 1 floto	
						AIRSTRIP LANDFILL					
ALF_1	1	SE	NW of Landfill	-	Landfill structure	View of Landfill N corner and across cap.	7627945.774	576908.420	3680	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_2	2	NW	SE of Landfill	-	Landfill structure	View of Landfill S corner and across cap.	7627880.895	576960.890	3835	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_3	3	NW	S point of Landfill	D1	Ponded water	Detail of Feature D1.	7627878.170	576955.713	3673	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_4	4	NW	S point of Landfill	-	Landfill structure	View across Landfill cap.	7627893.154	576945.113	3762	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_5	5	s	S point of Landfill	D1	Ponded water	Detail of Feature D1.	7627890.761	576946.071	4039	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_6	6	NE	S point of Landfill	-	Landfill structure	View along SE toe of Landfill.	7627882.248	576944.041	3874	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_7	7	NW	S point of Landfill	-	Landfill structure	View along SW toe of Landfill.	7627887.729	576947.649	3988	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_8	8	sw	E point of Landfill		Landfill structure	View along SE toe of Landfill.	7627910.466	576960.335	3726	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_9	9	NW	E point of Landfill		Landfill structure	View along NE toe of Landfill.	7627909.123	576961.678	3730	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_10	10	SE	W point of Landfill		Landfill structure	View along SW toe of Landfill.	7627902.530	576907.163	3825	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_11	11	N	W point of Landfill		Landfill structure	View along NW toe of Landfill.	7627901.320	576908.529	3575	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_12	12	NE	W point of Landfill	·	Landfill structure	View across Landfill cap.	7627903.637	576907.295	3625	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_13	13	sw	Landfill cap, toward W point	D2	Ponded water	Detail of Feature D2.	7627908.648	576917.750	3590	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_14	14	sw	W point of Landfill	Е	Orange staining	Detail of Feature E.	7627907.357	576910.270	4197	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_15	15	NW	Landfill cap, central	A	Minor depression	Detail of Feature A.	7627905.480	576945.201	4004	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_16	16	NE	Landfill cap, central	A	Minor depression	Detail of Feature A.	7627905.327	576940.419	4153	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_17	17	E	SE crest of Landfill	С	Infilled crack	Area of former Feature C (not observed).	7627900.783	576944.124	4053	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_18	18	w	SE crest of Landfill	С	Infilled crack	Area of former Feature C (not observed).	7627901.542	576952.749	4083	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_19	19	w	SE crest of Landfill	В	Minor erosion	Area of former Feature B (not observed).	7627898.332	576955.268	3842	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_20	20	E	SE crest of Landfill	В	Minor erosion	Area of former Feature B (not observed).	7627897.818	576943.165	4096	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_21	21	N	S point of Landfill	F	Infilled crack	Area of former Feature F (not observed).	7627891.721	576939.586	4103	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_22	22	sw	N point of Landfill	-	Landfill structure	View along NW toe of Landfill.	7627937.313	576916.692	4090	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP
ALF_23	23	SE	N point of Landfill	-	Landfill structure	View along NE toe of Landfill.	7627939.224	576914.918	3884	21-Aug-19	Fujifilm Finepix XP130 Aspect Ratio 4:3, Focal Length 5 to 25mm, 16.4 MP

# **APPENDIX H4**

**Select Site Photographs** 



PIN-4 Select Site Photographs Northwest Landfill – 22 August 2019



Photo: PIN-4 NWLF\_2

Date:

22 August 2019

**Description:** 

View along E toe of Landfill, shows side slope.



Photo: PIN-4 NWLF\_5

Date:

22 August 2019

**Description:** 

View across Lobe B, shows landfill cover and condition.



PIN-4 Select Site Photographs Northwest Landfill – 22 August 2019



Photo: PIN-4 NWLF\_12

Date:

22 August 2019

Description:

View of Feature C, minor erosion.



Photo: PIN-4 NWLF\_13

Date:

22 August 2019

**Description:** 

View of Feature A1 and A2, minor depressions.



PIN-4 Select Site Photographs Northwest Landfill – 22 August 2019



Photo: PIN-4 NWLF\_17

Date:

22 August 2019

### **Description:**

View across Lobe C, shows landfill cover and condition.



