FISHER ENVIRONMENTAL LTD.

ENGINEERING

Professional Engineers Ontario

LABORATORY

CALA
Canadian Association for Laboratory Accreditation Inc.

PHASE II ENVIRONMENTAL SITE ASSESSMENT

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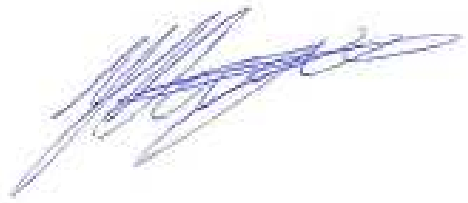
Project No. FE-P 19-9555

July 9, 2019

Issued to:	Dymon Group of Companies
Contact:	Stephen Creighton
Project Name:	Phase II Environmental Site Assessment
Project Address:	3455 Hawthorne Road, Ottawa, Ontario
Project Number:	FE-P 19-9555
Issued on:	September 19, 2019

Project Manager:
(Primary Contact)



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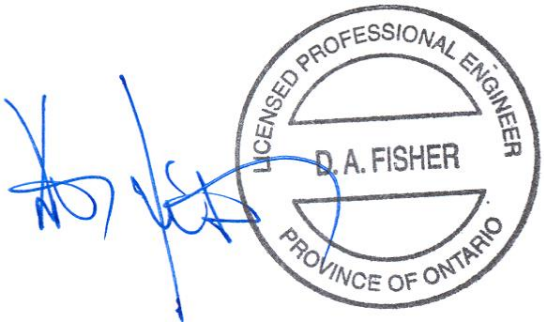
Reviewer:



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President
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GLOSSARY OF ACRONYMS

APEC:	Area of Potential Environmental Concern
asl:	Above Sea Level
AST:	Aboveground Storage Tank
BOD:	Biological Oxygen Demand
bgs:	Below Ground Surface
BTEX:	Benzene, Toluene, Ethylbenzene and Xylenes
COD:	Chemical Oxygen Demand
CPC:	Contaminants of Potential Concern
CSA:	Canadian Standards Association
EC:	Electrical Conductivity
ESA:	Environmental Site Assessment
FIP:	Fire Insurance Plan
MECP:	Ministry of the Environment, Conservation and Parks
MOE:	Ministry of the Environment
OHSA:	Occupational Health and Safety Act
PAH:	Polycyclic Aromatic (Polyaromatic) Hydrocarbons
PCA:	Potentially Contaminating Activity
PCB:	Polychlorinated Biphenyls
pH:	potential of Hydrogen
PHC (F1-F4):	Petroleum Hydrocarbons (Fractions 1 to 4)
ppb:	Parts per Billion
ppm:	Parts per Million
RSC:	Record of Site Condition
SAR:	Sodium Adsorption Ratio
UST:	Underground Storage Tank
VOC:	Volatile Organic Compounds

1. EXECUTIVE SUMMARY

Fisher Environmental Ltd. (Fisher) was commissioned by Dymon Group of Companies to carry out a Phase II Environmental Site Assessment (ESA) of the property located at 3455 Hawthorne Road, Ottawa, ON, hereinafter referred to as the "Site". The subsurface soil and groundwater investigation were carried out on June 18, 2019.

The Site is located on the east side of Hawthorne Road approximately 60 m north of the intersection of Hunt Club Road and Hawthorne Road. The Site is bounded by commercial/light industrial buildings to the north, south and east, and Hawthorne Road to the west.

The central western portion of the Site is occupied by a sales office trailer. The remaining portions of the Site are gravel covered and used as storage of landscaping supplies.

In the current investigation, six (6) boreholes were advanced in the investigated property to depths of up to 4.88 m bgs, and in three (3) of them, monitoring wells were installed to facilitate groundwater level monitoring and sampling.

A total of six (6) soil and two (2) groundwater samples were submitted to the laboratory for Metals, PHC(F1-F4), VOC, PAH, EC, SAR and/or pH analysis.

For the purpose of this Phase II ESA, the appropriate standards were identified as: Table 6 (Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition – Industrial/ Commercial/Community Property Use for soil samples and All Types of Property Use for groundwater samples, course textured soil) as contained in the MOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, hereinafter referred to as the "MOE Standards".

The results of chemical analysis for all submitted soil and groundwater samples were found to be in compliance with the applicable MOE Standards.

Based on the current subsurface investigation, it is concluded that no evidence of soil and groundwater contamination has occurred at the selected sampling locations. No further investigation is recommended at this time. It is expected that the Site could continue to be used for industrial/commercial/community purposes.

2. INTRODUCTION

Fisher Environmental Ltd. (Fisher) was commissioned by Dymon Group of Companies to carry out a Phase II Environmental Site Assessment (ESA) of the property located at 3455 Hawthorne Road, Ottawa, ON, hereinafter referred to as the "Site". The subsurface soil and groundwater investigation were carried out between on June 18, 2019.

3. PROPERTY DESCRIPTION

The Site is located on the east side of Hawthorne Road approximately 60 m north of the intersection of Hunt Club Road and Hawthorne Road. The Site is bounded by commercial/light industrial buildings to the north, south and east, and Hawthorne Road to the west.

The central western portion of the Site is occupied by a sales office trailer. The remaining portions of the Site are gravel covered and used as storage of landscaping supplies.

4. EXISTING REPORTS REVIEW

No existing reports were available for review.

5. SCOPE OF WORK

The current Phase II ESA was conducted in accordance with the CAN/CSA-Z769-00 standards, as published in March 2000 and reaffirmed in 2013, by the CSA Group.

A Phase II ESA involves sampling and testing of materials considered, usually by the outcome of a Phase I ESA or other investigation, to be possible instances of environmental contamination. The project, as carried out, fulfills the scope of a "Reconnaissance" type investigation in which conditions are previously unknown, and the aim is to establish whether any environmental contamination is present. Normal environmental assessment protocol reserves a detailed investigation for a subsequent phase if the reconnaissance survey indicates a requirement for further contaminant delineation.

The scope of this work generally consisted of the following:

- **Field Program -** Clearance of underground utilities and advancement of six (6) boreholes to depths of up to 5 m or resistance, and installation of three (3) groundwater monitoring wells.

- **Laboratory Testing Program -** Recovery and analysis of selected soil and groundwater samples for Metals, PHC (F1-F4), VOC, PAH, EC, SAR and/or pH.

- **Data Evaluation -** Comparison of results of chemical analyses with the applicable MOE (currently MECP) Standards.

- **Reporting -** Provision of final engineering report detailing findings of performed works, and any further recommendations.

As conducted, the present investigation may lack information or analytical work that are specific requirements for filing a Record of Site Condition (RSC) under Part XV.1 of the EPA and Amended O. Reg. 153/04, therefore, if a RSC is necessary, the property owner or its agent should undertake complementary investigations required under the RSC filing process.

6. FIELD PROGRAM

The subsurface soil and groundwater investigation (Phase II ESA) were carried out between June 18, 2019. The field work was conducted by Sean Fisher of Fisher Environmental Ltd. who directed drilling and sampling operations, and assured proper chain of custody procedures for the recovered soil and groundwater samples.

Six (6) boreholes were advanced in the investigated property to depths of up to 4.88 m bgs, and in three (3) of them, monitoring wells were installed to facilitate groundwater level monitoring and sampling.

6.1. Site Preparation

Site preparation included the location of public underground services by referring to the respective utilities: Hydro, Natural Gas, Telecommunications, Public Works, water, sewer and light cables to avoid potential disruptions to the utilities during the drilling. Soil drilling was conducted following receipt of clearance from all utilities for the given borehole locations.

6.2. Boreholes, Soil and Groundwater Sampling

The borehole locations were selected by an initial rationale as being the most likely locations of contamination. Refer to the attached Site Plan with Borehole and Monitoring Well Locations (Figure 1 in Appendix A).

Six (6) boreholes were advanced in the investigated property on June 18, 2019. Borehole drilling was carried out using a Diedrich D-50 drilling rig. The boreholes were extended to depths of up to 4.88 m, at which point native material had been reached.

Fisher retained a drilling contractor which maintains licensure for drilling (Water Well Drillers, Environmental Protection Act, Well Contractor License No. 6946) as required by the MOE, and conducted drilling and soil sampling works in accordance with CSA Standard Z769-00 (reaffirmed in 2013) and the Ontario Ministry of Environment and Energy (MOEE, currently MECP) "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", December 1996, and in compliance with Occupational Health and Safety regulations.

The intrusive subsurface investigation was conducted by means of solid auger boreholes advancement through the subsoil, and a 50 mm diameter spoon sampler driven 600 mm into subsoil by a 65 kg hammer, falling 760 mm, collecting soil samples at a maximum of 0.76 m interval and at stratigraphic boundaries.

Soil and groundwater samples were collected and handled in accordance with generally accepted sampling and handling procedures used by the environmental consulting industry. For guidance, these practices rely on the 1996 MOEE publication "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario". To minimize the potential for cross contamination between soil samples, the split spoon sampler used to collect soil samples from the boreholes was brushed clean of soil and then washed in municipal water containing phosphate free detergent, rinsed in municipal water and then rinsed with distilled water. As well, new disposable nitrile gloves and stainless-steel spatula were used during each sampling event to remove the soil cores from the sampler and to transfer the samples into plastic bags and/or glass jars.

Through each soil sample, the lithology and esthetic evidence of impacts (debris, staining and odours) were recorded as part of field quality control (QC) procedures. Additionally, each sample was screened in the field for headspace vapour concentration (combustible soil vapour and total organic vapour) using the 10.6 eV lamp MiniRae 2000 PID calibrated to 100 ppm Isobutylene. The samples were kept out of direct sunlight during field storage and the headspace measurements were made after at least two hours had elapsed since the sample *was bagged and the sample had* reached a minimum temperature of 15ºC. The headspace monitoring was performed on the samples as a preliminary screening for analysis.

Selection of samples to be submitted for laboratory analysis are based on the headspace vapour concentration, physical evidence of odours/ staining, apparent water table and/or proximity to potential contaminant sources. If no odours/staining are noted in the soil samples, the samples with the highest field screening measurement (i.e. highest headspace vapour concentration) are selected for laboratory analysis. Soil samples from the boreholes selected for potential chemical analysis of organic parameters were placed directly into laboratory supplied glass jars at the time of sampling, labeled and packed with minimal headspace. Samples were kept in coolers provided with cold packs during field storage and transportation to Fisher Environmental Laboratories for analysis. Following sampling, monitoring wells were installed in three (3) boreholes, in accordance to O. Reg. 903.

