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Supplemental
Phase II Environmental Site Assessment

1125 – 1149 Cyrville Road
City of Ottawa, Ontario

Prepared For

Westrich Pacific Group

November 12, 2021

Report: PE5498-1

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the property addressed 1125 to 1149 Cyrville Road, in the Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) that were identified during the previous Phase I ESAs and Phase I ESA Update and considered to result in areas of potential environmental concern (APECs) on the Phase II ESA Property.

The subsurface investigations conducted for this Phase II ESA consisted of three (3) field drilling programs that were conducted in 2007, 2011 and 2020. The 2007 field program consisted of drilling eight (8) boreholes (BH1-07 through BH8-07) in the immediate area of the former garage and UST. No monitoring wells were installed during the 2007 program. The 2011 field program consisted of drilling 12 boreholes (BH1 through BH12), three (3) of which were completed as groundwater monitoring wells (BH1, BH2 and BH12). The 2020 field program consisted of drilling four (4) boreholes, three (3) of which were completed as groundwater monitoring wells (BH3-20, BH4-20 and BH6-20).

The general soil profile encountered during the field programs consisted of an asphaltic concrete pavement structure, topsoil or fill (crushed stones), followed by a fill material consisting of silty sand with some gravel or silty clay with sand, underlain by topsoil or silty clay, followed by silty sand with shale fragments, underlain by shale bedrock.

Nineteen (19) soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F_1-F_4, volatile organic compounds (VOCs) and/or metals (including lead (Pb), mercury (Hg) and hexavalent chromium (CrVI)). BTEX and PHC concentrations above the MECP Table 7 Residential Standards were identified in the soil samples in the immediate area of the former UST nest. Metal concentrations above the selected MECP standards were generally identified in the fill material on the south-central portion of the site. All of the other soil samples complied with the MECP Table 7 Residential Standards.

Groundwater samples from monitoring wells BH1, BH2, BH12, BH3-20, BH4-20 and BH6-20 were collected during the August 2011, March 2020 and November 2021 sampling events. No free product or petroleum hydrocarbon sheen was noted on the purge water during the groundwater sampling events.

Groundwater samples were analyzed for BTEX, PHC and VOCs, with the exception of the groundwater sample BH3-20, collected on November 3, 2021.

Concentrations of BTEX, PHCs and 1-4 dichlorobenzene in excess of the MECP Table 7 Standards were identified in the immediate area of the former UST nest. All of the other groundwater samples complied with the selected MECP Standards.

Benzene was marginally in excess of the standard in the November 3, 2021 groundwater sample from BH3-20, while the duplicate sample concentration was not detected above the laboratory limit. It is expected that sediment was present in this groundwater sample. The groundwater at BH3-20 should be retested for confirmatory purposes.

Recommendations

Soil and Groundwater

Based on the findings of the Phase II ESA, it is recommended that a soil and groundwater remediation program be carried out at the Phase II Property. The remediation should be completed in conjunction with the construction excavation. It is anticipated that the impacted groundwater will be removed in conjunction with the excavation and removal of the impacted soil and upper levels of the underlying bedrock.

Prior to remedial activities, it is recommended that a representative sample of impacted soil be submitted for a leachate analysis in accordance with O.Reg. 347/558, as required for disposal at an approved landfill site. It is recommended that Paterson personnel be on-site at the time of the remedial activities to direct excavation and segregation of impacted soil, and to collect additional delineation and confirmatory soil samples as required in accordance with O.Reg. 153/04 to support the filing of a Record of Site Condition.

Excess Soil

Excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19: On-site and Excess Soil Management. Further information regarding this regulation can be provided upon request.

Monitoring Wells

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned according to Ontario Regulation 903 (Ontario Water Resources Act), however, we recommend that the wells be maintained for future sampling purposes. The monitoring wells are registered with the MECP under this regulation. Further information can be provided upon request in this regard.

1.0 INTRODUCTION

At the request of Westrich Pacific Group, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment at 1125 to 1149 Cyrville Road (the Phase II ESA Property), in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address areas of potential environmental concern (APECs) identified on the Phase II ESA Property, during the Phase I ESA Update conducted by Paterson in November of 2021. It should be noted that Paterson completed Paterson completed a Phase I-II ESA in 2007, 2011 and 2020. This report includes the results of the 2007, 2011 and 2020 subsurface investigations.

1.1 Site Description

Address:	1125 to 1149 Cyrville Road, Ottawa, Ontario
Location:	The subject site located on the north side of Cyrville Road, approximately 155 m east of Cyrville Road, in the City of Ottawa, Ontario. Refer to Figure 1 - Key Plan in the Figures section following the text.
Legal Description:	Part of Lot 27, Concession 2; Parts 2, 3, 4, 5, 6, and 7 on Registered Plan 4R-10638 and Parts 1 and 2 on Registered Plan 5R-8627, in City of Ottawa.
Latitude and Longitude:	45° 25' 26.96" N, 75° 37' 58.41" W

Site Description:

Configuration:	Irregular
Area:	8,470 m^2 (approximately)
Zoning:	MC –Mixed-use Zone.

1.2 Property Ownership

Paterson was engaged to conduct this Phase I-ESA by Mr. David Sanche of Westrich Pacific Corporation. The head office is located at 10309 102 Avenue, Edmonton, Alberta. Mr. Sanche can be reached by telephone at (780) 438-8811.

1.3 Current and Proposed Future Uses

The Phase II ESA Property is currently vacant land, formerly used for commercial and residential purposes.

It is our understanding that the Phase II ESA Property will be redeveloped with two (2) residential buildings with a total of 354 residential units. Due to the change in land use to a more sensitive land use (commercial to residential), a record of site condition (RSC) will be required as per O.Reg 154/03.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 7 of the document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", prepared by the Ontario Ministry of Environment, Conservation and Parks (MECP), April 2011. The MECP selected Table 7 Standards are based on the following considerations:

- ❒ Coarse-grained soil conditions
- ❒ Generic Site Condition for Shallow Soils
- ❒ Non-potable groundwater conditions
- ❒ Residential land use

Section 35 of O.Reg. 153/04 does apply to the Phase II ESA Property in that the property does not rely upon potable groundwater.

Section 41 of O.Reg. 153/04 does not apply to the Phase II ESA Property, as the property is not within 30m of an environmentally sensitive area.

Section 43.1 of O.Reg. 153/04 does apply to the Phase II ESA Property in that the property is a Shallow Soil property.

The intended use of the Phase II ESA Property is residential; therefore, the Residential Standards have been selected for the purpose of this Phase II ESA.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II ESA Property is addressed 1125 – 1149 Cyrville Road, which is located on the north side of Cyrville Road, approximately 155 m east of the Cyrville Road and Olgilvie Road intersection, in the City of Ottawa, Ontario. The site is situated an urban mixed-used area.

The Phase II ESA Property exists as vacant land with a temporary MOD space/trailer on the central west portion of the site as well as a small sea container situated on the northern end of the lot. Three (3) hydro poles are also present on the central portion of the site.

The majority of the land is covered in gravel with some low brush and three (3) asphaltic concrete paved laneways situated where the former buildings (residential dwellings) were once present, fronting Cyrville Road.

Site drainage consists primarily of infiltration. The site topography is relatively flat and slightly below the grade of Cyrville Road, while the regional topography slopes down in a southwesterly direction.

2.2 Past Investigations

Phase I ESA Update for the Phase II ESA Property. Based on the findings of the Phase I ESA Update, six (6) potentially contaminating activities (PCAs) were determined to result in areas of potential environmental concern (APECs) on the Phase II ESA Property.

These PCAs are summarized in Table 1, along with their respective locations and contaminants of potential concern (CPCs).