Photo: PIN-4 NWLF\_21

Date:

22 August 2019

## **Description:**

View along E toe of Lobe C, shows contact between graded landfill cover and adjacent native material.



PIN-4 Select Site Photographs Northwest Landfill – 22 August 2019

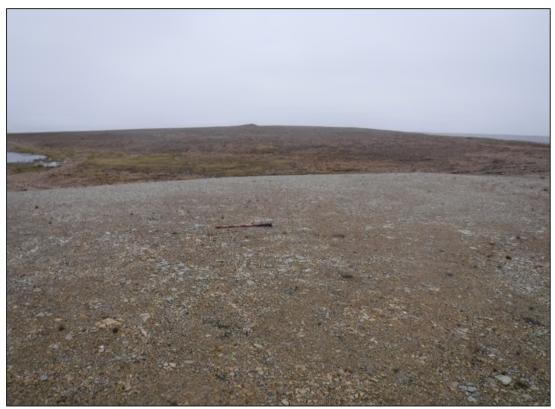


Photo: PIN-4 NWLF\_2

Date:

22 August 2019

Description:

View across Lobe D, shows landfill condition and cover.



Photo: PIN-4 NWLF\_30

Date:

22 August 2019

**Description:** 

Detail of Feature B1 and B2 (minor depressions) on Lobe D.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_1

Date:

22 August 2019

**Description:** 

View of N side of

Lobe A.



Photo: PIN-4 NLF\_3

Date:

22 August 2019

**Description:** 

View up N slope of Lobe A. Shows transition to organic material cap.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_4

Date:

22 August 2019

**Description:** 

View along N toe of Landfill.

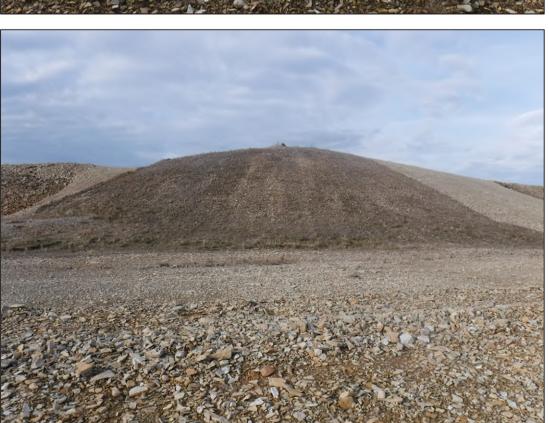


Photo: PIN-4 NLF\_5

Date:

22 August 2019

**Description:** 

View of organic material cap on E half of Lobe A. Note vegetation cover.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_

Date:

22 August 2019

**Description:** 

View of Feature A. In coarse native material at landfill toe.



Photo: PIN-4 NLF\_10

Date:

22 August 2019

**Description:** 

View across top crest of Lobe A.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_13

Date:

22 August 2019

**Description:** 

View across top of Lobe A. Shows landfill cover and condition.



Photo: PIN-4 NLF\_15

Date:

22 August 2019

**Description:** 

View of Feature I, minor settlement at crest of Lobe A.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_16

Date:

22 August 2019

**Description:** 

View of Feature B, minor erosion.



Photo: PIN-4 NLF\_27

Date:

22 August 2019

#### **Description:**

View across S toe of Lobe B. Shows crest section of landfill and transition to native material.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_28

Date:

22 August 2019

**Description:** 

View down slope of Lobe B. Shows landfill cover and condition.



Photo: PIN-4 NLF\_29

Date:

22 August 2019

**Description:** 

View of Feature C at crest of Lobe B.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_34

Date:

22 August 2019

**Description:** 

View across midslope of Lobe B. Lobe A slope in background.



Photo: PIN-4 NLF\_36

Date:

22 August 2019

**Description:** 

View of track mark, suspected to be previously identified as Feature H.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_39

Date:

22 August 2019

**Description:** 

View of Lobe B slope (N side) from the N.



Photo: PIN-4 NLF\_46

Date:

22 August 2019

**Description:** 

View up W side slope of Lobe B. Shows transition from cover material to native.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_48

Date:

22 August 2019

**Description:** 

View along N toe of Lobe C. Shows slope and transition.



