PUBLIC SERVICES AND PROCUREMENT CANADA
ENVIRONMENT AND CLIMATE CHANGE CANADA

Compliance Long-Term Monitoring at the Former Iqaluit Metal Dump and Community Landfill

PSPC Project R.098348.001

Final Report

November 28, 2019

Executive Summary

Dillon Consulting LTD./ Outcome Consultants Inc in joint venture (DOJV), was contracted by Public Services and Procurement Canada (PSPC) Environmental Services to complete compliance monitoring at the Iqaluit Former Military Dump (IQFMD) as per the Statement of Work (SoW) document entitled "Compliance Long Term Monitoring for Transport Canada at the Former Iqaluit Metal Dump – Iqaluit, NU", dated June 2019. Work was completed under the Northern Contaminated Site Environmental Clean-up Work/Services Supply Arrangement #EW699-170520/003/NCS and in accordance with the Nunavut Water Board (NWB) Water License 1BR-MDR1721.

Previous investigations identified sediment and surface water contamination at the site. A long-term monitoring plan (LTM) was developed in February 2018 by ARCADIS which outlined a sampling program to confirm that contaminants are attenuating naturally. As per the LTM, the initial Phase 1 of monitoring is required on site at years 1, 3 and 5 following remediation. In 2018, DOJV carried out the monitoring program for Year 1 of the LTM program. The monitoring program for Year 2 described in this report is supplemental to the defined LTM Program.

The 2019 field program took place on July 30th and 31st at the IQFMD. The program included observational monitoring for seepage and erosion; collecting surface water and sediment samples; and producing photographs to confirm assumptions of the long-term monitoring plan.

Results

Dillon-Outcome compared analytical results from the 2019 program with data previously collected during the 2017 remediation completed by ARCARDIS and results of the Year 1 LTM program completed by DOJV.

Observational Monitoring

No major issues were detected on site during the visit. Two (2) minor (<0.1m deep, <0.1m wide and <1m long) erosional features were observed on the slope crest. No seepage was observed on site, therefore no seepage samples were collected. Fish were observed in Pond 3. A tent was pitched on-site near Ponds 3 and 4 but no persons were present.

Lab Results

Dillon-Outcome collected surface water samples from seven (7) predetermined LTM stations, LTM-1 through LTM-7 and one supplemental off-site (up-stream) location. Surface water samples were analyzed for petroleum hydrocarbons (PHCs), Arsenic, Cadmium, Cobalt, Chromium, Lead, Nickel, Zinc, polychlorinated biphenyls (PCBs), major ions (>1ppm), hardness, total dissolved solids (TDS), total suspended solids (TSS), pH, conductivity and temperature.

Also, seven (7) sediment samples were collected from the predetermined LTM locations and one supplemental off-site (up-stream) location. Sediment samples were analysed for petroleum hydrocarbons (PHCs), Arsenic, Cadmium, Cobalt, Chromium, Lead, Nickel, Zinc and polychlorinated biphenyls (PCBs).

Concentrations of Cadmium, Zinc and Lead exceeded CCME guidelines in surface water samples collected from LTM station 7. Also, LTM supplemental sample location (SW8) exceeded guidelines for Zinc.

The sediment sample collected from LTM station 5 exceeded guidelines for PHC F3, Cadmium, Zinc and total PCBs.

The sediment sample collected from LTM station 6 exceeded guidelines for PHCs F2 & F3, Cadmium, Lead, Zinc and total PCBs.

The sediment sample collected from LTM station 7 and supplemental sample location SW8 exceeded guidelines for Zinc.

Trend Analysis

DOJV carried out an initial Mann-Kendall Trend Analysis utilizing the first 4 sets of data. The majority of evaluated contaminants of concern were evaluated at "Stable/No Trend". These results may change over time with additional data that may establish a trend, or that may remain stable. Zinc concentrations indicate a "Decreasing" trend for LTM1 and LTM3. Arsenic and Cadmium indicate an "Increasing" trend at LTM7 that should be tracked during future sampling events.

Recommendations

The long-term monitoring program will require additional data to reveal trends in concentrations at the site. Dillon-Outcome recommends that the program should continue on the currently-proposed schedule for Year 3 of the LTM during the summer of 2020. Consideration may be given to completing minor site grading concurrent with the next LTM monitoring event in 2020 to address the minor settlement/erosional feature observed at the site. A cost estimate has been presented in Appendix F for the LTM monitoring activities as well as this minor site grading work.

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Glossary of Acronyms

Acronym	Definition
AEC	Area of Environmental Concern
CALA	Canadian Association for Laboratory Accreditation Inc.
CCME	Canadian Council of Ministers of the Environment
CSQG	Canadian Soil Quality Guidelines
CWS	Canada-Wide Standards
DOJV	Dillon Consulting LTD. / Outcome Consultants Inc in Joint Venture
EQG	Environmental Quality Guidelines
ESA	Environmental Site Investigation
HCM	Hydrocarbon Contaminated Material
HSP	Health and Safety Plan
IQFMD	Iqaluit Former Military Dump (IQFMD)
ISQG	Interim Sediment Quality Guideline
LTM	Long-Term Monitoring
NWB	Nunavut Water Board
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated Biphenyls
PHC	Petroleum Hydrocarbon
PSPC	Public Services and Procurement Canada (PSPC) Environmental Services
Q.E.	Qikigtuaaluk Environmental
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percent Difference
TC	Transport Canada
TDS	Total Dissolved Solids
ToR	Terms of Reference
TSS	Total suspended solids
USGS	United States Geological Survey
VOC	Volatile Organic Compound

1.0 Introduction

1.1 Purpose

Dillon Consulting Limited and Outcome Consultants in joint venture (Dillon-Outcome or DOJV) was retained by Public Services and Procurement Canada (PSPC) on behalf of Transportation Canada (TC) to perform Year 2 of a Long-Term Monitoring (LTM) program at the Former Iqaluit Metal Dump and Community Landfill (Site). The LTM program was developed in 2018 to evaluate the effectiveness of the environmental remediation completed in 2017 (ARCADIS, 2018) and to comply with Part K, condition 1 of Water Licence 1BR-MDR1721 issued by the Nunavut Water Board (NWB) on July 31, 2017.

The project was completed under the Northern Contaminated Site Environmental Clean-up Work/Services Supply Arrangement #EW699-170520/003/NCS and in accordance with Dillon-Outcome's proposal "*Compliance Monitoring at the Iqaluit Former Military Dump (IQFMD)"* dated July 15, 2019.

1.2 Objective

The objective of the Project was to collect and interpret data with respect to applicable environmental quality guidelines (EQG) established in the long-term monitoring plan (LTM Plan) prepared by ARCADIS (ARCADIS, 2018). This objective was addressed through the execution of the sampling and analytical testing program at the previously-identified areas of environmental concern (AECs) at the Site. The LTM Plan will reassess the sources, pathways and receptors at the Site to confirm that the assumptions of the LTM Plan remain valid.

As per the Statement of Work by PSPC (June 2019) upon which this project was based, "the goal of this Performance and LTM work is to ensure that present and future risks to human health and the environment from the site conditions post remedial work are negligible and that monitoring, at some point in the future, could be terminated with confidence, based on findings of no risk and no depreciation of site environmental status" (PSPC, 2019).

1.3 The Site and Relevant Background Information

The Iqaluit Former Metal Dump and Community Landfill (UTM coordinates E521904.94, N7067812.69) is located 1.7km southwest of the City of Iqaluit, on the border of Sylvia Grinnell Territorial Park and the Sylvia Grinnell River (ARCADIS, 2018). The Site acted as a metal dump for the United States Air Force from 1955 to 1963.

Environmental investigations dating back to 1988 have been conducted on the Site. Previously investigated contaminants of concern included volatile organic compounds (VOCs), metals, polychlorinated biphenyls (PCBs), petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbons (PAHs) and pesticides. Due to the presence of contaminants of concern, a remediation program was

completed in 2017, and as such, past environmental site investigation results are not considered relevant and are not reported herein.

The environmental remediation program in 2017 focused on 4 Areas of Environmental Concern (AEC):

- AEC1: buried metal debris located up gradient of the vehicle dump
- AEC2: significant number of vehicles and was therefore referenced as the “Vehicle Dump”
- AEC3: main landfill area which contained graded debris spread over a steep outcrop
- AEC4: downgradient off-site and contained scattered buried debris

During the 2017 remediation work, non-Hazardous waste was consolidated, sorted, and landfilled. Areas containing hydrocarbon contaminated material (HCM) were subsequently excavated and prepared for off-site disposal. Metal contaminated soil was excavated for landfilling. PCB contaminated material was placed into Quatrex bags and shipped off-site. Material with lead-amended paint was collected and packaged in sea cans for transportation to an appropriate disposal facility. Tires were collected and sent off-site for disposal. Automotive or similar batteries were shipped south. All drums containing liquids were sorted and transported to the Qikigtuaaluk Environmental (Q.E.) facility. Additional hazardous materials including fire extinguishers, propane tanks, and oxygen cylinders were sent to the Q.E. facility for disposal. A small quantity of asbestos material was also sent off-site as part of the remediation.

A variety of aggregate types were transported to Site to be used in the modification of the AECs. AEC-1 was re-shaped and re-graded while AECs 2 and 3 were capped. Following the 2017 remediation work, the only structures remaining on-site were the capped landfill and associated drainage swales. Seven (7) long term monitoring stations were established on-site for the purpose of evaluating long term environmental quality at the Site following remediation, and in accordance with the ARCADIS Long-Term Monitoring Plan (LTM Plan) deliverable created by ARCADIS

2.0 Methodology

In brief, the field program took place between July 30 and 31, 2019 and was designed to include observational monitoring in addition to sediment and water sampling at each of the 7 predetermined monitoring stations in accordance with the LTM Plan. An additional off-site sampling location was requested by PSPC to provide analytical data from upstream of the Site. Further details of the methodology are presented in this section.

2.1 Health and Safety Plan

Dillon-Outcome created a site-specific Health and Safety Plan (HSP) for the work. The HSP conformed to applicable codes and regulations for the work. The field team was provided a copy of the HSP prior to the commencement of field work, and the HSP was reviewed before the field program began.

The HSP:

1. Identified site activities and potential hazards,
2. Described safe work practices and procedures,
3. Laid out required personal protective equipment (PPE)/safety levels,
4. Identified safety and first aid requirements, and
5. Identified emergency response procedures.

Dillon-Outcome provided the PSPC PM with a copy of the HSP prior to the initiation of field work.

2.2 Site Observations

Dillon-Outcome made observations across the Site during the field investigation and collected photographs (Appendix C) from standard photo points as specified in the LTM program. Locations were confirmed with a Differential Global Positioning System unit during the field program and are shown in Figure 2 (Appendix A).

2.3 LTM Sampling

Dillon-Outcome collected surface water and sediment samples from seven (7) predetermined LTM stations and one upstream and off-site location. The new sampling location was established adjacent to a culvert that extended under a side road that spurred off from the main road. GPS readings were collected of the sample location, UTM coordinates are as follows: 19 V 0522064 7068013.

2.3.1 Surface Water Sampling and Analysis

Dillon-Outcome collected surface water samples by submerging the bottle under the surface of the water, removing the cap and allowing the bottle to fill, then recapping the bottle. Field parameters

including pH, temperature, and conductivity were measured using a Horiba U-52 hand-held water quality meter, calibrated with standards provided, and recorded in field logs.

Dillon-Outcome collected surface water samples from seven (7) predetermined LTM stations, LTM-1 through LTM-7 and one new off-site, upstream location. The new upstream sampling location is depicted in Figure 2 (Appendix A). Surface water samples were analyzed for petroleum hydrocarbons (PHCs), Arsenic, Cadmium, Cobalt, Chromium, Lead, Nickel, Zinc, polychlorinated biphenyls (PCBs), major ions (>1ppm), hardness, total dissolved solids (TDS), total suspended solids (TSS), pH, conductivity and temperature.

Samples were collected into laboratory-provided glass jars with screw-tight Teflon lids. Dillon-Outcome noted the different laboratory requirements for each analyte and prepared each jar accordingly.

2.3.2 Sediment Sampling

For each sediment sample collected, a depth measurement, GPS coordinates, and description of the sediment (including colour, odour, sheen, staining, and grain size), the presence of debris, and any unusual characteristics was recorded.

Dillon-Outcome collected sediment samples from seven (7) predetermined LTM locations, LTM-1 through LTM-7 and one off-site upstream location. The new upstream sampling location is depicted in Figure 2. Sediment samples were analysed for petroleum hydrocarbons (PHCs), Arsenic, Cadmium, Cobalt, Chromium, Lead, Nickel, Zinc and polychlorinated biphenyls (PCBs).

Samples were collected into laboratory-provided glass jars with screw-tight Teflon lids. Dillon-Outcome noted the different laboratory requirements for each analyte and prepared each jar accordingly.

2.4 Quality Assurance and Quality Control

Samples were collected into laboratory-provided containers with appropriate preservative (where required). Samples were identified with numbers on their lids, and laboratory-provided labels indicating sample ID, date, and analysis.

Samples were placed into coolers with ice for preservation until shipment to the lab. Samples were shipped to the lab accompanied by chain of custody forms identifying samples, volumes, dates, and other pertinent information.

No field sampling equipment was used during the program; as a result, field equipment decontamination was not required.

Field duplicates are evaluated with the Relative Percent Difference (RPD). The RPD is calculated as follows and expressed as a percentage:

$$RPD = \frac{|parent - duplicate|}{\left(\frac{parent + duplicate}{2}\right)}$$

Dillon-Outcome defines the acceptable range for RPD in samples as below 40% for water, below 60% for soil and sediment, and below 50% for air. These values are based on those suggested in the CCME characterization guidance (CCME, 2016) and general industry practice.

2.4.1 Surface Water

Dillon-Outcome collected one field duplicate in the surface water sampling program:

- LTM2-DUP-19-SW was collected as a duplicate of LTM2-SW1-19 and analyzed for petroleum hydrocarbons (PHCs), Arsenic, Cadmium, Cobalt, Chromium, Lead, Nickel, Zinc, polychlorinated biphenyls (PCBs), major ions (>1ppm), hardness, total dissolved solids (TDS), total suspended solids (TSS), pH, conductivity and temperature

2.4.2 Sediment

Dillon-Outcome collected one field duplicate in the sediment sampling program:

- LTM2-DUP-19-SD was collected as a duplicate of LTM2-SD1-19 and analyzed for petroleum hydrocarbons (PHCs), Arsenic, Cadmium, Cobalt, Chromium, Lead, Nickel, Zinc and polychlorinated biphenyls (PCBs).

2.5 Laboratory

Analysis of samples was performed at Bureau Veritas Laboratories', Ottawa location. Bureau Veritas Laboratories (BVL), formerly known as Maxxam Analytics, is certified by the Canadian Association for Laboratory Accreditation Inc. (CALA) and has an internal set of QA/QC protocols, including replicate analysis, blank spikes, matrix spikes, instrumentation calibration, internal standards, method blanks, and internal QC checks. All laboratory quality information was reviewed as part of the data review.

2.6 Mann-Kendall Trend Analysis

The 2017 program was the first year of the monitoring plan, which means that LTM sampling locations have four data points available for surface water and two for sediments. An initial trend analysis was conducted for surface water sample results from the seven LTM stations. Additional sediment sampling is required to establish a trend, as three data points are required for the Mann-Kendall trend analysis (USGS, 2002). Any trend analysis discussed herein is based on a limited data set and only applies to surface water, as sediments have not yet been sufficiently sampled since remediation.

2.7 EQG Selection

The LTM divided the site into three (3) sectors; the upper, lower eastern and lower western. Table 1 outlines each sector, the associated LTM stations and the EQG classification, as established in the Nunavut Water Board submissions and the LTM Plan prepared by others.

Table 1. EQG Classification for LTM Stations (Arcadis, 2017)

Sector	LTM Station(s)	EQG
Upper	7	Commercial, Freshwater, Coarse grained soil
Lower - Eastern portion	2, 5, 6	Wildland, Freshwater, Coarse grained soil
Lower - Western portion	1, 3, 4	Wildland, Lowest of Marine or Freshwater, Coarse grained soil

Based on the EQG, analytical results for sediment and surface water samples are compared to the appropriate CCME criteria.

The Interim Sediment Quality Guideline (ISQG) for freshwater and marine aquatic life was used to evaluate contaminant concentrations in Sediment samples (CCME, 1999).

The Canadian Soil Quality Guidelines (CSQG) for coarse-grained soils were used to evaluate BTEX concentrations in sediment, as no criteria exists for the freshwater and marine ISQG (CCME, 1999). Both parkland and commercial use CSQGs are considered for the land based on proximity to the airport. Similarly, the Canada-Wide Standards (CWS) for Petroleum Hydrocarbons is used to evaluate PHC contamination (CCME, 2008).

For surface water samples, the Canadian Water Quality Guidelines for the Protection of Aquatic Life are applied (CCME, 2003). The inland water samples are classified as freshwater, but the marine guidelines are also included for reference as there is a tidal impact on ponds closer to shore. The acting criteria is the lowest of marine of freshwater guidelines. Water samples with considerable amounts of PHCs are compared to the Alberta Tier 1 Groundwater Remediation Guidelines (Alberta Government, 2019).

Environmental Quality Guidelines (EQGs) and CCME criteria were established during previous investigations by ARCADIS (ARCADIS, 2017).

3.0 Results

3.1 Observational Monitoring

3.1.1 Visual Monitoring

Visual monitoring was completed July 30 and 31, 2019. No major issues were detected on-site during the visit. Two (2) minor erosion features (<0.1m deep, <0.1m wide and <1m long) were once again observed on the slope crest, as depicted in Photo 15 enclosed in Appendix E.

3.1.2 Seepage Monitoring

No seepage was observed on-site, therefore no seepage samples were collected.

3.1.3 Natural Environment Monitoring

Two small (~10-cm to 15-cm) fish were observed within Pond 3.

A tent was observed within the TC property located near Ponds 3 and 4 and down gradient of the closed landfill (see Photo 19 in Appendix E, and Photo 7 in Appendix C). No people were present during the site visit.

3.2 Lab Results

Table 2 summarizes all exceedances identified through the 2017 and 2018 field programs.

Table 2. Contaminant Exceedance Summarization

Sample Type	Contaminant	2017 Exceedances	2018 Exceedances	2019 Exceedances
Surface Water	Cadmiun	STN 2	STN 5, 6	STN 7
	Lead	-	STN 5, 6	STN 7
	Zinc	STN 2, 3, 5, 6, 7	STN 5, 6, 7	STN 7, SW8
Sediment	Toluene	-	STN 6	-
	F2	-	STN 6	STN 6
	F3	-	STN 5, 6	STN 5, 6
	Cadmium	-	STN 5,6	STN 5,6
	Lead	-	STN 5, 6	STN 6
	Zinc	-	STN 5, 6, 7	STN 5, 6, 7, SW8
	Total PCBs	-	STN 5, 6, 7	STN 5, 6

3.2.1 Surface Water

The eight surface sample locations are shown on Figure 2. Analytical results are presented in Table B-1.

Concentrations of Cadmium, Zinc and Lead exceeded CCME guidelines in surface water samples collected from LTM station 7. Also, LTM supplemental sample location (SW8) exceeded guidelines for Zinc.

LTM station 7 indicate an increase in Cadmium and Lead concentrations exceeding the guidelines for the first time as well as the highest recorded Zinc concentration at this location.

Based on the 2019 results Cadmium, Lead and/or Zinc concentrations from LTM stations 2, 3, 5 and 6 do not exceed CCME guidelines.

DOJV carried out a Mann-Kenall trend analysis on surface water parameters that indicated at least one measurable concentration. This included metal parameters Arsenic, Cadmium, Cobalt, Lead, Nickel and Zinc. The data sets and trend analysis charts are included in Appendix B. Table 3 summarizes the evaluated Mann-Kendall results for the metal parameters for each of the seven LTM stations:

Table 3. Mann-Kendall Trend Analysis Summary

Station # / CoC	LTM1	LTM2	LTM3	LTM4	LTM5	LTM6	LTM7
Arsenic	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Increasing
Cadmium	Stable/No Trend	Stable/No Trend	Increasing	Stable/No Trend	Stable/No Trend	Stable/No Trend	Increasing
Cobalt	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend
Lead	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend
Nickel	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend
Zinc	Decreasing	Stable/No Trend	Decreasing	Stable/No Trend	Stable/No Trend	Stable/No Trend	Stable/No Trend

It should be noted that with only four data sets available, the majority of the trend analysis results show "Stable/No trend" and this may change over time with each new sampling event. The "Increasing" trend for LTM3 is a function of an increase of Reported Detection Limits (RDL) for 2018 and 2019 to above the measured quantity in October 2017 and as such, LTM3 may be better assessed as "Stable/No Trend". LTM3 will require additional data sets to properly evaluate trends.

Zinc concentrations indicate a "Decreasing" trend for LTM1 and LTM3.

Arsenic and Cadmium from LTM7 indicate an "Increasing" trend that appears to be driven by increased RDLs and the 2019 results. DOJV observed that the water level at LTM Station 7 was lower in 2019 than in 2018 and that the Total Suspended Solids (TSS) had increased from 1 mg/L to 580 mg/L. Since surface water metal analysis is for total metals the increase of metal concentrations for all measured metal parameters (As, Cd, Co, Pb, Ni, Zn) may be connected to this increase in TSS.

3.2.2 Sediment Samples

The eight sediment sample locations are shown on Figure 2 (Appendix A). Analytical results are presented in Table B-2 (Appendix B).

The sediment sample collected from LTM station 5 exceeded guidelines for PHC F3, Cadmium, Zinc and total PCBs.

The sediment sample collected from LTM station 6 exceeded guidelines for PHCs F2 & F3, Cadmium, Lead, Zinc and total PCBs.

The sediment sample collected from LTM station 7 and supplemental sample location SW8 exceeded guidelines for Zinc.

With only one previous sampling event completed, insufficient historical data exists for the sediment samples at LTM stations to conduct a thorough comparison. It does, however, appear that Year 1 and Year 2 results are relatively consistent.

3.3 QA/QC Results

As noted in Section 2.4, Dillon-Outcome defines the acceptable range for RPD in samples as below 40% for water, below 60% for soil and sediment, and below 50% for air. These values are based on those suggested in the CCME characterization guidance (CCME, 2016) and general industry practice.

3.3.1 Surface Water QA/QC Results

Duplicate RPDs from the 2019 LTM program in surface water samples ranged from 2% to 40%, within the acceptable range previously noted.

3.3.2 Sediment QA/QC Results

Duplicate RPDs from the 2019 LTM program in sediment ranged from 0% to 39%, within the acceptable range previously noted.

4.0 Conclusions

"The goal of this Performance and LTM work is to ensure that present and future risks to human health and the environment from the site conditions post remedial work are negligible and that monitoring, at some point in the future, could be terminated with confidence, based on findings of no risk and no depreciation of site environmental status" (PSPC, 2019). To fulfill the project objectives, Dillon-Outcome reviewed the land use, pathways and receptors, and completed an analysis of results relative to the EQG identified in the LTM Plan.

The following conclusions are presented from the results presented herein:

1. There were no observations made during this field program that would suggest a change in land use, exposure pathways, or receptors at the Site. In this respect, Dillon-Outcome considers the EQG from the LTM Plan to be suitable for use in the numerical comparison with analytical results obtained from the July, 2019 sampling event.

2. There have been exceedances of contaminants of concern noted in the samples retrieved. The majority of exceedances were observed in sediment, including both organic and inorganic contaminants of concern. There were exceedances of inorganic (metals) contaminants of concern in two water samples.

3. DOJV carried out an initial Mann-Kendall Trend Analysis utilizing the first 4 sets of data. The majority of contaminants of concern were evaluated at "Stable/No Trend". These results may change over time with additional data that establish a trend, or may stay stable. Zinc concentrations indicate a "Decreasing" trend for LTM1 and LTM3. The Arsenic and Cadmium trend of "Increasing" at LTM7 should be tracked during future sampling events.

4. The quality control program resulted in RPD calculations of analytical results from duplicate surface water and sediment samples that were determined to be within an acceptable range.

5. Observations indicate that a minor soil depression and potential soil erosion has occurred at two areas since the remediation program in 2017. This is likely caused by a small amount of settlement in an area that was not adequately compacted during remediation.

6. Observations indicate that a tent has been pitched on-site near Pond 3 and Pond 4. The EQGs established for this area of the site consider wildlife and parkland use, and as such the presence of a tent is not expected to change the exposure pathway.

5.0 Recommendations

The following recommendations derive from the results and conclusions contained herein:

I. There were exceedances of contaminants of concern in both sediment and water samples collected in September 2018 and July 2019. The long-term monitoring program will require additional data to reveal trends in concentrations at the monitoring stations where such exceedances were observed. DOJV recommends sampling in years 3 and 5 of Phase 1 of the LTM program to determine if these exceedances represent a trend. The same data set is recommended in order to increase the data set available and accuracy of the Mann-Kendall regression analysis. As required in the TOR for this undertaking, a cost estimate for LTM monitoring in Year 3 (FY2020-21) is presented in Appendix F.

II. It is recommended to continue monitoring the soil settlement and erosion features identified during the 2018 and 2019 site investigations. Alternatively, minor site grading may be considered by Canada at this location to avoid the worsening of the erosion features that could develop from surface water flow. A cost estimate has been provided in Appendix F for such site grading activities which could be efficiently completed during the next LTM monitoring event.

III. It is recommended to monitor the site to assess if the recreational land-use, eg. Tent, increases such that it alters the predetermined exposure pathways and land-use considered in the development of the water board approved EQGs.

6.0 Closure

This report was prepared exclusively for the purpose outlined in the report. The report is based on information provided to, or obtained by, Dillon-Outcome as indicated in the report, and applies solely to site conditions and the regulatory and planning frameworks existing at the time of the site investigation.

This report was prepared by Dillon-Outcome for the sole benefit of PSPC and TC. The material in it reflects Dillon-Outcome's best professional judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon- Outcome accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this information is satisfactory for your requirements.

Sincerely,

DILLON-OUTCOME JOINT VENTURE

Jonathan Markiewicz, P.Geo
Senior Project Manager

Michael Billowits, MSc.(Eng), P.Eng.
President, Outcome Consultants Inc.