6.3. Monitoring Wells Program

Three (3) monitoring wells were installed on the subject property. The wells were constructed of 52 mm ID diameter PVC pipes, which were pre-cleaned at the factory and delivered to the Site in sealed plastic bags. Further construction details of the monitoring wells are provided on the “Log of Boreholes” attached in Appendix B.

Groundwater sampling in the installed monitoring wells was conducted using bailers, where single-use (disposable) bailers are slowly lowered into the water column, allowed to fill, and removed. Laboratory supplied sample containers were used to collect groundwater samples which were labeled, stored in coolers provided with cold packs during field storage and transportation to Fisher Environmental Laboratories for analysis.

Based on surface topography, and distance to the nearest open water body, the local groundwater flow direction is predicted to be east. The localized shallow groundwater flow direction may be influenced by the presence of underground utilities, building foundation, variations in vertical and horizontal stratigraphy, depth of wells’ screened intervals and/or well trauma.

6.4. Site Geology

Fill material was found at the surface of all boreholes. The fill generally consisted of dark brown to brown silty sand to sandy silt with some to trace of topsoil/roots/gravel and occasional cobbles. A thin layer of compact brown silty sand was encountered below the fill of BH3. Native soils of greyish brown silt to sandy silt with shale were found underlying the fill of BH 1, 2, 4 & 5 and brown silty sand of BH3. Relative density of this silt/sandy silt was found to be compact to very dense. Grey shale was found underlying the above greyish brown silt/sandy silt to weathered shale.

A description of the subsurface conditions encountered at the boreholes locations is presented in Appendix B - Log of Boreholes.

6.5. Head Space Combustible Vapours

A 10.6 eV lamp MiniRae 2000 PID calibrated to 100 ppm Isobutylene was used to measure combustible vapours in the soil samples. Vapour concentrations were read during the soil sampling and all soil samples had concentrations of 10 ppm or less.

6.6. Visual Olfactory Soil / Groundwater Quality

During the borehole-drilling program, the following visual/olfactory observations were made:

- Fill materials were encountered in all boreholes at depths of up to 1.5 m bgs.
- No odours were noted in any collected soil or groundwater samples.

6.7. Selection of Analytical Samples and Parameters

Selection of samples for environmental analysis was based on appearance, expectations of Site conditions, and proximity of potential contaminant sources. Six (6) soil samples were submitted to the laboratory for Metals, PHC (F1-F4), VOC, PAH, EC, SAR and/or pH analysis. Two (2) groundwater samples were submitted to the laboratory for PHC (F1-F4) and VOC analysis.

TABLE 1: RATIONALE FOR ANALYTICAL PARAMETER

Parameter	Description
Metals	Various metallic elements can cause adverse environmental effects at relatively low concentrations. Such metals are associated with industrial activities and/or the use of fill materials of unknown quality, both historic and current, and it is common practice to include Metals analysis in subsurface soil investigations. Six (6) soil samples collected at the Site were submitted for Metals analysis.
PHC(F1-F4)	PHC are components of gasoline, diesel and other petroleum products for which soil quality guidelines have been developed. These compounds are widely utilized and often included in the evaluation of a Site's overall subsurface condition. Six (6) soil and two (2) groundwater samples collected at the Site were submitted for PHC (F1-F4) analysis.
VOC	VOC are any volatile compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds. VOC are included in gasoline, diesel, crude oil, lubricant, waste oil, adhesive, paint, stain, solvents, resin, monomer, and/or any other material containing VOC. Six (6) soil and two (2) groundwater samples collected at the Site were submitted for VOC analysis.

Parameter	Description
PAH	PAH are associated with coal and furnace ash, and/or the use of fill materials of unknown quality. Three (3) soil samples collected at the Site were submitted for PAH analysis.
pH	Soil pH is referred to as the "acidity" of the soil. When the soil pH is too "acid" (low pH) or too "alkaline" (high pH), nutrients present in the soil become locked-up or unavailable. One (1) soil sample collected at the Site were submitted for pH analysis.
EC	Soil EC is indirectly correlated with various chemical and physical properties of soil and is the ability of any material to conduct an electrical current. Sand has a lower conductivity while clay has a higher conductivity, which is correlated with particle size, soil texture, and water-holding capacity. Three (3) soil samples collected at the Site were submitted for EC analysis.
SAR	Soil SAR is the ratio of the concentration of sodium in relation to calcium and magnesium, which can be used to assess the potential to cause dispersion in soil. Three (3) soil samples collected at the Site were submitted for SAR analysis.

7. LABORATORY PROGRAM

7.1. General

Recovered soil and groundwater samples were submitted to Fisher Environmental Laboratories for analysis. As a Canadian Association for Laboratory Accreditation (CALA) registered analytical facility, QA/QC procedures were maintained consistent with CALA requirements and standard laboratory practices. The laboratories ensured that analytical sub-samples were, by appearance, representative of the whole sample as collected in the field.

7.2. Data Evaluation

7.2.1. Soil and Groundwater Standards

The MOE presents Soil and Groundwater Standards, under the Publication “Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” April 15, 2011. These standards present soil and groundwater criteria, which have been developed with regard to toxicological data. They are levels at and below which no environmental or safety concerns, or adverse conditions, are anticipated for environments or persons with average sensitivity. Based on where bedrock was encountered, the Site has a shallow soil property.

The subject property has been used for industrial/commercial purposes, and it is our understanding that the property will maintain its current industrial/commercial land use.

With regards to the potability status of the groundwater, it is uncertain whether the surrounding areas rely solely on municipal water as a source of drinking water, therefore a potable groundwater condition has been selected.

As specified by O. Reg. 153/04, "coarse textured soil is defined as material having more than 50 percent (by mass) of particles that are 75 μm or larger in mean diameter. Materials having more than 50 percent (by mass) of particles that are smaller than 75 μm in mean diameter are medium and fine textured soils." “When at least 1/3 of the soil at the property, measured by volume, consists of coarse textured soil, the standard for coarse textured soil shall apply. In any other case, the standard for medium and fine textured soil may be applied”.

A grain size analysis was not completed at the time of the investigation, therefore a more conservative site condition standards for coarse textured soil have been applied.

For the purpose of this Phase II ESA, the appropriate standards were identified as: Table 6 (Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition – Industrial/ Commercial/Community Property Use for soil samples and All Types of Property Use for groundwater samples, course textured soil) as contained in the MOE Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, hereinafter referred to as the “MOE Standards”.

The criteria values are presented with the results of analysis in the last column of the Certificates of Analysis (Appendix C).

7.2.2. Soil and Groundwater Quality

Six (6) soil and two (2) groundwater samples were submitted to the laboratory for Metals, PHC (F1-F4), VOC, PAH, EC, SAR and/or pH analysis. A copy of the Laboratory Certificates of Analysis is provided in Appendix C. Results of the chemical analyses are summarized in Table 2.

TABLE 2: EXCEEDANCES OF APPLICABLE SITE CONDITION STANDARDS

Borehole	Sample Depth	Sample #	Parameters Analyzed	Exceedances of April 15, 2011 Table 6 MOE Standards, Shallow Soils, Industrial/Commercial/ Community Property Use Potable Groundwater condition
MW3	Groundwater	19-2728-1	PHC (F1-F4) VOC	No Exceedances No Exceedances

Borehole	Sample Depth	Sample #	Parameters Analyzed	Exceedances of April 15, 2011 Table 6 MOE Standards, Shallow Soils, Industrial/Commercial/ Community Property Use Potable Groundwater condition
MW3 Duplicate	Groundwater	19-2728-2	PHC (F1-F4) VOC	No Exceedances No Exceedances
MW1	0.75-1.20 m	19-2728-3	Metals PHC (F1-F4) VOC PAH EC SAR	No Exceedances No Exceedances No Exceedances No Exceedances No Exceedances No Exceedances
MW2	0.00-0.60 m	19-2728-4	Metals PHC (F1-F4) VOC	No Exceedances No Exceedances No Exceedances
MW3	0.75-1.20 m	19-2728-5	Metals PHC (F1-F4) VOC PAH EC SAR	No Exceedances No Exceedances No Exceedances No Exceedances No Exceedances No Exceedances
BH4	0.75-1.20 m	19-2728-6	Metals PHC (F1-F4) VOC	No Exceedances No Exceedances No Exceedances
BH5	0.75-1.20 m	19-2728-7	Metals PHC (F1-F4) VOC	No Exceedances No Exceedances No Exceedances
BH6	0.75-1.20 m	19-2728-8	Metals PHC (F1-F4) VOC PAH EC SAR	No Exceedances No Exceedances No Exceedances No Exceedances No Exceedances No Exceedances

NOTES: PHC (F1-F4)*: Petroleum Hydrocarbons fractions (F1-F4)
F1 (C6-C10) Gasoline less BTEX
F2 (C10-C16) Diesel
F3 (C16-C34) Diesel
F4 (C34-C50) Heavy Oil
VOC: Volatile Organic Compounds, PAH: Polycyclic Aromatic Hydrocarbons,
SAR: Sodium Adsorption Ratio, EC: Electrical Conductivity
Bold: Exceeds the MOE Standards

*For a site to meet this standard there must be no evidence of free product, including but not limited to, visible petroleum hydrocarbon film or sheen present on any groundwater samples.

7.2.3. Metals

Six (6) soil samples were submitted for Metals analysis. The results of chemical analysis for Metals parameters in the submitted soil samples were found to be in compliance with the applicable MOE Standards.

7.2.4. Petroleum Hydrocarbons (PHC)

Six (6) soil and two (2) groundwater samples were submitted for PHC (F1-F4) analysis. The results of chemical analysis for PHC (F1-F4) parameters in the submitted soil and groundwater.

7.2.5. Volatile Organic Compounds (VOC)

Six (6) soil and two (2) groundwater samples were submitted for VOC analysis. The results of chemical analysis for VOC parameters in the submitted soil and groundwater.

7.2.6. Polycyclic Aromatic Hydrocarbons (PAH)

Three (3) soil samples were submitted for PAH analysis. The result of chemical analysis for PAH parameters for the submitted soil samples were found to be in compliance with the applicable MOE Standards.

7.2.7. pH

One (1) soil sample was submitted to the laboratory for pH analysis. The result of pH for the submitted soil sample was found to be within the recommended range.

7.2.8. Electrical Conductivity (EC)

Three (3) soil samples were submitted to the laboratory for EC analysis. The results of chemical analysis for EC parameters in the submitted soil samples were found to be in compliance with the applicable MOE Standards.

7.2.9. Sodium Adsorption Ratio (SAR)

Three (3) soil samples were submitted to the laboratory for SAR analysis. The results of chemical analysis for SAR parameters in the submitted soil samples were found to be in compliance with the applicable MOE Standards.