Photo: PIN-4 NLF\_50

Date:

22 August 2019

**Description:** 

View of Feature F, minor erosion.



PIN-4 Select Site Photographs North Landfill – 22 August 2019



Photo: PIN-4 NLF\_53

Date:

22 August 2019

**Description:** 

View of Feature E, minor erosion.



Photo: PIN-4 NLF\_5

Date:

22 August 2019

**Description:** 

View across Lobe C, shows landfill cover and condition.



PIN-4 Select Site Photographs North Landfill – 22 August 2019

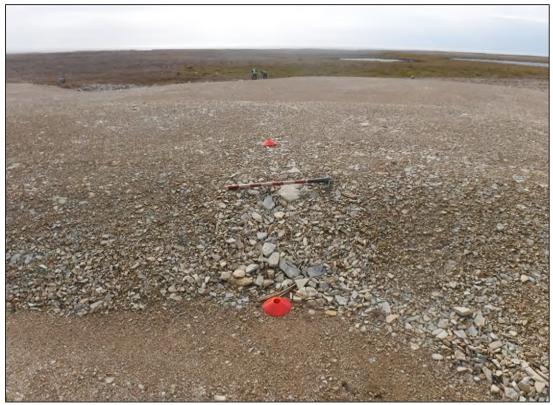


Photo: PIN-4 NLF\_59

Date:

22 August 2019

**Description:** 

View of Feature D, minor erosion.



Photo: PIN-4 NLF\_63

Date:

22 August 2019

**Description:** 

View along S toe of Lobe C. Shows slope and transition to native material.



PIN-4 Select Site Photographs Non-Hazardous Waste Landfill – 23 August 2019



Photo: PIN-4 NHWLF\_2

Date:

23 August 2019

**Description:** 

View long N toe of landfill. Shows slope and transition to native material.



Photo: PIN-4 NHWLF\_5

Date:

23 August 2019

**Description:** 

View along E crest of landfill. Note organic material cap.



PIN-4 Select Site Photographs Non-Hazardous Waste Landfill – 23 August 2019



Photo: PIN-4 NHWLF\_6

Date:

23 August 2019

### Description:

View across landfill cap. Shows cover material and condition.



Photo: PIN-4 NHWLF\_8

Date:

23 August 2019

#### **Description:**

View of Feature B, minor depression.



PIN-4 Select Site Photographs Non-Hazardous Waste Landfill – 23 August 2019



Photo: PIN-4 NHWLF\_10

Date:

23 August 2019

## Description:

View of Feature A, minor depression. Also shows transition between slope and organic cap material.



Photo: PIN-4 NHWLF\_18

Date:

23 August 2019

#### **Description:**

View of Feature D, minor erosion. MW-08 in the background.



PIN-4 Select Site Photographs Non-Hazardous Waste Landfill – 23 August 2019



Photo: PIN-4 NHWLF\_28

Date:

23 August 2019

Description:

View of N side of

landfill.



Photo: PIN-4 NHWLF\_34

Date:

23 August 2019

**Description:** 

View up SW corner slope of landfill.



PIN-4 Select Site Photographs Non-Hazardous Waste Landfill – 23 August 2019



Photo: PIN-4 NHWLF\_35

Date:

23 August 2019

**Description:** 

View along SW toe of landfill.



Photo: PIN-4 NHWLF\_39

Date:

23 August 2019

**Description:** 

View of Feature E, rough grading on cap at SE corner.



PIN-4 Select Site Photographs Station Area Landfill – West – 23 August 2019



Photo: PIN-4 SWLF\_2

Date:

23 August 2019

#### **Description:**

View along S toe of landfill from Access Road. Shows slope and transition from cover to native material.



Photo: PIN-4 SWLF\_4

Date:

23 August 2019

#### **Description:**

View of Feature C, minor depression.



PIN-4 Select Site Photographs Station Area Landfill – West – 23 August 2019



Photo: PIN-4 SWLF\_9

Date:

23 August 2019

Description:

View of Feature J, minor depression.



Photo: PIN-4 SWLF\_11

Date:

23 August 2019

**Description:** 

View of N side of landfill.