Table 1: Potentially Contaminating Activities and Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1: Former automotive service garage	Northwest corner of the Phase I ESA Property (east side of the former garage)	PCA 52 - Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	On-site	BTEX PHCs (F_1-F_4)	Soil Groundwater
APEC 2: Former underground storage tank (UST)	Northwest corner of the Phase I ESA Property (east side of the former office garage)	PCA 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHCs (F_1-F_4)	Soil Groundwater

Table 1: Potentially Contaminating Activities and Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 3: Heavy metal impacted fill material	South central portion of the site	PCA 30 - Importation of Fill Material of Unknown Quantity	On-site	Metals	Soil
APEC 4: Dry cleaners at 1060 Ogilvie Road (1097-1099 Cyrville Road)	Southwest corner of the Phase I ESA Property	PCA 37 - Operation of Dry Cleaning Equipment (where chemicals are used)	Off-site	VOCs	Groundwater
APEC 5: Former retail fuel outlet at 1150 Cyrville Road	Southeast corner of the Phase I ESA Property	PCA 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F_1-F_4)	Groundwater
APEC 6: Former retail fuel outlet at 1098 Ogilvie Road	Northern portion of the Phase I ESA Property	PCA 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F_1-F_4)	Soil Groundwater

Three (3) subsurface investigations were completed in 2007, 2011 and 2020 to address the aforementioned APECs. This Phase II ESA report includes all of our findings from these investigations to address the APECs on the Phase II Property.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigations were conducted in July 2007, August 2011 and February 2020. The 2007 field program consisted of drilling eight (8) boreholes (BH1-07 through BH8-07) in the immediate area of the former garage and UST. No monitoring wells were installed during the 2007 program.

The 2011 field program consisted of drilling 12 boreholes (BH1 through BH12), three (3) of which were completed as groundwater monitoring wells (BH1, BH2 and BH12).

The 2020 field program consisted of drilling four (4) boreholes, three (3) of which were completed as groundwater monitoring wells (BH3-20, BH4-20 and BH6-20).

Boreholes were drilled to a maximum depth of 5.79 m below the ground surface (mbgs).

3.2 Media Investigated

During the subsurface investigation, soil samples and groundwater samples were obtained and submitted for laboratory analysis. The rationale for sampling and analyzing this media is based on the Contaminants of Potential Concern identified in the Phase I ESA.

Contaminants of potential concern on the Phase II ESA Property include benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), volatile organic compounds (VOCs) and metals (including lead (PB), mercury (Hg) and hexavalent chromium (CrVI). These CPCs may be present in the soil and/or groundwater beneath the Phase II ESA Property.

3.3 Phase I Conceptual Site Model

According to the Geological Survey of Canada website on the Urban Geology of the National Capital Area was consulted as part of this assessment. Based on the information from NRCAN, bedrock in the area of the site consists of shale of the Billings Formation. Based on the maps, the thickness of overburden ranges from 0 to 3 m and consists of till.

Based on the regional topography, groundwater beneath the Phase I ESA Property is expected to flow in a southwesterly direction.

Existing Buildings and Structures

The Phase I ESA Property is vacant land with no permanent buildings. A temporary trailer, sea container and three (3) hydro poles are present on-site.

Subsurface Structures and Utilities

The Phase I ESA Property is situated in a municipally serviced area. Underground utilities and/or structures are not expected to be present on-site.

Fill Material

As noted previously identified in the original Phase I ESA report, fill material was identified at various locations on the Phase I ESA Property, during a previous Phase II-ESA. The fill generally consists of silty sand with gravel or crushed stone. Analytical testing of the fill material (2007) identified concentrations of BTEX parameters and petroleum hydrocarbons (PHCs) in the vicinity of the former UST, exceeding the MECP Table 7 Standards. Metals (cadmium, lead, mercury and zinc) concentration exceeding the Table 7 standard was also identified (2011) at BH8.

Areas of Natural Significance

No area of natural significance is present on the Phase I ESA Property or within the Phase I Study Area.

Water Bodies

There are no natural bodies of water on the Phase I ESA Property or within the Phase I Study Area.

Drinking Water Wells

There are no drinking water wells on-site, nor are any expected to be present on-site.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area consists primarily of commercial with some residential and institutional properties.

Potentially Contaminating Activities and Areas of Potential Environmental Concerns

Based on the findings of the Phase I ESA, there are historical on-site and off-site potentially contaminating activities (PCAsza) that are considered to represent areas of potential environmental concern (APECs) on the Phase I ESA Property.

These PCAs are summarized along with their respective locations and contaminants of potential concern (CPCs) in Table 1, in Section 2.2 of this report

Contaminants of Potential Concern

Based on the APECs identified on the Phase I ESA Property, the contaminants of potential concern (CPCs) in soil and/or groundwater are:

- ❒ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- ❒ Petroleum Hydrocarbons (PHCs, F1-F4);
- ❒ Volatile Organic Compounds (VOCs);
- ❒ Metals, including hydride forming compounds (arsenic, antimony and selenium).

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I-ESA Update is considered to be sufficient to conclude that there are PCAs that have resulted in APECs on the Phase I ESA Property.

A variety of independent sources were consulted as part of this assessment, and as such, the conclusions of this report are not affected by uncertainty which may be present with respect to the individual sources.

3.4 Deviations from Sampling and Analysis Plan

There were no deviations from the Sampling and Analysis Plan, which is included in Appendix 1 of this report.

3.5 Impediments

During the most recent sampling event in November 2021, the groundwater monitoring wells BH4-20 and BH6-20 could not be located and as such, no groundwater samples were acquired to retest for VOCs and PHCs. BH3-20 was the only monitoring well available for resampling.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigations conducted for this Phase II ESA consisted of three (3) field drilling programs that were conducted in 2007, 2011 and 2020.

The 2007 field program consisted of drilling eight (8) boreholes (BH1-07 through BH8-07) in the immediate area of the former garage and UST. No monitoring wells were installed during the 2007 program.

The 2011 field program consisted of drilling 12 boreholes (BH1 through BH12), three (3) of which were completed as groundwater monitoring wells (BH1, BH2 and BH12).

The 2020 field program consisted of drilling four (4) boreholes, three (3) of which were completed as groundwater monitoring wells (BH3-20, BH4-20 and BH6-20).

The boreholes were drilled to a maximum depth of 5.79 m below ground surface (bgs) to intercept groundwater.

The boreholes were drilled using a either a track mounted drill rig or a low clearance track mounted drill rig operated by George Downing Estate Drilling of Hawkesbury, Ontario, under full-time supervision of Paterson personnel. The borehole locations are indicated on the attached Drawing PE5498-3 - Test Hole Location Plan.

4.2 Soil Sampling

A total of 74 soil samples and eight (8) rock core samples were obtained from the boreholes by means of grab sampling from auger flights/auger samples and split spoon sampling. Split spoon samples were taken at approximate 0.76 m intervals.

The depths at which auger samples, split spoon, and rock core samples were obtained from the boreholes are shown as “**AU**”, “**SS**” and “**RC**”, respectively on the Soil Profile and Test Data Sheets.

The borehole profiles generally consisted of an asphaltic concrete pavement structure, topsoil or fill (crushed stone), followed by a fill material consisting of silty sand with some gravel or silty clay with sand, underlain by topsoil or silty clay, followed by silty sand with shale fragments, underlain by shale bedrock.

4.3 Field Screening Measurements

Soil samples recovered at the time of sampling were placed immediately into airtight plastic bags with nominal headspace. All lumps of soil inside the bags were broken by hand, and the soil was allowed to come to room temperature prior to conducting the vapour survey. Allowing the samples to stabilize to room temperature ensures consistency of readings between samples.