7.3. Quality Assurance/Quality Control

A chain of custody form was filled out for all samples prior to submitting to the laboratory. The chain of custody documented movement from selection of the sample to receipt at the laboratory and provided sample identification, requested analysis, and condition of samples upon arrival at the laboratory.

The laboratory checks randomly selected samples for Quality Assurance. Generally, one sample for every twenty samples submitted is selected for Quality Assurance checks. For each parameter, there is an acceptable upper and lower limit for the measured concentration of the parameter. Measured concentrations of analyzed samples must fall within the upper and lower acceptable limits in order for the sample to be valid. If the result exceeds the upper or lower acceptable limits, the sample must be re-analyzed.

Based on Quality Assurance Reports provided by Fisher Environmental Laboratories, measured concentrations in soil samples were within the acceptable limits for quality control. Copies of the QA/QC Reports for Metals, PHC (F1-F4), PAH, VOC, EC, SAR and/or pH in soil and groundwater are included with the Certificates of Analysis in Appendix C.

8. SUMMARY AND CONCLUSIONS

- Fisher carried out a Phase II Environmental Site Assessment of the property located at 3455 Hawthorne Road, Ottawa, ON. The subsurface soil and groundwater investigation were carried out on June 18, 2019.

- Six (6) boreholes were advanced in the investigated property to depths of up to 4.88m bgs, and in three (3) of them, monitoring wells were installed to facilitate groundwater level monitoring and sampling.

- Six (6) soil and two (2) groundwater samples were submitted to the laboratory for Metals, PHC (F1-F4), VOC, PAH, EC, SAR and/or pH analysis.

- The results of chemical analysis for all submitted soil and groundwater samples were found to be in compliance the applicable MOE standards.

Based on the current subsurface investigation, it is concluded that no evidence of soil and groundwater contamination has occurred at the selected sampling locations. No further investigation is recommended at this time. It is expected that the Site could continue to be used for industrial/commercial/community purposes.

9. LIMITATIONS

This report was prepared for use by Dymon Group of Companies, and is based on the work as described in the Scope of Work. The conclusions presented in this report reflect existing Site conditions within the scope of this assignment.

No investigation method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. It can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the information obtained and the formulation of the conclusions and recommendations. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions reached, but commit ourselves to care and competence in reaching those conclusions. Where a Phase II ESA is conducted without the completion or review of a current Phase I ESA, it is noted that the selected test locations are based on information made readily available to Fisher and/or a cursory review of current site operations. In such instances, knowledge of historical and/or neighboring property use data may be significantly limited. No warranty, whether expressed or implied, is included or intended in this report.

The scope of services performed may not be appropriate for the purposes of other users. This report should not be used in contexts other than pertaining to the evaluation of the property at the current time. Written authorization must be obtained from Fisher Environmental Ltd. prior to use by any other parties, or any future use of this document or its findings, conclusions, or recommendations represented herein. Any use which a third party makes of this report, or any reliance on or decisions made on the basis of it, are the responsibility of the third parties. Fisher Environmental Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Fisher Environmental Ltd. notes that the work conducted at the Site may not fully satisfy the MOE (currently MECP) requirements for the purpose of filling a Record of Site Condition (RSC). Should a RSC be required, then additional investigations should be conducted at the Site.

10. QUALIFICATIONS OF ASSESSOR

As a Qualified Person who conducts and supervises Phase II ESAs, Mr. David Fisher, president of Fisher Environmental Ltd., is a senior Managerial and Environmental Engineering Specialist with over 30 years of progressive, innovative experience in the Petrochemical and Environmental Engineering Industry. Mr. Fisher is responsible for the development and management of a progressive environmental consulting engineering company specializing in environmental site assessments and remediation, geotechnical and hydrogeological investigations, tank removals, PCB waste treatment, land reclamation, recycling, hazardous waste disposal, and associated laboratory analytical practices.

Fisher Environmental Ltd. has been established as a team of engineers and consultants since 1989, and continues to develop a strong, wide client base. The company is staffed with personnel holding graduate or postgraduate qualifications at the Markham headquarters, as well as specialist associates offering a broad range of expertise and knowledge in environmental consulting. With a background in the petroleum industry, extensive experience has been gained in the prevention and cleanup of contamination in air, water and soil.

11. REFERENCES

The Phase II ESA was conducted in accordance with the applicable Regulations, Guidelines, Policies, Standards, Protocols and Objectives administrated by the Ontario Ministry of the Environment. Specific reference is made to the following:

- CAN/CSA Standard Z769-00 (reaffirmed in 2013), Phase II Environmental Site Assessment, A National Standard of Canada;
- "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario" Ministry of the Environment and Energy, December 1996;
- Environmental Protection Act, RSO 1990, Charter E. 19, as amended, September 2004;
- "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act", Ministry of the Environment, dated April 15, 2011;
- The Ontario Water Resources Act – R.R.O. 1990, Regulation 903 – Amended to O. Reg. 128.03, August 2003;
- Google Earth.

APPENDIX A – SITE PLAN WITH BOREHOLE AND MONITORING WELL LOCATIONS

FISHER ENVIRONMENTAL LTD.
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NORTH

LEGEND

- MONITORING WELL
- BOREHOLE
- SITE BOUNDARY
- BENCHMARK

PROJECT NAME AND ADDRESS

GEOTECHNICAL INVESTIGATION AND PHASE II ESA

3455 HAWTHORNE ROAD, OTTAWA, ONTARIO

FIGURE 1:

SITE PLAN WITH BOREHOLE AND MONITORING WELL LOCATIONS

PROJECT NO.	SHEET NO.
FE-P 19-9555	1
DATE: JUNE 2019	
SCALE: AS SHOWN	

APPENDIX B – LOG OF BOREHOLES

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH1(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 19-9555

PROJECT NAME: Geotechnical Investigation

LOCATION: 3455 Hawthorne Road, Ottawa, ON

DRILLING METHOD: Diedrich D-50

DRILLING DATE: 18 June 2019

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES P.I.D. Reading	SAMPLES "N" VALUE
0	0	GROUND SURFACE (m asl)		99.99			
		FILL: dark brown to greyish brown silty sand, trace to some gravel, some to trace of topsoil/roots, moist.			1	SS	9
	0.91m			99.08	2	SS	>100
		GREYISH BROWN SILT: some clay, seam/layer/pieces of shale, moist, very dense.			3	SS	>100
	2.13m			97.86			
		GREY SHALE: weathered in upper portion, dry, hard.			4	SS	>100
					5	SS	>100
	4.88m			95.11			
		End of Borehole					
		Refusal to augering at 4.88m,					
		Monitoring well installed at 4.88m.					
		Dry on June 19, 2019.					

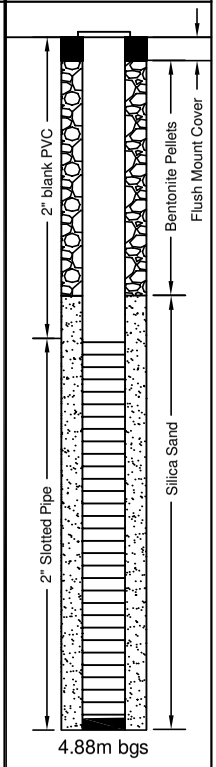
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✤ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH2(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 19-9555

PROJECT NAME: Geotechnical Investigation

LOCATION: 3455 Hawthorne Road, Ottawa, ON

DRILLING METHOD: Diedrich D-50

DRILLING DATE: 18 June 2019

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES P.I.D. Reading	SAMPLES "N" VALUE
		GROUND SURFACE (m asl)		99.49			
0	0	FILL: dark brown to greyish brown silty sand, trace to some gravel, some to trace of topsoil/roots, moist.			1	SS	11
		0.76m		98.73			
4	1	GREYISH BROWN SILT: some clay, seam/layer/pieces of shale, moist, very dense.			2	SS	>100
6	2				3	SS	>100
		2.13m		97.36			
8		GREY SHALE: weathered in upper portion, dry, hard.			4	SS	>100
10	3				5	SS	>100
12	4						
14		4.57m		94.92			
16	5	End of Borehole					
18		BH dry on completion.					
20	6	Monitoring well installed at 4.57m.					
22	7	Dry on June 19, 2019.					
24							
26	8						
28							
30	9						
32	10						

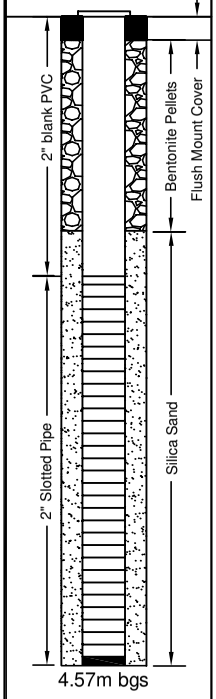
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH3(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 19-9555

PROJECT NAME: Geotechnical Investigation

LOCATION: 3455 Hawthorne Road, Ottawa, ON

DRILLING METHOD: Diedrich D-50

DRILLING DATE: 18 June 2019

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES P.I.D. Reading	SAMPLES "N" VALUE
		GROUND SURFACE (m asl)		100.61			
0	0	FILL: dark brown to greyish brown silty sand, trace to some gravel, some to trace of topsoil/roots, moist.			1	SS	17
2		0.76m		99.85			
4	1	BROWN TO GREYISH BROWN SILTY SAND: trace of gravel, moist, compact.			2	SS	12
		1.22m		99.39			
6	2	GREYISH BROWN SILT: some clay. seam/layer/pieces of shale, moist, very dense.			3	SS	65
		2.13m		98.48			
8		GREY SHALE: weathered in upper portion, dry, hard.			4	SS	>100
10	3				5	SS	>100
12							
14	4						
16		4.88m		95.73			
	5	End of Borehole					
18							
20	6	Monitoring well installed at 4.88m.					
		WL at 2.1m on June 19, 2019.					
22	7						
24							
26	8						
28							
30	9						
32	10						

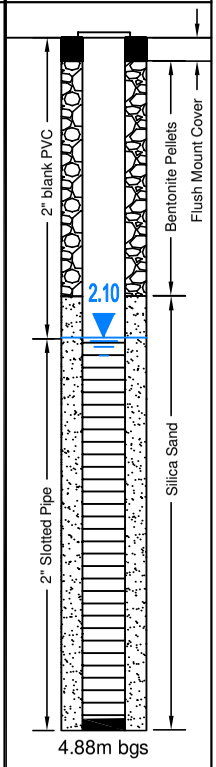
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH4 SHEET. 1 of 1