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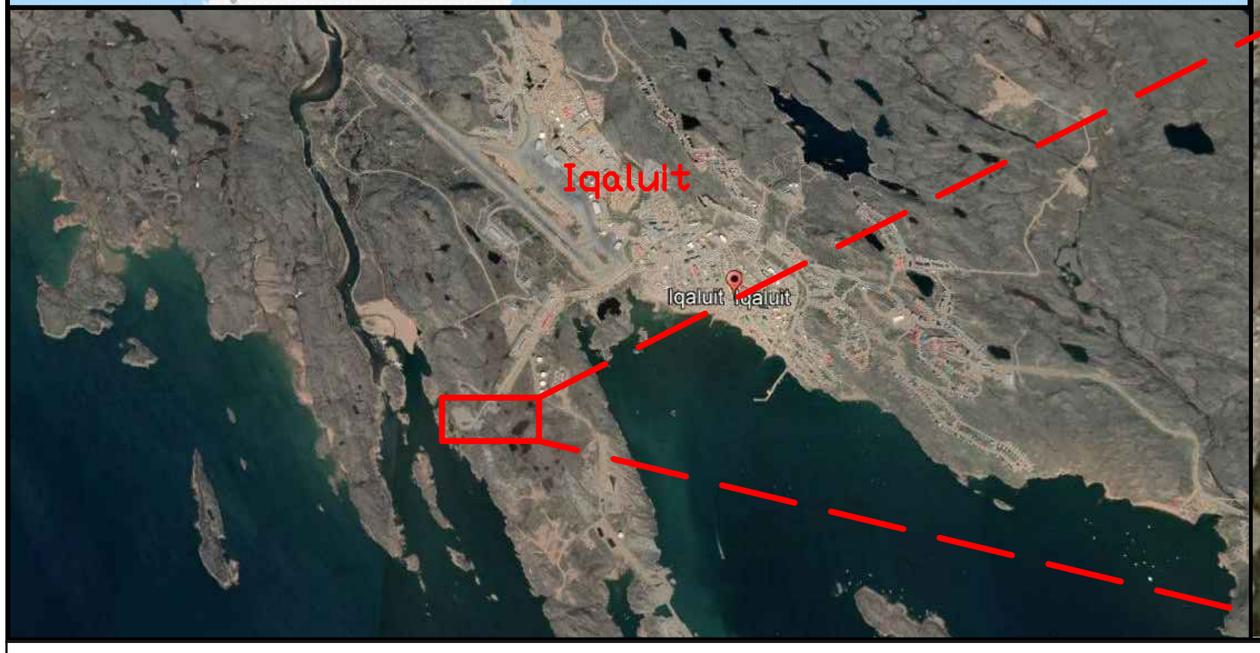
Appendix A

Figures



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References:

Google Earth images, Retrieved September 2019

*Original in colour

updated

Title: Site Location

Project: **FORMER IQALUIT METAL DUMP AND COMMUNITY LANDFILL SITE REMEDIATION SUMMARY REPORT**

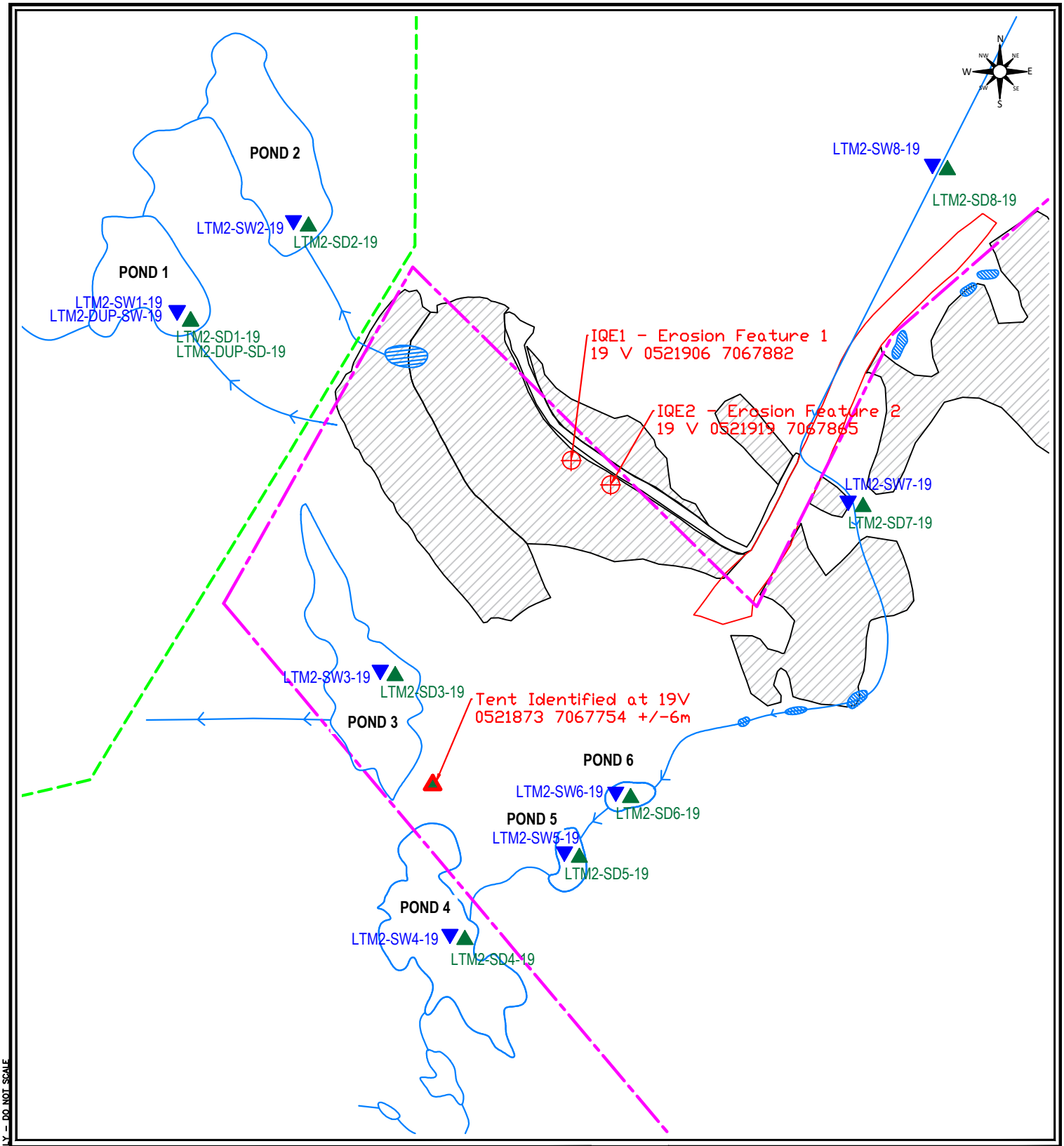
Client: PSPC - TRANSPORT CANADA

DILLON CONSULTING

outcome CONSULTANTS

Date: SEPTEMBER 2019

FIGURE 1



Legend

- POOLING WATER
- PROPERTY BOUNDARY
- PARK BOUNDARY
- STREAM/DRAINAGE
- EXTENT OF COMPLETED LANDFILL & CAPPING
- ACCESS ROAD

LONG TERM MONITORING SAMPLES

- LTM-SW4 — SURFACE WATER SAMPLE STATION
- LTM-SD4 — SEDIMENT SAMPLE STATION

Note: Adapted from Arcadis file:
102153-000_remediation_report_2018-01-04.dwg

25 0 Metres 25 50
1:2250

TO BE PRINTED IN COLOUR ON 8.5"X11" PAPER ONLY — DO NOT SCALE

updated on: 26-Sep-19 by Coleman Sadler

Title: LONG TERM MONITORING SAMPLE LOCATIONS

Project: FORMER IQALUIT METAL DUMP AND COMMUNITY LANDFILL SITE REMEDIATION SUMMARY REPORT

Client: PSPC - TRANSPORT CANADA

outcome CONSULTANTS | DILLON CONSULTING

Date: SEPTEMBER 2019

FIGURE 2

Appendix B

Analytical Results

Table B-1. Surface Water Sample Lab Results

Maxxam ID																						
Station ID					LTM1	DUP 1	LTM1-SW1-18	LTM2-SW1-19	LTM2-DUP-19-SW		LTM2	LTM2	LTM1-SW2-18	LTM2-SW2-19	LTM3	LTM3	LTM1-SW3-18	LTM2-SW3-19	LTM4	LTM4	LTM1-SW4-18	LTM2-SW4-19
Date					1	1	1	1	1		2	2	2	2	3	3	3	3	4	4	4	4
Source					21-Sep-17	21-Sep-17	19-Sep-18	30-Jul-19	30-Jul-19		21-Sep-17	3-Oct-17	19-Sep-18	30-Jul-19	21-Sep-17	3-Oct-17	19-Sep-18	30-Jul-19	21-Sep-17	3-Oct-17	19-Sep-18	30-Jul-19
Parameter (ug/L)	Units	CCME Freshwater[1]	CCME Marine[2]	Alberta Tier 1[3]	ARCADIS 2017	ARCADIS 2017	DOJV	DOJV	DOJV	RPD	ARCADIS 2017	ARCADIS 2017	DOJV	DOJV	ARCADIS 2017	ARCADIS 2017	DOJV	DOJV	ARCADIS 2017	ARCADIS 2017	DOJV	DOJV
PHCs, F1 to F4 (including BTEX)																						
Benzene	ug/L	370	110		<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	ug/L	90	25		<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	0.69	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	ug/L	2	215		<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Xylene	ug/L	-	-		<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
m+p-Xylene	ug/L	-	-		<0.40	<0.40	<0.40	<0.40	<0.40	nc	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Xylenes (total)	ug/L	-	-		<0.40	<0.40	<0.40	<0.40	<0.40	nc	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
F1 (C6-C10)	ug/L	-	-	2200	<25	<25	<25	<25	<25	nc	<25	<25	<25	<25	<25	56	<25	<25	<25	<25	<25	<25
F1 (C6-C10) minus BTEX	ug/L	-	-		<25	<25	<25	<25	<25	nc	<25	<25	<25	<25	<25	56	<25	<25	<25	<25	<25	<25
F2 (C10-C16)	ug/L	-	-	1100	<100	<100	<100	<100	<100	nc	<100	<100	<100	<100	<100	220	<100	<100	<100	<100	<100	<100
F3 (C16-C34)	ug/L	-	-		<200	<200	<200	<200	<200	nc	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
F4 (C34-C50)	ug/L	-	-		<200	<200	<200	<200	<200	nc	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Reached Baseline at C50		-	-		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Metals																						
Arsenic	ug/L	5	12.5		<1.0	<1.0	<1.0	<1.0	<1.0	nc	<0.10	<0.10	<1.0	<1.0	<0.50	0.6	<1.0	<1.0	<0.10	<0.10	<1.0	<1.0
Cadmium	ug/L	0.09	0.12		<0.10	<0.10	<0.10	<0.10	<0.10	nc	<0.010	0.111	<0.10	<0.10	<0.050	0.017	<0.10	<0.10	0.021	0.04	<0.10	<0.10
Chromium	ug/L	-	-		<10	<10	<5	<5.0	<5.0	nc	<1.0	<1.0	<5	<5.0	<5.0	<1.0	<5	<5.0	<1.0	<1.0	<5	<5.0
Cobalt	ug/L	-	-		<2.0	<2.0	<0.50	<0.50	<0.50	nc	<0.20	0.33	<0.50	<0.50	<1.0	0.54	<0.50	<0.50	<0.20	<0.20	<0.50	<0.50
Lead	ug/L	See Note 4			<2.0	<2.0	<0.5	<0.50	<0.50	nc	0.64	2.31	<0.5	<0.50	<1.0	12.9	<0.5	<0.50	<0.20	<0.20	<0.5	<0.50
Nickel	ug/L	See Note 4			<10	<10	<1	<1.0	<1.0	nc	<1.0	1.3	<1	<1.0	<5.0	2.5	<1	<1.0	<1.0	<1.0	<1	<1.0
Zinc	ug/L	7	-		<50	<50	5.6	<5.0	<5.0	nc	<5.0	14.7	<5	<5.0	68	18.4	<5	<5.0	<5.0	5.3	<5	<5.0
PCBs and Pesticides																						
Aroclor 1016	ug/L	-	-		<0.05	<0.05					<0.05	<0.05			<0.05	<0.05			<0.05	<0.05		
Aroclor 1221	ug/L	-	-		<0.05	<0.05					<0.05	<0.05			<0.05	<0.05			<0.05	<0.05		
Aroclor 1232	ug/L	-	-		<0.05	<0.05					<0.05	<0.05			<0.05	<0.05			<0.05	<0.05		
Aroclor 1242	ug/L	-	-		<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1248	ug/L	-	-		<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	ug/L	-	-		<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	ug/L	-	-		<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Polychlorinated biphenyls	ug/L	*	*		<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Other																						
Total Dissolved Solid (TDS)	mg/L	-	-				1880	1520	1410	0.08			1340	1700			4740	5760			395	2630
Low Level Total Suspended Solids (TSS	mg/L	-	-				7	2	3	0.40			1	6			5	3			1	2
Hardness (CaC03)	mg/L	-	-				350	300	280	0.07			250	310			840	1000			110	440
Lead Criteria (Based on Hardness)	ug/L						7	7	7				7	7			7	7			3.59	7
Nickel Criteria (Based on Hardness)	ug/L						150	150	150				150	150			150	150			102.76	150
Temperature (field, °C)		-	-				3.11	15.22		nc			1.01	15.68			1.48	15.41			0.76	16.04
pH (lab)		6.5-9	7-8.7		7.67	7.63	7.59	7.24	7.38	0.02	7.67	6.64	7.49	7.77	7.54	6.79	7.52	8.22	7.64	7.43	7.62	8.37
pH (field)							6.14	7.41		nc			6.51	7.94			6.41	8.15			7.52	8.5
Conductivity	mS/cm						3.13	1.16		nc			2.56	2.9			8.92	8.44			1.27	4.09

Notes:

[1]Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Freshwater. (Retrieved September 2019)

[2]Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Marine. (Retrieved September 2019)

[3]Alberta Government, Alberta Tier 1 Soil and Groundwater Guidelines. Table 2. Updated 2019

[4]Guideline is hardness dependent

20= Denotes Exceedance of CCME Criteria for lowest value of Marine/Freshwater Guidelines

nc= not calculable

Table B-1. Surface Water Sample Lab Results

Maxxam ID					LTM5	LTM5	LTM1-SW5-18	LTM2-SW5-19	LTM6	LTM6	LTM1-SW6-18	LTM1-SW8-18		LTM2-SW6-19	LTM7	LTM7	DUP2	LTM1-SW7-18	LTM2-SW7-19	LTM2-SW8-19
Station ID					5	5	5	5	6	6	6	6		6	7	7	7	7	7	NA
Date	Units	CCME Freshwater[1]	CCME Marine[2]	Alberta Tier 1[3]	21-Sep-17	3-Oct-17	19-Sep-18	31-Jul-19	21-Sep-17	3-Oct-17	19-Sep-18	19-Sep-18	RPD	31-Jul-19	21-Sep-17	3-Oct-17	3-Oct-17	19-Sep-18	30-Jul-19	31-Jul-19
Source					ARCADIS 2017	ARCADIS 2017	DOJV	DOJV	ARCADIS 2017	ARCADIS 2017	DOJV	DOJV		DOJV	ARCADIS 2017	ARCADIS 2017	ARCADIS 2017	DOJV	DOJV	DOJV
Parameter (ug/L)																				
PHCs, F1 to F4 (Including BTEX)																				
Benzene	ug/L	370	110		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	ug/L	90	25		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	ug/L	2	215		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	1.1	<0.20
o-Xylene	ug/L	-	-		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
m+p-Xylene	ug/L	-	-		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	nc	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Xylenes (total)	ug/L	-	-		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	nc	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
F1 (C6-C10)	ug/L	-	-	2200	<25	<25	<25	<25	<25	<25	<25	<25	nc	<25	<25	<25	<25	<25	<25	<25
F1 (C6-C10) minus BTEX	ug/L	-	-		<25	<25	<25	<25	<25	<25	<25	<25	nc	<25	<25	<25	<25	<25	<25	<25
F2 (C10-C16)	ug/L	-	-	1100	<100	<100	<100	<100	<100	<100	<100	<100	nc	<100	<100	<100	<100	<100	<100	<100
F3 (C16-C34)	ug/L	-	-		<200	<200	<200	<200	<200	<200	<200	<200	nc	<200	<200	<200	<200	<200	<200	<200
F4 (C34-C50)	ug/L	-	-		<200	<200	<200	<200	<200	<200	<200	<200	nc	<200	<200	<200	<200	<200	<200	<200
Reached Baseline at C50		-	-		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Metals																				
Arsenic	ug/L	5	12.5		<0.10	<0.10	<1.0	<1.0	<0.10	<0.10	<1	<1.0	nc	<1.0	0.15	0.17	0.17	<1.0	1.2	<1.0
Cadmium	ug/L	0.09	0.12		0.035	0.043	0.14	<0.10	0.025	0.043	0.15	<0.10	nc	<0.10	<0.010	0.013	0.019	<0.1	0.23	<0.10
Chromium	ug/L	-	-		<1.0	<1.0	<5	<5.0	<1.0	<1.0	<5	<5	nc	<5.0	<1.0	<1.0	<1.0	<5	<5.0	<5.0
Cobalt	ug/L	-	-		<0.20	0.22	0.54	<0.50	<0.20	0.26	0.68	0.53	0.25	<0.50	<0.20	0.56	0.62	<0.50	6.8	1.9
Lead	ug/L	See Note 4			0.26	<0.20	1.8	<0.50	<0.20	<0.20	2.4	1.6	0.40	0.51	0.21	0.61	0.62	<0.5	11	<0.50
Nickel	ug/L	See Note 4			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1	nc	<1.0	<1.0	<1.0	1.3	<1	4.2	1.1
Zinc	ug/L	7	-		5.7	28	16	<5.0	14.4	9.1	16	13	0.21	<5.0	40.8	223	254	57	640	7.9
PCBs and Pesticides																				
Aroclor 1016	ug/L	-	-		<0.05	<0.05			<0.05	<0.05					<0.05	<0.05	<0.05			
Aroclor 1221	ug/L	-	-		<0.05	<0.05			<0.05	<0.05					<0.05	<0.05	<0.05			
Aroclor 1232	ug/L	-	-		<0.05	<0.05			<0.05	<0.05					<0.05	<0.05	<0.05			
Aroclor 1242	ug/L	-	-		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1248	ug/L	-	-		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	ug/L	-	-		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	ug/L	-	-		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Polychlorinated biphenyls	ug/L	*	*		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Other																				
Total Dissolved Solid (TDS)	mg/L	-	-				170	110			130	65		85				80	95	115
Low Level Total Suspended Solids (TSS	mg/L	-	-				28	5			64	25		42				1	530	12
Hardness (CaC03)	mg/L	-	-				46	71			44	44		70				50	65	74
Lead Criteria (Based on Hardness)	ug/L						1	2.06			1	1		2.02				1	1.84	2.17
Nickel Criteria (Based on Hardness)	ug/L						25	73.67			25	25		72.88				25	68.89	76.03
Temperature (field, °C)		-	-				1.01	7.88			0.92	0.92		7.99				1.68	6.88	7.25
pH (lab)		6.5-9	7-8.7		7.61	7.41	7.45	7.70	7.63	7.37	7.42	7.21	0.03	7.59	7.31	7.23	7.22	7.29	7.22	7.19
pH (field)							7.93	8.16			7.6	7.6		7.56				7.5	7.29	6.82
Conductivity	mS/cm						0.145	0.13			0.109	0.109		0.147				0.12	0.127	0.123

Notes:

[1] Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Freshwater. (Retrieved September 2019)

[2] Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Marine. (Retrieved September 2019)

[3] Alberta Government, Alberta Tier 1 Soil and Groundwater Guidelines. Table 2. Updated 2019

[4] Guideline is hardness dependent

20= Denotes Exceedance of CCME Criteria for lowest value of Marine/Freshwater Guidelines

nc= not calculable

Table B-2. Sediment Sample Lab Results

Sample ID Station ID Source Sampling Date	UNITS	MDL	SQGPAL (Freshwater)		SQGPAL (Marine)		CCME Soil PL3	CCME Soil CL4	CWS Soil PL5	CWS Soil CL6	LTM-SD1-18 1 DOJV 19-Sep-18	LTM2-SD1-19 1 DOJV 30-Jul-19	LTM2-DUP-19-SD 1 DOJV 30-Jul-19	RPD	LTM-SD2-18 2 DOJV 19-Sep-18	LTM2-SD2-19 2 DOJV 30-Jul-19	LTM-SD3-18 3 DOJV 19-Sep-18	LTM2-SD3-19 3 DOJV 30-Jul-19	LTM-SD4-18 4 DOJV 19-Sep-18	LTM2-SD4-19 4 DOJV 30-Jul-19	LTM-SD5-18 5 DOJV 19-Sep-18	LTM2-SD5-19 5 DOJV 31-Jul-19
			ISQG	PEL	ISQG	PEL																
Moisutre	%		-	-	-	-	-	-	-	-	19	13	14	0.07	15	11	16	28	21	15	89	52
PHCs, F1 to F4 (Including BTEX)																						
Benzene	ug/g	0.005	-	-	-	-	0.03	0.03	-	-	<0.0060	<0.0060	<0.0060	nc	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.036	<0.012
Ethylbenzene	ug/g	0.01	-	-	-	-	0.37	0.37	-	-	<0.010	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.060	<0.020
Toluene	ug/g	0.02	-	-	-	-	0.082	0.082	-	-	<0.020	<0.020	<0.020	nc	<0.020	<0.020	0.030	<0.020	<0.020	<0.020	<0.12	<0.040
o-Xylene	ug/g	0.02	-	-	-	-	-	-	-	-	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.12	<0.040
p+m-Xylene	ug/g	0.04	-	-	-	-	-	-	-	-	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.12	<0.040
Total Xylenes	ug/g	0.04	-	-	-	-	11	11	-	-	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.12	<0.040
F1 (C6-C10)	ug/g	10	-	-	-	-	-	-	210	320	<10	<10	<10	nc	<10	<10	<10	<10	<10	<10	<60	<20
F1 (C6-C10) - BTEX	ug/g	10	-	-	-	-	-	-	-	-	<10	<10	<10	nc	<10	<10	<10	<10	<10	<10	<60	<20
F2 (C10-C16 Hydrocarbons)	ug/g	10	-	-	-	-	-	-	150	260	<10	<10		nc	<10	<10	<10	<10	<10	<10	290	71
F3 (C16-C34 Hydrocarbons)	ug/g	50	-	-	-	-	-	-	300	1700	<50	<50		nc	<50	<50	<50	97	<50	<50	1400	350
F4 (C34-C50 Hydrocarbons)	ug/g	50	-	-	-	-	-	-	2800	3300	<50	<50		nc	<50	<50	<50	53	<50	<50	<500	130
Reached Baseline at C50												Yes				Yes		Yes		Yes		Yes
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	50																				
Metals																						
Arsenic (As)	ug/g	1.0	5.9	17.0	7.2	41.6	-	-	-	-	1.4	1.2	1.1	0.09	1.6	<1.0	1.2	2.6	1.6	1.6	1.8	1.4
Cadmium (Cd)	ug/g	0.10	0.6	3.5	0.7	4.2	-	-	-	-	<0.10	<0.10	<0.10	nc	0.18	<0.10	<0.10	0.13	0.2	0.11	4.9	0.75
Chromium (Cr)	ug/g	1.0	37.3	90	52.3	160	-	-	-	-	28	29	25	0.15	22	21	19	18	17	15	23	20
Cobalt (Co)	ug/g	0.10	-	-	-	-	-	-	-	-	4.4	3.6	3.6	0	4.5	3.4	5.3	3.7	3.6	3.3	7.5	5.6
Lead (Pb)	ug/g	1.0	35.0	91.3	30.2	112	-	-	-	-	3.6	3.4	3.0	0.13	3.6	4.7	8.9	23	6.5	10	69	22
Nickel (Ni)	ug/g	0.50	-	-	-	-	-	-	-	-	7.5	6.8	6.2	0.09	8.2	5.5	5.5	6.5	5.3	4.9	14	11
Zinc (Zn)	ug/g	5.0	123	315	124	124	-	-	-	-	40	46	31	0.39	56	33	46	48	52	49	250	190
PCBs and Pesticides																						
Total PCB	ug/g	0.075	0.0341	0.277	0.0215	0.189	-	-	-	-	<0.010	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	1.4	0.17
Aroclor 1242	ug/g	0.075	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.090	<0.020
Aroclor 1248	ug/g	0.075	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.090	<0.020
Aroclor 1254	ug/g	0.075	0.06	0.34	0.0633	0.709	-	-	-	-	<0.010	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.090	<0.020
Aroclor 1260	ug/g	0.075	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	1.4	0.17

Notes:

1 CCME, Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, Freshwater, ISQG (Retrieved September 2019)

2 CCME, Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, Freshwater, PEL (Retrieved September 2019)

3 CCME, Canadian Soil Quality Guidelines for the Protection of Environmental Health, Residential/Parkland Land-Use, coarse-grained soil September 2019)

4 CCME, Canadian Soil Quality Guidelines for the Protection of Environmental Health, Commercial Land-Use, coarse-grained soil (September 2019)

5 CCME (2008) Canadian-Wide Standards for Petroleum Hydrocarbons in Soil - table 1, Tier 1 levels for PHCs, Residential/Parkland Use in coarse-grained surface soils

6 CCME (2008) Canadian-Wide Standards for Petroleum Hydrocarbons in Soil - table 1, Tier 1 levels for PHCs, Commercial Use in coarse-grained surface soils

20 =	Denotes exceedance of CCME for both freshwater/marine ISQG (or other criteria)
20 =	Denotes exceedance of CCME for freshwater ISQG
20 =	Denotes exceedance of CCME for marine ISQG
-' =	No Guideline

Table B-2. Sediment Sample Lab Results

Sample ID Station ID Source Sampling Date	UNITS	MDL	SQGPAL (Freshwater)		SQGPAL (Marine)		CCME Soil PL3	CCME Soil CL4	CWS Soil PL5	CWS Soil CL6	LTM-SD6-18 6 DOJV 19-Sep-18	LTM-SD8-18 6 DOJV 19-Sep-18	RPD	LTM2-SD6-19 6 DOJV 31-Jul-19	LTM-SD7-18 7 DOJV 19-Sep-18	LTM2-SD7-19 7 DOJV 30-Jul-19	LTM2-SD8-19 NA DOJV 31-Jul-19
			ISQG	PEL	ISQG	PEL											
Moisutre	%		-	-	-	-	-	-	-	-	82	84		74	72	33	31
PHCs, F1 to F4 (Including BTEX)																	
Benzene	ug/g	0.005	-	-	-	-	0.03	0.03	-	-	<0.018	<0.024		<0.012	<0.012	<0.0060	<0.0060
Ethylbenzene	ug/g	0.01	-	-	-	-	0.37	0.37	-	-	<0.030	<0.040		<0.020	<0.020	<0.010	<0.010
Toluene	ug/g	0.02	-	-	-	-	0.082	0.082	-	-	0.10	0.26	0.89	<0.040	<0.040	<0.020	<0.020
o-Xylene	ug/g	0.02	-	-	-	-	-	-	-	-	<0.060	<0.080		<0.040	<0.040	<0.020	<0.020
p+m-Xylene	ug/g	0.04	-	-	-	-	-	-	-	-	<0.060	<0.080		<0.040	<0.040	<0.020	<0.020
Total Xylenes	ug/g	0.04	-	-	-	-	11	11	-	-	<0.060	<0.080		<0.040	<0.040	<0.020	<0.020
F1 (C6-C10)	ug/g	10	-	-	-	-	-	-	210	320	<30	<40		<20	<20	<10	<10
F1 (C6-C10) - BTEX	ug/g	10	-	-	-	-	-	-	-	-	<30	<40		<20	<20	<10	<10
F2 (C10-C16 Hydrocarbons)	ug/g	10	-	-	-	-	-	-	150	260	2700	210	1.71	1300.0	<30	<10	<10
F3 (C16-C34 Hydrocarbons)	ug/g	50	-	-	-	-	-	-	300	1700	1700	1200	0.34	1400	290	140	200
F4 (C34-C50 Hydrocarbons)	ug/g	50	-	-	-	-	-	-	2800	3300	540	420	0.25	490	<150	61	71
Reached Baseline at C50														Yes		No	No
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	50														280	170
Metals																	
Arsenic (As)	ug/g	1.0	5.9	17.0	7.2	41.6	-	-	-	-	1.8	2.3	0.24	3.3	2.7	<1.0	1.2
Cadmium (Cd)	ug/g	0.10	0.6	3.5	0.7	4.2	-	-	-	-	3.9	9.3	0.82	7.4	0.2	0.15	<0.10
Chromium (Cr)	ug/g	1.0	37.3	90	52.3	160	-	-	-	-	28	35	0.22	36	**43**	34	19
Cobalt (Co)	ug/g	0.10	-	-	-	-	-	-	-	-	7.8	9.5	0.20	17	10	5.8	4.4
Lead (Pb)	ug/g	1.0	35.0	91.3	30.2	112	-	-	-	-	100	110	0.10	130	20	12	11
Nickel (Ni)	ug/g	0.50	-	-	-	-	-	-	-	-	12	16	0.29	16	15	9.9	7.9
Zinc (Zn)	ug/g	5.0	123	315	124	124	-	-	-	-	240	440	0.59	350	230	190	140
PCBs and Pesticides																	
Total PCB	ug/g	0.075	0.0341	0.277	0.0215	0.189	-	-	-	-	3.4	3.8	0.11	3.9	0.59	<0.020	<0.020
Aroclor 1242	ug/g	0.075	-	-	-	-	-	-	-	-	<0.60	<0.050		<0.40	<0.040	<0.020	<0.020
Aroclor 1248	ug/g	0.075	-	-	-	-	-	-	-	-	<0.60	<0.050		<0.40	<0.040	<0.020	<0.020
Aroclor 1254	ug/g	0.075	0.06	0.34	0.0633	0.709	-	-	-	-	<0.60	<0.050		<0.40	<0.040	<0.020	<0.020
Aroclor 1260	ug/g	0.075	-	-	-	-	-	-	-	-	3.4	3.8	0.11	3.9	0.59	<0.020	<0.020