PIN-4 Select Site Photographs Station Area Landfill – West – 23 August 2019

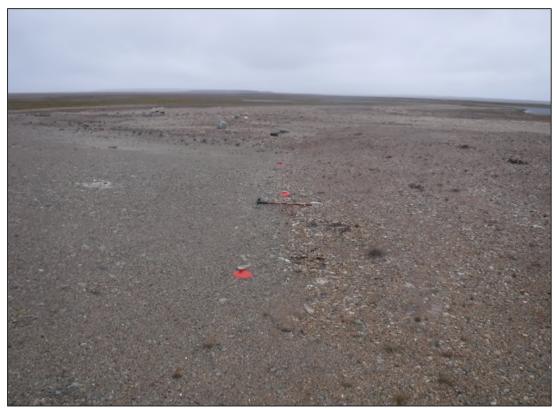


Photo: PIN-4 SWLF\_12

Date:

23 August 2019

Description:

View of Feature D2, minor erosion.



Photo: PIN-4 SWLF\_17

Date:

23 August 2019

Description:

View of Feature A2, minor depression.



PIN-4 Select Site Photographs Station Area Landfill – West – 23 August 2019



Photo: PIN-4 SWLF\_22

Date:

23 August 2019

#### **Description:**

View along W toe of landfill. Note the difference in cover material on W half of landfill. Shows slope and transition to native environment.



Photo: PIN-4 SWLF\_27

Date:

23 August 2019

#### **Description:**

View up W slope of landfill. Shows cover material and condition.



PIN-4 Select Site Photographs Station Area Landfill – West – 23 August 2019



Photo: PIN-4 SWLF\_28

Date:

23 August 2019

**Description:** 

View of Feature H, minor depression.



Photo: PIN-4 SWLF\_

Date:

23 August 2019

**Description:** 

View of Feature B, minor depression.



PIN-4 Select Site Photographs Station Area Landfill – West – 23 August 2019



Photo: PIN-4 SWLF\_37

Date:

23 August 2019

**Description:** 

View of the transition between Type I (right of frame) and Type II (left of frame) cover material.



Photo: PIN-4 SWLF\_38

Date:

23 August 2019

**Description:** 

View of Feature I1, I2, minor linear depressions.



PIN-4 Select Site Photographs
Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_1

Date:

21 August 2019

**Description:** 

View of VT-1. Note vegetation cover on organic cap material. Access road in background.



Photo: PIN-4 TILF\_2

Date:

21 August 2019

**Description:** 

View of VT-2, VT-3 in background.



PIN-4 Select Site Photographs
Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_4

Date:

21 August 2019

**Description:** 

View of VT-4. Note transition of organic cap material to clear stone on landfill sides.



Photo: PIN-4 TILF\_7

Date:

21 August 2019

**Description:** 

View along E toe of landfill. Marshy area with water bodies to the S of the landfill visible in background.



PIN-4 Select Site Photographs
Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_12

Date:

21 August 2019

#### **Description:**

View across landfill cap. Shows cover material and condition, as well as vegetation across the structure.



Photo: PIN-4 TILF\_14

Date:

21 August 2019

#### **Description:**

View of Feature E1, minor depression.



PIN-4 Select Site Photographs Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_15

Date:

21 August 2019

**Description:** 

View of Feature E2, minor depression.



Photo: PIN-4 TILF\_18

Date:

21 August 2019

**Description:** 

Area where vegetation was previously noted. Not observed at this location in 2019.



PIN-4 Select Site Photographs
Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_21

Date:

21 August 2019

Description:

View of Feature I, minor erosion.



Photo: PIN-4 TILF\_26

Date:

21 August 2019

#### Description:

View of Feature A, depression. Access road visible in background.



PIN-4 Select Site Photographs
Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_32

Date:

21 August 2019

#### Description:

View of Feature K, rough grading.
Ridges and depressions in this area exceed 10cm in magnitude.
Low-lying marshy areas S of landfill present in background.



Photo: PIN-4 TILF\_37

Date:

21 August 2019

#### **Description:**

View up corner slope of landfill.



PIN-4 Select Site Photographs
Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_38

Date:

21 August 2019

Description:

View of S side of landfill.



Photo: PIN-4 TILF\_39

Date:

21 August 2019

**Description:** 

View of Feature D, ponded water, abutting landfill toe.