PROJECT NO.: FE-P 19-9555

PROJECT NAME: Geotechnical Investigation

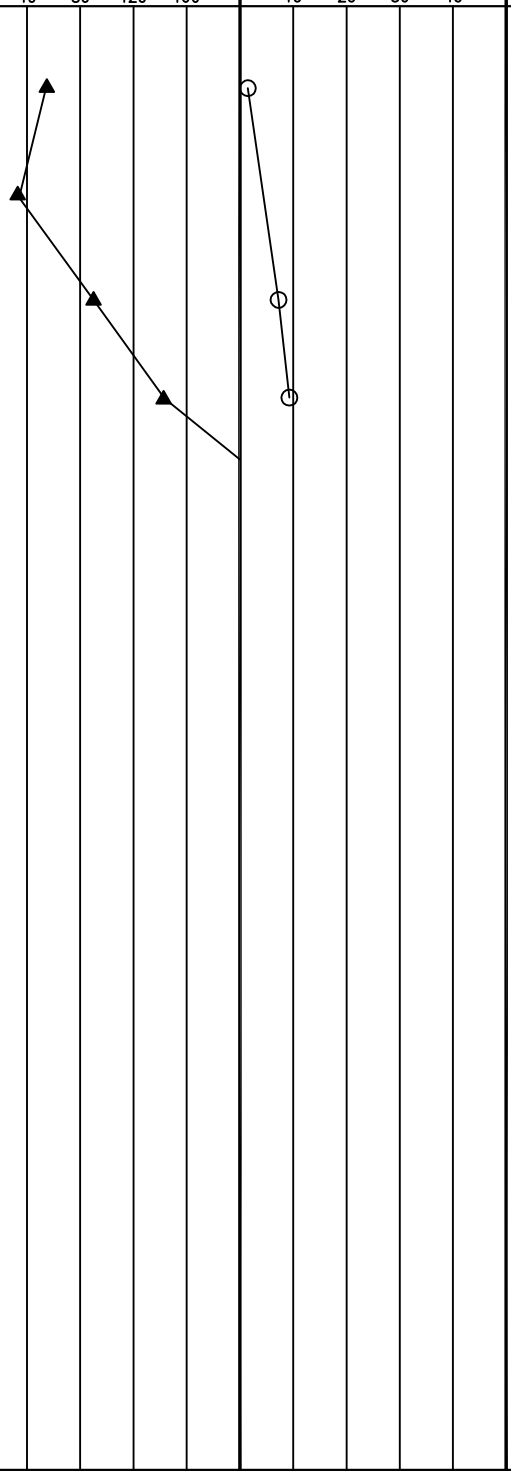
LOCATION: 3455 Hawthorne Road, Ottawa, ON

DRILLING METHOD: Diedrich D-50

DRILLING DATE: 18 June 2019

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES P.I.D. Reading	SAMPLES "N" VALUE
		GROUND SURFACE (m asl)		100.66			
0	0	FILL: dark brown silty sand, some gravel, occasional cobbles, some to trace of topsoil, roots, moist.			1	SS	26
		0.76m		99.90			
4	1	FILL: greyish brown silt to sandy silt, trace topsoil/roots, pieces of shale, moist.			2	SS	16
		1.52m		99.14			
6	2	GREYISH BROWN TO BROWN GREY SILT TO SANDY SILT: some clay, pieces of shale, moist, compact to dense.			3	SS	45
8		2.59m		98.07	4	SS	70
10	3	GREY SHALE: seam of limestone, weathered in upper portion, dry, hard.			5	SS	>100
		3.35m		97.31			
12	4	End of Borehole					
14		Refusal to augering at 3.35m.					
16	5	BH dry on completion.					
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32	10						

PENETRATION TESTING (SPT) ▲ 20 40 60 80
SHEAR STRENGTH (Kpa) ✚ 40 80 120 160
VAPOUR READING (ppm) □ 20 40 60 80
MOISTURE CONTENT (%) ○ 10 20 30 40



PIEZOMETER OR WELL CONSTRUCTION

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH5 SHEET. 1 of 1

PROJECT NO.: FE-P 19-9555

PROJECT NAME: Geotechnical Investigation

LOCATION: 3455 Hawthorne Road, Ottawa, ON

DRILLING METHOD: Diedrich D-50

DRILLING DATE: 18 June 2019

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES P.I.D. Reading	SAMPLES "N" VALUE
		GROUND SURFACE (m asl)		100.31			
0	0	FILL: greyish brown sand, some silt & gravel, moist.			1	SS	23
0.61m				99.70			
4	1	FILL: greyish brown silt to sandy silt, trace topsoil/roots, pieces of shale, moist.			2	SS	13
1.52m				98.79			
6	2	GREYISH BROWN TO BROWN GREY SILT TO SANDY SILT: some clay, pieces of shale, moist, compact.			3	SS	16
2.13m				98.18			
8	2.44m	GREY SHALE: dry, hard.		97.87	4	SS	>100
		End of Borehole					
10	3	Refusal to augering at 2.44m.					
12	4	BH dry on completion.					
14							
16	5						
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32	10						

PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ○ 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION

FISHER ENVIRONMENTAL LTD.

LOG OF BOREHOLE NO. BH6 SHEET. 1 of 1

PROJECT NO.: FE-P 19-9555

PROJECT NAME: Geotechnical Investigation

LOCATION: 3455 Hawthorne Road, Ottawa, ON

DRILLING METHOD: Diedrich D-50

DRILLING DATE: 18 June 2019

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES P.I.D. Reading	SAMPLES "N" VALUE	PENETRATION TESTING (SPT) ▲ / SHEAR STRENGTH (Kpa) ✚	VAPOUR READING (ppm) □ / MOISTURE CONTENT (%) ○	PIEZOMETER OR WELL CONSTRUCTION
		GROUND SURFACE (m asl)		100.20						
0	0	FILL: dark brown silty sand, some gravel, occasional cobbles, some to trace of topsoil, roots, occasional cobbles, moist.			1	SS	18			
2										
4	1				2	SS	57			
		1.37m		98.83						
6	2	GREYISH BROWN SILT TO WEATHERED SHALE: some clay, moist, hard.			3	SS	>100		○	
		2.13m		98.07						
8		End of Borehole								
10	3	Refusal to augering at 2.13m.								
12		BH dry on completion.								
14	4									
16	5									
18										
20	6									
22										
24	7									
26	8									
28										
30	9									
32										
	10									

PENETRATION TESTING (SPT) ▲ / SHEAR STRENGTH (Kpa) ✚: 20 40 60 80 / 40 80 120 160

VAPOUR READING (ppm) □ / MOISTURE CONTENT (%) ○: 20 40 60 80 / 10 20 30 40

APPENDIX C – CERTIFICATES OF ANALYSIS

FISHER ENVIRONMENTAL LABORATORIES

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Tel.:
E-mail:
Attn: Glen Luckman

F.E. Job #: 19-2728
Project Name: Phase II ESA
Project ID: FE-P-19-9555
Date Sampled: 18-Jun-2019
Date Received: 19-Jun-2019
Date Reported: 3-Jul-2019
Location: 3455 Hawthorne
Ottawa, ON

Certificate of Analysis

Analyses	Matrix	Quantity	Date Extracted	Date Analyzed	Lab SOP	Method Reference
VOCs	Water	2	N/A	24-Jun-19	VOCs F-6	SM 6200-B
PHCs (F1 & BTEX)	Water	2	N/A	24-Jun-19	PHCs F-7	CCME CWS
PHCs (F2 - F4)	Water	2	25-Jun-19	26-Jun-19	PHCs F-7	CCME CWS
Metals	Soil	6	24-Jun-19	24-Jun-19	Metals F-18	SM 3125-B
VOCs	Soil	6	20-Jun-19	25-Jun-19	VOCs F-14	SW-846, 8260C
PHCs (F1 & BTEX)	Soil	6	20-Jun-19	25-Jun-19	PHCs F-7	CCME CWS
PHCs (F2 - F4)	Soil	6	23-Jun-19	24-Jun-19	PHCs F-7	CCME CWS
PAHs	Soil	3	25-Jun-19	26-Jun-19	PAHs F-4	SM 6410-B
EC	Soil	3	21-Jun-19	21-Jun-19	PCBs F-5	SM 6630C
SAR	Soil	3	21-Jun-19	24-Jun-19	pH-EC-SAR F-16	EPA 6010C
pH	Soil	1	21-Jun-19	21-Jun-19	pH-EC-SAR F-16	SW-846, 9045D
Moisture Content	Soil	6	N/A	21-Jun-19	Support Procedures F-99	Carter (1993)

Fisher Environmental Laboratories is accredited by CALA (the Canadian Association for Laboratory Accreditation Inc.) for specific parameters as required by Ontario Regulation 153/04. All analytical testing has been performed in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act published by Ontario Ministry of the Environment.

Authorized by:

Roger Lin, Ph. D., C. Chem.
Laboratory Manager

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-1*** MW3	***19-2728-2*** MW3 Duplicate			**Ground Water Standards** [1] **Table 6 All Types**	**Ground Water Standards** [1] **Table 7 All Types**
	Concentration (µ g/L)					
VOCs in Water						
Acetone	<30	<30			2700	100000
Benzene	<0.5	<0.5			0.5	0.5
Bromodichloromethane	<2	<2			16	67000
Bromoform	<5	<5			5	5
Bromomethane	<0.5	<0.5			0.89	0.89
Carbon Tetrachloride	<0.2	<0.2			0.2	0.2
Chlorobenzene	<0.5	<0.5			30	140
Chloroform	<1	<1			2	2
Dibromochloromethane	<2	<2			25	65000
1,2-Dichlorobenzene	<0.5	<0.5			3	150
1,3-Dichlorobenzene	<0.5	<0.5			59	7600
1,4-Dichlorobenzene	<0.5	<0.5			0.5	0.5
Dichlorodifluoromethane	<2	<2			590	3500
1,1-Dichloroethane	<0.5	<0.5			5	11
1,2-Dichloroethane	<0.5	<0.5			0.5	0.5
1,1-Dichloroethylene	<0.5	<0.5			0.5	0.5
c-1,2-Dichloroethylene	<0.5	<0.5			1.6	1.6
t-1,2-Dichloroethylene	<0.5	<0.5			1.6	1.6
1,2-Dichloropropane	<0.5	<0.5			0.58	0.58
1,3-Dichloropropene (cis-+trans-)	<0.5	<0.5			0.5	0.5
Ethylbenzene	<0.5	<0.5			2.4	54
Ethylene Dibromide	<0.2	<0.2			0.2	0.2
Hexane (n)	<5	<5			5	5
Methyl Ethyl Ketone	<20	<20			1800	21000
Methyl Isobutyl Ketone	<20	<20			640	5200
Methyl tert-butyl Ether	<2	<2			15	15
Methylene Chloride	<5	<5			26	26
Styrene	<0.5	<0.5			5.4	43
1,1,1,2-Tetrachloroethane	<0.5	<0.5			1.1	1.1
1,1,2,2-Tetrachloroethane	<0.5	<0.5			0.5	0.5
Tetrachloroethylene	<0.5	<0.5			0.5	0.5
Toluene	<0.5	<0.5			24	320
1,1,1-Trichloroethane	<0.5	<0.5			23	23
1,1,2-Trichloroethane	<0.5	<0.5			0.5	0.5
Trichloroethylene	<0.5	<0.5			0.5	0.5
Trichlorofluoromethane	<5	<5			150	2000
Vinyl Chloride	<0.5	<0.5			0.5	0.5
Xylenes	<0.5	<0.5			72	72
Surrogate Recovery (%)						
Bromochloromethane	116	100			60-140	
1,4-Difluorobenzene	105	89			60-140	
1,4-Dichlorobutane	120	105			60-140	

< result obtained was below RL (Reporting Limit).