A gastech, calibrated to Hexane, was used to measure the combustible vapour concentrations in the headspace of all soil samples obtained from the boreholes. The soil vapours were measured by inserting the analyzer probe into the nominal headspace above the soil sample. Samples were then agitated, and the peak readings recorded.

The combustible vapour readings were in the range of 5 to 40 ppm in the soil samples obtained, which are not considered to be indicative of potential hydrocarbon impacts. A petroleum hydrocarbon odour was noted in some of the soil samples obtained from BH3-20, BH4-20 and BH6-20 at approximately 3 m below the ground surface (mbgs). No obvious staining was observed any of the soil samples obtained.

Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

4.4 Groundwater Monitoring Well Installation

Six (6) groundwater monitoring wells were installed on the Phase II ESA Property as part of the 2011 and 2020 subsurface investigations. The monitoring wells consisted of 32 mm diameter, Schedule 40 threaded PVC risers and screens. Monitoring well construction details are listed below in Table 2 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Borehole locations and elevations were surveyed geodetically by Paterson personnel.

TABLE 2: Monitoring Well Construction Details

Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1	68.67	4.75	3.29-4.75	2.45-4.75	0.13-2.45	Flushmount
BH2	69.50	5.69	2.69-5.69	2.40-5.69	0.13-2.40	Flushmount
BH12	70.25	5.61	2.61-5.61	2.00-5.61	0.13-2.00	Flushmount
BH3-20	69.35	5.79	2.79-5.79	2.42-5.79	0.13-2.42	Flushmount
BH4-02	68.62	5.18	2.185-5.18	1.80-5.18	0.13-1.80	Flushmount
BH6-02	68.77	5.05	2.05-5.05	1.60-5.05	0.13-1.60	Flushmount

4.5 Groundwater Sampling

Groundwater sampling protocols were followed using the MECP document entitled “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario”, dated May 1996. Groundwater samples were obtained from each monitoring well, using dedicated sampling equipment. Standing water was purged from each well prior to sampling. Samples were stored in coolers to reduce analyte volatilization during transportation. Details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan in Appendix 1.

4.6 Analytical Testing

Based on the guidelines outlined in the Sampling and Analysis Plan appended to this report, the following soil and groundwater samples, as well as analyzed parameters are presented in Tables 3 and 4.

TABLE 3: Soil Samples Submitted and Analyzed Parameters

Sample ID	Sample Depth / Stratigraphic Unit	Parameters Analyzed							Rationale
		BTEX	VOCs	PHCs (F1-F4)	Metals	Hg	CrVI	Pb	
July 11, 2007									
BH1-SS2	0.76-1.15m Fill	X		X					Assess the potential soil impacts due to the former UST located on-site and the former retail fuel outlet off-site.
BH2-AU1	0.5-0.61m Fill	X		X					Assess the potential soil impacts due to the former UST located on-site.

TABLE 3: Soil Samples Submitted and Analyzed Parameters

Sample ID	Sample Depth / Stratigraphic Unit	Parameters Analyzed							Rationale
		BTEX	VOCs	PHCs (F1-F4)	Metals	Hg	CrVI	Pb	
BH2-SS2	0.76-1.32m Fill	X		X					Assess the potential soil impacts due to the former UST located on-site.
BH4-SS2/SS3	0.76-1.57m Native (shale)	X		X					Assess the potential soil impacts due to the former UST and garage located on-site.
BH5-SS2	0.76-1.32m Fill	X		X					Assess the potential soil impacts due to the former UST situated on-site.
August 17, 2011									
BH1-SS2	0.76-1.37m Fill	X		X					Assess the potential soil impacts due to the former UST and garage located on-site.
BH2-SS2	0.76-1.37m Fill		X						Assess the potential soil impacts due to the dry-cleaners located off-site.
BH7-SS1	0.0-0.6m Fill							X	Assess the quality of the fill material.
BH8-SS1	0.76-1.37m Fill				X	X	X	X	Assess the quality of the fill material.
BH9-SS2	0.76-1.37m Fill							X	Assess the quality of the fill material.
BH10-SS2	0.76-1.37m Fill				X	X	X	X	Assess the quality of the fill material.
BH12-SS2	0.76-1.37m Fill	X		X					Assess the potential soil impacts due to the former retail fuel outlet located off-site.
February 21, 2020									
BH3-20-SS2	0.76-1.37m Fill				X	X	X	X	Assess the quality of the fill material.
BH4-20-SS2A	0.76-1.37m Fill, silty sand	X		X	X	X	X	X	Assess the potential soil impact due to former UST and garage on-site as well as the quality of the fill material.
BH5-20-AU1	0.0-0.6m Fill				X	X	X	X	Assess the quality of the fill material.
BH5-20-SS3/SS4	0.76-1.37m Silty Sand	X		X	X	X	X	X	Assess the potential soil impact due to former UST and garage as well as the quality of the fill material.
BH6-20-AU1	0.0-0.6m Fill				X	X	X	X	Assess the quality of the fill material.

TABLE 4: Groundwater Samples Submitted and Analyzed Parameters

Sample ID	Screened Interval	Parameters Analyzed			Rationale
		BTEX	PHCs (F1-F4)	VOCs	
July 12, 2007					
MW1-GW1	1.07-4.57m	X	X	X	Assess potential groundwater impacts due to the former UST and garage located on-site.
August 22, 2011					
BH1-GW1	3.29-4.75m	X	X	X	Assess potential groundwater impacts due to the former UST and garage located on-site.
BH2-GW1	2.69-5.69m	X		X	Assess potential groundwater impacts due to the dry-cleaners off-site.
BH12-GW1	2.61-5.61m	X	X		Assess the potential groundwater impacts due to the former retail fuel outlet located off-site.
March 3, 2020					
BH3-20-GW1	2.79-5.79m		X		Assess the potential groundwater impacts due to the former retail fuel outlet located off-site.
BH4-20-GW1	2.18-5.18m		X		Assess potential groundwater impacts due to the former UST and garage located on-site.
BH6-20-GW1	2.05-5.05m		X		Assess potential groundwater impacts due to the former UST and garage located on-site.
November 2 & 3, 2021					
BH3-20	2.79-5.79m	X	X		Assess the potential groundwater impacts due to the former retail fuel outlet located off-site.
DUP*	2.79-5.79m	X	X		Duplicate groundwater sample from BH3-20 for QA/QC purposes.

Notes:
- Only PHC – F1 was analyzed.

Paracel Laboratories (Paracel), of Ottawa, Ontario, performed the laboratory analysis on the samples submitted for analytical testing. Paracel is a member of the Standards Council of Canada/Canadian Association for Laboratory Accreditation (SCC/CALA). Paracel is accredited and certified by SCC/CALA for specific tests registered with the association.

4.7 Residue Management

All soil cuttings, purge water and fluids from equipment cleaning were retained on-site.

4.8 Elevation Surveying

Boreholes were surveyed at geodetic elevations by Paterson personnel.

4.9 Quality Assurance and Quality Control Measures

A summary of quality assurance and quality control (QA/QC) measures, including sampling containers, preservation, labelling, handling, and custody, equipment cleaning procedures, and field quality control measurements is provided in the Sampling and Analysis Plan in Appendix 1.

5.0 REVIEW AND EVALUATION

5.1 Geology

The soil profile consists of an asphaltic concrete pavement structure, topsoil or fill (crushed stones), followed by a fill material consisting of silty sand with some gravel or silty clay with sand, underlain by topsoil or silty clay, followed by silty sand with shale fragments, underlain by shale bedrock.

Bedrock was encountered at depths ranging from approximately 0.65 to 1.83 m below grade. Bedrock was cored to a maximum depth of 5.79 m below grade.

Groundwater was encountered within the overburden at depths ranging from approximately 0.46 to 2.38 mbgs.