PIN-4 Select Site Photographs Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_44

Date:

21 August 2019

Description:

View of Feature F, orange staining. Inside footprint of ponded water zone.



Photo: PIN-4 TILF\_

Date:

21 August 2019

**Description:** 

View along E midslope line of landfill.



PIN-4 Select Site Photographs
Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_49

Date:

21 August 2019

**Description:** 

View of Feature A, minor depression.



Photo: PIN-4 TILF\_58

Date:

21 August 2019

Description:

View of Feature L, linear depression. New in 2019.



PIN-4 Select Site Photographs Tier II Soil Disposal Facility – 21 August 2019



Photo: PIN-4 TIILF\_61

Date:

21 August 2019

Description:

View of W side of landfill.



Photo: PIN-4 TILF\_62

Date:

21 August 2019

**Description:** 

View of E side of landfill.



PIN-4 Select Site Photographs Airstrip Landfill – 21 August 2019



Photo: PIN-4 ASLF\_1

Date:

21 August 2019

**Description:** 

View of landfill from the NW. Single lobe.



Photo: PIN-4 ASLF\_3

Date:

21 August 2019

**Description:** 

View of ponded water (Features D1, D2) in relation to landfill.



PIN-4 Select Site Photographs Airstrip Landfill – 21 August 2019



Photo: PIN-4 ASLF\_4

Date:

21 August 2019

**Description:** 

View across landfill cap. Shows cover material and condition. Note vegetation.



Photo: PIN-4 ASLF\_14

Date:

21 August 2019

Description:

View of Feature E, orange staining.



PIN-4 Select Site Photographs Airstrip Landfill – 21 August 2019



Photo: PIN-4 ASLF\_15

Date:

21 August 2019

Description:

View of Feature A, depression.



Photo: PIN-4 ASLF\_19

Date:

21 August 2019

#### **Description:**

View of E side of landfill. Shows side slope, transition to native material and encroachment of surrounding vegetation.

# **APPENDIX I**

PIN-4 Hazardous Waste Temporary Storage Area and Beach Landing Area summary report



VIA EMAIL: alison.street@forces.gc.ca

PSPC – DND
Alison Street, Project Manager
Department of National Defence/ Government of Canada
180 Kent Street- 16th Floor
Ottawa, ON K1P 0B6

Arcadis Canada Inc.
121 Granton Drive, Suite 12
Richmond Hill
Ontario L4B 3N4
Tel 905 764-9380
www.arcadis.com

**ENVIRONMENT** 

Subject:

DEW Line Monitoring Program – PIN-4 Additional Work 2019 Inspection of Former Hazardous Waste Temporary Storage Area at Beach Landing Area Date:

13 December 2019

Ryan Janzen, P.Eng.

Dear Ms. Street:

As per the scope of work amendment to the 2019 PIN-4 monitoring program, Arcadis conducted a visual inspection of the above referenced subject area located within the PIN-4 site. This letter documents the findings of our August 2019 inspection, and includes a) figures identifying the areas, and b) the photo log of the areas provided as an attachment to this letter. A full set of the digital photograph files will be sent via digital transfer.

Phone:

Contact:

613-721-0555

30000251-006

This area is located adjacent to the former shoreline landing area, approximately 5.4 km SE of the former hangar building on site, at the end of a winding access road which remains in good condition. The following was observed at or around the area:

Email:

ryan.janzen@arcadis.com

 A long ramp/berm on the W edge of the area which was reportedly an old loading ramp for barges (visible in photos HazWaste\_4 and \_5); Our ref:

• Several large rocks around the perimeter of the zone:

 Four standing sign frames in various states of disrepair at what appear to be the N, S, E and W perimeter points of the former Hazardous Waste Storage area;

3

- Several timbers lying on the ground near the western-most sign frame; and
- One placard found face up on the ground, with "Caution PCB Storage Area Trespassing Is Prohibited" inscribed.

The area appears to comprise native granular beach deposit material graded flat by heavy equipment. There is low-lying vegetation (various types) present across the former storage area.

During Arcadis' 2019 site reconnaissance, no evidence of residual waste (ie. soil/waste bags, parts of sea cans, garbage, etc.) was observed other than the standing sign frames and timbers (found on the ground next to the western-most sign frame).