Bold: Result exceeds limit noted in Ground Water Standards.

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.

Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;

Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;

Industrial/Commercial/Community Property use (**I/C/C**);

( ) Standard value in brackets applies to medium and fine textured soils.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(ug/L)		Recovery (%)		Recovery (%)	
VOCs in Water						
Acetone	<30	30	71	50-140	91	50-140
Benzene	<0.5	0.5	104	60-130	122	50-140
Bromodichloromethane	<2	2	106	50-140	127	50-140
Bromoform	<5	5	98	60-130	105	50-140
Bromomethane	<0.5	0.5	79	50-140	72	50-140
Carbon Tetrachloride	<0.2	0.2	100	60-130	77	50-140
Chlorobenzene	<0.5	0.5	119	60-130	96	50-140
Chloroform	<1	1	109	60-130	128	50-140
Dibromochloromethane	<2	2	100	60-130	128	50-140
1,2-Dichlorobenzene	<0.5	0.5	109	60-130	120	50-140
1,3-Dichlorobenzene	<0.5	0.5	102	60-130	109	50-140
1,4-Dichlorobenzene	<0.5	0.5	106	60-130	120	50-140
Dichlorodifluoromethane	<2	2	77	50-140	61	50-140
1,1-Dichloroethane	<0.5	0.5	93	60-130	95	50-140
1,2-Dichloroethane	<0.5	0.5	88	60-130	101	50-140
1,1-Dichloroethylene	<0.5	0.5	115	60-130	116	50-140
c-1,2-Dichloroethylene	<0.5	0.5	108	60-130	84	50-140
t-1,2-Dichloroethylene	<0.5	0.5	114	60-130	87	50-140
1,2-Dichloropropane	<0.5	0.5	106	60-130	89	50-140
1,3-Dichloropropene (cis-+trans-)	<0.5	0.5	102	60-130	96	50-140
Ethylbenzene	<0.5	0.5	99	60-130	110	50-140
Ethylene Dibromide	<0.2	0.2	96	60-130	118	50-140
Hexane (n)	<5	5	91	60-130	114	50-140
Methyl Ethyl Ketone	<20	20	112	50-140	63	50-140
Methyl Isobutyl Ketone	<20	20	89	50-140	84	50-140
Methyl tert-butyl Ether	<2	2	119	60-130	89	50-140
Methylene Chloride	<5	5	100	60-130	100	50-140
Styrene	<0.5	0.5	104	60-130	82	50-140
1,1,1,2-Tetrachloroethane	<0.5	0.5	81	60-130	119	50-140
1,1,2,2-Tetrachloroethane	<0.5	0.5	107	60-130	108	50-140
Tetrachloroethylene	<0.5	0.5	101	60-130	121	50-140
Toluene	<0.5	0.5	110	60-130	128	50-140
1,1,1-Trichloroethane	<0.5	0.5	108	60-130	86	50-140
1,1,2-Trichloroethane	<0.5	0.5	109	60-130	96	50-140
Trichloroethylene	<0.5	0.5	108	60-130	117	50-140
Trichlorofluoromethane	<5	5	124	50-140	114	50-140
Vinyl Chloride	<0.5	0.5	107	50-140	78	50-140
Xylenes	<0.5	0.5	106	60-130	116	50-140
Surrogates						
Parameter	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**
Bromocholoromethane	109	60-140	72	60-140	115	60-140
1,4-Difluorobenzene	104	60-140	76	60-140	109	60-140
1,4-Dichlorobutane	110	60-140	102	60-140	122	60-140

LEGEND:

RL - Reporting Limit

LCS - Laboratory Control Sample

MS - Matrix Spike

AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
VOCs in Water						
Acetone	0.0	0-30				
Benzene	0.0	0-30				
Bromodichloromethane	0.0	0-30				
Bromoform	0.0	0-30				
Bromomethane	0.0	0-30				
Carbon Tetrachloride	0.0	0-30				
Chlorobenzene	0.0	0-30				
Chloroform	1	0-30				
Dibromochloromethane	0.0	0-30				
1,2-Dichlorobenzene	0.0	0-30				
1,3-Dichlorobenzene	0.0	0-30				
1,4-Dichlorobenzene	0.0	0-30				
Dichlorodifluoromethane	0.0	0-30				
1,1-Dichloroethane	0.0	0-30				
1,2-Dichloroethane	0.0	0-30				
1,1-Dichloroethylene	0.0	0-30				
c-1,2-Dichloroethylene	0.0	0-30				
t-1,2-Dichloroethylene	0.0	0-30				
1,2-Dichloropropane	0.0	0-30				
1,3-Dichloropropene (cis-+trans-)	0.0	0-30				
Ethylbenzene	0.0	0-30				
Ethylene Dibromide	0.0	0-30				
Hexane (n)	0.0	0-30				
Methyl Ethyl Ketone	0.0	0-30				
Methyl Isobutyl Ketone	0.0	0-30				
Methyl tert-butyl Ether	0.0	0-30				
Methylene Chloride	0.0	0-30				
Styrene	0.0	0-30				
1,1,1,2-Tetrachloroethane	0.0	0-30				
1,1,2,2-Tetrachloroethane	0.0	0-30				
Tetrachloroethylene	0.0	0-30				
Toluene	0.0	0-30				
1,1,1-Trichloroethane	0.0	0-30				
1,1,2-Trichloroethane	0.0	0-30				
Trichloroethylene	0.0	0-30				
Trichlorofluoromethane	0.0	0-30				
Vinyl Chloride	0.0	0-30				
Xylenes	0.0	0-30				
Surrogates						
Parameter	**Recovery (%)**	**AR**				
Bromocholoromethane	84	60-140				
1,4-Difluorobenzene	77	60-140				
1,4-Dichlorobutane	88	60-140				

LEGEND:

AR - Acceptable Range

RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-1*** MW3	***19-2728-2*** MW3 Duplicate			**Ground Water Standards [1]**	
					Table 6	**Table 7**
					All Types	**All Types**
	Concentration (µ g/L)					
BTEX in Water						
Benzene	<0.5	<0.5			0.5	0.5
Toluene	<0.5	<0.5			24	320
Ethylbenzene	<0.5	<0.5			2.4	54
Xylenes	<0.5	<0.5			72	72
PHCs (F1-F4) in Water						
$F1_{-BTEX}$ (C_6 - C_{10})	<25	<25			420	420
F2 (C_{10} - C_{16})	<100	<100			150	150
F3 (C_{16} - C_{34})	<100	<100			500	500
F4 (>C_{34})	<100	<100			500	500
Chromatogram descends to baseline by nC50 ? (Yes/No)	Yes	Yes				
Surrogate Recovery (%)						
Bromochloromethane	116	100			60-140	
1,4-Difluorobenzene	105	89			60-140	
1,4-Dichlorobutane	120	105			60-140	

F_{4G} (gravimetric heavy hydrocarbons) cannot be added to the C_6 to C_{50} hydrocarbons.

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;
Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;
Industrial/Commercial/Community Property use (**I/C/C**);
( ) Standard value in brackets applies to medium and fine textured soils.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(ug/L)		Recovery (%)		Recovery (%)	
BTEX in Water						
Benzene	<0.02	0.02	104	60-130	114	50-140
Toluene	<0.2	0.2	119	60-130	107	50-140
Ethylbenzene	<0.05	0.05	103	60-130	103	50-140
Xylenes	<0.05	0.05	110	60-130	101	50-140
PHC (F1-F4) in Water						
$F1_{-BTEX}$ (C_6 - C_{10})	<10	10	119	80-120	107	60-140
F2 (C_{10} - C_{16})	<10	10	99	80-120	88	60-140
F3 (C_{16} - C_{34})	<50	50	97	80-120	92	60-140
F4 (>C_{34})	<50	50	106	80-120	83	60-140
Surrogates						
Parameter	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**
Bromochloromethane	64	60-140	62	60-140	85	60-140
1,4-Difluorobenzene	75	60-140	108	60-140	76	60-140
1,4-Dichlorobutane	77	60-140	115	60-140	94	60-140

LEGEND:

RL - Reporting Limit

LCS - Laboratory Control Sample

MS - Matrix Spike

AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
BTEX in Water						
Benzene	10	0-30				
Toluene	11	0-30				
Ethylbenzene	11	0-30				
Xylenes	12	0-30				
PHC (F1-F4) in Water						
$F1_{-BTEX}$ (C_6 - C_{10})	16	0-30				
F2 (C_{10} - C_{16})	15	0-30				
F3 (C_{16} - C_{34})	12	0-30				
F4 (>C_{34})	0.0	0-30				
Surrogates						
Parameter	**Recovery (%)**	**AR**				
Bromochloromethane	95	60-140				
1,4-Difluorobenzene	102	60-140				
1,4-Dichlorobutane	102	60-140				

LEGEND:

AR - Acceptable Range

RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-3*** BH 1 0.75-1.20m	***19-2728-4*** BH 2 0.00-0.60m	***19-2728-5*** BH 3 0.75-1.20m	***19-2728-6*** BH 4 0.75-1.20m	**Soil Standards [1]** **Table 6** **I/C/C**	**Soil Standards [1]** **Table 7** **I/C/C**
	Concentration (µg/g)					
Metals in Soil						
Antimony	<1	<1	<1	<1	(50) 40	(50) 40
Arsenic	3.4	6	2.7	3.7	18	18
Barium	36	27	32	28	670	670
Beryllium	<2	<2	<2	<2	(10) 8	(10) 8
Boron	<5	<5	<5	<5	120	120
Cadmium	<1	<1	<1	<1	1.9	1.9
Chromium	22	7.4	17	19	160	160
Cobalt	16	8	11	15	(100) 80	(100) 80
Copper	30	7.8	14	21	(300) 230	(300) 230
Lead	<10	19	<10	<10	120	120
Molybdenum	<2	<2	<2	<2	40	40
Nickel	28	15	23	25	(340) 270	(340) 270
Selenium	<1	<1	<1	<1	5.5	5.5
Silver	<0.5	<0.5	<0.5	<0.5	(50) 40	(50) 40
Thallium	<1	<1	<1	<1	3.3	3.3
Uranium	<1	<1	<1	<1	33	33
Vanadium	22	10	16	19	86	86
Zinc	52	<30	48	52	340	340