Site geology details are provided in the Soil Profile and Test Data Sheets provided in Appendix 1.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling events on August 22, 2011 and on March 3 of 2020 using an electronic water level meter. Groundwater levels are summarized below in Table 5.

TABLE 5: Groundwater Level Measurements				
Borehole Location	**Ground Surface Elevation (m)**	**Water Level Depth (m below grade)**	**Water Level Elevation (m ASL)**	**Date of Measurement**
BH1	68.67	2.29	66.38	August 22, 2011
BH2	69.50	2.94	66.56	August 22, 2011
BH12	70.25	3.29	66.96	August 22, 2011
BH3-20	69.35	2.38	66.97	March 3, 2020
BH4-20	68.62	1.23	67.39	March 3, 2020
BH6-20	68.77	0.46	68.31	March 3, 2020
BH3-20	69.35	2.05	67.30	November 2, 2021

Based on the groundwater elevations measured during the March 2020 sampling event, groundwater contour mapping was completed. Groundwater contours are shown on Drawing PE5498-3. Based on the contour mapping, groundwater flow at the subject site is in a southwesterly direction. A horizontal hydraulic gradient of approximately 0.037m/m was calculated.

5.3 Fine-Coarse Soil Texture

Grain-size analysis was not completed for the Phase II ESA Property. As such, the more stringent, coarse-grained soil standards were used.

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in vapour readings ranging from 11.7 to 12.3 ppm. The field screening results of each individual soil sample are provided on the Soil Profile and Test Data Sheets appended to this report.

5.5 Soil Quality

Nineteen (19) soil samples were submitted for BTEX, PHCs (F1-F4), VOCs and/or metals (including mercury, hexavalent chromium and lead) analysis. The results of the analytical testing from 2007, 2011 and 2020 are presented below in Tables 6, 7 and 8. The laboratory certificates of analysis are provided in Appendix 1.

TABLE 6: Analytical Test Results (July 2007)
Soil – BTEX and PHC (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g) July 11, 2007					MECP Table 7 Residential Standards (µg/g)
		BH1 SS2	BH2 AU1	BH2 SS2	BH4 SS2/SS3	BH5 SS2	
Benzene	0.03	0.04	0.17	**0.33**	**2.82**	nd	0.21
Toluene	0.05	0.12	0.11	0.25	0.31	0.16	2.3
Ethylbenzene	0.05	nd	0.16	0.28	1.17	0.06	2
Xylenes	0.10	0.09	0.5	1.14	**7.16**	0.93	3.1
PHC F_1	20	nd	40	**100**	**100**	30	55
PHC F_2	10	**103**	54	**201**	**192**	**151**	98
PHC F_3	10	207	**478**	**368**	**450**	215	300
PHC F_4	10	16	401	296	630	173	2800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined** – Parameters exceed the MECP table 7 standards

Several of the soil samples analyzed as part of the 2007 subsurface investigation identified PHC and/or BTEX parameters in excess of MECP Table 7 Residential Standards.

TABLE 6 Continued: Analytical Test Results (August 2011)
Soil – BTEX and PHC (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g)		MECP Table 7 Residential Standards (µg/g)
		BH1-SS2 16-Aug-2011	BH12-SS2 17-Aug-2011	
Benzene	0.02	nd	nd	0.21
Toluene	0.05	nd	nd	2.3
Ethylbenzene	0.05	nd	nd	2
Xylenes	0.05	nd	nd	3.1
PHC F_1	10	nd	nd	55
PHC F_2	10	nd	nd	98
PHC F_3	10	nd	nd	300
PHC F_4	10	nd	nd	2800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – Parameter not tested

No detectable BTEX and PHC concentrations were identified in the soil samples analyzed from the 2011 subsurface investigation. The test results were in compliance with MECP Table 7 Residential Standards.

TABLE 6 Continued: Analytical Test Results (February 2020)
Soil – BTEX and PHCs (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g) February 21, 2020		MECP Table 7 Residential Standards (µg/g)
		BH4-20-SS2A	BH5-20 SS3/SS4	
Benzene	0.02	nd	0.12	0.21
Toluene	0.05	nd	**2.93**	2.3
Ethylbenzene	0.05	nd	0.88	2
Xylenes	0.05	nd	**17.7**	3.1
PHC F_1	7	nd	**308**	55
PHC F_2	4	nd	**129**	98
PHC F_3	8	51	166	300
PHC F_4	6	nd	72	2800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined** – Parameters exceed the MECP Table 7 standards

The BTEX and PHC parameter concentrations identified in BH4-20 comply with the MECP Table 7 residential standards. Concentrations of toluene, xylenes and PHCs (F_1-F_3) in the soil sample analyzed from BH5-20-SS3/SS4 exceed the applicable MECP Table 7 Residential Standards.

TABLE 7: Analytical Test Results (August 2011)
Soil – Metals

Parameter	MDL (µg/L)	Soil Samples (µg/g) August 17, 2011		MECP Table 7 Residential Standards
		BH8-SS1	BH10-SS2	
Antimony	1	nd	nd	7.5
Arsenic	1	11	2	18
Barium	1	120	96	390
Beryllium	0.5	nd	nd	4
Boron (total)	5	6.2	nd	120
Cadmium	0.5	**4.1**	nd	1.2
Chromium	5	24	22	160
Chromium (VI)	0.4	nd	nd	8
Cobalt	1	12	9	22
Copper	5	49	42	140
Lead	1	**143**	53	120
Mercury	0.1	**0.5**	nd	0.27
Molybdenum	1	6	2	6.9
Nickel	5	43	29	100
Selenium	1	1	nd	2.4
Silver	0.3	nd	nd	20
Thallium	1	nd	nd	1
Uranium	1	4	2	23
Vanadium	10	29	28	86
Zinc	20	**711**	61	340

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined** – Parameters exceed the MECP Table 7 standards

The identified metal parameter concentrations in the soil sample analyzed from BH10 were in compliance with MECP Table 7 Residential Standards. Several of the metal parameter concentrations identified in the soil sample analyzed from BH8 exceeded MECP Table 7 standards for residential use.

TABLE 7 Continued: Analytical Test Results (February 2020)
Soil – Metals, Hg, CrVI and Pb

Parameter	MDL (µg/g)	Soil Samples (µg/g) February 21, 2020			MECP Table 7 Residential Standards (µg/g)
		BH3-20-SS2	BH4-20-SS2A	BH5-20-AU1	
Antimony	1.0	1.1	nd	nd	7.5
Arsenic	1.0	8.2	6.0	6.1	18
Barium	1.0	193	163	103	390
Beryllium	0.5	0.7	nd	nd	4
Boron	5.0	6.2	6.1	5.4	120
Cadmium	0.5	0.9	nd	nd	1.2
Chromium	5.0	29.1	37.2	27.6	160
Chromium VI	0.2	nd	nd	nd	8
Cobalt	1.0	7.9	9.6	8.0	22
Copper	5.0	31.8	30.3	30.3	140
Lead	1.0	**337**	42.0	25.7	120
Mercury	0.1	**6.9**	nd	0.2	0.27
Molybdenum	1.0	2.2	2.6	2.6	6.9
Nickel	5.0	25.7	33.0	24.3	100
Selenium	1.0	nd	nd	nd	2.4
Silver	0.3	nd	nd	nd	20
Thallium	1.0	nd	nd	nd	1
Uranium	1.0	1.3	nd	nd	23
Vanadium	10.0	29.4	36.9	36.5	86
Zinc	20.0	**366**	166	53.2	340

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined** – Parameters exceed the MECP Table 7 standards