Notes:

[1] CCME, Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, Freshwater, ISQG (Retrieved September 2019)

[2] CCME, Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, Freshwater, PEL (Retrieved September 2019)

[3] CCME, Canadian Soil Quality Guidelines for the Protection of Environmental Health, Residential/Parkland Land-Use, coarse-grained soil September 2019)

[4] CCME, Canadian Soil Quality Guidelines for the Protection of Environmental Health, Commercial Land-Use, coarse-grained soil (September 2019)

[5] CCME (2008) Canadian-Wide Standards for Petroleum Hydrocarbons in Soil - table 1, Tier 1 levels for PHCs, Residential/Parkland Use in coarse-grained surface soils

[6] CCME (2008) Canadian-Wide Standards for Petroleum Hydrocarbons in Soil - table 1, Tier 1 levels for PHCs, Commercial Use in coarse-grained surface soils

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20 =	Denotes exceedance of CCME for freshwater ISQG
20 =	Denotes exceedance of CCME for marine ISQG
-' =	No Guideline

Mann Kendall Trend Evaluation

Contaminant: Arsenic

Monitoring Inputs

Event	LTM1	LTM2	LTM3	LTM4	LTM5	LTM6	LTM7
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1	0.25	0.025	0.125	0.025	0.025	0.025	0.15
2	0.25	0.025	0.6	0.025	0.025	0.025	0.17
3	0.25	0.025	0.25	0.25	0.25	0.25	0.25
4	0.25	0.025	0.25	0.25	0.25	0.25	1.2
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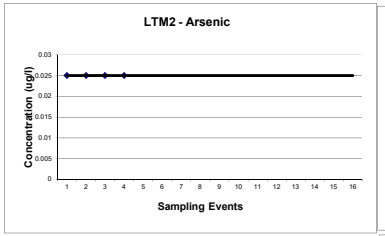
12							
13							
14							
15							
16							

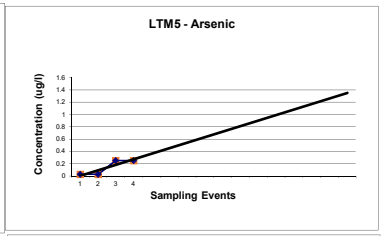
Data Entry Cell
Inferred Data
Concentration less than RDL

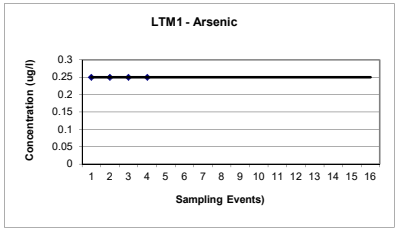
Mann-Kendall Results

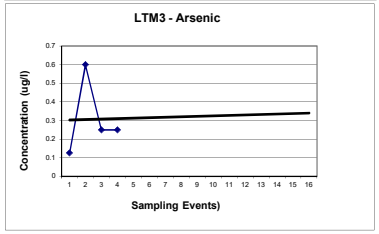
0-4 Event Evaluation

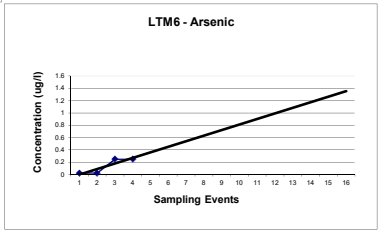
LTM1	Stable/No Trend
LTM2	Stable/No Trend
LTM3	Stable/No Trend
LTM4	Stable/No Trend
LTM5	Stable/No Trend
LTM6	Stable/No Trend
LTM7	Increasing

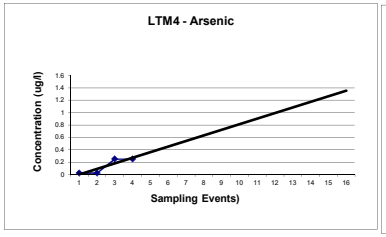


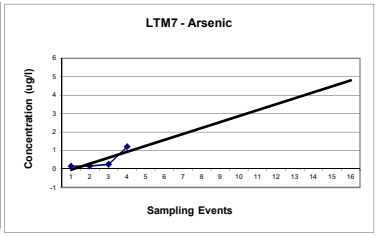












Notes:
1- Values below detection limits were included as one quarter (25%) of the reported detection limits indicated on the certificate of analyses
2- Sampling Event from LTM1 was not collected and a value equal to the fist event was utilized.
3- The evaluations with 4 events use an "S_{max}" value of 4

Mann Kendall Trend Evaluation

Contaminant: Cadmium

Monitoring Inputs

Event	LTM1	LTM2	LTM3	LTM4	LTM5	LTM6	LTM7
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1	0.025	0.0025	0.0125	0.021	0.035	0.025	0.0025
2	0.025	0.111	0.017	0.04	0.043	0.043	0.013
3	0.025	0.025	0.025	0.025	0.14	0.15	0.025
4	0.025	0.025	0.025	0.025	0.025	0.025	0.23
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12							
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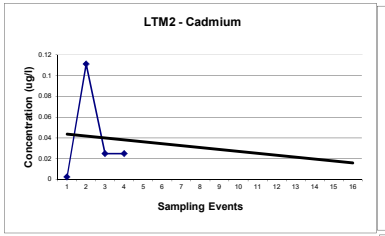
15							
16							

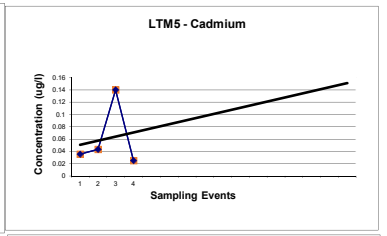
Data Entry Cell
Inferred Data
Concentration less than RDL

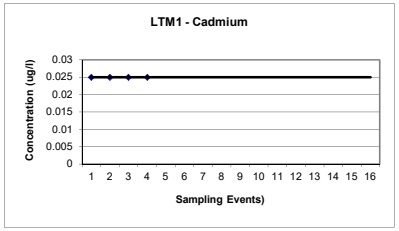
Mann-Kendall Results

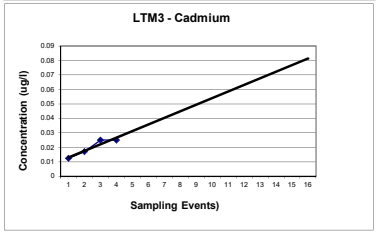
0-4 Event Evaluation

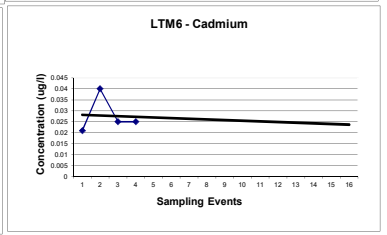
LTM1	Stable/No Trend
LTM2	Stable/No Trend
LTM3	Increasing
LTM4	Stable/No Trend
LTM5	Stable/No Trend
LTM6	Stable/No Trend
LTM7	Increasing

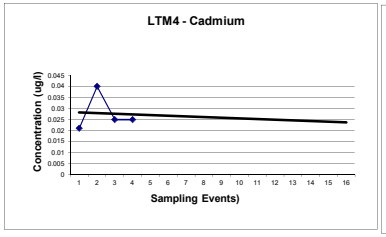


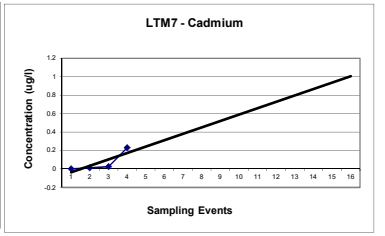












Notes:
1- Values below detection limits were included as one quarter (25%) the reported detection limits indicated on the certificate of analyses
2- Sampling Event from LTM1 was not collected and a value equal to the fist event was utilized.
3- The evaluations with 4 events use an "S_{max}" value of 4

Mann Kendall Trend Evaluation

Contaminant: Cobalt

Monitoring Inputs

Event	LTM1	LTM2	LTM3	LTM4	LTM5	LTM6	LTM7
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1	0.5	0.05	0.25	0.05	0.05	0.05	0.05
2	0.5	0.33	0.54	0.05	0.22	0.26	0.56
3	0.125	0.125	0.125	0.125	0.54	0.68	0.125
4	0.125	0.125	0.125	0.125	0.125	0.125	6.8
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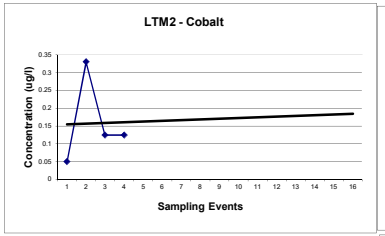
16							

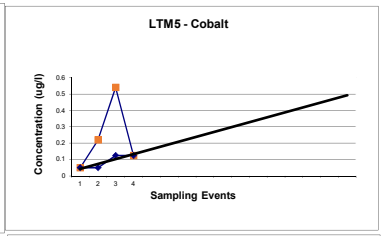
Data Entry Cell
Inferred Data
Concentration less than RDL

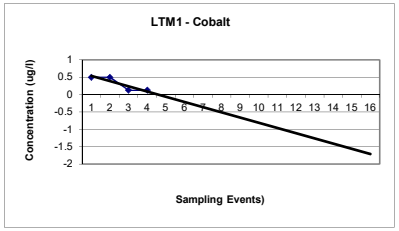
Mann-Kendall Results

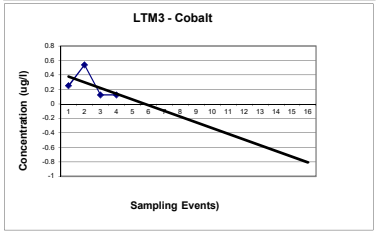
0-4 Event Evaluation

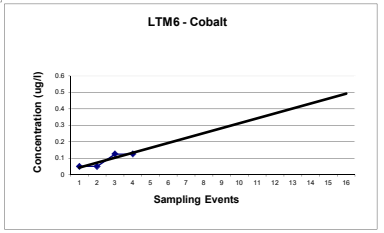
LTM1	Stable/No Trend
LTM2	Stable/No Trend
LTM3	Stable/No Trend
LTM4	Stable/No Trend
LTM5	Stable/No Trend
LTM6	Stable/No Trend
LTM7	Stable/No Trend

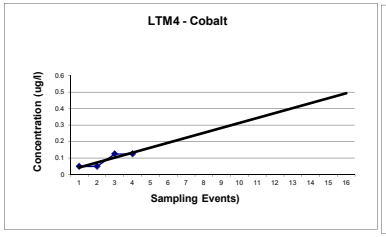


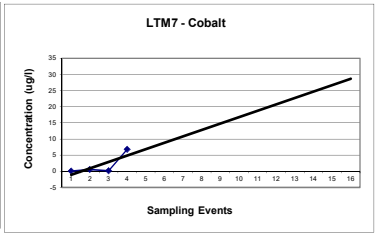












Notes:
1- Values below detection limits were included as one quarter (25%) of the reported detection limits indicated on the certificate of analyses
2- Sampling Event from LTM1 was not collected and a value equal to the fist event was utilized.
3- The evaluations with 4 events use an "S_{max}" value of 4

Mann Kendall Trend Evaluation

Contaminant: Lead

Monitoring Inputs

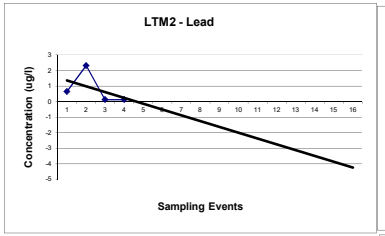
Event	LTM1	LTM2	LTM3	LTM4	LTM5	LTM6	LTM7
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1	0.5	0.64	0.25	0.05	0.26	0.05	0.21
2	0.5	2.31	12.9	0.05	0.05	0.05	0.61
3	0.125	0.125	0.125	0.125	1.8	2.4	0.125
4	0.125	0.125	0.125	0.125	0.125	0.51	11
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

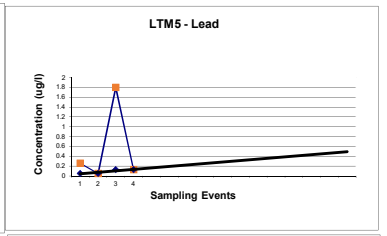
Data Entry Cell
Inferred Data
Concentration less than RDL

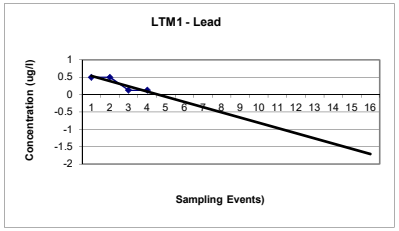
Mann-Kendall Results

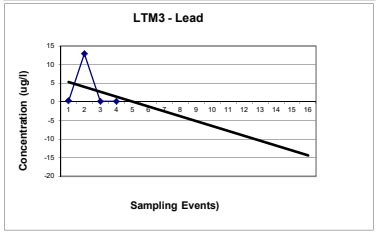
0-4 Event Evaluation

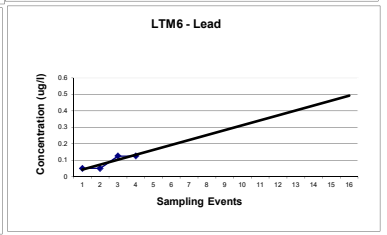
LTM1	Stable/No Trend
LTM2	Stable/No Trend
LTM3	Stable/No Trend
LTM4	Stable/No Trend
LTM5	Stable/No Trend
LTM6	Stable/No Trend
LTM7	Stable/No Trend

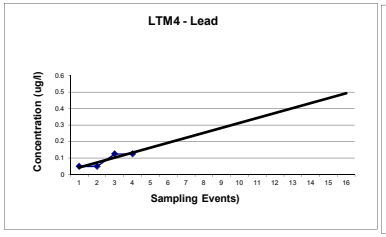


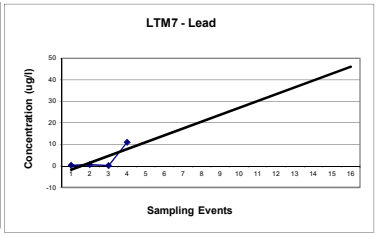












Notes:
1- Values below detection limits were included as one quarter (25%) of the reported detection limits indicated on the certificate of analyses
2- Sampling Event from LTM1 was not collected and a value equal to the fist event was utilized.
3- The evaluations with 4 events use an "S_{max}" value of 4

Mann Kendall Trend Evaluation

Contaminant: Nickel

Monitoring Inputs

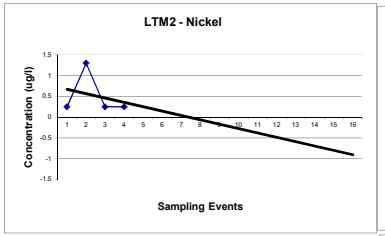
Event	LTM1	LTM2	LTM3	LTM4	LTM5	LTM6	LTM7
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1	2.5	0.25	1.25	0.25	0.25	0.25	0.25
2	2.5	1.3	2.5	0.25	0.25	0.25	1.3
3	0.25	0.25	0.25	0.25	0.25	0.25	0.25
4	0.25	0.25	0.25	0.25	0.25	0.25	4.2
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

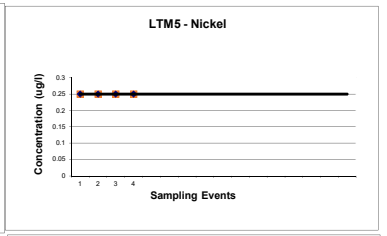
Data Entry Cell
Inferred Data
Concentration less than RDL

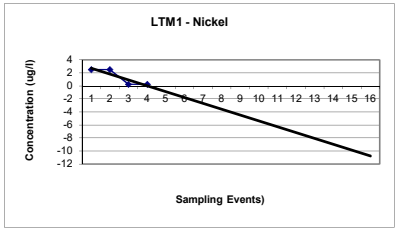
Mann-Kendall Results

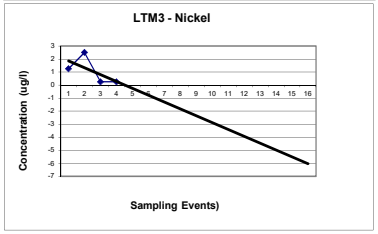
0-4 Event Evaluation

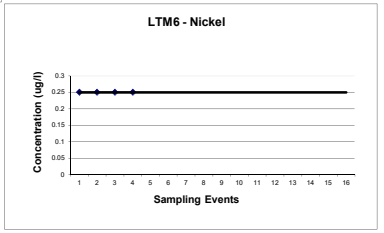
LTM1	Stable/No Trend
LTM2	Stable/No Trend
LTM3	Stable/No Trend
LTM4	Stable/No Trend
LTM5	Stable/No Trend
LTM6	Stable/No Trend
LTM7	Stable/No Trend

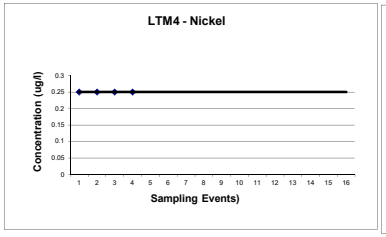


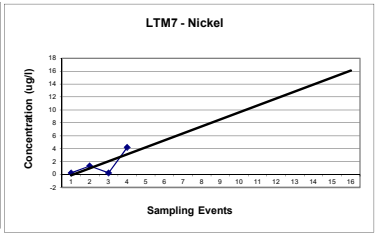












Notes:
1- Values below detection limits were included as one quarter (25%) of the reported detection limits indicated on the certificate of analyses
2- Sampling Event from LTM1 was not collected and a value equal to the fist event was utilized.
3- The evaluations with 4 events use an "S_{max}" value of 4

Mann Kendall Trend Evaluation

Contaminant: Zinc

Monitoring Inputs

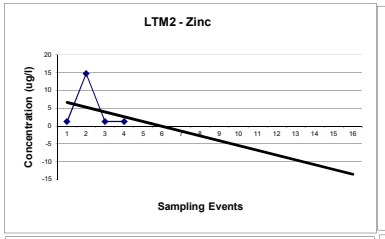
Event	LTM1	LTM2	LTM3	LTM4	LTM5	LTM6	LTM7
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
1	12.5	1.25	68	1.25	5.7	14.4	40.8
2	12.5	14.7	18.4	5.3	28	0.1	223
3	5.6	1.25	1.25	1.25	16	16	57
4	1.25	1.25	1.25	1.25	1.25	1.25	640
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

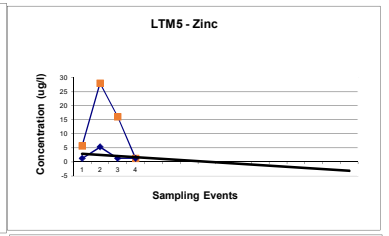
Data Entry Cell
Inferred Data
Concentration less than RDL

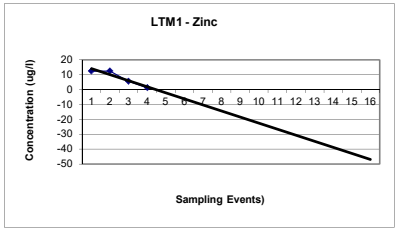
Mann-Kendall Results

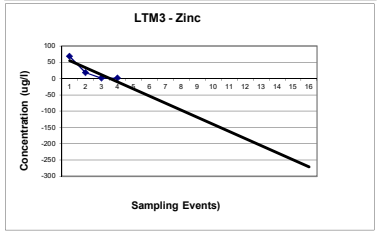
0-4 Event Evaluation

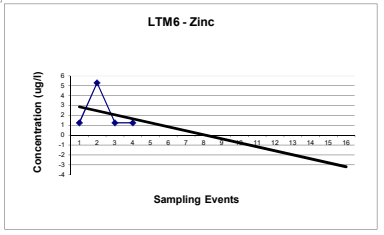
LTM1	Decreasing
LTM2	Stable/No Trend
LTM3	Decreasing
LTM4	Stable/No Trend
LTM5	Stable/No Trend
LTM6	Stable/No Trend
LTM7	Stable/No Trend

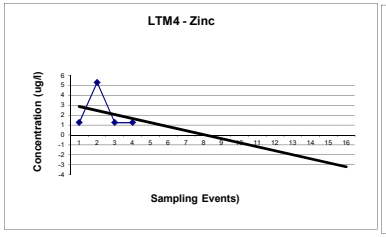


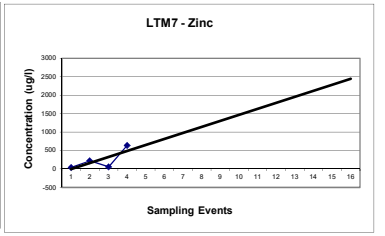












Notes:
1- Values below detection limits were included as one quarter (25%) of the reported detection limits indicated on the certificate of analyses
2- Sampling Event from LTM1 was not collected and a value equal to the fist event was utilized.
3- The evaluations with 4 events use an "S_{max}" value of 4

Appendix C

Site Investigation Report

Iqaluit Former Military Dump – Compliance Monitoring Field Status Report

Field Report		Date: Wednesday August 4, 2019 Consultant Name: DOJV
Author	Jonathan Markiewicz	Project Site/ Name: Iqaluit Former Military Dump – Compliance Monitoring
Distribution		Michael Brownlee, Jason Mauchan, Michael Billowits
Objective		Field Status Report
Reporting Items		
TOPIC		**WORK ACTIVITY AND PROGRESS**
Start and End Time		Tuesday July 30, 2019 – 4:00pm to 10:00pm Wednesday July 31, 2019 - 6:00am to 11:00am
Field Personnel on site		DR: Jonathan Markiewicz
Field Progress		- **Observational Monitoring (Visual, Seepage, and Natural Environment) was completed on July 31, 2019** - No major issues observed, 2x MINOR (< 0.1m in depth, <0.1m in width and <1-m in length) erosion features observed on the slope crest that should be monitored overtime. - No Seepage observed – No Seepage (Soil or Water) samples required - 3/4 Signs were off of their posts, 1 sign found on south slope - Tent located west of the Landfill near Ponds 3 and 4 - **Sampling was completed on July 30 and 31, 2019** - All seven LTM Stations were located - One new supplemental sample location was established - Surface Water quality readings were collected at each location - Surface water and sediment samples were collected at each location - Duplicate samples were collected from LTM Station No. 1. - Samples and equipment were shipped south
Schedule update		- Samples shipped south by priority, received by lab on August 2, 2019, analyses by regular TAT, sample results received in 10-12 business days from July 31, 2019
Health /Safety		Daily Tailgate Completed - Slips and Trips - Carrying Loads over uneven surfaces (used a backback for loads)
Deviations from workplan		- Supplemental sample location #8 was collected further upstream on the ditch due to lack of viable sampling location within the indicated area (refer to attached figure for approximate location -
Notes: Include visitors, Any equipment issues etc		-
Weather & ground cover conditions		July 30 - Afternoon: 10˚C, clear with some clouds Ground clear July 31 - Morning: 3˚C, clear and sunny Ground clear
Lab summary		- Collected 1 Surface Water (SW) and one Sediment (SD) sample from each of the seven LTM stations and one supplemental location - Collected one field duplicate for SW and SD at LTM station 1 and labelled LTM2-DUP-19-SW and LTM2-DUP-19-SD.

Photo 1: Missing sign at south access to the Iqaluit FMD (looking southwest)

Photo 2: Surface water monitoring and Sampling at LTM station 2, Pond 2 (looking north west)

Photo 3: Main Landfill (looking north).

Photo 4: Main landfill crest at centre line.
(looking north)

Photo 5: Main Landfill and missing notification sign.
(looking southeast)

Photo 6: Swale located on south side of the Main Landfill
(looking south west).

Photo 7: Tent located within property boundary and near Ponds 3 and 4. (looking northeast)

Photo 8: Location of Supplemental sample #8. (looking north)

Appendix D

Laboratory Certificates of Analysis and Chain of Custody Forms

Your Project #: P2019-0
Site Location: 1QFMD-CTM
Your C.O.C. #: 729927-01-01, 729927-02-01

Attention: Jonathan Marciewicz

Outcome Consultants Inc.
151 Holland Avenue
Suite 200
Ottawa, ON
CANADA K14 0Y2

Report Date: 2019/08/12
Report #: R5835424
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L4969
Received: 2019/08/02, 13:15

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Petroleum Hydrocarbons F2-F4 in Soil (1, 2)	9	2019/08/08	2019/08/08	CAM SOP-00316	CCME CWS m
F4G (CCME Hydrocarbons Gravimetric) (1)	2	2019/08/12	2019/08/12	CAM SOP-00316	CCME PHC-CWS m
Strong Acid Leachable Metals by ICPMS (1)	8	2019/08/08	2019/08/08	CAM SOP-00447	EPA 6020B m
Strong Acid Leachable Metals by ICPMS (1)	1	2019/08/08	2019/08/09	CAM SOP-00447	EPA 6020B m
Moisture (1)	9	N/A	2019/08/07	CAM SOP-00445	Carter 2nd ed 51.2 m
Polychlorinated Biphenyl in Soil (1)	8	2019/08/08	2019/08/08	CAM SOP-00309	EPA 8082A m
Polychlorinated Biphenyl in Soil (1)	1	2019/08/08	2019/08/09	CAM SOP-00309	EPA 8082A m
Volatile Organic Compounds and F1 PHCs (1)	6	N/A	2019/08/07	CAM SOP-00230	EPA 8260 m
Volatile Organic Compounds and F1 PHCs (1)	3	N/A	2019/08/08	CAM SOP-00230	EPA 8260 m

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Chloride by Automated Colourimetry (1)	9	N/A	2019/08/08	CAM SOP-00463	SM 4500-Cl E m
Free (WAD) Cyanide (1)	9	N/A	2019/08/07	CAM SOP-00457	OMOE E3015 m
Total Cyanide (1)	9	2019/08/07	2019/08/07	CAM SOP-00457	OMOE E3015 5 m
Petroleum Hydro. CCME F1 & BTEX in Water (1)	9	N/A	2019/08/08	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	9	2019/08/08	2019/08/09	CAM SOP-00316	CCME PHC-CWS m
Fluoride (1)	9	2019/08/07	2019/08/08	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3) (1)	9	N/A	2019/08/09	CAM SOP 00102/00408/00447	SM 2340 B
Total Metals Analysis by ICPMS (1)	8	N/A	2019/08/07	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS (1)	1	N/A	2019/08/08	CAM SOP-00447	EPA 6020B m
Total Ammonia-N (1)	9	N/A	2019/08/08	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (1, 3)	9	N/A	2019/08/07	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Polychlorinated Biphenyl in Water (1)	3	2019/08/07	2019/08/07	CAM SOP-00309	EPA 8082A m
Polychlorinated Biphenyl in Water (1)	6	2019/08/07	2019/08/08	CAM SOP-00309	EPA 8082A m
pH (1)	9	2019/08/07	2019/08/08	CAM SOP-00413	SM 4500H+ B m
Sulphate by Automated Colourimetry (1)	9	N/A	2019/08/08	CAM SOP-00464	EPA 375.4 m
Sulphide (1)	9	N/A	2019/08/09	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (1)	9	2019/08/08	2019/08/09	CAM SOP-00428	SM 23 2540C m

Your Project #: P2019-0
Site Location: 1QFMD-CTM
Your C.O.C. #: 729927-01-01, 729927-02-01

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Report Date: 2019/08/12
Report #: R5835424
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L4969
Received: 2019/08/02, 13:15

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Low Level Total Suspended Solids (1)	9	2019/08/08	2019/08/09	CAM SOP-00428	SM 23 2540D 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.