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;
Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;
Industrial/Commercial/Community Property use (**I/C/C**);
( ) Standard value in brackets applies to medium and fine textured soils.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-7*** BH 5 0.75-1.20m	***19-2728-8*** BH 6 0.75-1.20m			**Soil Standards [1]**	
					Table 6	**Table 7**
					I/C/C	**I/C/C**
	Concentration (µg/g)					
Metals in Soil						
Antimony	<1	<1			(50) 40	(50) 40
Arsenic	3.4	3.1			18	18
Barium	42	37			670	670
Beryllium	<2	<2			(10) 8	(10) 8
Boron	<5	<5			120	120
Cadmium	<1	<1			1.9	1.9
Chromium	18	18			160	160
Cobalt	12	13			(100) 80	(100) 80
Copper	25	26			(300) 230	(300) 230
Lead	<10	<10			120	120
Molybdenum	<2	<2			40	40
Nickel	25	25			(340) 270	(340) 270
Selenium	<1	<1			5.5	5.5
Silver	<0.5	<0.5			(50) 40	(50) 40
Thallium	<1	<1			3.3	3.3
Uranium	<1	<1			33	33
Vanadium	18	18			86	86
Zinc	48	52			340	340

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;
Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;
Industrial/Commercial/Community Property use (**I/C/C**);
( ) Standard value in brackets applies to medium and fine textured soils.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(µg/g)		Recovery (%)		Recovery (%)	
Metals in Soil						
Antimony	<1	1	99	80-120	97	70-130
Arsenic	<1	1	101	80-120	87	70-130
Barium	<5	5	113	80-120	91	70-130
Beryllium	<2	2	100	80-120	113	70-130
Boron	<5	5	90	80-120	97	70-130
Cadmium	<1	1	99	80-120	105	70-130
Chromium	<5	5	106	80-120	102	70-130
Cobalt	<2	2	114	80-120	108	70-130
Copper	<5	5	110	80-120	95	70-130
Lead	<10	10	96	80-120	114	70-130
Molybdenum	<2	2	107	80-120	106	70-130
Nickel	<5	5	111	80-120	100	70-130
Selenium	<1	1	95	80-120	92	70-130
Silver	<0.5	0.5	99	80-120	93	70-130
Thallium	<1	1	98	80-120	123	70-130
Uranium	<1	1	92	80-120	120	70-130
Vanadium	<10	10	84	80-120	109	70-130
Zinc	<30	30	88	80-120	82	70-130

LEGEND:

RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
Metals in Soil						
Antimony	0.0	0-30				
Arsenic	23.9	0-30				
Barium	11.1	0-30				
Beryllium	7.2	0-30				
Boron	22.3	0-30				
Cadmium	0.0	0-30				
Chromium	2.5	0-30				
Cobalt	7.4	0-30				
Copper	8.8	0-30				
Lead	3.8	0-30				
Molybdenum	0.0	0-30				
Nickel	9	0-30				
Selenium	0.0	0-30				
Silver	0.0	0-30				
Thallium	0.0	0-30				
Uranium	10	0-30				
Vanadium	7.2	0-30				
Zinc	4.3	0-30				

LEGEND:

AR - Acceptable Range

RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-3*** BH 1 0.75-1.20m	***19-2728-4*** BH 2 0.00-0.60m	***19-2728-5*** BH 3 0.75-1.20m	***19-2728-6*** BH 4 0.75-1.20m	**Soil Standards [1]** **Table 6** **I/C/C**	**Table 7** **I/C/C**
	Concentration (µg/g)					
VOCs in Soil						
Acetone	<0.5	<0.5	<0.5	<0.5	(28) 16	(28) 16
Benzene	<0.02	<0.02	<0.02	<0.02	(0.4) 0.32	(0.4) 0.32
Bromodichloromethane	<0.05	<0.05	<0.05	<0.05	(1.9) 1.5	18
Bromoform	<0.05	<0.05	<0.05	<0.05	(1.7) 0.61	(1.7) 0.61
Bromomethane	<0.05	<0.05	<0.05	<0.05	0.05	0.05
Carbon Tetrachloride	<0.05	<0.05	<0.05	<0.05	(0.71) 0.21	(1.5) 0.21
Chlorobenzene	<0.05	<0.05	<0.05	<0.05	(2.7) 2.4	(2.7) 2.4
Chloroform	<0.05	<0.05	<0.05	<0.05	(0.18) 0.47	(0.18) 0.47
Dibromochloromethane	<0.05	<0.05	<0.05	<0.05	(2.9) 2.3	13
1,2-Dichlorobenzene	<0.05	<0.05	<0.05	<0.05	(1.7) 1.2	(8.5) 6.8
1,3-Dichlorobenzene	<0.05	<0.05	<0.05	<0.05	(12) 9.6	(12) 9.6
1,4-Dichlorobenzene	<0.05	<0.05	<0.05	<0.05	(0.57) 0.2	(0.84) 0.2
Dichlorodifluoromethane	<0.05	<0.05	<0.05	<0.05	(25) 16	(25) 16
1,1-Dichloroethane	<0.05	<0.05	<0.05	<0.05	(0.6) 0.47	(21) 17
1,2-Dichloroethane	<0.05	<0.05	<0.05	<0.05	0.05	0.05
1,1-Dichloroethylene	<0.05	<0.05	<0.05	<0.05	(0.48) 0.064	(0.48) 0.064
c-1,2-Dichloroethylene	<0.05	<0.05	<0.05	<0.05	(2.5) 1.9	(37) 55
t-1,2-Dichloroethylene	<0.05	<0.05	<0.05	<0.05	(2.5) 1.3	(9.3) 1.3
1,2-Dichloropropane	<0.05	<0.05	<0.05	<0.05	(0.68) 0.16	(0.68) 0.16
1,3-Dichloropropene (cis-+trans-)	<0.05	<0.05	<0.05	<0.05	(0.081) 0.059	(0.21) 0.18
Ethylbenzene	<0.05	<0.05	<0.05	<0.05	(1.6) 1.1	(19) 9.5
Ethylene Dibromide	<0.05	<0.05	<0.05	<0.05	0.05	0.05
Hexane (n)	<0.05	<0.05	<0.05	<0.05	(88) 46	(88) 46
Methyl Ethyl Ketone	<0.5	<0.5	<0.5	<0.5	(88) 70	(88) 70
Methyl Isobutyl Ketone	<0.5	<0.5	<0.5	<0.5	(210) 31	(210) 31
Methyl tert-butyl Ether	<0.05	<0.05	<0.05	<0.05	(2.3) 1.6	(3.2) 11
Methylene Chloride	<0.05	<0.05	<0.05	<0.05	(2) 1.6	(2) 1.6
Styrene	<0.05	<0.05	<0.05	<0.05	(43) 34	(43) 34
1,1,1,2-Tetrachloroethane	<0.05	<0.05	<0.05	<0.05	(0.11) 0.087	(0.11) 0.087
1,1,2,2-Tetrachloroethane	<0.05	<0.05	<0.05	<0.05	(0.094) 0.05	(0.094) 0.05
Tetrachloroethylene	<0.05	<0.05	<0.05	<0.05	(2.5) 1.9	(21) 4.5
Toluene	<0.2	<0.2	<0.2	<0.2	(9) 6.4	(78) 68
1,1,1-Trichloroethane	<0.05	<0.05	<0.05	<0.05	(12) 6.1	(12) 6.1
1,1,2-Trichloroethane	<0.05	<0.05	<0.05	<0.05	(0.11) 0.05	(0.11) 0.05
Trichloroethylene	<0.05	<0.05	<0.05	<0.05	(0.61) 0.55	(0.61) 0.91
Trichlorofluoromethane	<0.05	<0.05	<0.05	<0.05	(5.8) 4	(5.8) 4
Vinyl Chloride	<0.02	<0.02	<0.02	<0.02	(0.25) 0.032	(0.25) 0.032
Xylenes	<0.05	<0.05	<0.05	<0.05	(30) 26	(30) 26
Surrogate Recovery (%)						
1,2-Dichloroethane-d4	119	132	114	119	50-140	
Toluene-d8	79	138	110	75	50-140	
4-Bromofluorobenzene	136	130	104	132	50-140	

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.

Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;

Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;

Industrial/Commercial/Community Property use (**I/C/C**);