DEW Line Monitoring; PIN-4 Additional Work 13 December 2019 30000251-006

The photo provided shows the hazardous waste storage sign lying on the ground; which was subsequently collected and transported to Cambridge Bay. The placard denoting PCB storage was removed from the site and taken to the local dump in Cambridge Bay for disposal by Arcadis staff.

We trust this letter suits your needs at the present time.

Sincerely,

Arcadis Canada Inc.

Ryan Janzen, P.Eng Project Engineer Troy Austrins, P.Eng. (ON)
Project Manager

Copies:

Mr. Charles Gravelle, Arcadis

Enclosures:

#### **Attachments**

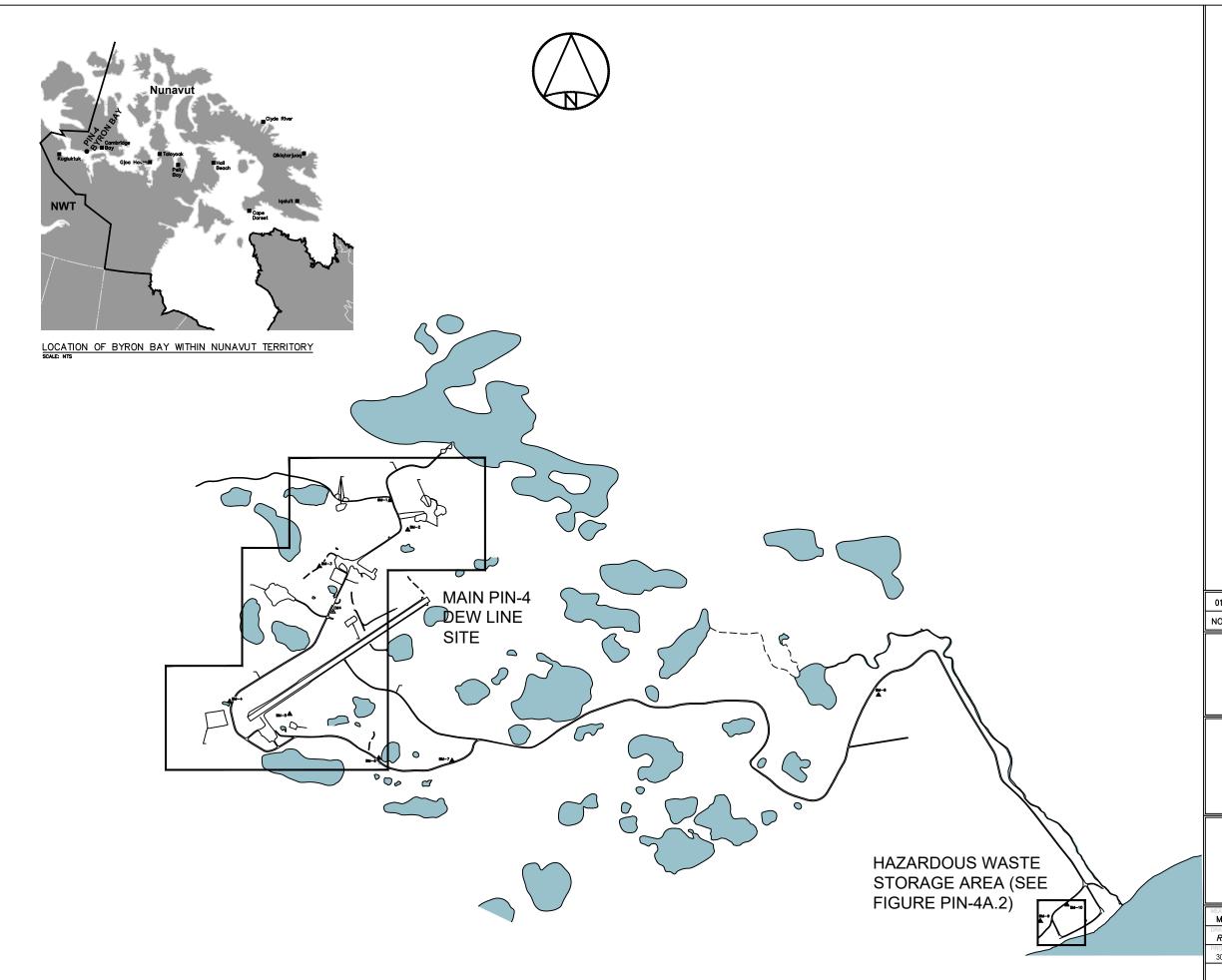
Photograph Log

#### **Figures**

Figure PIN-4A.1: Overall Site Plan

Figure PIN-4A.2: Former Temporary Hazardous Waste Storage Area at Beach Landing Area