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 Bureau Veritas Laboratories Mississauga
(2) All CCME PHC 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.
(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Your Project #: P2019-0
Site Location: 1QFMD-CTM
Your C.O.C. #: 729927-01-01, 729927-02-01

Attention: Jonathan Marciewicz

Outcome Consultants Inc.
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Report Date: 2019/08/12
Report #: R5835424
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L4969
Received: 2019/08/02, 13:15

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sara Singh, B.Sc, Senior Project Manager
Email: Sara.Singh@bvlabs.com
Phone# (905)817-5827
==========
This report has been generated and distributed using a secure automated process.
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.

BV Labs Job #: B9L4969
Report Date: 2019/08/12

Outcome Consultants Inc.
Client Project #: P2019-0
Site Location: 1QFMD-CTM
Sampler Initials: JSM

RESULTS OF ANALYSES OF SOIL

BV Labs ID		KKZ480	KKZ482	KKZ484	KKZ486	KKZ488	KKZ490		
Sampling Date		2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/31	2019/07/31		
COC Number		729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-02-01		
	UNITS	LTM2-SD1-19	LTM2-SD2-19	LTM2-SD3-19	LTM2-SD4-19	LTM2-SD5-19	LTM2-SD6-19	RDL	QC Batch
Inorganics									
Moisture	%	13	11	28	15	52	74	1.0	6267904

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		KKZ492	KKZ494	KKZ496		
Sampling Date		2019/07/30	2019/07/31	2019/07/30		
COC Number		729927-02-01	729927-02-01	729927-02-01		
	UNITS	LTM2-SD7-19	LTM2-SD8-19	LTM2-DUP-19-SD	RDL	QC Batch
Inorganics						
Moisture	%	33	31	14	1.0	6267904

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.bvlabs.com

BV Labs Job #: B9L4969
Report Date: 2019/08/12

Outcome Consultants Inc.
Client Project #: P2019-0
Site Location: 1QFMD-CTM
Sampler Initials: JSM

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		KKZ480	KKZ482	KKZ482	KKZ484	KKZ486	KKZ488		
Sampling Date		2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/31		
COC Number		729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01		
	UNITS	LTM2-SD1-19	LTM2-SD2-19	LTM2-SD2-19 Lab-Dup	LTM2-SD3-19	LTM2-SD4-19	LTM2-SD5-19	RDL	QC Batch
Metals									
Acid Extractable Arsenic (As)	ug/g	1.2	<1.0	<1.0	2.6	1.6	1.4	1.0	6269709
Acid Extractable Cadmium (Cd)	ug/g	<0.10	<0.10	<0.10	0.13	0.11	0.75	0.10	6269709
Acid Extractable Chromium (Cr)	ug/g	29	24	21	18	15	20	1.0	6269709
Acid Extractable Cobalt (Co)	ug/g	3.6	3.7	3.4	3.7	3.3	5.6	0.10	6269709
Acid Extractable Lead (Pb)	ug/g	3.4	4.7	4.7	23	10	22	1.0	6269709
Acid Extractable Nickel (Ni)	ug/g	6.8	6.3	5.5	6.5	4.9	11	0.50	6269709
Acid Extractable Zinc (Zn)	ug/g	46	35	33	48	49	190	5.0	6269709

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

BV Labs ID		KKZ490	KKZ492	KKZ494	KKZ496		
Sampling Date		2019/07/31	2019/07/30	2019/07/31	2019/07/30		
COC Number		729927-02-01	729927-02-01	729927-02-01	729927-02-01		
	UNITS	LTM2-SD6-19	LTM2-SD7-19	LTM2-SD8-19	LTM2-DUP-19-SD	RDL	QC Batch
Metals							
Acid Extractable Arsenic (As)	ug/g	3.3	<1.0	1.2	1.1	1.0	6269709
Acid Extractable Cadmium (Cd)	ug/g	7.4	0.15	<0.10	<0.10	0.10	6269709
Acid Extractable Chromium (Cr)	ug/g	36	34	19	25	1.0	6269709
Acid Extractable Cobalt (Co)	ug/g	17	5.8	4.4	3.6	0.10	6269709
Acid Extractable Lead (Pb)	ug/g	130	12	11	3.0	1.0	6269709
Acid Extractable Nickel (Ni)	ug/g	16	9.9	7.9	6.2	0.50	6269709
Acid Extractable Zinc (Zn)	ug/g	350	190	140	31	5.0	6269709

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2019/08/12

Outcome Consultants Inc.
Client Project #: P2019-0
Site Location: 1QFMD-CTM
Sampler Initials: JSM

VOLATILE ORGANICS BY GC/MS (SOIL)

BV Labs ID		KKZ480	KKZ480	KKZ482	KKZ484	KKZ486		
Sampling Date		2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/30		
COC Number		729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01		
	UNITS	LTM2-SD1-19	LTM2-SD1-19 Lab-Dup	LTM2-SD2-19	LTM2-SD3-19	LTM2-SD4-19	RDL	QC Batch
Volatile Organics								
Benzene	ug/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0060	6267104
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6267104
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6267104
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6267104
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6267104
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	6267104
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	6267104
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	6267104
Surrogate Recovery (%)								
4-Bromofluorobenzene	%	93	94	92	90	92		6267104
D10-o-Xylene	%	85	80	82	87	86		6267104
D4-1,2-Dichloroethane	%	110	112	113	114	114		6267104
D8-Toluene	%	90	87	90	89	92		6267104

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

BV Labs ID		KKZ488		KKZ490		KKZ492	KKZ494	KKZ496		
Sampling Date		2019/07/31		2019/07/31		2019/07/30	2019/07/31	2019/07/30		
COC Number		729927-01-01		729927-02-01		729927-02-01	729927-02-01	729927-02-01		
	UNITS	LTM2-SD5-19	RDL	LTM2-SD6-19	RDL	LTM2-SD7-19	LTM2-SD8-19	LTM2-DUP-19-SD	RDL	QC Batch
Volatile Organics										
Benzene	ug/g	<0.012	0.012	<0.012	0.012	<0.0060	<0.0060	<0.0060	0.0060	6267104
Ethylbenzene	ug/g	<0.020	0.020	<0.020	0.020	<0.010	<0.010	<0.010	0.010	6267104
Toluene	ug/g	<0.040	0.040	<0.040	0.040	0.043	<0.020	<0.020	0.020	6267104
p+m-Xylene	ug/g	<0.040	0.040	<0.040	0.040	<0.020	<0.020	<0.020	0.020	6267104
o-Xylene	ug/g	<0.040	0.040	<0.040	0.040	<0.020	<0.020	<0.020	0.020	6267104
Total Xylenes	ug/g	<0.040	0.040	<0.040	0.040	<0.020	<0.020	<0.020	0.020	6267104
F1 (C6-C10)	ug/g	<20	20	<40	40	<10	<10	<10	10	6267104
F1 (C6-C10) - BTEX	ug/g	<20	20	<40	40	<10	<10	<10	10	6267104
Surrogate Recovery (%)										
4-Bromofluorobenzene	%	91		92		91	92	89		6267104
D10-o-Xylene	%	87		85		87	88	84		6267104
D4-1,2-Dichloroethane	%	116		116		113	114	112		6267104
D8-Toluene	%	90		90		90	91	91		6267104

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2019/08/12

Outcome Consultants Inc.
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Site Location: 1QFMD-CTM
Sampler Initials: JSM

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		KKZ480	KKZ482	KKZ484	KKZ486		KKZ488		
Sampling Date		2019/07/30	2019/07/30	2019/07/30	2019/07/30		2019/07/31		
COC Number		729927-01-01	729927-01-01	729927-01-01	729927-01-01		729927-01-01		
	UNITS	LTM2-SD1-19	LTM2-SD2-19	LTM2-SD3-19	LTM2-SD4-19	RDL	LTM2-SD5-19	RDL	QC Batch
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	10	71	20	6269411
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	97	<50	50	350	100	6269411
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	53	<50	50	130	100	6269411
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes		Yes		6269411
Surrogate Recovery (%)									
o-Terphenyl	%	91	91	91	92		94		6269411

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		KKZ490			KKZ492	KKZ494		
Sampling Date		2019/07/31			2019/07/30	2019/07/31		
COC Number		729927-02-01			729927-02-01	729927-02-01		
	UNITS	LTM2-SD6-19	RDL	QC Batch	LTM2-SD7-19	LTM2-SD8-19	RDL	QC Batch
F2-F4 Hydrocarbons								
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g				280	170	100	6274357
F2 (C10-C16 Hydrocarbons)	ug/g	1300	30	6269411	<10	<10	10	6269411
F3 (C16-C34 Hydrocarbons)	ug/g	1400	150	6269411	140	200	50	6269411
F4 (C34-C50 Hydrocarbons)	ug/g	490	150	6269411	61	71	50	6269411
Reached Baseline at C50	ug/g	Yes		6269411	No	No		6269411
Surrogate Recovery (%)								
o-Terphenyl	%	92		6269411	94	92		6269411

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		KKZ496		
Sampling Date		2019/07/30		
COC Number		729927-02-01		
	UNITS	LTM2-DUP-19-SD	RDL	QC Batch
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6269411
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6269411
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6269411
Reached Baseline at C50	ug/g	Yes		6269411
Surrogate Recovery (%)				
o-Terphenyl	%	91		6269411

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2019/08/12

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Site Location: 1QFMD-CTM
Sampler Initials: JSM

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

BV Labs ID		KKZ480	KKZ480	KKZ482	KKZ484	KKZ486		
Sampling Date		2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/30		
COC Number		729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01		
	UNITS	LTM2-SD1-19	LTM2-SD1-19 Lab-Dup	LTM2-SD2-19	LTM2-SD3-19	LTM2-SD4-19	RDL	QC Batch
PCBs								
Aroclor 1242	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6269014
Aroclor 1248	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6269014
Aroclor 1254	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6269014
Aroclor 1260	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6269014
Total PCB	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6269014
Surrogate Recovery (%)								
Decachlorobiphenyl	%	96	88	62	88	81		6269014

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

BV Labs ID		KKZ488		KKZ490		KKZ492	KKZ494		
Sampling Date		2019/07/31		2019/07/31		2019/07/30	2019/07/31		
COC Number		729927-01-01		729927-02-01		729927-02-01	729927-02-01		
	UNITS	LTM2-SD5-19	RDL	LTM2-SD6-19	RDL	LTM2-SD7-19	LTM2-SD8-19	RDL	QC Batch
PCBs									
Aroclor 1242	ug/g	<0.020	0.020	<0.40	0.40	<0.020	<0.020	0.020	6269014
Aroclor 1248	ug/g	<0.020	0.020	<0.40	0.40	<0.020	<0.020	0.020	6269014
Aroclor 1254	ug/g	<0.020	0.020	<0.40	0.40	<0.020	<0.020	0.020	6269014
Aroclor 1260	ug/g	0.17	0.020	3.9	0.40	<0.020	<0.020	0.020	6269014
Total PCB	ug/g	0.17	0.020	3.9	0.40	<0.020	<0.020	0.020	6269014
Surrogate Recovery (%)									
Decachlorobiphenyl	%	94		115		78	88		6269014

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: B9L4969
Report Date: 2019/08/12

Outcome Consultants Inc.
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POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

BV Labs ID		KKZ496		
Sampling Date		2019/07/30		
COC Number		729927-02-01		
	UNITS	LTM2-DUP-19-SD	RDL	QC Batch
PCBs				
Aroclor 1242	ug/g	<0.010	0.010	6269014
Aroclor 1248	ug/g	<0.010	0.010	6269014
Aroclor 1254	ug/g	<0.010	0.010	6269014
Aroclor 1260	ug/g	<0.010	0.010	6269014
Total PCB	ug/g	<0.010	0.010	6269014
Surrogate Recovery (%)				
Decachlorobiphenyl	%	82		6269014

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: B9L4969
Report Date: 2019/08/12

Outcome Consultants Inc.
Client Project #: P2019-0
Site Location: 1QFMD-CTM
Sampler Initials: JSM

RESULTS OF ANALYSES OF WATER

BV Labs ID		KKZ479	KKZ481			KKZ481		
Sampling Date		2019/07/30	2019/07/30			2019/07/30		
COC Number		729927-01-01	729927-01-01			729927-01-01		
	UNITS	LTM2-SW1-19	LTM2-SW2-19	RDL	QC Batch	LTM2-SW2-19 Lab-Dup	RDL	QC Batch
Calculated Parameters								
Hardness (CaCO3)	mg/L	300	310	1.0	6266758			
Inorganics								
Total Ammonia-N	mg/L	<0.050	<0.050	0.050	6266897			
Total Dissolved Solids	mg/L	1520	1700	10	6269337			
Fluoride (F-)	mg/L	0.14	0.18	0.10	6267317			
pH	pH	7.24	7.77		6267338			
Total Suspended Solids	mg/L	2	6	1	6269045			
Dissolved Sulphate (SO4)	mg/L	110	110	1.0	6267376			
Sulphide	mg/L	<0.020	<0.020	0.020	6272329			
Total Cyanide (CN)	mg/L	<0.0050	<0.0050	0.0050	6267053	<0.0050	0.0050	6267053
WAD Cyanide (Free)	mg/L	<0.0010	<0.0010	0.0010	6267064	<0.0010	0.0010	6267064
Dissolved Chloride (Cl-)	mg/L	860	890	10	6267373			
Nitrite (N)	mg/L	<0.010	<0.010	0.010	6267354			
Nitrate (N)	mg/L	<0.10	<0.10	0.10	6267354			
Nitrate + Nitrite (N)	mg/L	<0.10	<0.10	0.10	6267354			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: B9L4969
Report Date: 2019/08/12

Outcome Consultants Inc.
Client Project #: P2019-0
Site Location: 1QFMD-CTM
Sampler Initials: JSM

RESULTS OF ANALYSES OF WATER

BV Labs ID		KKZ483		KKZ485			KKZ485		
Sampling Date		2019/07/30		2019/07/30			2019/07/30		
COC Number		729927-01-01		729927-01-01			729927-01-01		
	UNITS	LTM2-SW3-19	RDL	LTM2-SW4-19	RDL	QC Batch	LTM2-SW4-19 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	1000	1.0	440	1.0	6266758			
Inorganics									
Total Ammonia-N	mg/L	<0.050	0.050	<0.050	0.050	6266897			
Total Dissolved Solids	mg/L	5760	20	2630	10	6269337			
Fluoride (F-)	mg/L	0.28	0.10	0.22	0.10	6267317			
pH	pH	8.22		8.37		6267338			
Total Suspended Solids	mg/L	3	1	2	1	6269045			
Dissolved Sulphate (SO4)	mg/L	360	2.0	190	1.0	6267376	190	1.0	6267376
Sulphide	mg/L	<0.020	0.020	<0.020	0.020	6272329			
Total Cyanide (CN)	mg/L	<0.0050	0.0050	<0.0050	0.0050	6267053			
WAD Cyanide (Free)	mg/L	<0.0010	0.0010	<0.0010	0.0010	6267064			
Dissolved Chloride (Cl-)	mg/L	2800	30	1300	15	6267373	1300	15	6267373
Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	6267354	<0.010	0.010	6267354
Nitrate (N)	mg/L	<0.10	0.10	<0.10	0.10	6267354	<0.10	0.10	6267354
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	<0.10	0.10	6267354	<0.10	0.10	6267354

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: B9L4969
Report Date: 2019/08/12

Outcome Consultants Inc.
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Sampler Initials: JSM

RESULTS OF ANALYSES OF WATER

BV Labs ID		KKZ487	KKZ489		KKZ491		KKZ493		
Sampling Date		2019/07/31	2019/07/31		2019/07/30		2019/07/31		
COC Number		729927-01-01	729927-02-01		729927-02-01		729927-02-01		
	UNITS	LTM2-SW5-19	LTM2-SW6-19	RDL	LTM2-SW7-19	RDL	LTM2-SW8-19	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	71	70	1.0	65	1.0	74	1.0	6266758
Inorganics									
Total Ammonia-N	mg/L	0.058	0.077	0.050	0.25	0.050	0.42	0.050	6266897
Total Dissolved Solids	mg/L	110	85	10	95	10	115	10	6269337
Fluoride (F-)	mg/L	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	6267317
pH	pH	7.70	7.59		7.22		7.19		6267338
Total Suspended Solids	mg/L	5	42	1	530	5	12	1	6269045
Dissolved Sulphate (SO4)	mg/L	9.2	5.8	1.0	<1.0	1.0	<1.0	1.0	6267376
Sulphide	mg/L	<0.020	<0.020	0.020	0.067	0.020	<0.020	0.020	6272329
Total Cyanide (CN)	mg/L	<0.0050	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	6267053
WAD Cyanide (Free)	mg/L	<0.0010	<0.0010	0.0010	<0.0010	0.0010	<0.0010	0.0010	6267064
Dissolved Chloride (Cl-)	mg/L	12	5.0	1.0	2.8	1.0	3.2	1.0	6267373
Nitrite (N)	mg/L	<0.010	<0.010	0.010	<0.010	0.010	<0.050	0.050	6267354
Nitrate (N)	mg/L	<0.10	0.31	0.10	0.19	0.10	<0.50	0.50	6267354
Nitrate + Nitrite (N)	mg/L	<0.10	0.31	0.10	0.19	0.10	<0.50	0.50	6267354

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2019/08/12

Outcome Consultants Inc.
Client Project #: P2019-0
Site Location: 1QFMD-CTM
Sampler Initials: JSM

RESULTS OF ANALYSES OF WATER

BV Labs ID		KKZ495		
Sampling Date		2019/07/30		
COC Number		729927-02-01		
	UNITS	LTM2-DUP-19-SW	RDL	QC Batch
Calculated Parameters				
Hardness (CaCO3)	mg/L	280	1.0	6266758
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	6266897
Total Dissolved Solids	mg/L	1410	10	6269337
Fluoride (F-)	mg/L	0.13	0.10	6267317
pH	pH	7.38		6267338
Total Suspended Solids	mg/L	3	1	6269045
Dissolved Sulphate (SO4)	mg/L	110	1.0	6267376
Sulphide	mg/L	<0.020	0.020	6272329
Total Cyanide (CN)	mg/L	<0.0050	0.0050	6267053
WAD Cyanide (Free)	mg/L	<0.0010	0.0010	6267064
Dissolved Chloride (Cl-)	mg/L	790	10	6267373
Nitrite (N)	mg/L	<0.010	0.010	6267354
Nitrate (N)	mg/L	<0.10	0.10	6267354
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	6267354

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		KKZ479	KKZ479	KKZ481	KKZ483	KKZ485	KKZ487		
Sampling Date		2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/31		
COC Number		729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01		
	UNITS	LTM2-SW1-19	LTM2-SW1-19 Lab-Dup	LTM2-SW2-19	LTM2-SW3-19	LTM2-SW4-19	LTM2-SW5-19	RDL	QC Batch
Metals									
Total Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6267310
Total Cadmium (Cd)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6267310
Total Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6267310
Total Cobalt (Co)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6267310
Total Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6267310
Total Nickel (Ni)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6267310
Total Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6267310

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

BV Labs ID		KKZ489	KKZ491	KKZ493	KKZ495		
Sampling Date		2019/07/31	2019/07/30	2019/07/31	2019/07/30		
COC Number		729927-02-01	729927-02-01	729927-02-01	729927-02-01		
	UNITS	LTM2-SW6-19	LTM2-SW7-19	LTM2-SW8-19	LTM2-DUP-19-SW	RDL	QC Batch
Metals							
Total Arsenic (As)	ug/L	<1.0	1.2	<1.0	<1.0	1.0	6267310
Total Cadmium (Cd)	ug/L	<0.10	0.23	<0.10	<0.10	0.10	6267310
Total Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	6267310
Total Cobalt (Co)	ug/L	<0.50	6.8	1.9	<0.50	0.50	6267310
Total Lead (Pb)	ug/L	0.51	11	<0.50	<0.50	0.50	6267310
Total Nickel (Ni)	ug/L	<1.0	4.2	1.1	<1.0	1.0	6267310
Total Zinc (Zn)	ug/L	<5.0	640	7.9	<5.0	5.0	6267310

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		KKZ479	KKZ481	KKZ483	KKZ485	KKZ487	KKZ489		
Sampling Date		2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/31	2019/07/31		
COC Number		729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-02-01		
	UNITS	LTM2-SW1-19	LTM2-SW2-19	LTM2-SW3-19	LTM2-SW4-19	LTM2-SW5-19	LTM2-SW6-19	RDL	QC Batch
BTEX & F1 Hydrocarbons									
Benzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6269148
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6269148
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6269148
o-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6269148
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6269148
Total Xylenes	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6269148
F1 (C6-C10)	ug/L	<25	<25	<25	<25	<25	<25	25	6269148
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	<25	<25	<25	25	6269148
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	<100	<100	<100	100	6269012
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	<200	200	6269012
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	<200	200	6269012
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	Yes	Yes		6269012
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	100	99	100	99	100	100		6269148
4-Bromofluorobenzene	%	101	99	100	100	102	100		6269148
D10-Ethylbenzene	%	99	97	98	97	99	100		6269148
D4-1,2-Dichloroethane	%	96	96	97	96	99	97		6269148
o-Terphenyl	%	99	104	103	103	102	102		6269012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: B9L4969
Report Date: 2019/08/12

Outcome Consultants Inc.
Client Project #: P2019-0
Site Location: 1QFMD-CTM
Sampler Initials: JSM

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		KKZ491	KKZ493	KKZ495		
Sampling Date		2019/07/30	2019/07/31	2019/07/30		
COC Number		729927-02-01	729927-02-01	729927-02-01		
	UNITS	LTM2-SW7-19	LTM2-SW8-19	LTM2-DUP-19-SW	RDL	QC Batch
BTEX & F1 Hydrocarbons						
Benzene	ug/L	<0.20	<0.20	<0.20	0.20	6269148
Toluene	ug/L	1.1	<0.20	<0.20	0.20	6269148
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	0.20	6269148
o-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	6269148
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	6269148
Total Xylenes	ug/L	<0.40	<0.40	<0.40	0.40	6269148
F1 (C6-C10)	ug/L	<25	<25	<25	25	6269148
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	25	6269148
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	100	6269012
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	200	6269012
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	6269012
Reached Baseline at C50	ug/L	Yes	Yes	Yes		6269012
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	100	102	100		6269148
4-Bromofluorobenzene	%	100	102	100		6269148
D10-Ethylbenzene	%	100	101	102		6269148
D4-1,2-Dichloroethane	%	98	98	96		6269148
o-Terphenyl	%	108	103	102		6269012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: B9L4969
Report Date: 2019/08/12

Outcome Consultants Inc.
Client Project #: P2019-0
Site Location: 1QFMD-CTM
Sampler Initials: JSM

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		KKZ479	KKZ479	KKZ481	KKZ483	KKZ485	KKZ487		
Sampling Date		2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/30	2019/07/31		
COC Number		729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01	729927-01-01		
	UNITS	LTM2-SW1-19	LTM2-SW1-19 Lab-Dup	LTM2-SW2-19	LTM2-SW3-19	LTM2-SW4-19	LTM2-SW5-19	RDL	QC Batch
PCBs									
Aroclor 1242	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Aroclor 1248	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Aroclor 1254	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Aroclor 1260	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Total PCB	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Surrogate Recovery (%)									
Decachlorobiphenyl	%	82	83	65	58 (1)	70	79		6267172

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

BV Labs ID		KKZ489	KKZ491	KKZ493	KKZ495		
Sampling Date		2019/07/31	2019/07/30	2019/07/31	2019/07/30		
COC Number		729927-02-01	729927-02-01	729927-02-01	729927-02-01		
	UNITS	LTM2-SW6-19	LTM2-SW7-19	LTM2-SW8-19	LTM2-DUP-19-SW	RDL	QC Batch
PCBs							
Aroclor 1242	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Aroclor 1248	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Aroclor 1254	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Aroclor 1260	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Total PCB	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	6267172
Surrogate Recovery (%)							
Decachlorobiphenyl	%	75	92	79	82		6267172

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.7°C
Package 2	9.7°C
Package 3	11.0°C
Package 4	9.3°C

PCB Analysis: Detection limits for some samples were adjusted for high moisture content.

Sample KKZ488 [LTM2-SD5-19] : VOCF1 Analysis: Detection limits were raised due to high moisture content of soil provided.

Sample KKZ490 [LTM2-SD6-19] : VOCF1 Analysis: Detection limits were raised due to high moisture content of soil provided.

PCB Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Sample KKZ493 [LTM2-SW8-19] : Nitrite/Nitrate: Due to colour interferences, sample required dilution. Detection limit was adjusted accordingly.

Results relate only to the items tested.