( ) Standard value in brackets applies to medium and fine textured soils.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-7*** BH 5 0.75-1.20m	***19-2728-8*** BH 6 0.75-1.20m			**Soil Standards [1]** Table 6 I/C/C	Table 7 I/C/C
	Concentration (µg/g)					
VOCs in Soil						
Acetone	<0.5	<0.5			(28) 16	(28) 16
Benzene	<0.02	<0.02			(0.4) 0.32	(0.4) 0.32
Bromodichloromethane	<0.05	<0.05			(1.9) 1.5	18
Bromoform	<0.05	<0.05			(1.7) 0.61	(1.7) 0.61
Bromomethane	<0.05	<0.05			0.05	0.05
Carbon Tetrachloride	<0.05	<0.05			(0.71) 0.21	(1.5) 0.21
Chlorobenzene	<0.05	<0.05			(2.7) 2.4	(2.7) 2.4
Chloroform	<0.05	<0.05			(0.18) 0.47	(0.18) 0.47
Dibromochloromethane	<0.05	<0.05			(2.9) 2.3	13
1,2-Dichlorobenzene	<0.05	<0.05			(1.7) 1.2	(8.5) 6.8
1,3-Dichlorobenzene	<0.05	<0.05			(12) 9.6	(12) 9.6
1,4-Dichlorobenzene	<0.05	<0.05			(0.57) 0.2	(0.84) 0.2
Dichlorodifluoromethane	<0.05	<0.05			(25) 16	(25) 16
1,1-Dichloroethane	<0.05	<0.05			(0.6) 0.47	(21) 17
1,2-Dichloroethane	<0.05	<0.05			0.05	0.05
1,1-Dichloroethylene	<0.05	<0.05			(0.48) 0.064	(0.48) 0.064
c-1,2-Dichloroethylene	<0.05	<0.05			(2.5) 1.9	(37) 55
t-1,2-Dichloroethylene	<0.05	<0.05			(2.5) 1.3	(9.3) 1.3
1,2-Dichloropropane	<0.05	<0.05			(0.68) 0.16	(0.68) 0.16
1,3-Dichloropropene (cis-+trans-)	<0.05	<0.05			(0.081) 0.059	(0.21) 0.18
Ethylbenzene	<0.05	<0.05			(1.6) 1.1	(19) 9.5
Ethylene Dibromide	<0.05	<0.05			0.05	0.05
Hexane (n)	<0.05	<0.05			(88) 46	(88) 46
Methyl Ethyl Ketone	<0.5	<0.5			(88) 70	(88) 70
Methyl Isobutyl Ketone	<0.5	<0.5			(210) 31	(210) 31
Methyl tert-butyl Ether	<0.05	<0.05			(2.3) 1.6	(3.2) 11
Methylene Chloride	<0.05	<0.05			(2) 1.6	(2) 1.6
Styrene	<0.05	<0.05			(43) 34	(43) 34
1,1,1,2-Tetrachloroethane	<0.05	<0.05			(0.11) 0.087	(0.11) 0.087
1,1,2,2-Tetrachloroethane	<0.05	<0.05			(0.094) 0.05	(0.094) 0.05
Tetrachloroethylene	<0.05	<0.05			(2.5) 1.9	(21) 4.5
Toluene	<0.2	<0.2			(9) 6.4	(78) 68
1,1,1-Trichloroethane	<0.05	<0.05			(12) 6.1	(12) 6.1
1,1,2-Trichloroethane	<0.05	<0.05			(0.11) 0.05	(0.11) 0.05
Trichloroethylene	<0.05	<0.05			(0.61) 0.55	(0.61) 0.91
Trichlorofluoromethane	<0.05	<0.05			(5.8) 4	(5.8) 4
Vinyl Chloride	<0.02	<0.02			(0.25) 0.032	(0.25) 0.032
Xylenes	<0.05	<0.05			(30) 26	(30) 26
Surrogate Recovery (%)						
1,2-Dichloroethane-d4	133	121			50-140	
Toluene-d8	129	110			50-140	
4-Bromofluorobenzene	125	113			50-140	

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.

Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;

Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;

Industrial/Commercial/Community Property use (**I/C/C**);

( ) Standard value in brackets applies to medium and fine textured soils.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(µg/g)		Recovery (%)		Recovery (%)	
VOCs in Soil						
Acetone	<0.5	0.5	134	50-140	76	50-140
Benzene	<0.02	0.02	104	60-130	114	50-140
Bromodichloromethane	<0.05	0.05	109	50-140	107	50-140
Bromoform	<0.05	0.05	117	60-130	84	50-140
Bromomethane	<0.05	0.05	119	50-140	79	50-140
Carbon Tetrachloride	<0.05	0.05	103	60-130	110	50-140
Chlorobenzene	<0.05	0.05	95	60-130	95	50-140
Chloroform	<0.05	0.05	106	60-130	126	50-140
Dibromochloromethane	<0.05	0.05	114	60-130	94	50-140
1,2-Dichlorobenzene	<0.05	0.05	119	60-130	127	50-140
1,3-Dichlorobenzene	<0.05	0.05	123	60-130	103	50-140
1,4-Dichlorobenzene	<0.05	0.05	108	60-130	130	50-140
Dichlorodifluoromethane	<0.05	0.05	119	50-140	127	50-140
1,1-Dichloroethane	<0.05	0.05	109	60-130	124	50-140
1,2-Dichloroethane	<0.05	0.05	109	60-130	111	50-140
1,1-Dichloroethylene	<0.05	0.05	99	60-130	105	50-140
c-1,2-Dichloroethylene	<0.05	0.05	104	60-130	125	50-140
t-1,2-Dichloroethylene	<0.05	0.05	107	60-130	128	50-140
1,2-Dichloropropane	<0.05	0.05	108	60-130	104	50-140
1,3-Dichloropropene (cis-+trans-)	<0.05	0.05	105	60-130	116	50-140
Ethylbenzene	<0.05	0.05	103	60-130	103	50-140
Ethylene Dibromide	<0.05	0.05	121	60-130	94	50-140
Hexane (n)	<0.05	0.05	126	60-130	69	50-140
Methyl Ethyl Ketone	<0.5	0.5	115	50-140	71	50-140
Methyl Isobutyl Ketone	<0.5	0.5	76	50-140	108	50-140
Methyl tert-butyl Ether	<0.05	0.05	74	60-130	81	50-140
Methylene Chloride	<0.05	0.05	103	60-130	108	50-140
Styrene	<0.05	0.05	109	60-130	94	50-140
1,1,1,2-Tetrachloroethane	<0.05	0.05	104	60-130	104	50-140
1,1,2,2-Tetrachloroethane	<0.05	0.05	111	60-130	112	50-140
Tetrachloroethylene	<0.05	0.05	105	60-130	97	50-140
Toluene	<0.2	0.2	119	60-130	107	50-140
1,1,1-Trichloroethane	<0.05	0.05	106	60-130	115	50-140
1,1,2-Trichloroethane	<0.05	0.05	105	60-130	96	50-140
Trichloroethylene	<0.05	0.05	111	60-130	108	50-140
Trichlorofluoromethane	<0.05	0.05	108	50-140	86	50-140
Vinyl Chloride	<0.02	0.02	103	50-140	117	50-140
Xylenes	<0.05	0.05	110	60-130	101	50-140
Surrogates						
Parameter	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**
1,2-Dichloroethane-d4	64	60-140	62	60-140	85	60-140
Toluene-d8	75	60-140	108	60-140	76	60-140
4-Bromofluorobenzene	77	60-140	115	60-140	94	60-140

LEGEND:

RL - Reporting Limit

LCS - Laboratory Control Sample

MS - Matrix Spike

AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
VOCs in Soil						
Acetone	0.0	0-50				
Benzene	10	0-50				
Bromodichloromethane	0.0	0-50				
Bromoform	0.0	0-50				
Bromomethane	0.0	0-50				
Carbon Tetrachloride	0.0	0-50				
Chlorobenzene	0.0	0-50				
Chloroform	0.0	0-50				
Dibromochloromethane	0.0	0-50				
1,2-Dichlorobenzene	0.0	0-50				
1,3-Dichlorobenzene	0.0	0-50				
1,4-Dichlorobenzene	0.0	0-50				
Dichlorodifluoromethane	0.0	0-50				
1,1-Dichloroethane	0.0	0-50				
1,2-Dichloroethane	0.0	0-50				
1,1-Dichloroethylene	0.0	0-50				
c-1,2-Dichloroethylene	0.0	0-50				
t-1,2-Dichloroethylene	0.0	0-50				
1,2-Dichloropropane	0.0	0-50				
1,3-Dichloropropene (cis-+trans-)	11	0-50				
Ethylbenzene	0.0	0-50				
Ethylene Dibromide	0.0	0-50				
Hexane (n)	0.0	0-50				
Methyl Ethyl Ketone	0.0	0-50				
Methyl Isobutyl Ketone	0.0	0-50				
Methyl tert-butyl Ether	0.0	0-50				
Methylene Chloride	0.0	0-50				
Styrene	0.0	0-50				
1,1,1,2-Tetrachloroethane	0.0	0-50				
1,1,2,2-Tetrachloroethane	0.0	0-50				
Tetrachloroethylene	0.0	0-50				
Toluene	11	0-50				
1,1,1-Trichloroethane	0.0	0-50				
1,1,2-Trichloroethane	0.0	0-50				
Trichloroethylene	0.0	0-50				
Trichlorofluoromethane	0.0	0-50				
Vinyl Chloride	0.0	0-50				
Xylenes	12	0-50				
Surrogates						
Parameter	**Recovery (%)**	**AR**				
1,2-Dichloroethane-d4	95	60-140				
Toluene-d8	102	60-140				
4-Bromofluorobenzene	102	60-140				

LEGEND:

AR - Acceptable Range

RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-3*** BH 1 0.75-1.20m	***19-2728-4*** BH 2 0.00-0.60m	***19-2728-5*** BH 3 0.75-1.20m	***19-2728-6*** BH 4 0.75-1.20m	**Soil Standards [1]** **Table 6** **I/C/C**	**Soil Standards [1]** **Table 7** **I/C/C**
	Concentration (µg/g)					
BTEX in Soil						
Benzene	<0.02	<0.02	<0.02	<0.02	(0.4) 0.32	(0.4) 0.32
Toluene	<0.2	<0.2	<0.2	<0.2	(9) 6.4	(78) 68
Ethylbenzene	<0.05	<0.05	<0.05	<0.05	(1.6) 1.1	(19) 9.5
Xylenes	<0.05	<0.05	<0.05	<0.05	(30) 26	(30) 26
PHCs (F_1-F_4) in Soil						
$F1_{-BTEX}$ (C_6 - C_{10})	<10	<10	<10	<10	(65) 55	(65) 55
F2 (C_{10} - C_{16})	35	57	29	24	(250) 230	(250) 230
F3 (C_{16} - C_{34})	74	<50	<50	180	(2,500) 1,700	(2,500) 1,700
F4 (C_{34}-C_{50})	<50	<50	<50	<50	(6,600) 3,300	(6,600) 3,300
Chromatogram descends to baseline by nC50 ? (Yes/No)	Yes	Yes	Yes	Yes		
Surrogate Recovery (%)						
1,2-Dichloroethane-d4	119	132	114	119	60-140	
Toluene-d8	79	138	110	75	60-140	
4-Bromofluorobenzene	136	130	104	132	60-140	

F_{4G} (gravimetric heavy hydrocarbons) cannot be added to the C_6 to C_{50} hydrocarbons.

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.

Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;

Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;

Industrial/Commercial/Community Property use (**I/C/C**);

( ) Standard value in brackets applies to medium and fine textured soils.

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-7*** BH 5 0.75-1.20m	***19-2728-8*** BH 6 0.75-1.20m			**Soil Standards [1]**	
					Table 6	**Table 7**
					I/C/C	**I/C/C**
	Concentration (µg/g)					
BTEX in Soil						
Benzene	<0.02	<0.02			(0.4) 0.32	(0.4) 0.32
Toluene	<0.2	<0.2			(9) 6.4	(78) 68
Ethylbenzene	<0.05	<0.05			(1.6) 1.1	(19) 9.5
Xylenes	<0.05	<0.05			(30) 26	(30) 26
PHCs (F_1-F_4) in Soil						
$F1_{-BTEX}$ (C_6 - C_{10})	<10	<10			(65) 55	(65) 55
F2 (C_{10} - C_{16})	30	45			(250) 230	(250) 230
F3 (C_{16} - C_{34})	<50	<50			(2,500) 1,700	(2,500) 1,700
F4 (C_{34}-C_{50})	<50	<50			(6,600) 3,300	(6,600) 3,300
Chromatogram descends to baseline by nC50 ? (Yes/No)	Yes	Yes				
Surrogate Recovery (%)						
1,2-Dichloroethane-d4	133	121			60-140	
Toluene-d8	129	110			60-140	
4-Bromofluorobenzene	125	113			60-140	

F_{4G} (gravimetric heavy hydrocarbons) cannot be added to the C_6 to C_{50} hydrocarbons.