TABLE 7 Continued: Analytical Test Results (February 2020)
Soil – Metals

Parameter	MDL (µg/g)	Soil Samples (µg/g) February 21, 2020		MECP Table 7 Residential Standards (µg/g)
		BH5-20 SS3/SS4	BH6-20 AU1	
Antimony	1.0	nd	1.5	7.5
Arsenic	1.0	10.4	4.8	18
Barium	1.0	144	121	390
Beryllium	0.5	0.9	0.5	4
Boron	5.0	11.6	10.0	120
Cadmium	0.5	0.6	0.6	1.2
Chromium	5.0	26.2	20.1	160
Chromium VI	0.2	nd	nd	8
Cobalt	1.0	16.3	6.5	22
Copper	5.0	56.1	85.6	140
Lead	1.0	21.5	91.7	120
Mercury	0.1	0.1	nd	0.27
Molybdenum	1.0	**10.3**	2.4	6.9
Nickel	5.0	68.2	20.1	100
Selenium	1.0	1.2	nd	2.4
Silver	0.3	nd	nd	20
Thallium	1.0	nd	nd	1
Uranium	1.0	4.4	1.1	23
Vanadium	10.0	41.7	23.9	86
Zinc	20.0	102	84.8	340

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined** – Parameters exceed the MECP Table 7 standards

The metal parameter concentrations identified in the soil samples analyzed from BH4-20 and BH6-20 were in compliance with MECP Table 7 Residential Standards. However, some of the metal parameter concentrations identified in soil samples analyzed from BH3-20 and BH5-20 exceeded the MECP Table 7 Residential Standards.

TABLE 8: Analytical Test Results (August 2011)
Soil – Lead (Pb)

Parameter	MDL (µg/g)	Soil Samples (µg/g) August 17, 2011				MECP Table 7 Residential Standards (µg/g)
		BH3-SS2	BH6-AU1	BH7-SS1	BH9-SS2	
Lead	1.0	70	28	68	5	120

Notes:
- MDL – Method Detection Limit

Lead concentrations were identified in the fill material assessed in 2011. All of the lead concentrations were in compliance of the MECP Table 7 Residential Standards.

TABLE 9: Analytical Test Results (August 2011)
Soil – Volatile Organic Compounds (VOCs)

Parameter	MDL (µg/g)	Soil Samples (µg/g)	MECP Table 7 Residential Standards (µg/g)
		BH2-SS2 16-Aug-2011	
Acetone	0.5	nd	16
Benzene	0.02	nd	0.32
Bromodichloromethane	0.05	nd	18
Bromoform	0.05	nd	0.61
Bromomethane	0.05	nd	0.05
Carbon Tetrachloride	0.05	nd	0.21
Chlorobenzene	0.05	nd	2.4
Chloroform	0.05	nd	0.47
Dibromochloromethane	0.05	nd	13
1,2-Dichlorobenzene	0.05	nd	6.8
1,3-Dichlorobenzene	0.05	nd	9.6
1,4-Dichlorobenzene	0.05	nd	0.2
Dichlorodifluoromethane	0.05	nd	16
1,1-Dichloroethane	0.05	nd	17
1,2-Dichloroethane	0.05	nd	0.05
1,1-Dichloroethylene	0.05	nd	0.064
cis-1,2-Dichloroethylene	0.05	nd	55
trans-1,2-Dichloroethylene	0.05	nd	1.3
1,2-Dichloropropane	0.05	nd	0.16
1,3-Dichloropropylene	0.05	nd	0.18
1,4-Dioxane	0.05	nd	1.8
Ethylbenzene	0.05	nd	9.5
Ethylene dibromide	0.05	nd	0.05
Hexane (n)	0.05	nd	46
Methyl Ethyl Ketone	0.5	nd	70
Methyl Isobutyl Ketone	0.5	nd	31
Methyl tert-Butyl Ether (MTBE)	2	nd	11
Methylene Chloride	0.2	nd	1.6
Styrene	0.05	nd	34
1,1,1,2-Tetrachloroethane	0.05	nd	0.087
1,1,2,2-Tetrachlorethane	0.05	nd	0.05
Tetrachloroethylene	0.05	nd	4.5
Toluene	0.05	nd	68
1,1,1-Trichloroethane	0.05	nd	6.1
1,1,2-Trichloroethane	0.05	nd	0.05
Trichloroethylene	0.05	nd	0.91
Trichlorofluoromethane	0.05	nd	4
Vinyl Chloride	0.02	nd	0.032
Xylenes	0.05	nd	26

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

No detectable VOC parameter concentrations were identified in Soil Sample BH2-SS2 during the 2011 subsurface program. The soil sample was in compliance with MECP Table 7 Residential Standards.

The analytical results for BTEX, PHCs, VOCs and Metals tested in soil are shown on Drawing PE5498-4 – Analytical Testing Plan – Soil.

The maximum concentrations of analyzed parameters in the soil at the site are summarized below in Table 10.

TABLE 10: Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Borehole	Depth Interval (m BGS)
Benzene	**2.82**	BH4-SS2/SS3	0.76-1.57m; Native
Toluene	**2.93**	BH5-20-SS3/SS4	0.76-1.37m Silty sand
Ethylbenzene	1.17	BH4-SS2/SS3	0.76-1.57m; Native
Xylenes	**17.7**	BH5-20-SS3/SS4	0.76-1.57m; Native
PHC F_1	**308**		
PHC F_2	**129**		
PHC F_3	**478**	BH2-AU1	0.5-0.61, Fill
PHC F_4	630	BH4-SS2/SS3	0.76-1.57m; Native
Antimony	1.5	BH6-20-AU1	0.0-0.6m, Fill
Arsenic	10.4	BH5-20-SS3/SS4	0.76-1.57m; Native
Barium	144		
Beryllium	0.9		
Boron	11.6		
Cadmium	**4.1**	BH8-SS1	0.76-1.37m, Fill
Chromium	26.2	BH5-20-SS3/SS4	0.76-1.57m; Native
Cobalt	16.3		
Copper	85.6	BH6-20-AU1	0.0-0.6m, Fill
Lead	**337**	BH3-20-SS2	0.76-1.37m, Fill
Mercury	**6.9**		
Molybdenum	**10.3**	BH5-SS3/SS4	0.76-1.57m; Native
Nickel	68.2		
Selenium	1.2		
Uranium	4.4		
Vanadium	41.7		
Zinc	**711**	BH8-SS1	0.76-1.37m, Fill

Note:
- **Bold and underlined** – Parameters exceed the MECP Table 7 standards

No other parameters were identified above the laboratory method detection limits.

5.6 Groundwater Quality

Groundwater samples from monitoring wells installed in BH1, BH2, BH12, BH3-20, BH4-20 and BH6-20 were submitted for laboratory analysis of BTEX, PHC (fractions, F1-F4) and/or VOC analyses. The groundwater samples were obtained from the screened intervals noted in Table 2. An additional groundwater sample plus a duplicate was collected on November 3, 2021 and submitted for BTEX and PHCs. The results of the analytical testing are presented in Tables 11 through 13. The laboratory certificates of analysis are provided in Appendix 1.

TABLE 11: Analytical Test Results (July 2007)
Groundwater – PHC (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) July 11, 2007	MECP Table 7 Standards (µg/L)
		MW1-GW1	
PHC F_1	25	nd	420
PHC F_2	100	**204**	150
PHC F_3	100	113	500
PHC F_4	100	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

The PHC (F_2) concentration identified in the sample obtained from MW1 in the 2007 investigation marginally exceeded MECP Table 7 standards. All remaining detected PHC concentrations were in compliance with MECP Table 7 standards.