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BV Labs Job #: B9L4969
Report Date: 2019/08/12

QUALITY ASSURANCE REPORT

Outcome Consultants Inc.
Client Project #: P2019-0
Site Location: 1QFMD-CTM
Sampler Initials: JSM

			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
6267104	4-Bromofluorobenzene	2019/08/07	104	60 - 140	105	60 - 140	93	%				
6267104	D10-o-Xylene	2019/08/07	99	60 - 130	97	60 - 130	86	%				
6267104	D4-1,2-Dichloroethane	2019/08/07	101	60 - 140	103	60 - 140	108	%				
6267104	D8-Toluene	2019/08/07	106	60 - 140	106	60 - 140	90	%				
6267172	Decachlorobiphenyl	2019/08/07	99	60 - 130	88	60 - 130	80	%				
6269012	o-Terphenyl	2019/08/09	99	60 - 130	106	60 - 130	102	%				
6269014	Decachlorobiphenyl	2019/08/08	95	60 - 130	76	60 - 130	82	%				
6269148	1,4-Difluorobenzene	2019/08/08	101	70 - 130	102	70 - 130	99	%				
6269148	4-Bromofluorobenzene	2019/08/08	100	70 - 130	101	70 - 130	100	%				
6269148	D10-Ethylbenzene	2019/08/08	98	70 - 130	96	70 - 130	96	%				
6269148	D4-1,2-Dichloroethane	2019/08/08	99	70 - 130	101	70 - 130	98	%				
6269411	o-Terphenyl	2019/08/08	92	60 - 130	93	60 - 130	95	%				
6266897	Total Ammonia-N	2019/08/08	101	75 - 125	102	80 - 120	<0.050	mg/L	NC	20		
6267053	Total Cyanide (CN)	2019/08/07	98	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20		
6267064	WAD Cyanide (Free)	2019/08/07	98	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20		
6267104	Benzene	2019/08/07	94	60 - 140	94	60 - 130	<0.0060	ug/g	NC	50		
6267104	Ethylbenzene	2019/08/07	87	60 - 140	86	60 - 130	<0.010	ug/g	NC	50		
6267104	F1 (C6-C10) - BTEX	2019/08/07					<10	ug/g	NC	30		
6267104	F1 (C6-C10)	2019/08/07	94	60 - 140	91	80 - 120	<10	ug/g	NC	30		
6267104	o-Xylene	2019/08/07	94	60 - 140	93	60 - 130	<0.020	ug/g	NC	50		
6267104	p+m-Xylene	2019/08/07	94	60 - 140	93	60 - 130	<0.020	ug/g	NC	50		
6267104	Toluene	2019/08/07	90	60 - 140	89	60 - 130	<0.020	ug/g	NC	50		
6267104	Total Xylenes	2019/08/07					<0.020	ug/g	NC	50		
6267172	Aroclor 1242	2019/08/07					<0.05	ug/L	NC	30		
6267172	Aroclor 1248	2019/08/07					<0.05	ug/L	NC	30		
6267172	Aroclor 1254	2019/08/07					<0.05	ug/L	NC	30		
6267172	Aroclor 1260	2019/08/07	91	60 - 130	75	60 - 130	<0.05	ug/L	NC	30		
6267172	Total PCB	2019/08/07	91	60 - 130	75	60 - 130	<0.05	ug/L	NC	40		
6267310	Total Arsenic (As)	2019/08/07	108	80 - 120	104	80 - 120	<1.0	ug/L	NC	20		
6267310	Total Cadmium (Cd)	2019/08/07	109	80 - 120	106	80 - 120	<0.10	ug/L	NC	20		
6267310	Total Chromium (Cr)	2019/08/07	105	80 - 120	103	80 - 120	<5.0	ug/L	NC	20		
6267310	Total Cobalt (Co)	2019/08/07	103	80 - 120	102	80 - 120	<0.50	ug/L	NC	20		

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QUALITY ASSURANCE REPORT(CONT'D)

			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
6267310	Total Lead (Pb)	2019/08/07	101	80 - 120	102	80 - 120	<0.50	ug/L	NC	20		
6267310	Total Nickel (Ni)	2019/08/07	101	80 - 120	100	80 - 120	<1.0	ug/L	NC	20		
6267310	Total Zinc (Zn)	2019/08/07	105	80 - 120	107	80 - 120	<5.0	ug/L	NC	20		
6267317	Fluoride (F-)	2019/08/08	99	80 - 120	99	80 - 120	<0.10	mg/L	NC	20		
6267338	pH	2019/08/08			102	98 - 103			0.11	N/A		
6267354	Nitrate (N)	2019/08/07	100	80 - 120	102	80 - 120	<0.10	mg/L	NC	20		
6267354	Nitrite (N)	2019/08/07	104	80 - 120	100	80 - 120	<0.010	mg/L	NC	20		
6267373	Dissolved Chloride (Cl-)	2019/08/08	NC	80 - 120	103	80 - 120	<1.0	mg/L	0.018	20		
6267376	Dissolved Sulphate (SO4)	2019/08/08	NC	75 - 125	99	80 - 120	<1.0	mg/L	0.40	20		
6267904	Moisture	2019/08/07							0	20		
6269012	F2 (C10-C16 Hydrocarbons)	2019/08/09	108	50 - 130	109	60 - 130	<100	ug/L	NC	30		
6269012	F3 (C16-C34 Hydrocarbons)	2019/08/09	109	50 - 130	121	60 - 130	<200	ug/L	NC	30		
6269012	F4 (C34-C50 Hydrocarbons)	2019/08/09	115	50 - 130	127	60 - 130	<200	ug/L	NC	30		
6269014	Aroclor 1242	2019/08/08					<0.010	ug/g	NC	50		
6269014	Aroclor 1248	2019/08/08					<0.010	ug/g	NC	50		
6269014	Aroclor 1254	2019/08/08					<0.010	ug/g	NC	50		
6269014	Aroclor 1260	2019/08/08	108	30 - 130	85	30 - 130	<0.010	ug/g	NC	50		
6269014	Total PCB	2019/08/08	108	30 - 130	85	30 - 130	<0.010	ug/g	NC	50		
6269045	Total Suspended Solids	2019/08/09					<1	mg/L	8.0	25	98	85 - 115
6269148	Benzene	2019/08/08	96	70 - 130	96	70 - 130	<0.20	ug/L	NC	30		
6269148	Ethylbenzene	2019/08/08	93	70 - 130	93	70 - 130	<0.20	ug/L	NC	30		
6269148	F1 (C6-C10) - BTEX	2019/08/08					<25	ug/L	NC	30		
6269148	F1 (C6-C10)	2019/08/08	108	70 - 130	95	70 - 130	<25	ug/L	NC	30		
6269148	o-Xylene	2019/08/08	91	70 - 130	90	70 - 130	<0.20	ug/L	NC	30		
6269148	p+m-Xylene	2019/08/08	94	70 - 130	94	70 - 130	<0.40	ug/L	NC	30		
6269148	Toluene	2019/08/08	92	70 - 130	91	70 - 130	<0.20	ug/L	NC	30		
6269148	Total Xylenes	2019/08/08					<0.40	ug/L	NC	30		
6269337	Total Dissolved Solids	2019/08/09					<10	mg/L	2.8	25	100	90 - 110
6269411	F2 (C10-C16 Hydrocarbons)	2019/08/09	100	50 - 130	101	80 - 120	<10	ug/g	NC	30		
6269411	F3 (C16-C34 Hydrocarbons)	2019/08/09	90	50 - 130	92	80 - 120	<50	ug/g	NC	30		
6269411	F4 (C34-C50 Hydrocarbons)	2019/08/09	88	50 - 130	90	80 - 120	<50	ug/g	NC	30		
6269709	Acid Extractable Arsenic (As)	2019/08/08	91	75 - 125	98	80 - 120	<1.0	ug/g	NC	30		

QUALITY ASSURANCE REPORT(CONT'D)

			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
6269709	Acid Extractable Cadmium (Cd)	2019/08/08	93	75 - 125	101	80 - 120	<0.10	ug/g	NC	30		
6269709	Acid Extractable Chromium (Cr)	2019/08/08	79	75 - 125	96	80 - 120	<1.0	ug/g	15	30		
6269709	Acid Extractable Cobalt (Co)	2019/08/08	91	75 - 125	96	80 - 120	<0.10	ug/g	7.1	30		
6269709	Acid Extractable Lead (Pb)	2019/08/08	94	75 - 125	102	80 - 120	<1.0	ug/g	1.2	30		
6269709	Acid Extractable Nickel (Ni)	2019/08/08	90	75 - 125	97	80 - 120	<0.50	ug/g	13	30		
6269709	Acid Extractable Zinc (Zn)	2019/08/08	NC	75 - 125	94	80 - 120	<5.0	ug/g	5.2	30		
6272329	Sulphide	2019/08/09	92	80 - 120	97	80 - 120	<0.020	mg/L	0	20		
6274357	F4G-sg (Grav. Heavy Hydrocarbons)	2019/08/12	89	65 - 135	101	65 - 135	<100	ug/g				

N/A = Not Applicable

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.

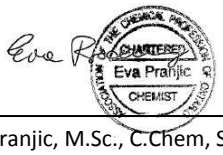
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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).

VALIDATION SIGNATURE PAGE

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

Anastassia Hamanov, Scientific Specialist



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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.

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RUSH!

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CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#34798 Outcome Consultants Inc.	Company Name:		Quotation #:	B84523	BV Labs Job #:	Bottle Order #: 729927
Attention:	Jonathan Marciewicz	Attention:	Jonathan Marciewicz	P.O. #:			
Address:	151 Holland Avenue Suite 200 Ottawa ON K14 0Y2	Address:		Project:	P2019-0		
Tel:	(613) 729-2402 Fax:	Tel:	Fax:	Project Name:	IQFMD-LTM	COC #: C#729927-01-01	Project Manager: Sara Singh
Email:	jmarkiewicz@outcomeinc.ca	Email:	jmarkiewicz@outcomeinc.ca	Site #:			
				Sampled By:	JSM		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine	☒ CCME ☐ Sanitary Sewer Bylaw	
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ Reg 558. ☐ Storm Sewer Bylaw	
☐ Table 3 ☐ Agri/Other ☐ For RSC	☐ MISA Municipality	
☐ Table ___	☐ PWQO	
	☐ Other	

Include Criteria on Certificate of Analysis (Y/N)? ____

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

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 such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ____ Time Required: ____ ☐
Rush Confirmation Number: ____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Iqaluit	# of Bottles	Comments
1		LTM2-SW1-19	30/07/19		SW		X	15	
2		LTM2-SD1-19			~~SW~~ SD		X	4	
3		LTM2-SW2-19			SW		X	15	
4		LTM2-SD2-19			~~SW~~ SED		X	4	
5		LTM2-SW3-19			SW		X	15	
6		LTM2-SD3-19			~~SW~~ SED		X	4	
7		LTM2-SW4-19			SW		X	15	
8		LTM2-SD4-19			~~SW~~ SED		X	4	
9		LTM2-SW5-19	31/07/19		SW		X	15	
10		LTM2-SD5-19	"		~~SW~~ SED		X	4	

02-Aug-19 13:15
Sara Singh
B9L4969
DSG ENV-853

F1/BTEX Rushed

See

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	19/07/31	11h00	Kenya Jenkins BV	2019/08/02	13:15			See ACT	Present	✓	
			DIPIKA SINGH	2019/08/03	05:29				Intact		✓

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV 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.

* 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.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

Refer to ACTR

Bureau Veritas Laboratories
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvlabs.com

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#34798 Outcome Consultants Inc.	Company Name:		Quotation #:	B84523	BV Labs Job #:	Bottle Order #: 729927
Attention:	Jonathan Marciewicz	Attention:	Jonathan Marciewicz	P.O. #:			
Address:	151 Holland Avenue Suite 200 Ottawa ON K14 0Y2	Address:		Project:	P2019-0		
Tel:	(613) 729-2402 Fax:	Tel:	Fax:	Project Name:	TQEMP - LTM	COC #: C#729927-02-01	Project Manager: Sara Singh
Email:	jmarkiewicz@outcomeinc.ca	Email:	jmarkiewicz@outcomeinc.ca	Site #:			
				Sampled By:	JSM		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011): ☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___

Other Regulations: ☒ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558. ☐ Storm Sewer Bylaw ☐ MISA Municipality ☐ PWQO ☐ Other

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

Field Filtered (please circle): Metals / Hg / Cr VI

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

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 such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Iqaluit	# of Bottles	Comments
1		LTM2-SW6-19	31/07/19		SW	X	15	
2		LTM2-SD6-19	"		~~SW~~ SED	X	4	
3		LTM2-SW7-19	30/07/19		SW	X	15	F1/BTEX RUSHED
4		LTM2-SD7-19	"		~~SW~~ SED	X	4	
5		LTM2-SW8-19	31/07/19		SW	X	15	
6		LTM2-SD8-19	"		~~SW~~ SED	X	4	
7		LTM2-DUP-19-SW	30/07/19		SW	X	15	
8		LTM2-DUP-19-SD	"		~~SW~~ SED	X	5	
9								
10								

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Recei	Custody Seal Present	Yes	No
	31/07/19	1700	See Page 1	2019/08/02	13 15			5.0 ACT	Intact	☒	☐

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV 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.

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SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

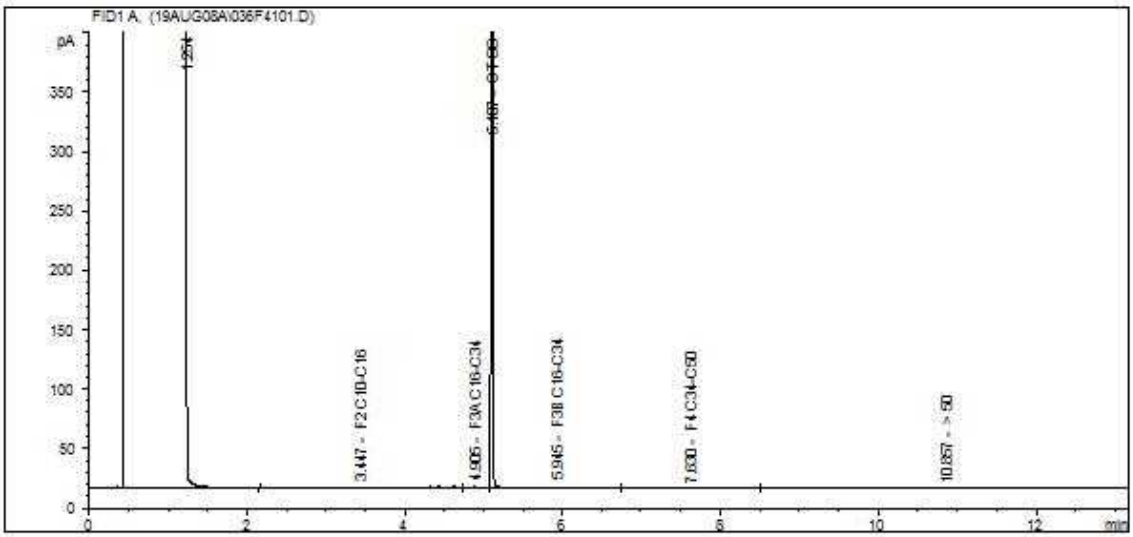
White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

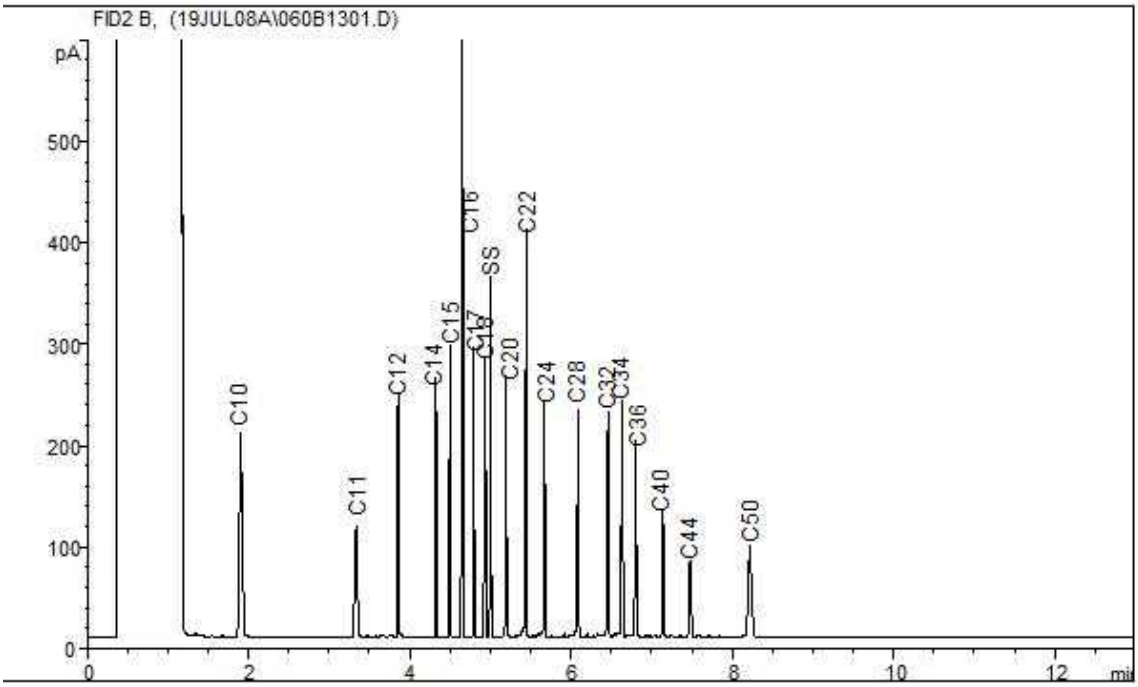
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ479

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SW1-19

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

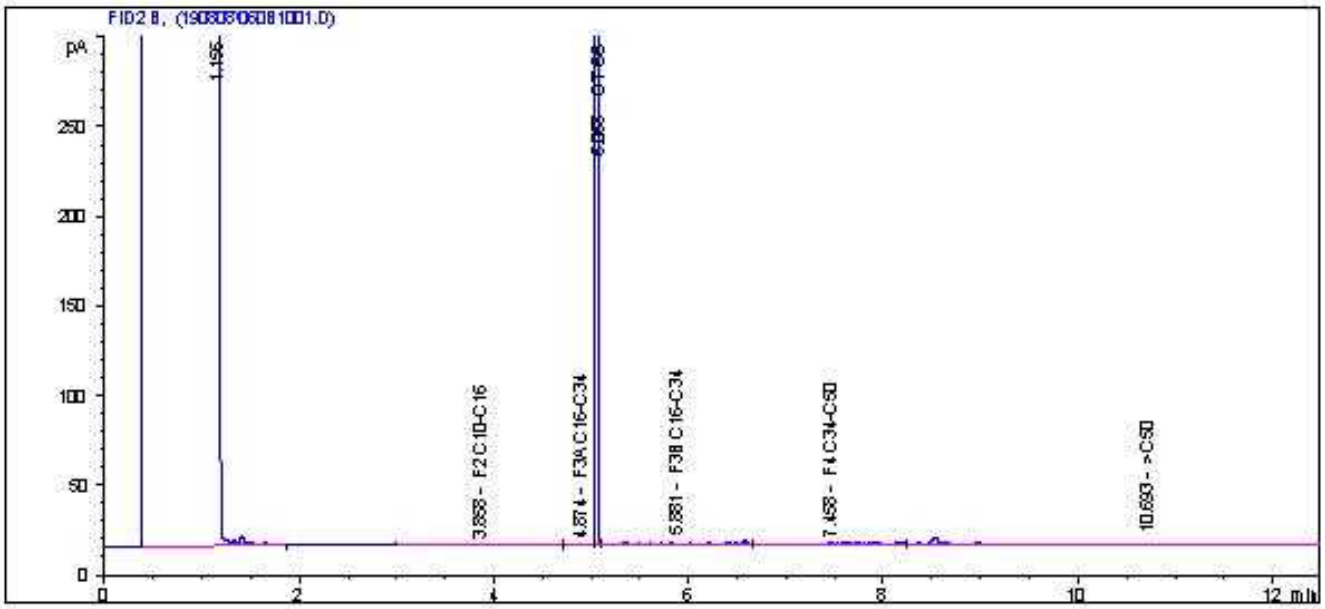
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

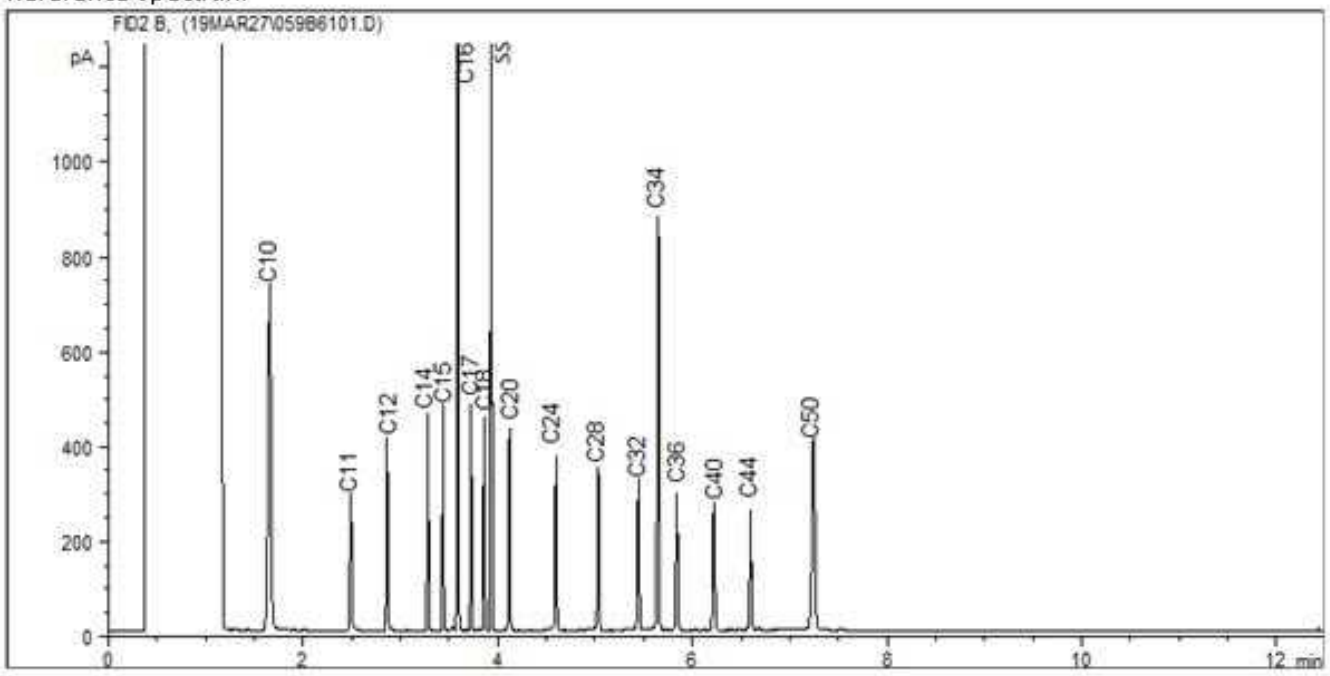
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ480

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SD1-19

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

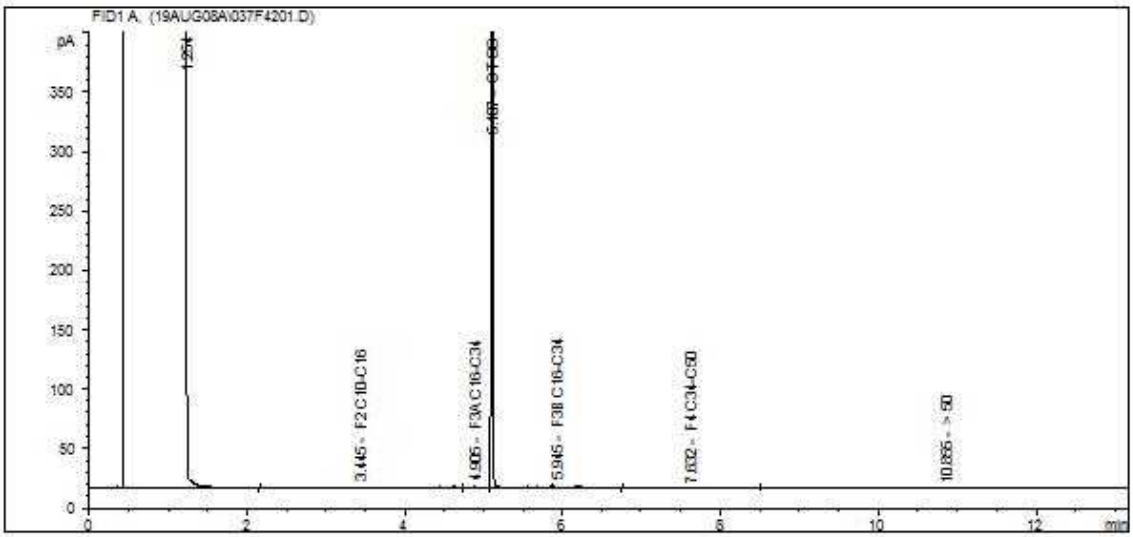
Gasoline: C6 - C12	**Diesel:** C10 - C24	**Jet Fuels: C6 - C16**
Varsol: C8 - C12	**Fuel Oils: C6 - C32**	**Creosote: C10 - C26**
Kerosene: C8 - C16	**Motor Oils: C16 - C50**	**Asphalt: C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

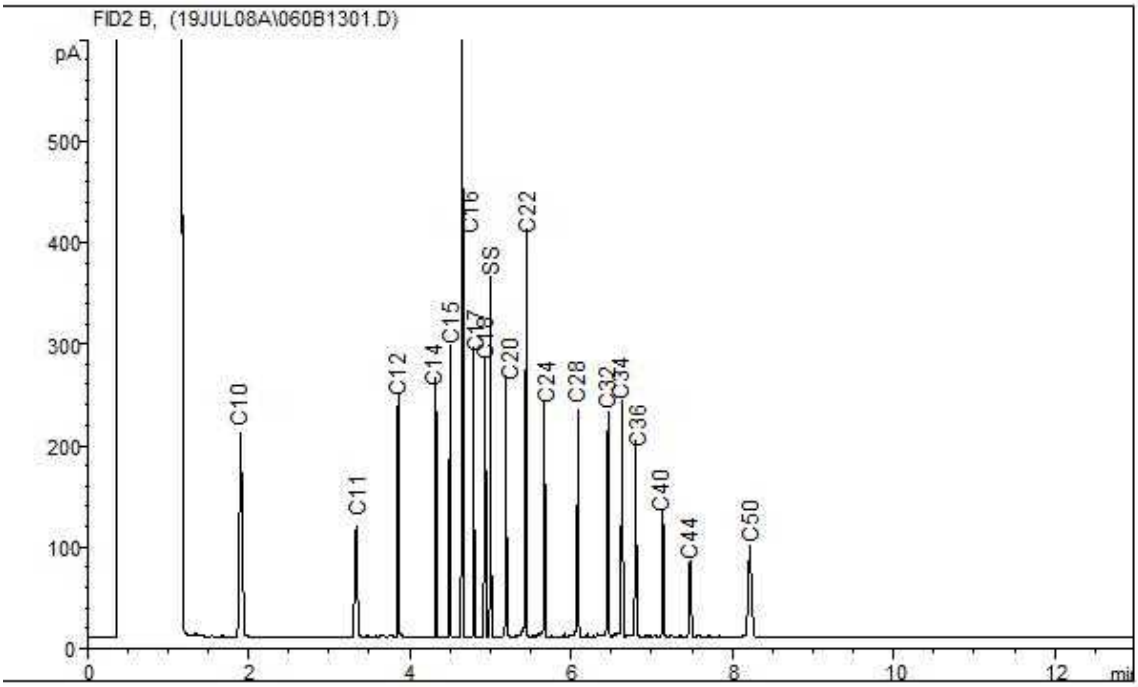
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ481

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SW2-19

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

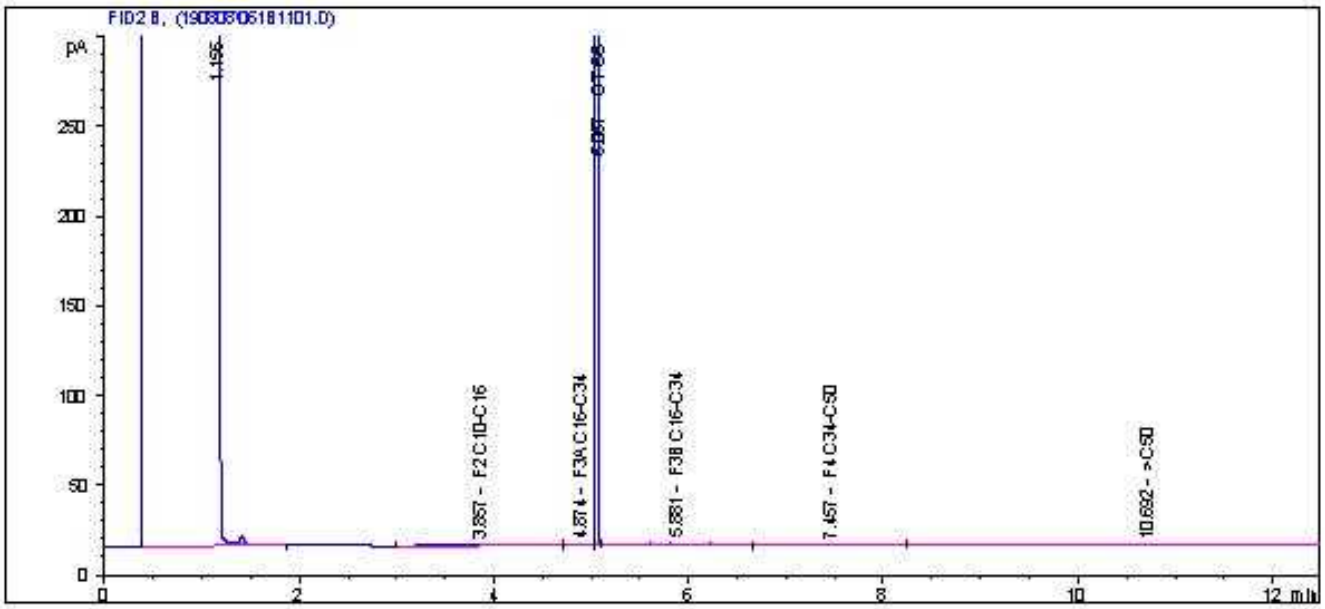
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