Photo Identification	Figure ID	View Direction	Photo Location	Caption	UTN	1	Photo Size KB	Date of Photo	Camera Information
					Northing	Easting			
Former Tempora	Former Temporary Hazardous Waste Storage Area; PIN-4								
HazWaste_1	1	E	Former Hazardous Waste Storage Area	Looking E across the area.	7626633.587	581960.714	3638	23-Aug-19	Fujifilm Finepix XP130 Ratio 4:3, Focal Length 5.0mm 16.4 Mpixel
HazWaste_2	2	N	Former Hazardous Waste Storage Area	Looking N across the area.	7626563.474	582006.99	3706	23-Aug-19	Fujifilm Finepix XP130 Ratio 4:3, Focal Length 5.0mm 16.4 Mpixel
HazWaste_3	3	w	Former Hazardous Waste Storage Area	Looking W across the area.	7626599.352	582059.019	4297	23-Aug-19	Fujifilm Finepix XP130 Ratio 4:3, Focal Length 5.0mm 16.4 Mpixel
HazWaste_4	4	s	Former Hazardous Waste Storage Area	Looking S across the area. Note old loading ramp/berm.	7626671.975	582016.862	3734	23-Aug-19	Fujifilm Finepix XP130 Ratio 4:3, Focal Length 5.0mm 16.4 Mpixel
HazWaste_5	5	sw	Former Hazardous Waste Storage Area	Looking SW from centre. Note old loading ramp/berm.	7626612.529	582009.831	3776	23-Aug-19	Fujifilm Finepix XP130 Ratio 4:3, Focal Length 5.0mm 16.4 Mpixel
HazWaste_6	6	SE	Former Hazardous Waste Storage Area	Looking SE from centre.	7626612.537	582008.307	4157	23-Aug-19	Fujifilm Finepix XP130 Ratio 4:3, Focal Length 5.0mm 16.4 Mpixel
HazWaste_7	7	NE	Former Hazardous Waste Storage Area	Looking NE from centre.	7626611.281	582008.276	4194	23-Aug-19	Fujifilm Finepix XP130 Ratio 4:3, Focal Length 5.0mm 16.4 Mpixel
HazWaste_8	8	NW	Former Hazardous Waste Storage Area	Looking NW from centre.	7626610.966	582009.582	4255	23-Aug-19	Fujifilm Finepix XP130 Ratio 4:3, Focal Length 5.0mm 16.4 Mpixel
HazWaste_9	9	-	Former Hazardous Waste Storage Area	Photo of the sign on ground removed from site.	7626597.517	582025.721	3905	23-Aug-19	Fujifilm Finepix XP130 Ratio 4:3, Focal Length 5.0mm 16.4 Mpixel