TABLE 11 Continued: Analytical Test Results (August 2011)
Groundwater – BTEX and PHC (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) August 16, 2011		MECP Table 7 Standards (µg/L)
		BH1-GW1	BH12-GW1	
Benzene	0.5	nd	nd	0.5
Toluene	0.5	nd	nd	320
Ethylbenzene	0.5	nd	nd	54
Xylenes	0.5	nd	nd	72
PHC F_1	25	nd	nd	420
PHC F_2	100	nd	nd	150
PHC F_3	100	nd	nd	500
PHC F_4	100	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

No detectable PHC concentrations were identified in the groundwater samples analyzed as part of the 2011 subsurface investigation with one exception.

The PHC (F_4) concentration identified in the groundwater sample analyzed from BH1 was in compliance with MECP Table 7 standards.

TABLE 11 Continued: Analytical Test Results (March 2020)
Groundwater – PHC (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) March 3, 2020			MECP Table 7 Standards (µg/L)
		BH3-20 GW1	BH4-20 GW1	BH6-20 GW1	
PHC F_1	25	nd	nd	nd	420
PHC F_2	100	nd	nd	nd	150
PHC F_3	100	nd	nd	nd	500
PHC F_4	100	nd	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

No PHC parameters were identified above the laboratory method detection limits in the groundwater samples analyzed. The test results were in compliance with MECP Table 7 standards.

TABLE 11 Continued: Analytical Test Results (November 2021)
Groundwater – BTEX and PHC (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) November 3, 2021		MECP Table 7 Standards (µg/L)
		BH3-20 GW1	DUP	
Benzene	0.5	**0.8**	nd	0.5
Toluene	0.5	nd	nd	320
Ethylbenzene	0.5	nd	nd	54
Xylenes	0.5	nd	nd	72
PHC F_1	25	nd	nd	420
PHC F_2	100	nd	NA	150
PHC F_3	100	nd	NA	500
PHC F_4	100	nd	NA	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – Parameters not analyzed
- **Bold and underline** – Parameters exceed the MECP Table 7 standards

The benzene concentration was marginally in excess in the groundwater sample BH3-20 that was collected on November 3, 2021. However, all parameter concentrations in the duplicate sample were noted as non-detect. It is expected that sediment was present in the BH3-20 groundwater sample that resulted in biased high benzene value.

TABLE 13: Analytical Test Results (July 2007)
Groundwater – VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) July 11, 2007	MECP Table 7 Standards (µg/L)
		MW1-GW1	
Benzene	0.5	**11.9**	0.5
Bromodichloromethane	0.5	nd	67,000
Bromoform	0.5	nd	5
Bromomethane	0.5	nd	0.89
Carbon Tetrachloride	0.2	nd	0.2
Chlorobenzene	0.5	nd	140
Chloroform	0.5	nd	2
Dibromochloromethane	0.5	nd	65,000
Dichlorodifluoromethane	1	nd	3,500
1,2-Dichlorobenzene	0.5	nd	150
1,3-Dichlorobenzene	0.5	nd	7,600
1,4-Dichlorobenzene	0.5	**1.9**	0.5
1,1-Dichloroethane	0.5	nd	11
1,2-Dichloroethane	0.5	nd	0.5
1,1-Dichloroethylene	0.5	nd	0.5
cis-1,2-Dichloroethylene	0.5	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	1.6
1,2-Dichloropropane	0.5	nd	0.58
1,3-Dichloropropene, total	0.5	nd	0.5
Ethylbenzene	0.5	8.3	54
Ethylene dibromide	0.2	nd	0.2
Hexane	1	nd	5
Methyl Ethyl Ketone	5	nd	21,000
Methyl Isobutyl Ketone	5	nd	5,200
Methyl tert-butyl ether	2	nd	15
Methylene Chloride	5	nd	26
Styrene	0.5	nd	43
1,1,1,2-Tetrachloroethane	0.5	nd	1.1
1,1,2,2-Tetrachloroethane	0.5	nd	0.5
Tetrachloroethylene	0.5	nd	0.5
1,1,1-Trichloroethane	0.5	nd	23
1,1,2-Trichloroethane	0.5	nd	0.5
Toluene	0.5	4.2	320
Trichloroethylene	0.5	nd	0.5
Trichlorofluoromethane	1	nd	2,000
Vinyl Chloride	0.5	nd	0.5
Xylenes	0.5	6.6	72

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined** – Parameters exceed the applicable MECP Standards

The benzene and 1,4-dichlorobenzene concentrations identified during the 2007 subsurface investigation exceeded the MECP Table 7 Standards in BH1-GW1. All other parameters identified were in compliance with the MECP Table 7 Standards.

TABLE 13 Continued: Analytical Test Results (August 2011)
Groundwater – VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) August 22, 2011		MECP Table 7 Standards (µg/L)
		BH1-GW1	BH2-GW1	
Acetone	5	90.7	nd	100,000
Benzene	0.5	nd	nd	0.5
Bromodichloromethane	0.5	nd	nd	67,000
Bromoform	0.5	nd	nd	5
Bromomethane	0.5	nd	nd	0.89
Carbon Tetrachloride	0.2	nd	nd	0.2
Chlorobenzene	0.5	nd	nd	140
Chloroform	0.5	**3.3**	nd	2
Dibromochloromethane	0.5	nd	nd	65,000
Dichlorodifluoromethane	1	nd	nd	3,500
1,2-Dichlorobenzene	0.5	nd	nd	150
1,3-Dichlorobenzene	0.5	nd	nd	7,600
1,4-Dichlorobenzene	0.5	nd	nd	0.5
1,1-Dichloroethane	0.5	nd	nd	11
1,2-Dichloroethane	0.5	nd	nd	0.5
1,1-Dichloroethylene	0.5	nd	nd	0.5
cis-1,2-Dichloroethylene	0.5	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	0.58
1,3-Dichloropropene, total	0.5	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	54
Ethylene dibromide	0.2	nd	nd	0.2
Hexane	1	nd	nd	5
Methyl Ethyl Ketone	5	nd	nd	21,000
Methyl Isobutyl Ketone	5	nd	nd	5,200
Methyl tert-butyl ether	2	nd	nd	15
Methylene Chloride	5	nd	nd	26
Styrene	0.5	nd	nd	43
1,1,1,2-Tetrachloroethane	0.5	nd	nd	1.1
1,1,2,2-Tetrachloroethane	0.5	nd	nd	0.5
Tetrachloroethylene	0.5	nd	nd	0.5
1,1,1-Trichloroethane	0.5	nd	nd	23
1,1,2-Trichloroethane	0.5	nd	nd	0.5
Toluene	0.5	nd	nd	320
Trichloroethylene	0.5	nd	nd	0.5
Trichlorofluoromethane	1	nd	nd	2,000
1,3,5 Trimethylbenzene	0.5	nd	nd	--
Vinyl Chloride	0.5	nd	nd	0.5
Xylenes	0.5	1.6	nd	72

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined** – Parameters exceed the selected MECP Standards

The chloroform concentration identified in groundwater sample BH1-GW1 during the 2011 sampling event, marginally exceeded MECP Table 7 standards.

The source of this chloroform is expected to be from the municipally treated water used during coring of the bedrock and as such, chloroform is not considered a contaminant.