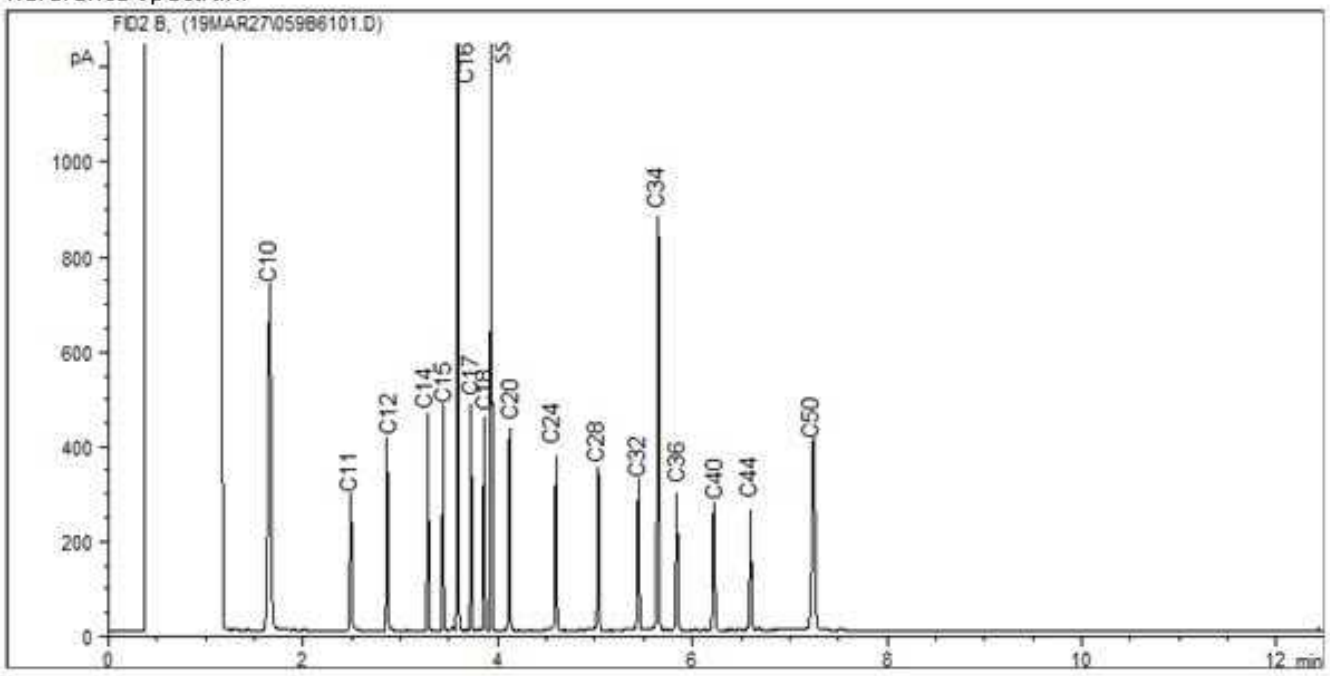
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ482

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SD2-19

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

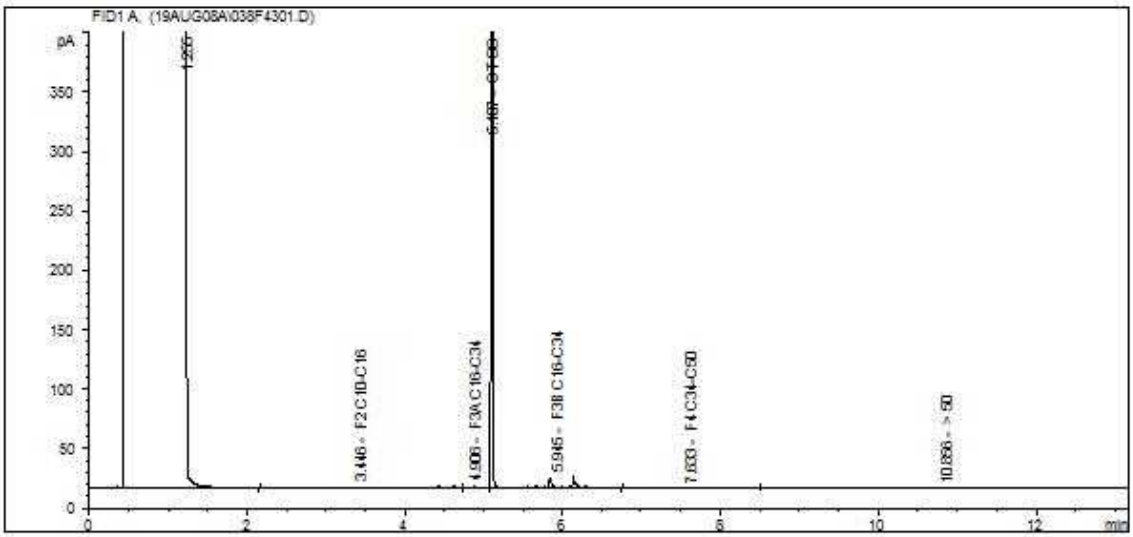
Gasoline: C6 - C12	**Diesel:** C10 - C24	**Jet Fuels: C6 - C16**
Varsol: C8 - C12	**Fuel Oils: C6 - C32**	**Creosote: C10 - C26**
Kerosene: C8 - C16	**Motor Oils: C16 - C50**	**Asphalt: C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

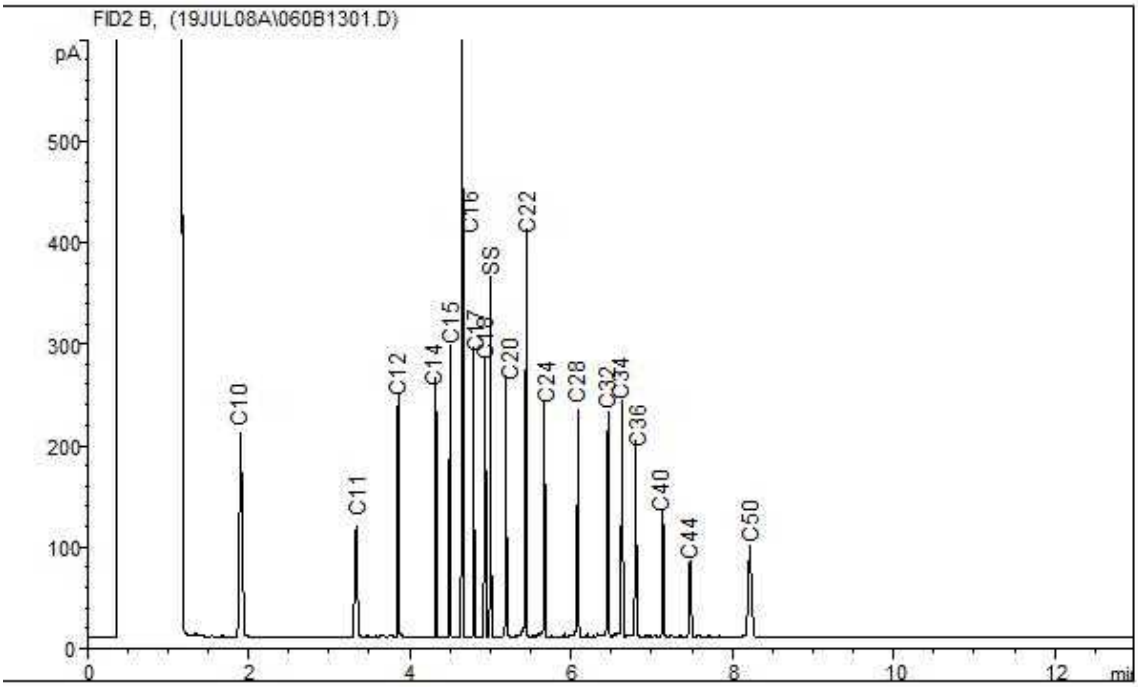
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ483

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SW3-19

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

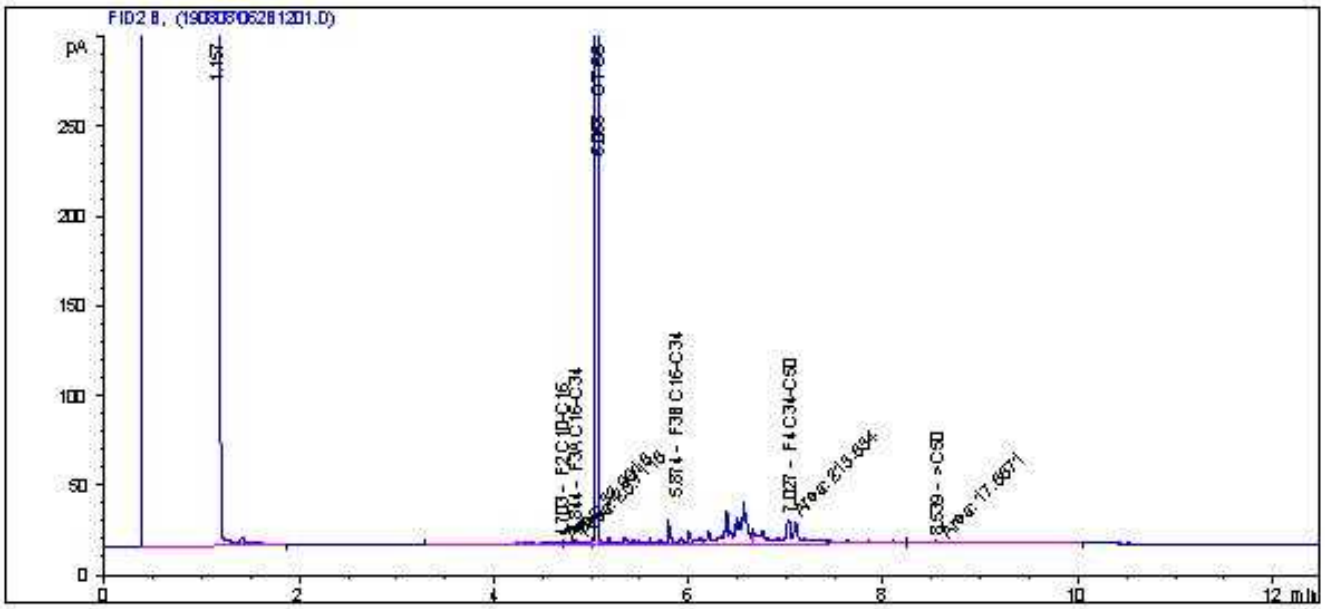
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

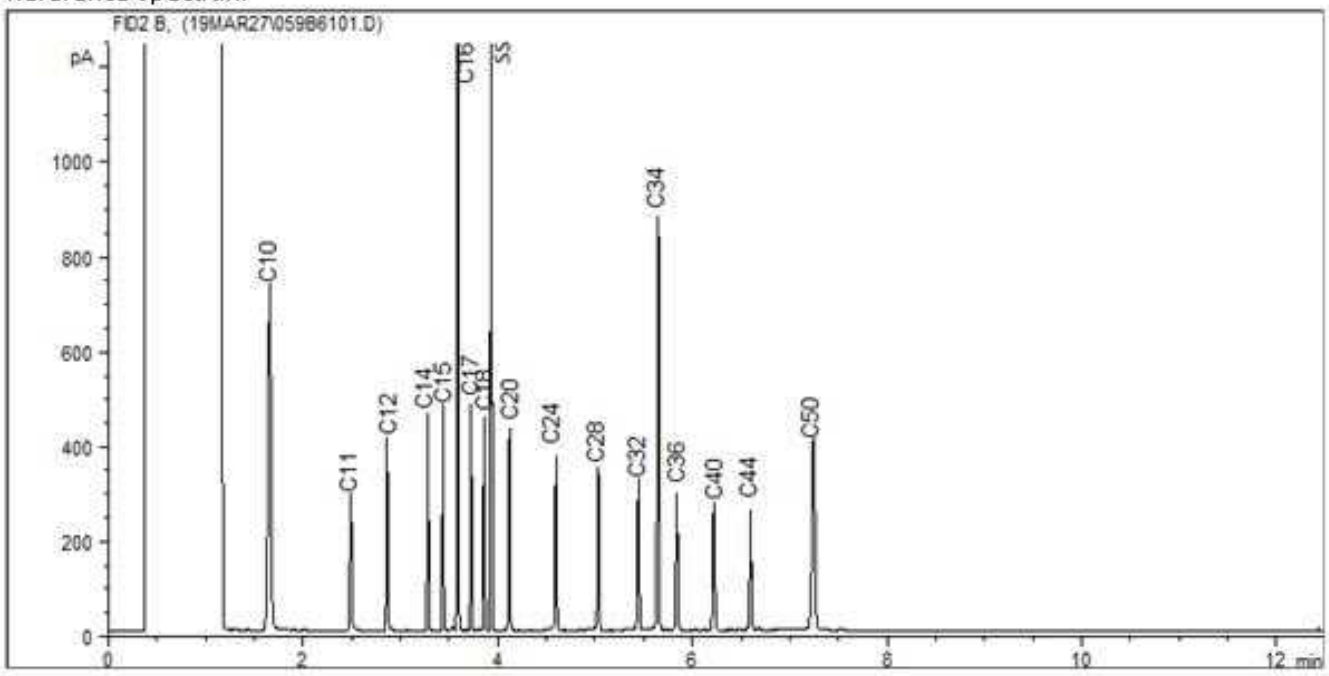
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ484

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SD3-19

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C6 - C12	**Diesel:** C10 - C24	**Jet Fuels: C6 - C16**
Varsol: C8 - C12	**Fuel Oils: C6 - C32**	**Creosote: C10 - C26**
Kerosene: C8 - C16	**Motor Oils: C16 - C50**	**Asphalt: C18 - C50+**

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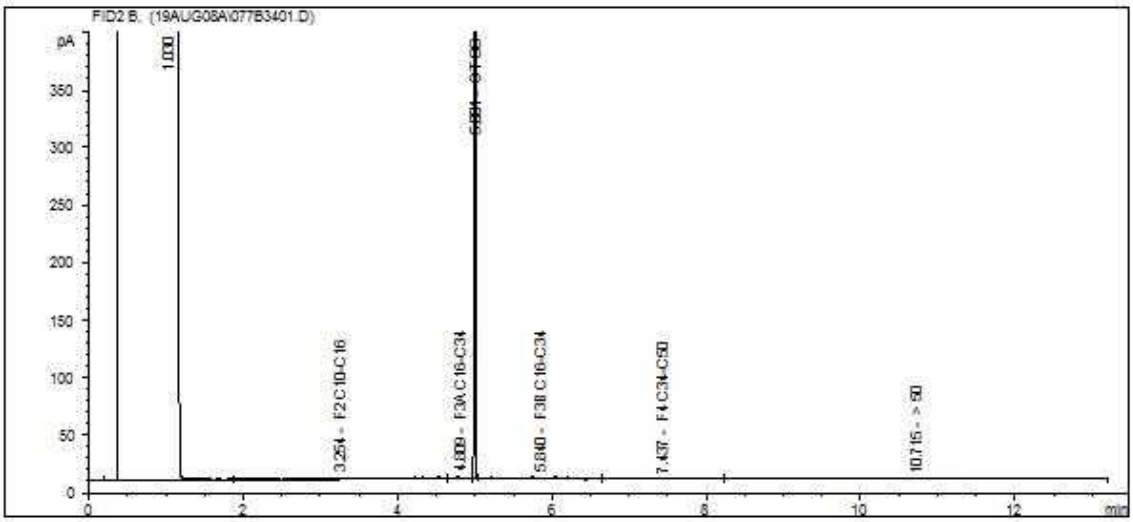
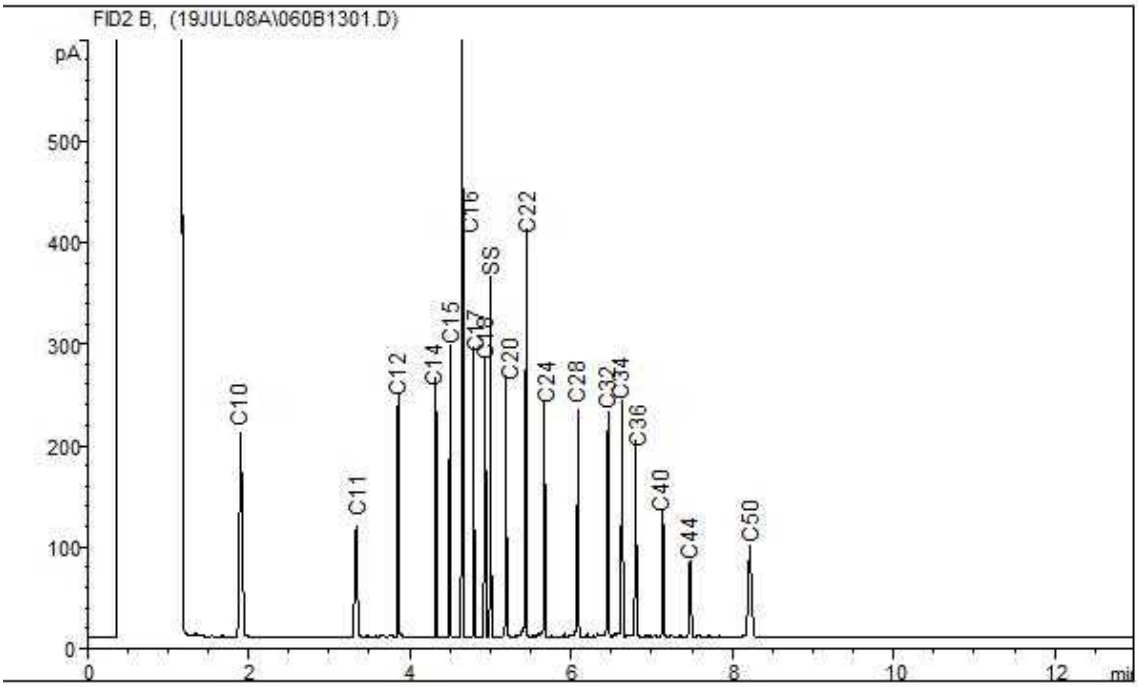
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ485

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SW4-19

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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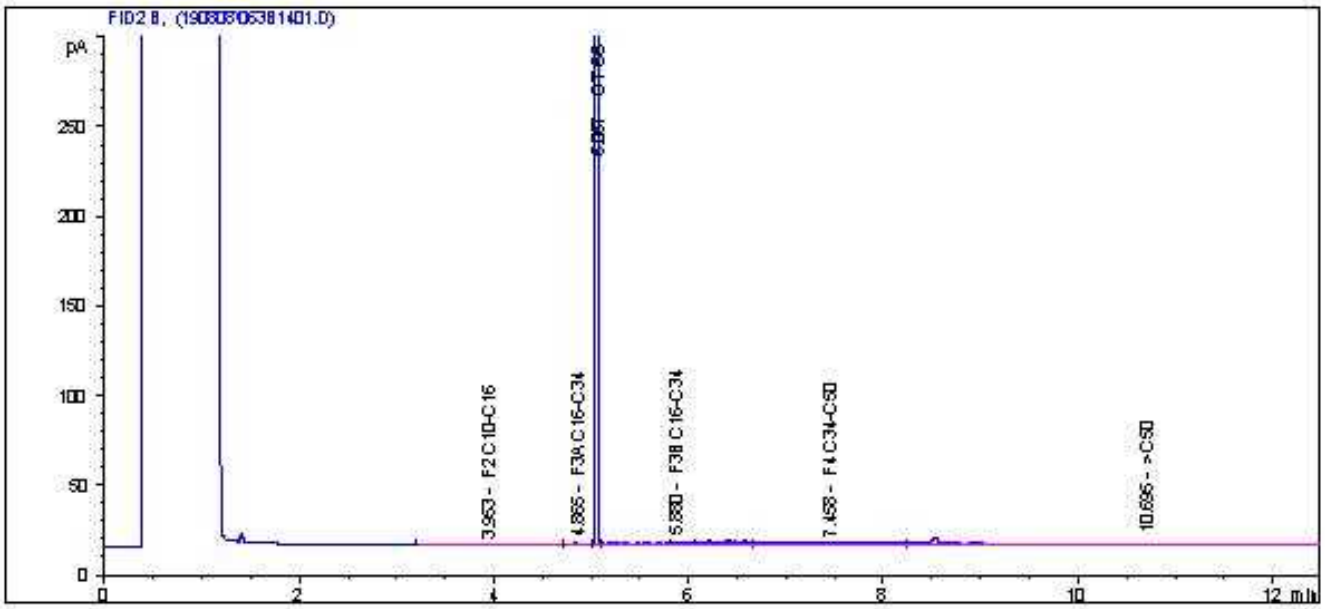
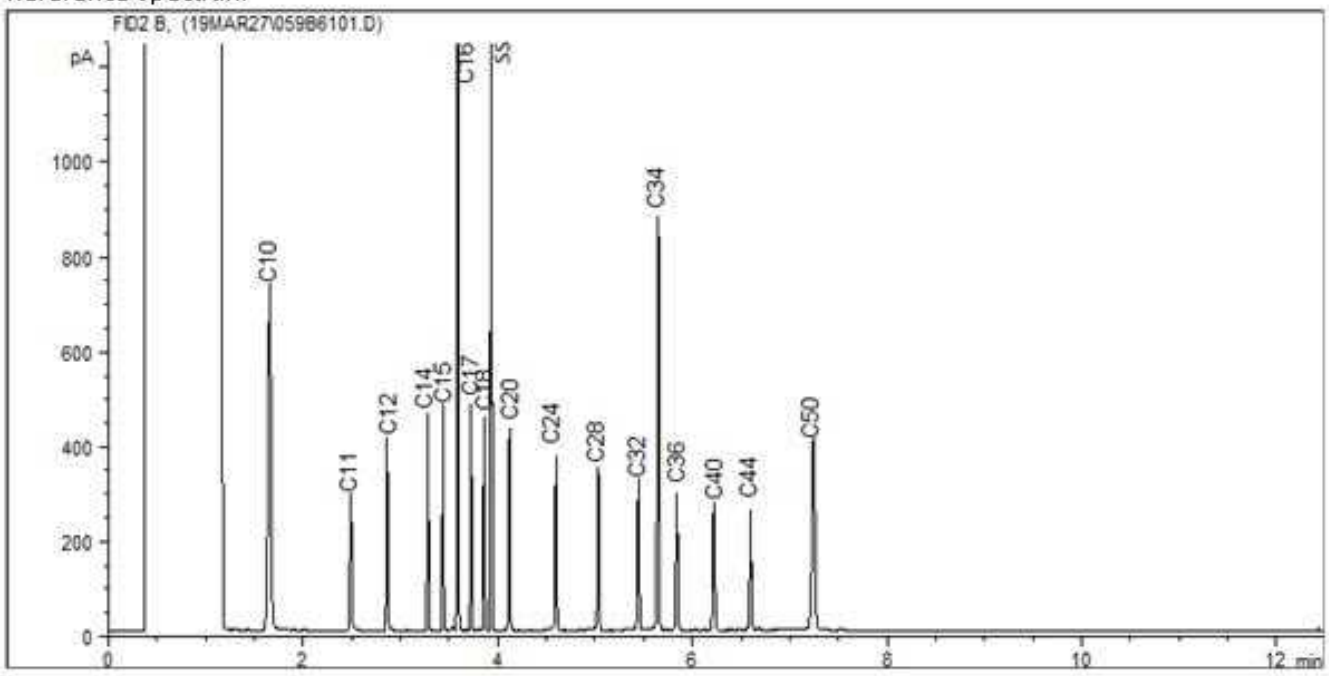
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ486

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SD4-19

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum

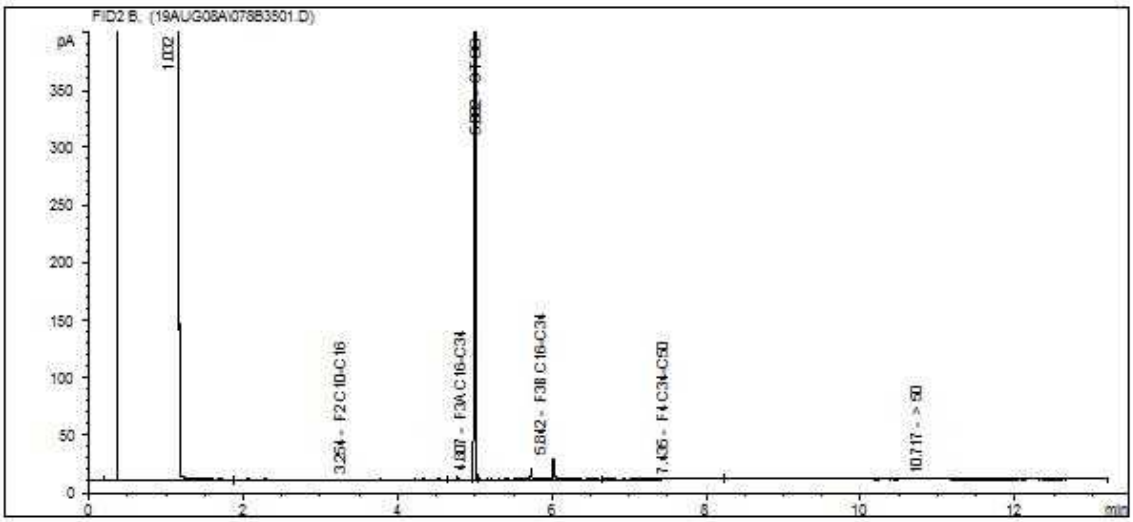


TYPICAL PRODUCT CARBON NUMBER RANGES

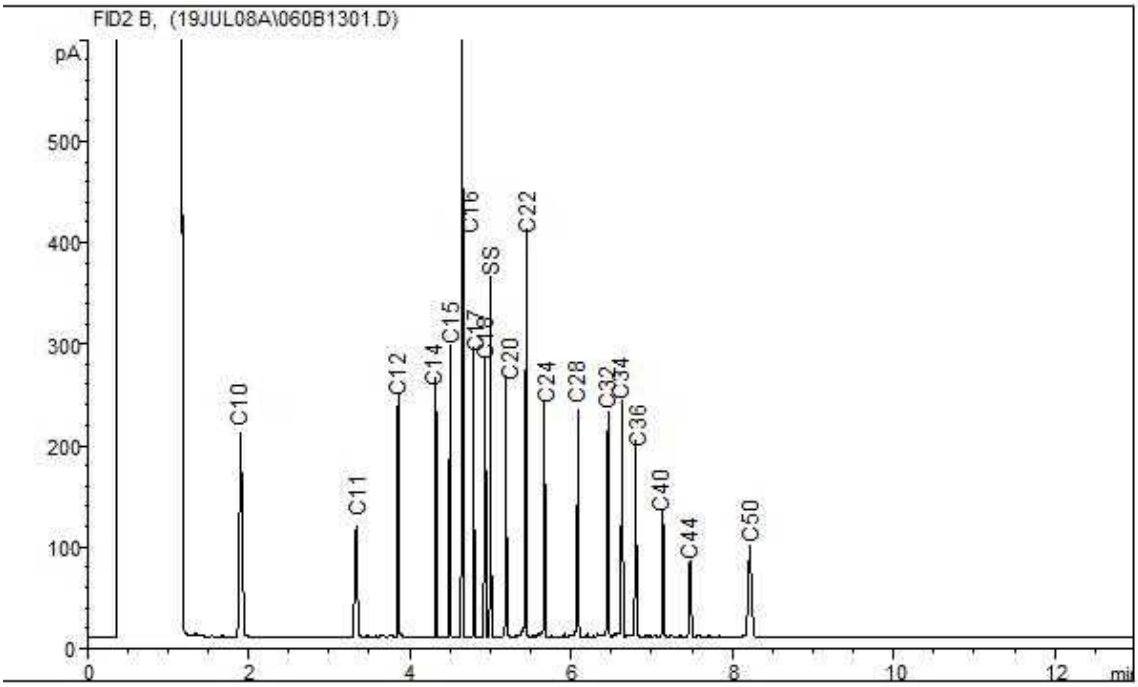
Gasoline: C6 - C12	**Diesel:** C10 - C24	**Jet Fuels: C6 - C16**
Varsol: C8 - C12	**Fuel Oils: C6 - C32**	**Creosote: C10 - C26**
Kerosene: C8 - C16	**Motor Oils: C16 - C50**	**Asphalt: C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