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.

Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;

Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;

Industrial/Commercial/Community Property use (**I/C/C**);

( ) Standard value in brackets applies to medium and fine textured soils.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(µg/g)		Recovery (%)		Recovery (%)	
BTEX in Soil						
Benzene	<0.02	0.02	104	60-130	114	50-140
Toluene	<0.2	0.2	119	60-130	107	50-140
Ethylbenzene	<0.05	0.05	103	60-130	103	50-140
Xylenes	<0.05	0.05	110	60-130	101	50-140
PHCs (F_1-F_4) in Soil						
$F1_{-BTEX}$ (C_6 - C_{10})	<10	10	119	80-120	107	60-140
F2 (C_{10} - C_{16})	<10	10	99	80-120	88	60-140
F3 (C_{16} - C_{34})	<50	50	97	80-120	92	60-140
F4 (C_{34}-C_{50})	<50	50	106	80-120	83	60-140
Surrogates						
Parameter	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**
1,2-Dichloroethane-d4	64	60-140	62	60-140	85	60-140
Toluene-d8	75	60-140	108	60-140	76	60-140
4-Bromofluorobenzene	77	60-140	115	60-140	94	60-140

LEGEND:

RL - Reporting Limit

LCS - Laboratory Control Sample

AR - Acceptable Range

BTEX should be subtracted from F_1, Naphthalene from F_2 and selected PAHs from F_3 if BTEX/PAHs are analyzed, then report $F_{1\text{-BTEX}}$, $F_{2\text{-Naph.}}$ and $F_{3\text{-PAH}}$. nC_{50} response factor was within 70% of nC_{10}+nC_{16}+nC_{34} average.

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
BTEX in Soil						
Benzene	10	0-50				
Toluene	11	0-50				
Ethylbenzene	11	0-50				
Xylenes	12	0-50				
PHCs (F_1-F_4) in Soil						
$F1_{-BTEX}$ (C_6 - C_{10})	16	0-30				
F2 (C_{10} - C_{16})	15	0-30				
F3 (C_{16} - C_{34})	12	0-30				
F4 (C_{34}-C_{50})	0.0	0-30				
Surrogates						
Parameter	**Recovery (%)**	**AR**				
1,2-Dichloroethane-d4	95	60-140				
Toluene-d8	102	60-140				
4-Bromofluorobenzene	102	60-140				

LEGEND:

RPD - Relative Percent Difference

AR - Acceptable Range

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-3*** BH 1 0.75-1.20m	***19-2728-5*** BH 3 0.75-1.20m	***19-2728-8*** BH 6 0.75-1.20m		**Soil Standards [1]** Table 6 I/C/C	**Soil Standards [1]** Table 7 I/C/C
	Concentration (µg/g)					
PAHs in Soil						
Naphthalene	<0.05	<0.05	<0.05		(28) 9.6	(28) 9.6
2-Methylnaphthalene	<0.05	<0.05	<0.05		(42) 30	(85) 76
1-Methylnaphthalene	<0.05	<0.05	<0.05			
Acenaphthylene	<0.05	<0.05	<0.05		(0.17) 0.15	(0.17) 0.15
Acenaphthene	<0.05	<0.05	<0.05		(29) 21	96
Fluorene	<0.05	<0.05	<0.05		(69) 62	(69) 62
Phenanthrene	<0.05	<0.05	<0.05		(16) 12	(16) 12
Anthracene	<0.05	<0.05	<0.05		(0.74) 0.67	(0.74) 0.67
Fluoranthene	<0.05	<0.05	<0.05		9.6	9.6
Pyrene	<0.05	<0.05	<0.05		96	96
Benzo [a] anthracene	<0.05	<0.05	<0.05		0.96	0.96
Chrysene	<0.05	<0.05	<0.05		9.6	9.6
Benzo [b] fluoranthene	<0.05	<0.05	<0.05		0.96	0.96
Benzo [k] fluoranthene	<0.05	<0.05	<0.05		0.96	0.96
Benzo [a] pyrene	<0.05	<0.05	<0.05		0.3	0.3
Indeno [1,2,3-cd] pyrene	<0.1	<0.1	<0.1		(0.95) 0.76	(0.95) 0.76
Dibenzo [a,h] anthracene	<0.1	<0.1	<0.1		0.1	0.1
Benzo [g,h,i] perylene	<0.1	<0.1	<0.1		9.6	9.6
Surrogate Recovery (%)						
Naphthalene-d8	83	125	108		50-140	
Phenanthrene-d10	93	81	82		50-140	
Chrysene-d12	81	87	76		50-140	

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.

Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;

Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;

Industrial/Commercial/Community Property use (**I/C/C**);

( ) Standard value in brackets applies to medium and fine textured soils.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(µg/g)		Recovery (%)		Recovery (%)	
PAHs in Soil						
Naphthalene	<0.05	0.05	116	50-140	105	50-140
2-Methylnaphthalene	<0.05	0.05	102	50-140	83	50-140
1-Methylnaphthalene	<0.05	0.05	93	50-140	103	50-140
Acenaphthylene	<0.05	0.05	104	50-140	83	50-140
Acenaphthene	<0.05	0.05	108	50-140	85	50-140
Fluorene	<0.05	0.05	95	50-140	113	50-140
Phenanthrene	<0.05	0.05	107	50-140	102	50-140
Anthracene	<0.05	0.05	100	50-140	91	50-140
Fluoranthene	<0.05	0.05	95	50-140	95	50-140
Pyrene	<0.05	0.05	93	50-140	91	50-140
Benzo [a] anthracene	<0.05	0.05	109	50-140	109	50-140
Chrysene	<0.05	0.05	98	50-140	99	50-140
Benzo [b] fluoranthene	<0.05	0.05	103	50-140	87	50-140
Benzo [k] fluoranthene	<0.05	0.05	102	50-140	93	50-140
Benzo [a] pyrene	<0.05	0.05	112	50-140	97	50-140
Indeno [1,2,3-cd] pyrene	<0.1	0.1	119	50-140	109	50-140
Dibenzo [a,h] anthracene	<0.1	0.1	114	50-140	102	50-140
Benzo [g,h,i] perylene	<0.1	0.1	111	50-140	105	50-140
Surrogates						
Parameter	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**
Naphthalene-d8	107	50-140	133	50-140	103	50-140
Phenanthrene-d10	82	50-140	70	50-140	68	50-140
Chrysene-d12	115	50-140	87	50-140	83	50-140

LEGEND:

RL - Reporting Limit

MS - Matrix Spike

AR - Acceptable Range

LCS - Laboratory Control Sample

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
PAHs in Soil						
Naphthalene	0.0	0-40				
2-Methylnaphthalene	0.0	0-40				
1-Methylnaphthalene	0.0	0-40				
Acenaphthylene	0.0	0-40				
Acenaphthene	0.0	0-40				
Fluorene	0.0	0-40				
Phenanthrene	0.0	0-40				
Anthracene	0.0	0-40				
Fluoranthene	0.0	0-40				
Pyrene	0.0	0-40				
Benzo [a] anthracene	0.0	0-40				
Chrysene	0.0	0-40				
Benzo [b] fluoranthene	0.0	0-40				
Benzo [k] fluoranthene	0.0	0-40				
Benzo [a] pyrene	0.0	0-40				
Indeno [1,2,3-cd] pyrene	0.0	0-40				
Dibenzo [a,h] anthracene	0.0	0-40				
Benzo [g,h,i] perylene	0.0	0-40				
Surrogates						
Parameter	**Recovery (%)**	**AR**				
Naphthalene-d8	104	50-140				
Phenanthrene-d10	87	50-140				
Chrysene-d12	96	50-140				

LEGEND:

AR - Acceptable Range

RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-3*** BH 1 0.75-1.20m					**Soil Standards** *
pH *(pH unit)*	7.12					(5-11) 5-9

* Surface soil pH value from 5 - 9, Sub-surface soil pH value from 5-11.

QA/QC Report

Parameter	**LCS**	**AR**	**Duplicate**	**AR**		
	Absolute Difference *(pH Unit)*					
pH *(pH unit)*	7.00	6.90-7.20	0.05	<0.3		

LEGEND:

LCS - Laboratory Control Sample

AR - Acceptable Range

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-3*** BH 1 0.75-1.20m	***19-2728-5*** BH 3 0.75-1.20m	***19-2728-8*** BH 6 0.75-1.20m			**Soil Standards [1]**
SAR *(no unit)*	0.36	0.05	0.20			12

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;
Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;
Industrial/Commercial/Community Property use (**I/C/C**);
( ) Standard value in brackets applies to medium and fine textured soils.

QA/QC Report

Parameter	**LCS**	**AR**	**Duplicate**	**AR**		
			RPD (%)			
SAR *(no unit)*	0.39	0.30-0.50	1.2	0-30		

LEGEND:

LCS - Laboratory Control Sample

AR - Acceptable Range

RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-3*** BH 1 0.75-1.20m	***19-2728-5*** BH 3 0.75-1.20m	***19-2728-8*** BH 6 0.75-1.20m			**Soil Standards** [1]
EC *(mS/cm)*	0.26	0.15	0.13			1.4

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition;
Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition;
Industrial/Commercial/Community Property use (**I/C/C**);
( ) Standard value in brackets applies to medium and fine textured soils.

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**Duplicate**	**AR**
			Recovery (%)		**RPD (%)**	
EC *(mS/cm)*	<0.01	0.01	104	90-110	2.3	0-10

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, PHCs, VOCs, PAHs, pH, EC, SAR
Sample Description:	2 Water and 6 Soil Samples

Parameter	***19-2728-3*** BH 1 0.75-1.20m	***19-2728-4*** BH 2 0.00-0.60m	***19-2728-5*** BH 3 0.75-1.20m	***19-2728-6*** BH 4 0.75-1.20m	***19-2728-7*** BH 5 0.75-1.20m	***19-2728-8*** BH 6 0.75-1.20m
Moisture Content (%)	10	12	12	11	13	14

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**Duplicate**	**AR**
			Recovery (%)		**RPD (%)**	
Moisture Content (%)	<0.1	0.1	99	70-130	1.0	0-20

LEGEND:

RL - Reporting Limit

LCS - Laboratory Control Sample

AR - Acceptable Range

RPD - Relative Percent Difference