## **LEGEND**

∧<sup>CM4</sup>

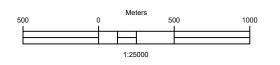
SURVEY CONTROL MONUMENT



PERMANENT BENCHMARK LOCATION



BODY OF WATER



01	DRAFT	2019.11.03	RF	RJ	CG
NO.	VERSION	DATE	PAR	VERIF.	APPR.



Construction de Défense Canada Defence Construction Canada

COLLECTION OF LANDFILL MONITORING DATA

PIN-4, BYRON BAY, NUNAVUT

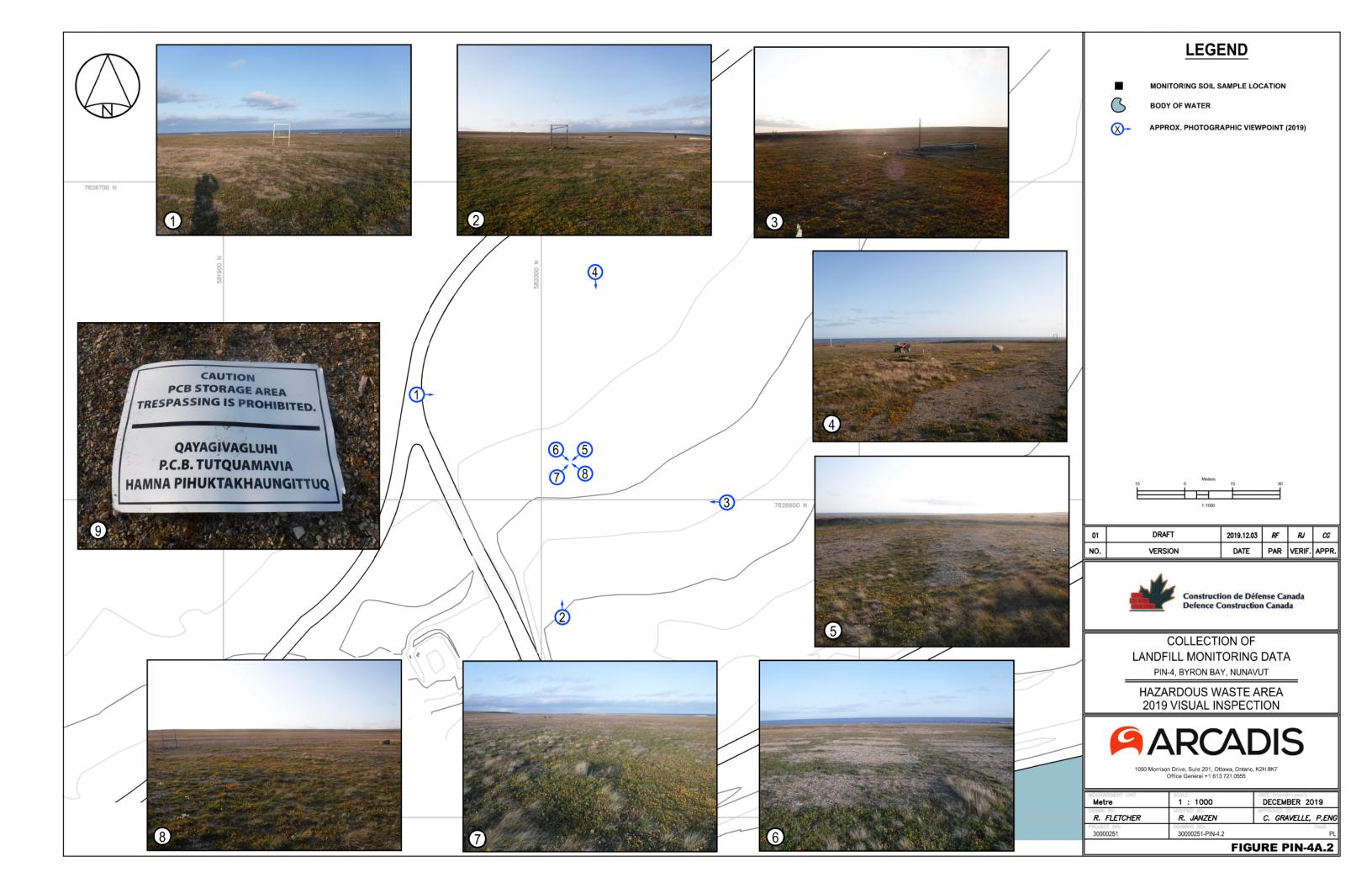
OVERALL SITE PLAN



1050 Morrison Drive, Suite 201, Ottawa, Ontario, K2H 8K7 Office General +1 613 721 0555

MEASUREMENT UNIT Metre	1 : 25000	DECEMBER 2019
R. FLETCHER	R. JANZEN	C. GRAVELLE, P.ENG
PROJECT NO:	DRAWING NO:	PAGE
30000251	30000251-PIN-4.1	PL

FIGURE PIN-4A.1





#### Arcadis Canada Inc.

1050 Morrison Drive Suite 201 Ottawa, Ontario K2H 8K7 Tel 613 721 0555 Fax 613 721 0029

www.arcadis.com