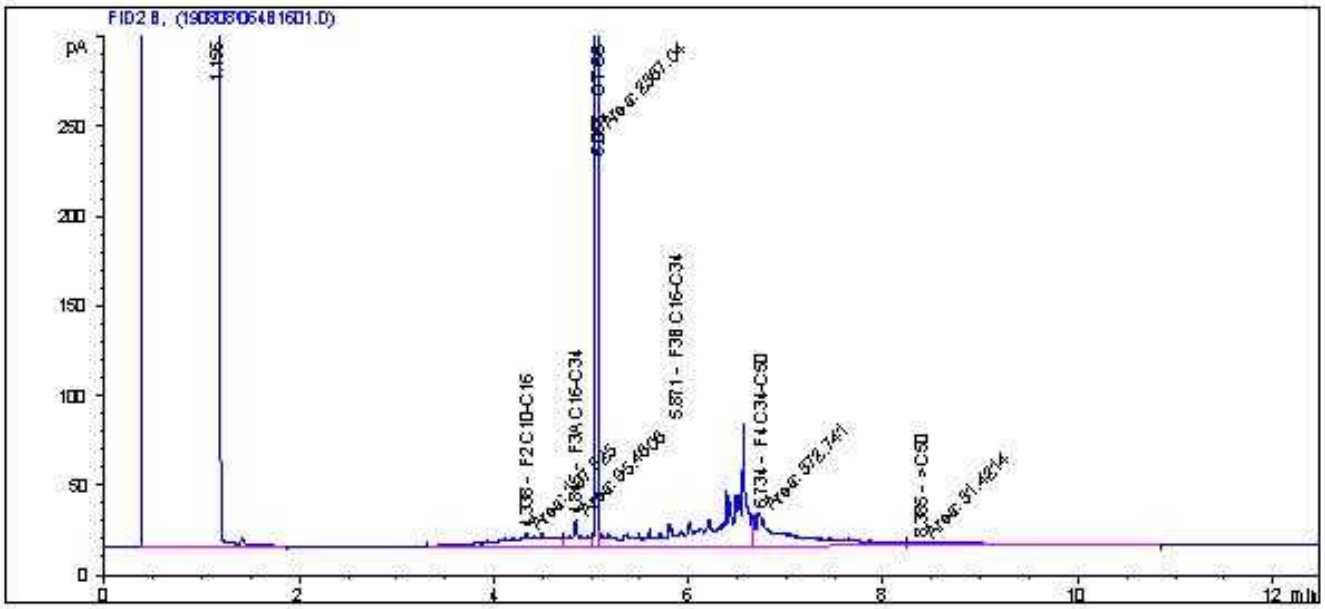
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

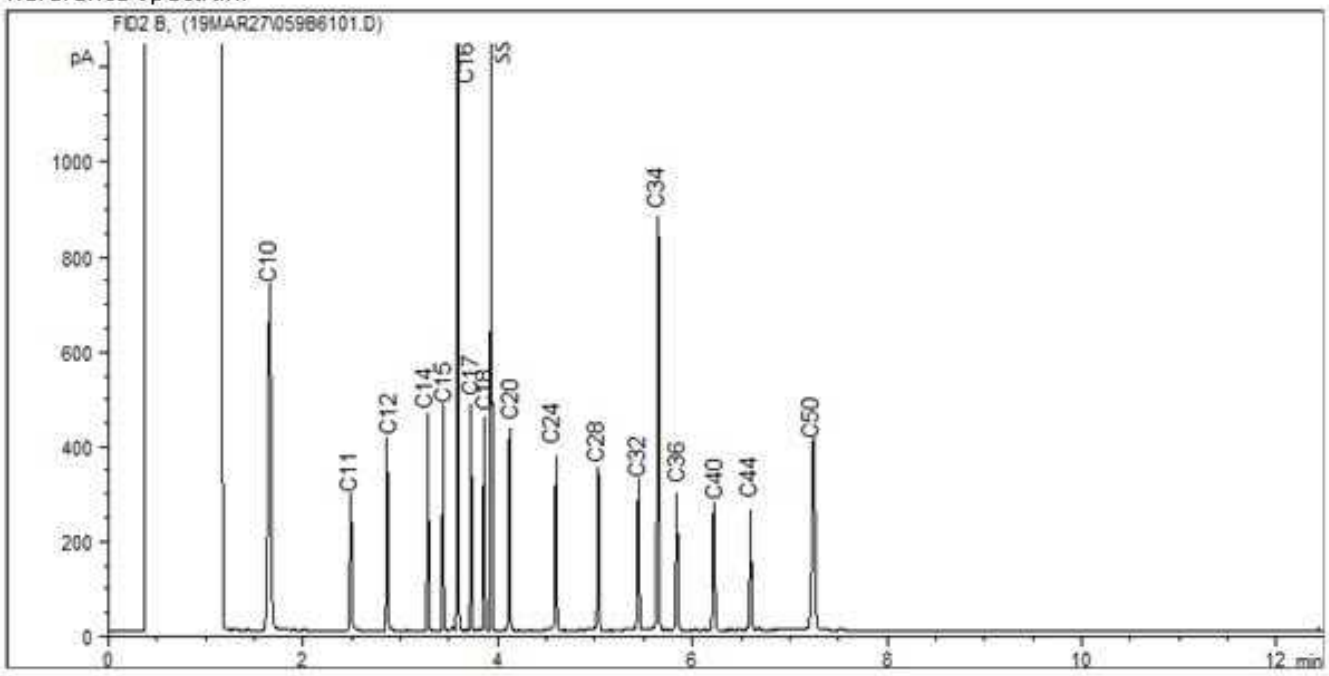
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ488

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SD5-19

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

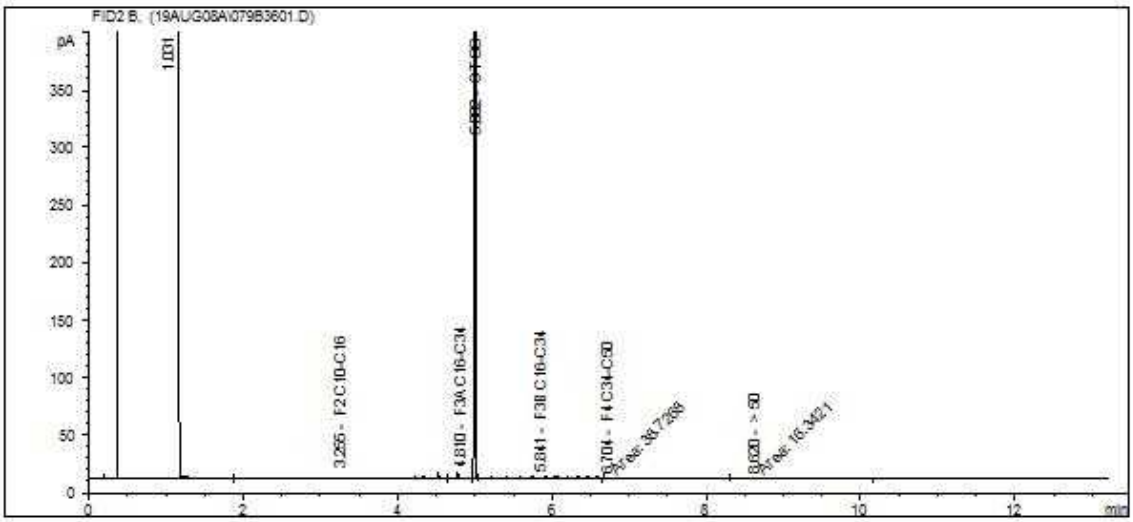
Gasoline: C6 - C12	**Diesel:** C10 - C24	**Jet Fuels: C6 - C16**
Varsol: C8 - C12	**Fuel Oils: C6 - C32**	**Creosote: C10 - C26**
Kerosene: C8 - C16	**Motor Oils: C16 - C50**	**Asphalt: C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

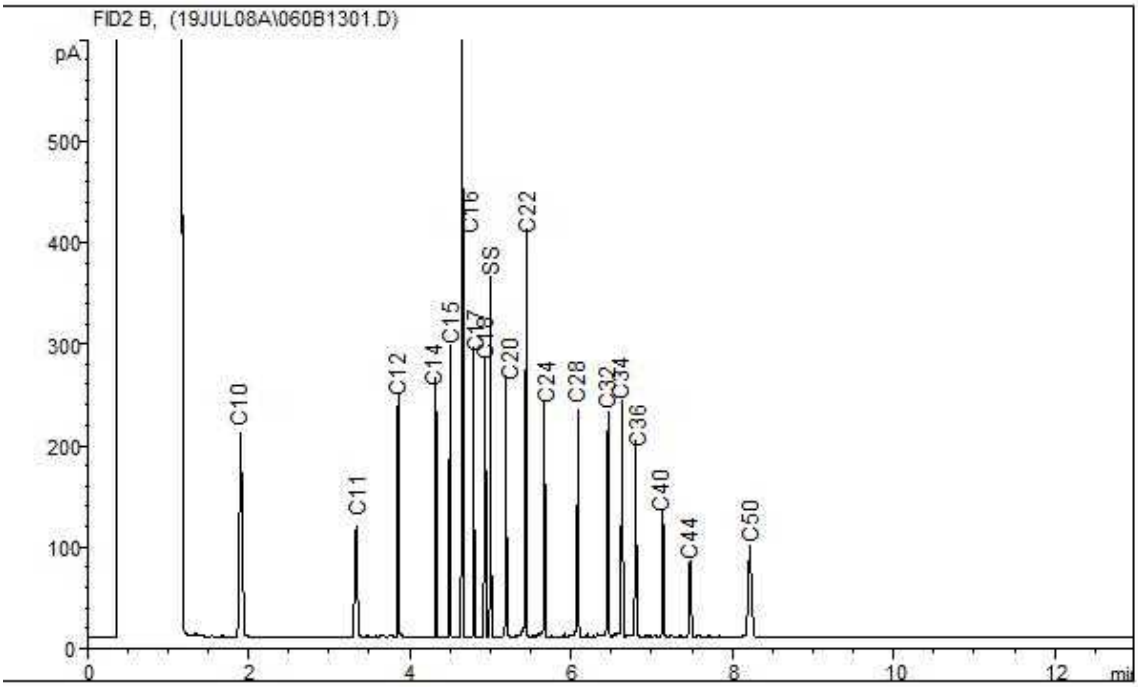
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ489

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SW6-19

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

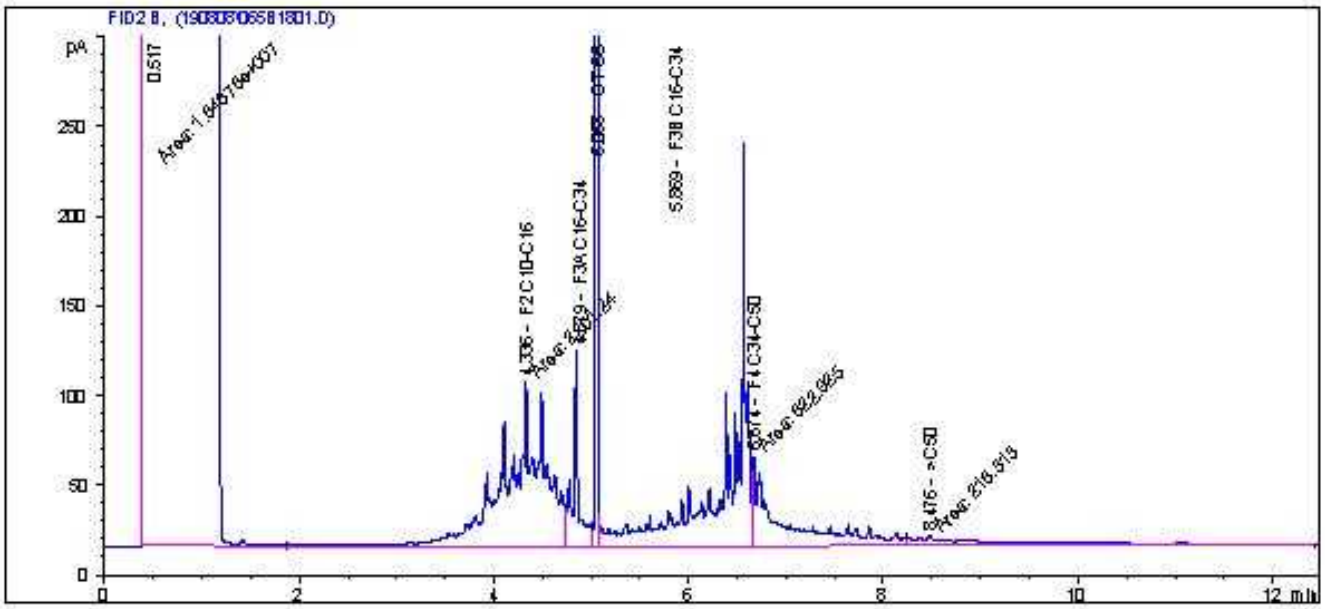
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

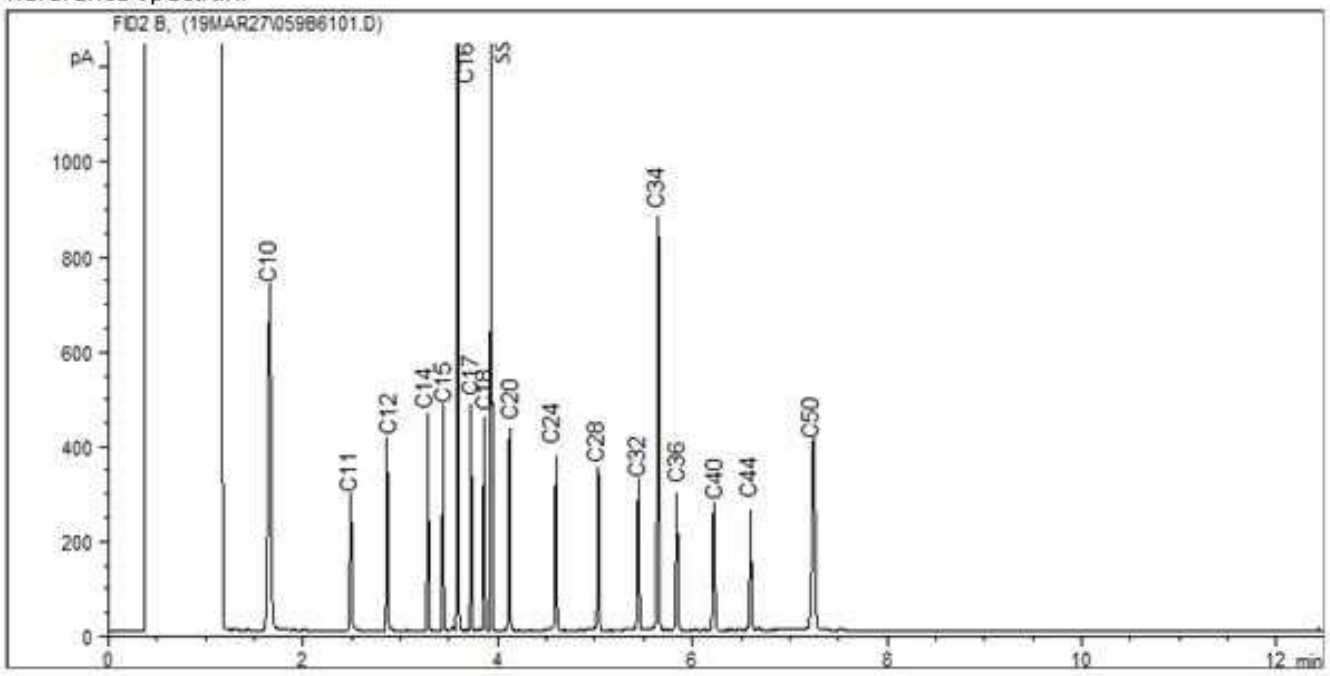
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ490

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SD6-19

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

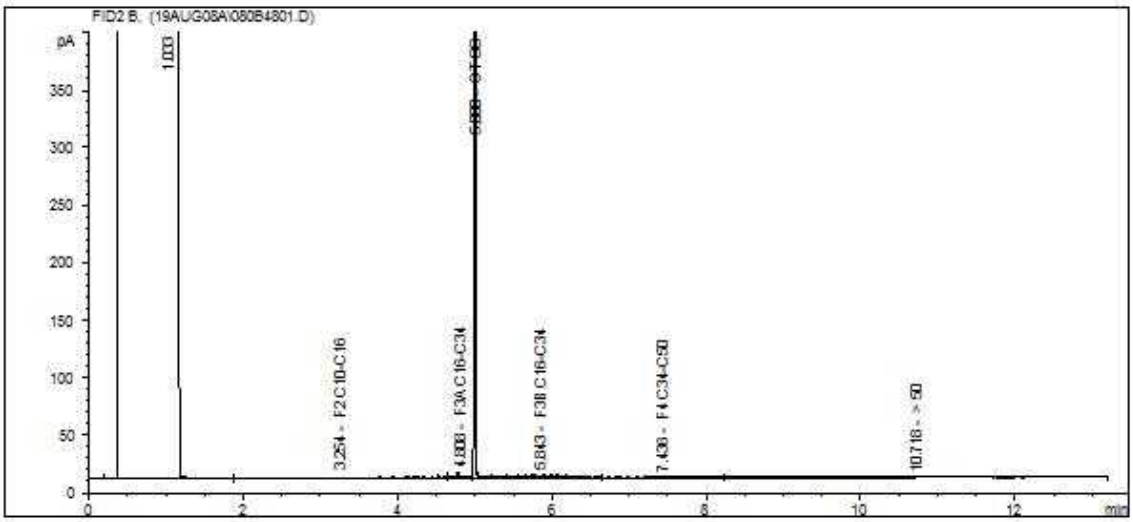
Gasoline: C6 - C12	**Diesel: C10 - C24**	**Jet Fuels: C6 - C16**
Varsol: C8 - C12	**Fuel Oils: C6 - C32**	**Creosote: C10 - C26**
Kerosene: C8 - C16	**Motor Oils: C16 - C50**	**Asphalt: C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

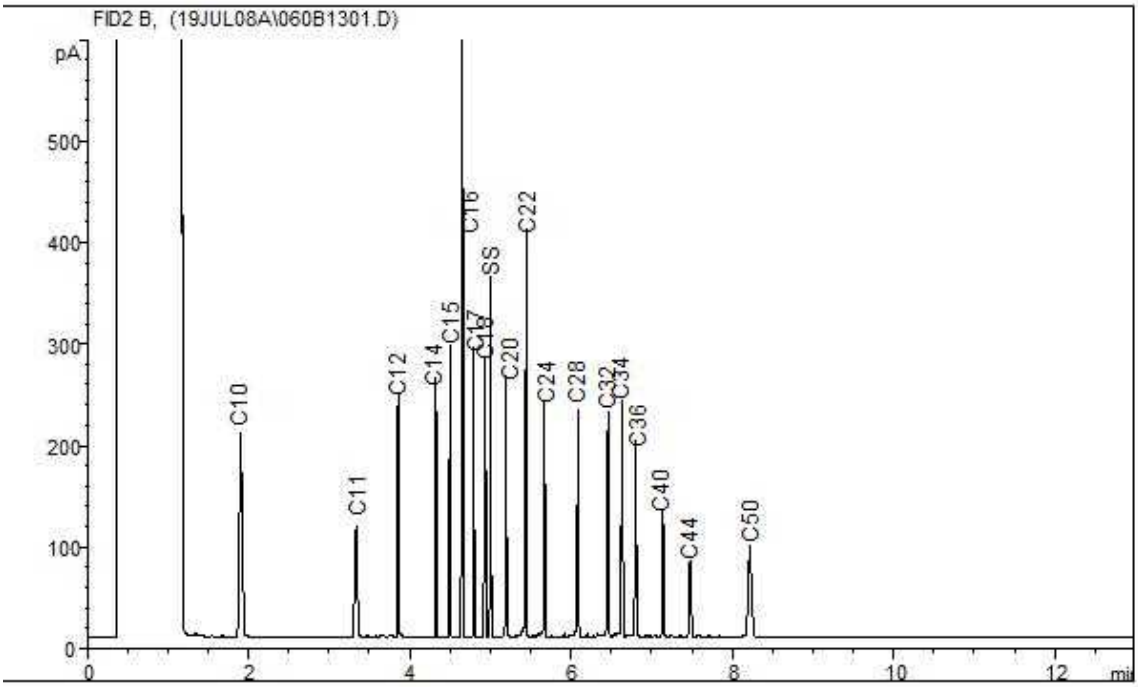
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ491

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SW7-19

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

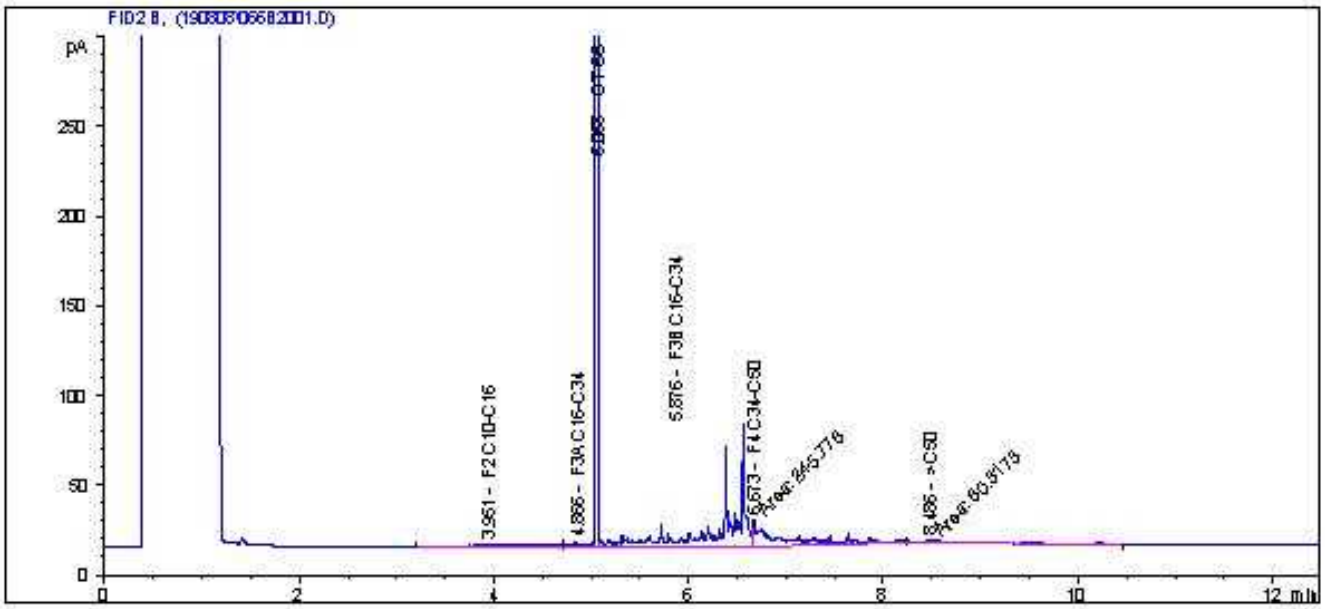
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

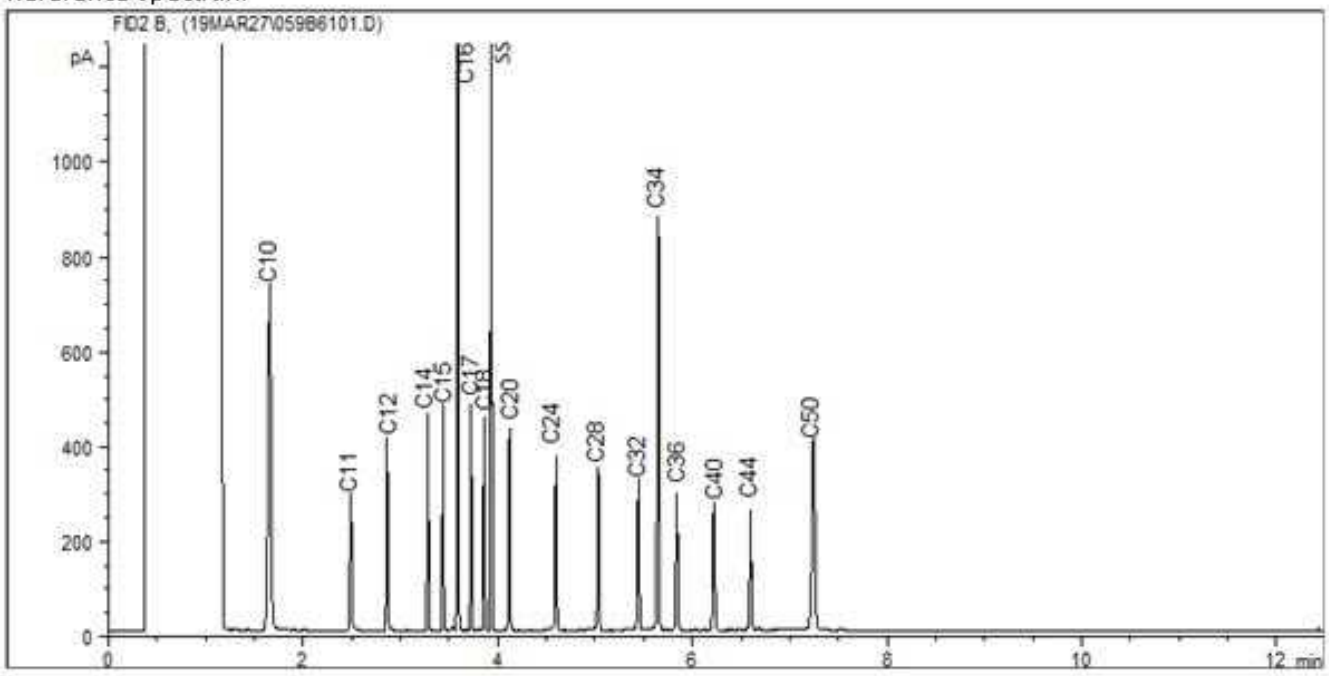
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ492