TABLE 13 Continued: Analytical Test Results (March 2020)
Groundwater – VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) March 3, 2020			MECP Table 7 Standards (µg/L)
		BH3-20 GW1	BH4-20 GW1	BH6-20 GW1	
Acetone	5	nd	nd	nd	100,000
Benzene	0.5	nd	nd	nd	0.5
Bromodichloromethane	0.5	nd	nd	nd	67,000
Bromoform	0.5	nd	nd	nd	5
Bromomethane	0.5	nd	nd	nd	0.89
Carbon Tetrachloride	0.2	nd	nd	nd	0.2
Chlorobenzene	0.5	nd	nd	nd	140
Chloroform	0.5	nd	nd	nd	2
Dibromochloromethane	0.5	nd	nd	nd	65,000
Dichlorodifluoromethane	1	nd	nd	nd	3,500
1,2-Dichlorobenzene	0.5	nd	nd	nd	150
1,3-Dichlorobenzene	0.5	nd	nd	nd	7,600
1,4-Dichlorobenzene	0.5	nd	nd	nd	0.5
1,1-Dichloroethane	0.5	nd	nd	nd	11
1,2-Dichloroethane	0.5	nd	nd	nd	0.5
1,1-Dichloroethylene	0.5	nd	nd	nd	0.5
cis-1,2-Dichloroethylene	0.5	nd	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	0.58
1,3-Dichloropropene, total	0.5	nd	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	nd	54
Ethylene dibromide	0.2	nd	nd	nd	0.2
Hexane	1	nd	nd	nd	5
Methyl Ethyl Ketone	5	nd	nd	nd	21,000
Methyl Isobutyl Ketone	5	nd	nd	nd	5,200
Methyl tert-butyl ether	2	nd	nd	nd	15
Methylene Chloride	5	nd	nd	nd	26
Styrene	0.5	nd	nd	nd	43
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	1.1
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	0.5
Tetrachloroethylene	0.5	nd	nd	nd	0.5
1,1,1-Trichloroethane	0.5	nd	nd	nd	23
1,1,2-Trichloroethane	0.5	nd	nd	nd	0.5
Toluene	0.5	nd	nd	nd	320
Trichloroethylene	0.5	nd	nd	nd	0.5
Trichlorofluoromethane	1	nd	nd	nd	2,000
Vinyl Chloride	0.5	nd	nd	nd	0.5
Xylenes	0.5	nd	nd	nd	72

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

No detectable VOC parameter concentrations were identified in the groundwater samples analyzed. The groundwater results were in compliance with MECP Table 7 standards.

The analytical results for VOCs (including the BTEX group of parameters) and PHCs tested in groundwater are shown on Drawing PE5498-5–Analytical Testing Plan – Groundwater.

The maximum concentrations of analyzed parameters in the groundwater at the site are summarized below in Table 13.

TABLE 14: Maximum Concentrations – Groundwater

Parameter	Maximum Concentration (µg/L)	Borehole	Screened Interval (m BGS)
Benzene	**11.9**	MW1-GW1 (2007)	1.07-4.57
Ethylbenzene	8.3		
Toluene	4.2		
PHC F_2	**204**		
PHC F_3	113		
PHC F_4	1.6	BH1-GW1	3.29-4.75
Acetone	90.7		
Chloroform	**3.3**	MW1-GW1 (2007)	1.07-4.57
Xylenes	6.6		
1,4-Dichlorobenzene	**1.9**		

Note:
- **Bold and underlined** – Parameters exceed the applicable MECP Standards

No other parameters were identified above the laboratory method detection limits.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of the July 2007, August 2011, February 2020 and November 2021 sampling events were handled in accordance with the Analytical Protocol with respect to preservation method, storage requirement, and container type.

As per Subsection 47(3) of O.Reg. 153/04, as amended, under the Environmental Protection Act, a Certificate of Analysis has been received for each sample submitted for analysis and all Certificates of Analysis are appended to this report.

A duplicate groundwater sample (DUP) was obtained from BH3-20 on November 3, 2021 and analyzed for BTEX and PHC, F1.

All parameter concentrations of the duplicate sample were non-detect. However, the groundwater sample BH3-20 contained a benzene concentration marginally in excess of the selected standards. It is expected that sediment was present in this sample.

Based on the analytical laboratory results, it is our opinion that the overall quality of the field data collected during this Phase II-ESA is considered to be sufficient to meet the overall objectives of this assessment.

5.8 Phase II Conceptual Site Model

The following section has been prepared in accordance with the requirements of O.Reg. 153/04, as amended by the Environmental Protection Act. Conclusions and recommendations are discussed in a subsequent section.

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

Based on the results of the Phase I ESA completed for the subject site, six (6) PCAs and the resultant APECs are summarized in Table 1 in Section 2.2, along with their respective locations and contaminants of potential concern (CPCs).

Contaminants of Potential Concern

As per Section 3.3, the contaminants of potential concern (CPCs) in soil and/or groundwater include benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), Volatile Organic Compounds (VOCs) and metals (including lead (Pb), mercury (Hg) and hexavalent chromium (CrVI).

Subsurface Structures and Utilities

The Phase II ESA Property is situated in a municipally serviced area. Underground utilities and/or structures are not expected to be present on the Phase II ESA Property.

Based on the findings of the Phase II ESA, any former underground utilities were not expected to affect contaminant distribution and transport.

Physical Setting

Site Stratigraphy

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is illustrated on Drawings PE5498-4A, 4B, 5A and 5B. The stratigraphy consists of:

- An asphaltic concrete structure or topsoil ranging approximately from 0.056 to 0.25 m thick, was encountered in BH4-07, BH6-07, BH8-07, BH2 and BH12.
- Granular fill material consisting of crushed stone was identified beneath the asphaltic concrete structure and in BH1-07, BH2-07, BH3-07, BH5-07, BH7-07, BH3, BH4, BH7, BH8, BH9, BH10 and BH11, and extended to depths ranging from 0.15 to 0.51 mbgs. Groundwater was not encountered in this layer.
- Fill material consisting of silty sand with gravel, sand and silty clay with traces of organics were identified in all of the boreholes. The fill material extended to depths of approximately 0.46 to 1.83 mbgs. BH3 and BH5 were terminated in this layer. Groundwater was encountered in this layer in BH6-20.
- Topsoil was identified beneath the fill material in BH4, BH7 and BH11, extending to depths of approximately 1.09 to 1.68 mbgs. Groundwater was not encountered in this layer.
- Silty sand or sandy silt with traces of shale was encountered in BH3, BH6, BH4-20 and BH5-20, extending to depths of approximately 1.06 to 5.18 mbgs. BH4-20, BH5-20 and BH6-20 were terminated in this layer. Groundwater was encountered in this layer in BH4-20.
- Silty clay with some shale was encountered in BH1, BH2, BH3A, BH6, BH8, BH9, BH10 and BH11, extending to depths ranging from 1.22 to 1.83mbgs. Groundwater was not encountered in this layer.
- Shale bedrock was encountered in all of the boreholes, except BH3, BH5, BH4-20, BH5-20 and BH6-20, and terminated in this layer. Groundwater was encountered in this layer at BH1, BH2 and BH12.

Hydrogeological Characteristics

Groundwater at the Phase II ESA Property was encountered in the bedrock. During the August 2020 groundwater monitoring event, groundwater flow was measured in a southwesterly direction, with a hydraulic gradient of 0.037 m/m. Groundwater contours are shown on Drawing PE5498-3 – Test Hole Location Plan.

Approximate Depth to Bedrock

Bedrock was encountered during the drilling program at depths ranging from approximately 0.65 to 1.83 mbgs.

Approximate Depth to Water Table

The depth to the water table at the subject site varies between approximately 0.46 to 2.38m below existing grade.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation does not apply to the Phase II ESA Property, in that the subject property is not within 30m of an environmentally sensitive area.

Section 43.1 of the Regulation does apply to the Phase II ESA Property as bedrock is located less than 2 m below ground surface.

Fill Placement

The fill material consisted of silty sand with some gravel, silty clay with sand and identified in all of the boreholes, which extended to depths of 0.46 to 1.83 mbgs.

Existing Buildings and Structures

The Phase II ESA Property is vacant land with no permanent buildings. A temporary trailer, sea container and three (3) hydro poles are present on-site.