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SD7-19

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum

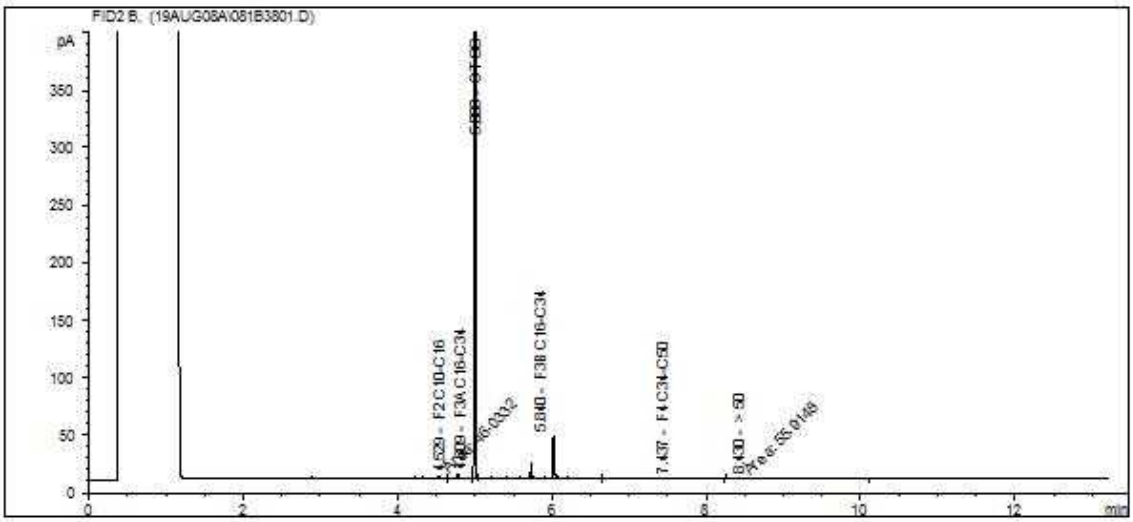


TYPICAL PRODUCT CARBON NUMBER RANGES

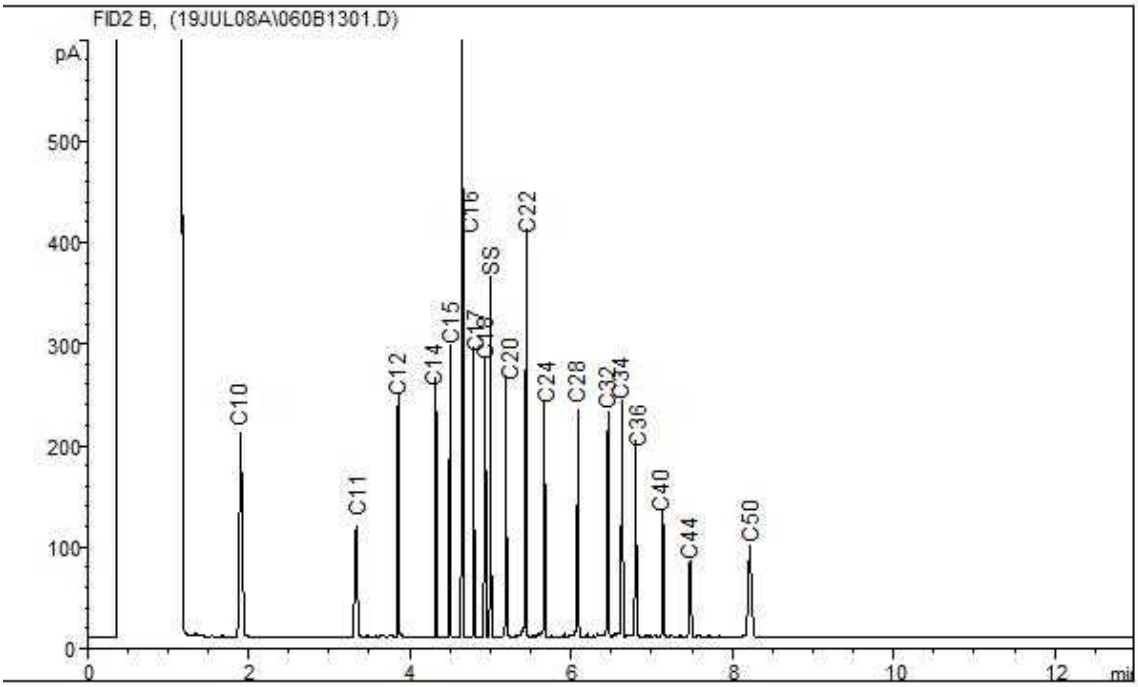
Gasoline: C6 - C12	**Diesel: C10 - C24**	**Jet Fuels: C6 - C16**
Varsol: C8 - C12	**Fuel Oils: C6 - C32**	**Creosote: C10 - C26**
Kerosene: C8 - C16	**Motor Oils: C16 - C50**	**Asphalt: C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

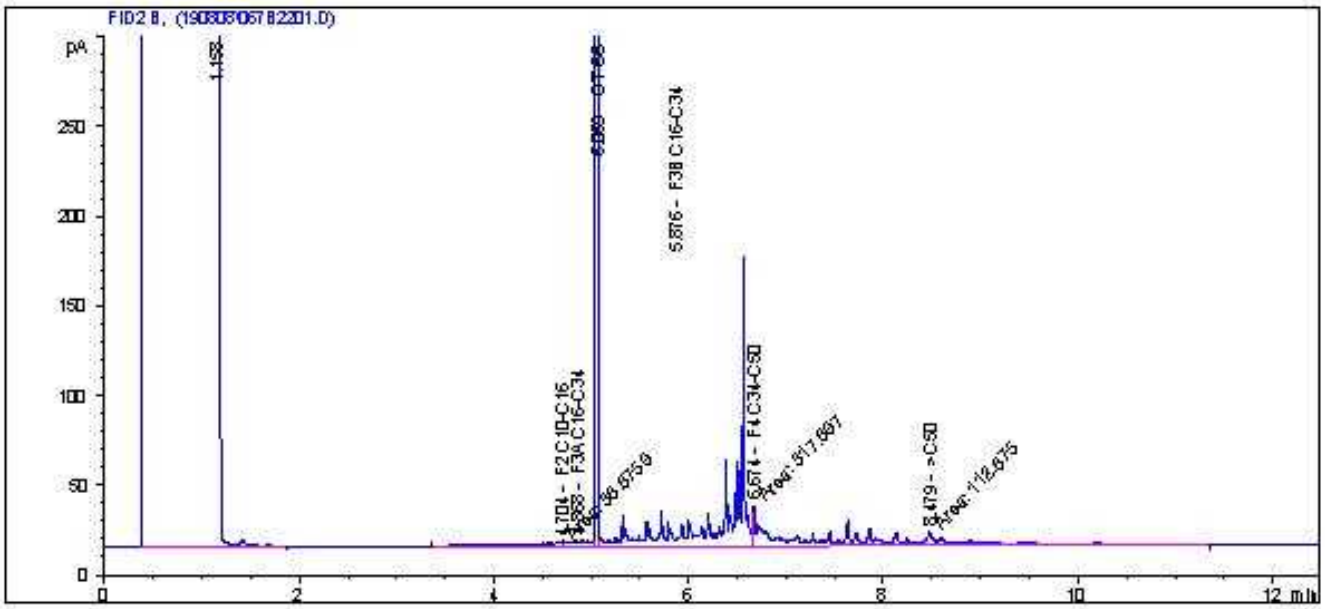
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

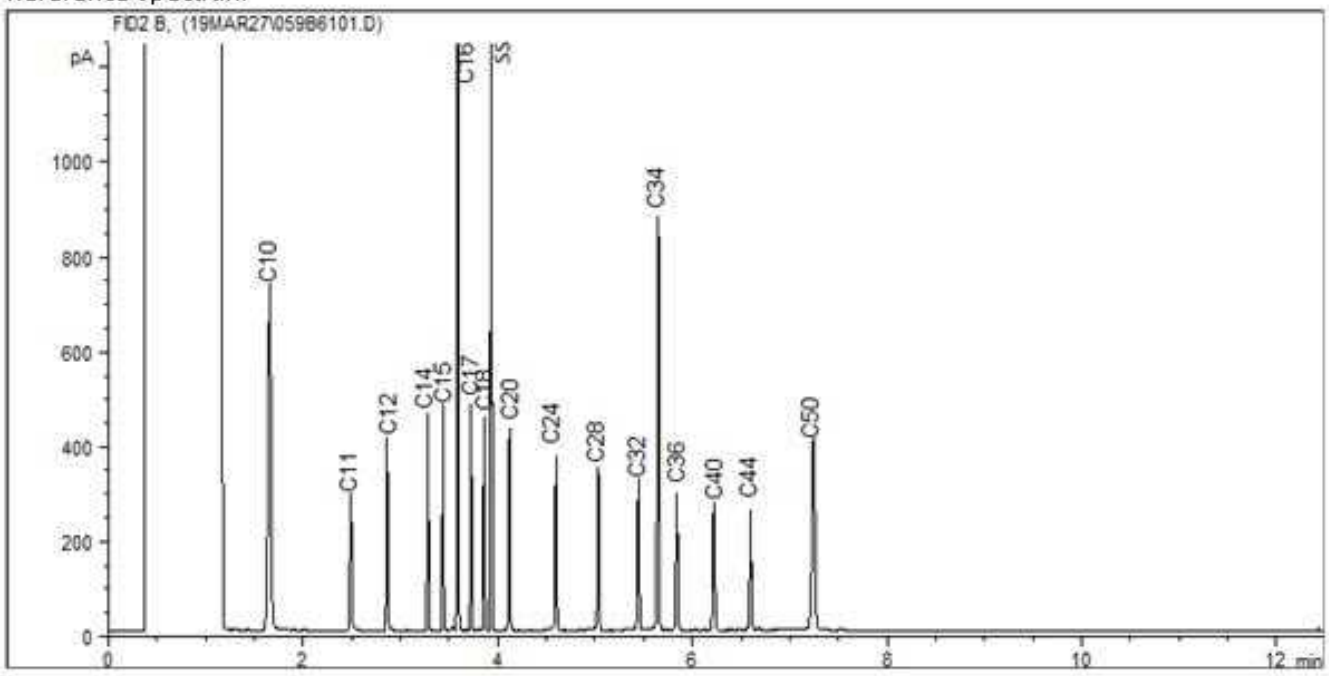
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ494

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-SD8-19

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum

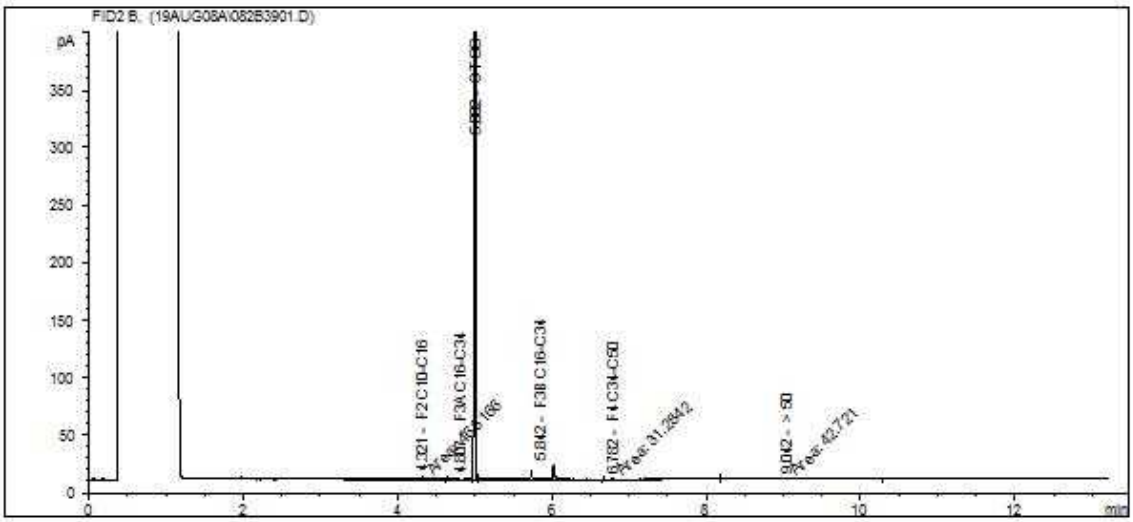


TYPICAL PRODUCT CARBON NUMBER RANGES

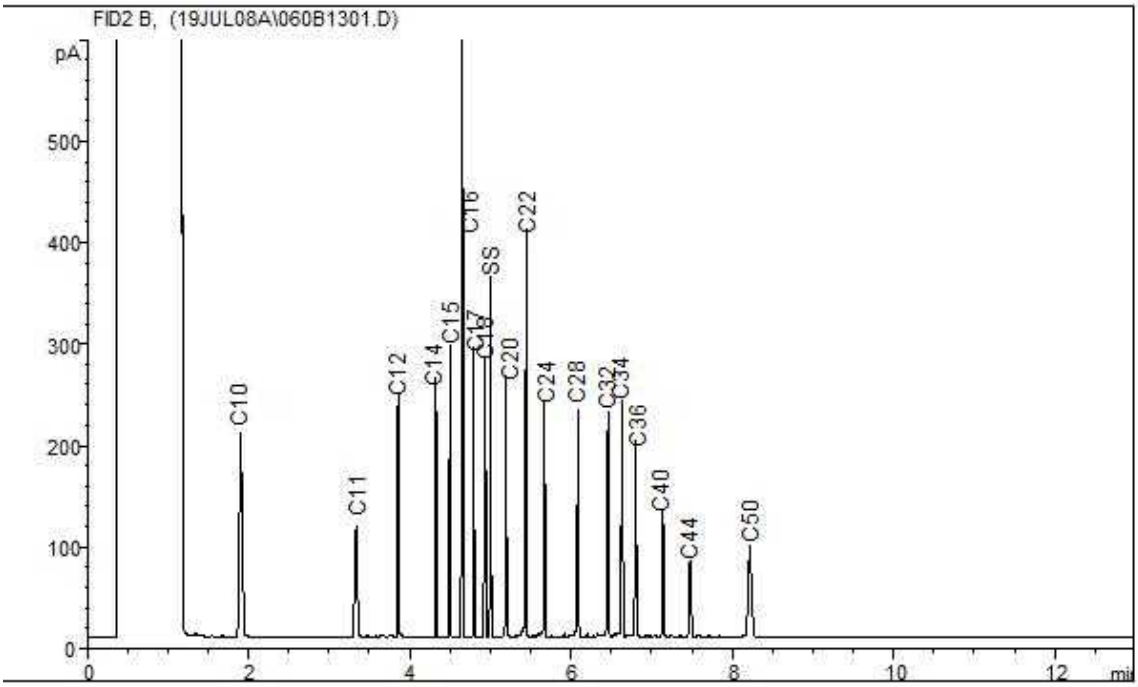
Gasoline: C6 - C12	**Diesel: C10 - C24**	**Jet Fuels: C6 - C16**
Varsol: C8 - C12	**Fuel Oils: C6 - C32**	**Creosote: C10 - C26**
Kerosene: C8 - C16	**Motor Oils: C16 - C50**	**Asphalt: C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

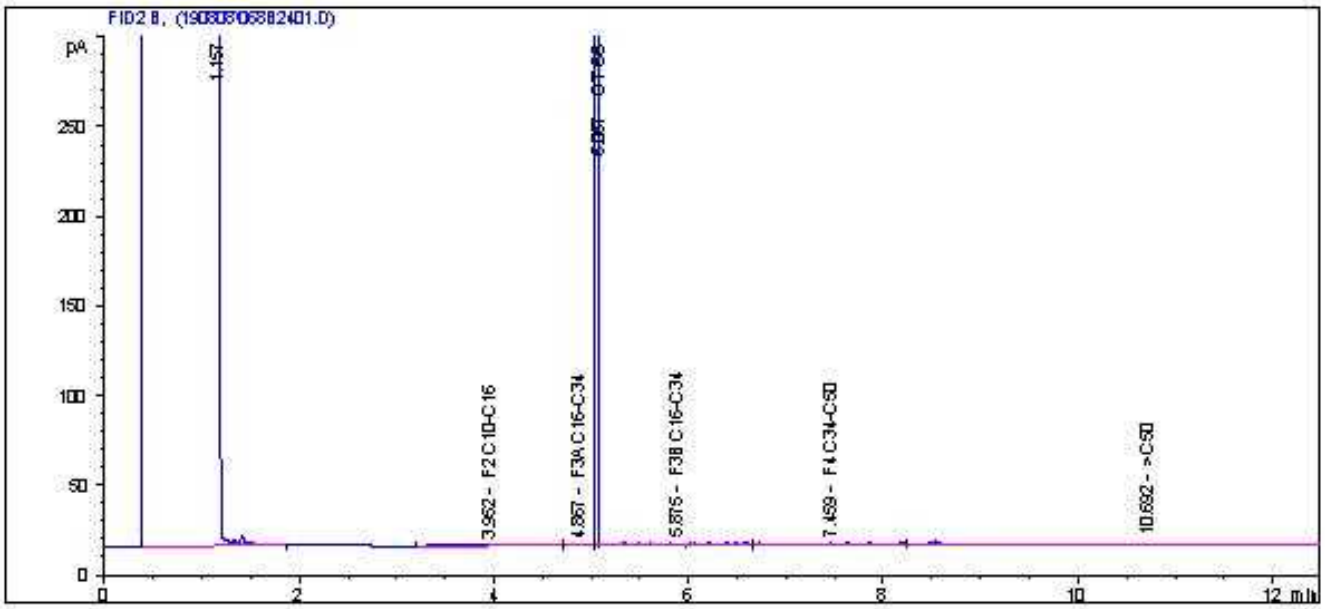
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

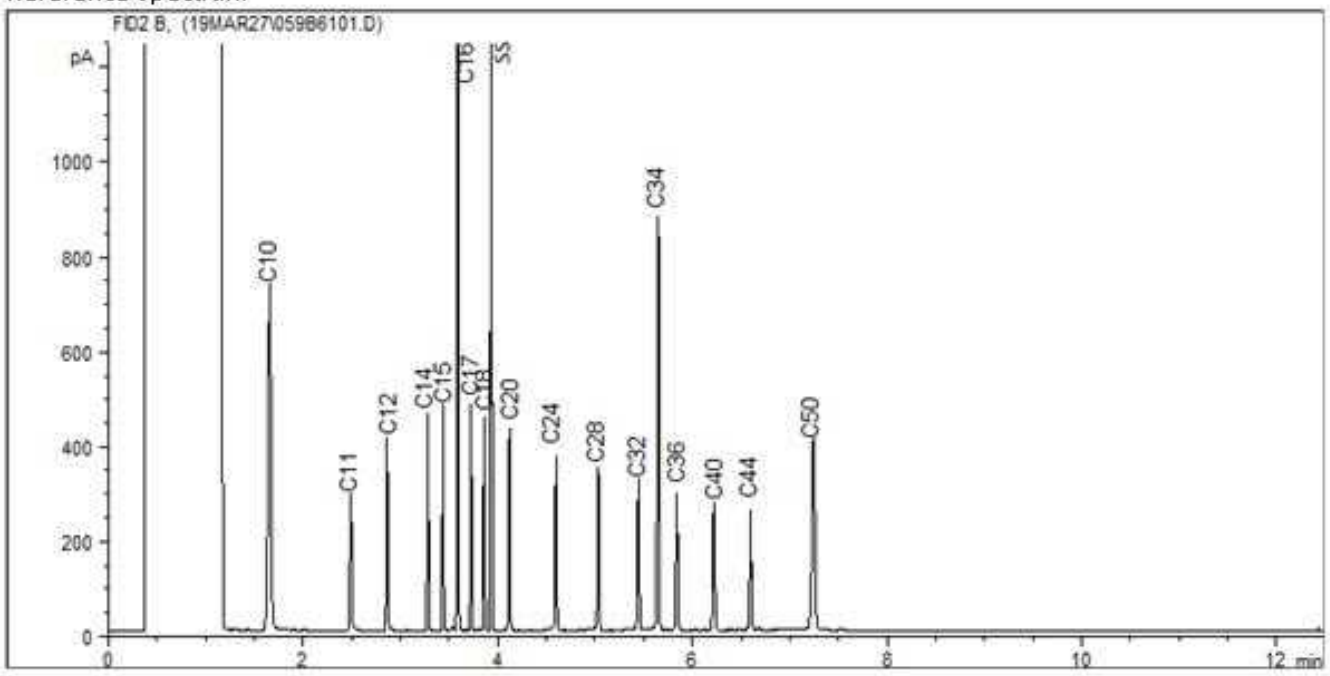
BV Labs Job #: B9L4969
Report Date: 2019/08/12
BV Labs Sample: KKZ496

Outcome Consultants Inc.
Client Project #: P2019-0
Project name: 1QFMD-CTM
Client ID: LTM2-DUP-19-SD

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C6 - C12	**Diesel: C10 - C24**	**Jet Fuels: C6 - C16**
Varsol: C8 - C12	**Fuel Oils: C6 - C32**	**Creosote: C10 - C26**
Kerosene: C8 - C16	**Motor Oils: C16 - C50**	**Asphalt: C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Appendix E

Photo Log

Photo Log

Photo 1

Date
30.Jul.19

Description
West Slope of Landfill Cap

Viewing Direction
South-East

Photo 2

Date
30.Jul.19

Description
South-West Slope of Landfill Cap. Note that the yellow Landfill sign is no longer present.

Viewing Direction
East

Photo 3

Date
31.Jul.19

Description
South Slope of Landfill Cap

Viewing Direction
North-East

Photo 4

Date
31.Jul.19

Description
South-East Slope of Landfill Cap

Viewing Direction
North

Photo 5

Date
31.Jul.19

Description
East Slope of Landfill Cap

Viewing Direction
North-West

Photo 6

Date
31.Jul.19

Description
East Toe of Landfill Cap

Viewing Direction
North-West

Photo 7

Date
31.Jul.19

Description
East Toe of Landfill Cap. Note the Tent in the background.

Viewing Direction
South-East

Photo 8

Date
31.Jul.19

Description
South Toe of Landfill Cap

Viewing Direction
South-East

Photo 9

Date
31.Jul.19

Description
South-West Toe of Landfill Cap

Viewing Direction
North

Photo 10

Date
31.Jul.19

Description
East Slope Swale – Top. Note the ATV parked on-site by recreational fishermen

Viewing Direction
North-East

Photo 11

Date
31.Jul.19

Description
East Slope Swale – Mid. Note the debris (eg. plastic bags) collecting in the swale from off-site sources

Viewing Direction
North-East

Photo 12

Date
31.Jul.19

Description
East Slope Swale - Bottom

Viewing Direction

Photo 13

Date
31.Jul.19

Description
Top of Landfill

Viewing Direction
South-East

Photo 14

Date
31.Jul.19

Description
Top of Landfill

Viewing Direction
North-West

Photo 15

Date
31.Jul.19

Description
Landfill Cap Crest. Note IQE2 – Erosional Feature 2 along the crest

Viewing Direction
South-East

Photo 16

Date
30.Jul.19

Description
Former Vehicle Dump

Viewing Direction
North

Photo 17

Date
30.Jul.19

Description
Former Vehicle Dump

Viewing Direction
West

Photo 18

Date
30.Jul.19

Description
Former Vehicle Dump. Note this is the only sign that remains intact.

Viewing Direction
South

Photo 19

Date
30.Jul.19

Description
Pond 3 (right) and Pond 4 (left) beyond the Toe of the Landfill Cap. Note the tent pitched on-site.

Viewing Direction
South-West

Photo 20

Date
30.Jul.19

Description
Sampling at Pond #2 – LTM2-SW2 /SD2

Viewing Direction
West

Photo 21

Date
31.Jul.19

Description
Sampling from beside road culvert at Supplemental Sample location SW8

Viewing Direction
South

Appendix F

Cost Estimate

Table F-1
Cost Estimate for Year 3 (2020FY) LTM Sampling Program

	Task Number		1		2		3		FY 20/21 Total	
	Task Name		Project Management, Administration, Meetings		Compliance Long Term Monitoring Field Program		NWB Reporting, Annual PSPC Report (Draft/Final)		Number	Value
Labour	**Rate**	**Unit**	#	$	#	$	#	$	#	$
Senior Lead/Principal	$150.00	hr	$4	$600		$0	$6	$900	$10	$1,500
Int. Professional / PM	$125.00	hr	$12	$1,500		$0	$16	$2,000	$28	$3,500
Int. Professional	$125.00	hr	$16	$2,000	$40	$5,000	$30	$3,750	$86	$10,750
Junior Professional	$90.00	hr				$0	$36	$3,240	$36	$3,240
CADD/Draftperson	$76.00	hr				$0	$4	$304	$4	$304
Administration	$35.00	hr	$4	$140		$0	$3	$105	$7	$245
Labour Subtotal			**$4,240**		**$5,000**		**$10,299**		**$19,539**	
Disbursements										
Field						$1,200				$1,200
Subcontractors										$0
Lab						$5,618				$5,618
Disbursements Subtotal			**$0**		**$6,818**		**$0**		**$6,818**	
Travel										
Airplane						$1,900				$1,900
Rail										$0
Rental Vehicle						$500				$500
Personal Vehicle										$0
Taxi						$70				$70
Other transportation						$0				$0
Accomodations						$690				$690
Meals						$427				$427
Incidentals / Other						$200				$200
Travel Subtotal			**$0**		**$3,787**		**$0**		**$3,787**	
Communications Markup	0	%	**$0**		**$0**		**$0**		**$0**	
Disbursements Markup	0	%	**$0**		**$0**		**$0**		**$0**	
Subtotal			**$4,240**		**$15,606**		**$10,299**		**$30,145**	

Table F-2
Cost Estimate for Minor Grading Activities

	Task Number		1		2		3		FY 18/19 Total	
	Task Name		Project Management, Administration, Meetings, Planning, Data Review		Regrade Upper Section of Landfill Slope		Reporting		Number	Value
Labour	**Rate**	**Unit**	#	$	#	$	#	$	#	$
Senior Advisor	$150.00	hr	5	$750.00		$0.00	5	$750.00	10	$1,500.00
Senior Lead/Principal	$150.00	hr		$0.00		$0.00		$0.00	0	$0.00
Sr. Professional / PM	$150.00	hr		$0.00		$0.00		$0.00	0	$0.00
Int. Professional	$125.00	hr		$0.00		$0.00		$0.00	0	$0.00
Junior Professional	$90.00	hr	10	$900.00	10	$900.00	10	$900.00	30	$2,700.00
CADD/Draftperson	$76.00	hr		$0.00		$0.00		$0.00	0	$0.00
Administration	$35.00	hr	5	$175.00		$0.00	5	$175.00	10	$350.00
Labour Subtotal			**$1,825.00**		**$900.00**		**$1,825.00**		**$4,550.00**	
Disbursements										
Data Review										$0.00
Field						$0.00				$0.00
Subcontractors					1	$5,500.00				$5,500
Lab						$0.00				$0.00
Printing						$0.00				$0.00
Disbursements Subtotal			**$0.00**		**$5,500.00**		**$0.00**		**$5,500.00**	
Travel										
Airplane										$ -
Rail										$0.00
Rental Vehicle					1	$250.00				$250.00
Personal Vehicle						$0.00				$0.00
Taxi						$0.00				$0.00
Other transportation						$0.00				$0.00
Accomodations					1	$345.00				$400.00
Meals					1	$142.48				$200.00
Incidentals / Other						$0.00				$0.00
Travel Subtotal			**$0.00**		**$737.48**		**$0.00**		**$850.00**	
Communications Markup	0	%	**$0.00**		**$0.00**		**$0.00**		**$0.00**	
Disbursements Markup	0	%	**$0.00**		**$0.00**		**$0.00**		**$0.00**	
Subtotal			**$1,825.00**		**$7,137.48**		**$1,825.00**		**$10,900.00**	

Notes:

1. It has been assumed that the planning and oversight of the minor grading activities would be carried out concurrently with a call-up for the LTM monitoring activities; The work would be completed by a local contractor with a rubber tired backhoe, or similar, and would involve utilization of existing aggregate materials available at the site.