Proposed Buildings and Other Structures

The proposed site development for the Phase II ESA Property includes two (2) residential buildings with a total of 354 residential units.

Areas of Natural Significance

There are no areas of natural significance in the Phase I Study Area.

Water Bodies

There are no natural water bodies in the Phase I Study Area.

Environmental Condition

Areas Where Contaminants are Present

Based on the analytical results, impacted fill material was identified on the south-central portion of the Phase II ESA Property. BTEX and PHCs as well as a metal parameter was identified in the soil in the immediate area of the former UST nest.

Based on the analytical results, groundwater impacted with VOCs and PHCs was identified in the area of the former garage on the northwestern side of the Phase II ESA Property.

Types of Contaminants

Based on the analytical results for soil, the contaminants of concern include benzene, toluene, xylenes, PHCs (F1-F3), molybdenum, lead, mercury and zinc.

Based on the analytical results for groundwater, the contaminants of concern include benzene, PHC (F2) and 1-4 Dichlorobenzene.

Contaminated Media

Based on the analytical results for soil and groundwater, there is contaminated fill and groundwater beneath the Phase II ESA Property.

What Is Known About Areas Where Contaminants Are Present

Based on the findings of the Phase II ESA, the metal impacted fill material is present in the south-central portion of the site, while the benzene, toluene and xylenes and PHC impacted soil is present in the immediate area of the former UST nest.

Benzene and PHC impacted groundwater was identified in this area as well. 1-4, Dichlorobenzene was also identified in the immediate area of the UST nest. It is expected that this contaminant is from an on-site source, specifically the automotive repair garage.

Distribution and Migration of Contaminants

Based on the findings of the Phase II ESA, distribution and migration of contaminants, with the exception of 1-4 Dichlorobenzene is considered to have occurred on the Phase II ESA Property. The 1-4 dichlorobenzene is expected to be a result of the on-site automotive repair garage.

Discharge of Contaminants

Based on the findings of the Phase II ESA, discharge of contaminants in soil are expected to be a result of the former UST/garage situated on the northwest portion of the property and importation of fill material of an unknown quality on the central south portion of the site.

Based on the findings of the Phase II ESA, discharge of contaminants in groundwater is expected to be a result of the former UST and/or garage operations.

Climatic and Meteorological Conditions

In general, climatic and meteorological conditions have the potential to affect contaminant distribution. Two (2) ways by which climatic and meteorological conditions may affect contaminant distribution include the downward leaching of contaminants by means of the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally.

Based on the analytical results, no significant downward leaching or groundwater migration occurred.

Potential for Vapour Intrusion

Based on the findings of the Phase II ESA and lack of building structures, there is no potential for vapour intrusion on the Phase II ESA Property.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the property addressed 1125 to 1149 Cyrville Road, in the Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) that were identified during the previous Phase I ESAs and Phase I ESA Update and considered to result in areas of potential environmental concern (APECs) on the Phase II ESA Property.

The subsurface investigations conducted for this Phase II ESA consisted of three (3) field drilling programs that were conducted in 2007, 2011 and 2020. The 2007 field program consisted of drilling eight (8) boreholes (BH1-07 through BH8-07) in the immediate area of the former garage and UST. No monitoring wells were installed during the 2007 program. The 2011 field program consisted of drilling 12 boreholes (BH1 through BH12), three (3) of which were completed as groundwater monitoring wells (BH1, BH2 and BH12). The 2020 field program consisted of drilling four (4) boreholes, three (3) of which were completed as groundwater monitoring wells (BH3-20, BH4-20 and BH6-20).

The general soil profile encountered during the field programs consisted of an asphaltic concrete pavement structure, topsoil or fill (crushed stones), followed by a fill material consisting of silty sand with some gravel or silty clay with sand, underlain by topsoil or silty clay, followed by silty sand with shale fragments, underlain by shale bedrock.

Nineteen (19) soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F_1-F_4, volatile organic compounds (VOCs) and/or metals (including lead (Pb), mercury (Hg) and hexavalent chromium (CrVI)). BTEX and PHC concentrations above the MECP Table 7 Residential Standards were identified in the soil samples in the immediate area of the former UST nest. Metal concentrations above the selected MECP standards were generally identified in the fill material on the south-central portion of the site. All of the other soil samples complied with the MECP Table 7 Residential Standards.

Groundwater samples from monitoring wells BH1, BH2, BH12, BH3-20, BH4-20 and BH6-20 were collected during the August 2011, March 2020 and November 2021 sampling events. No free product or petroleum hydrocarbon sheen was noted on the purge water during the groundwater sampling events.

Groundwater samples were analyzed for BTEX, PHC and VOCs, with the exception of the groundwater sample BH3-20, collected on November 3, 2021.

Concentrations of BTEX, PHCs and 1-4 dichlorobenzene in excess of the MECP Table 7 Standards were identified in the immediate area of the former UST nest. All of the other groundwater samples complied with the selected MECP Standards.

Benzene was marginally in excess of the standard in the November 3, 2021 groundwater sample from BH3-20, while the duplicate sample concentration was not detected above the laboratory limit. It is expected that sediment was present in this groundwater sample. The groundwater at BH3-20 should be retested for confirmatory purposes.

Recommendations

Soil and Groundwater

Based on the findings of the Phase II ESA, it is recommended that a soil and groundwater remediation program be carried out at the Phase II Property. The remediation should be completed in conjunction with the construction excavation. It is anticipated that the impacted groundwater will be removed in conjunction with the excavation and removal of the impacted soil and upper levels of the underlying bedrock.

Prior to remedial activities, it is recommended that a representative sample of impacted soil be submitted for a leachate analysis in accordance with O.Reg. 347/558, as required for disposal at an approved landfill site. It is recommended that Paterson personnel be on-site at the time of the remedial activities to direct excavation and segregation of impacted soil, and to collect additional delineation and confirmatory soil samples as required in accordance with O.Reg. 153/04 to support the filing of a Record of Site Condition.

Excess Soil

Excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19: On-site and Excess Soil Management. Further information regarding this regulation can be provided upon request.

Monitoring Wells

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned according to Ontario Regulation 903 (Ontario Water Resources Act), however, we recommend that the wells be maintained for future sampling purposes. The monitoring wells are registered with the MECP under this regulation. Further information can be provided upon request in this regard.

7.0 STATEMENT OF LIMITATIONS

This Phase II - Environmental Site Assessment report has been prepared under the supervision of a Qualified Person, in general accordance with O.Reg. 153/04, as amended, and meets the requirements of CSA Z769-00. The conclusions presented herein are based on information gathered from a limited sampling and testing program. The test results represent conditions at specific test locations at the time of the field program.

The client should be aware that any information pertaining to soils and all test hole logs are furnished as a matter of general information only and test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the test holes themselves.

Should any conditions be encountered at the subject site and/or historical information that differ from our findings, we request that we be notified immediately in order to allow for a reassessment.

This report was prepared for the sole use of Westrich Pacific Group. Notification from Westrich Pacific Group and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

Mandy Witteman, B.Eng., M.A.Sc.

Mark D'Arcy, P.Eng., QP$_{ESA}$

Report Distribution:

- Westrich Pacific Group
- Paterson Group

FIGURES

Figure 1 - Key Plan

Drawing PE5498-3 – Test Hole Location Plan & Groundwater Contour Plan

Drawing PE5498-4 – Analytical Testing Plan – Soil

Drawing PE5498-4A – Cross-section A – A' – Soil

Drawing PE5498-4B – Cross-section B – B' – Soil

Drawing PE5498-5 – Analytical Testing Plan – Groundwater

Drawing PE5498-5A – Cross-section A – A' – Groundwater

Drawing PE5498-5B – Cross-section B – B' – Groundwater

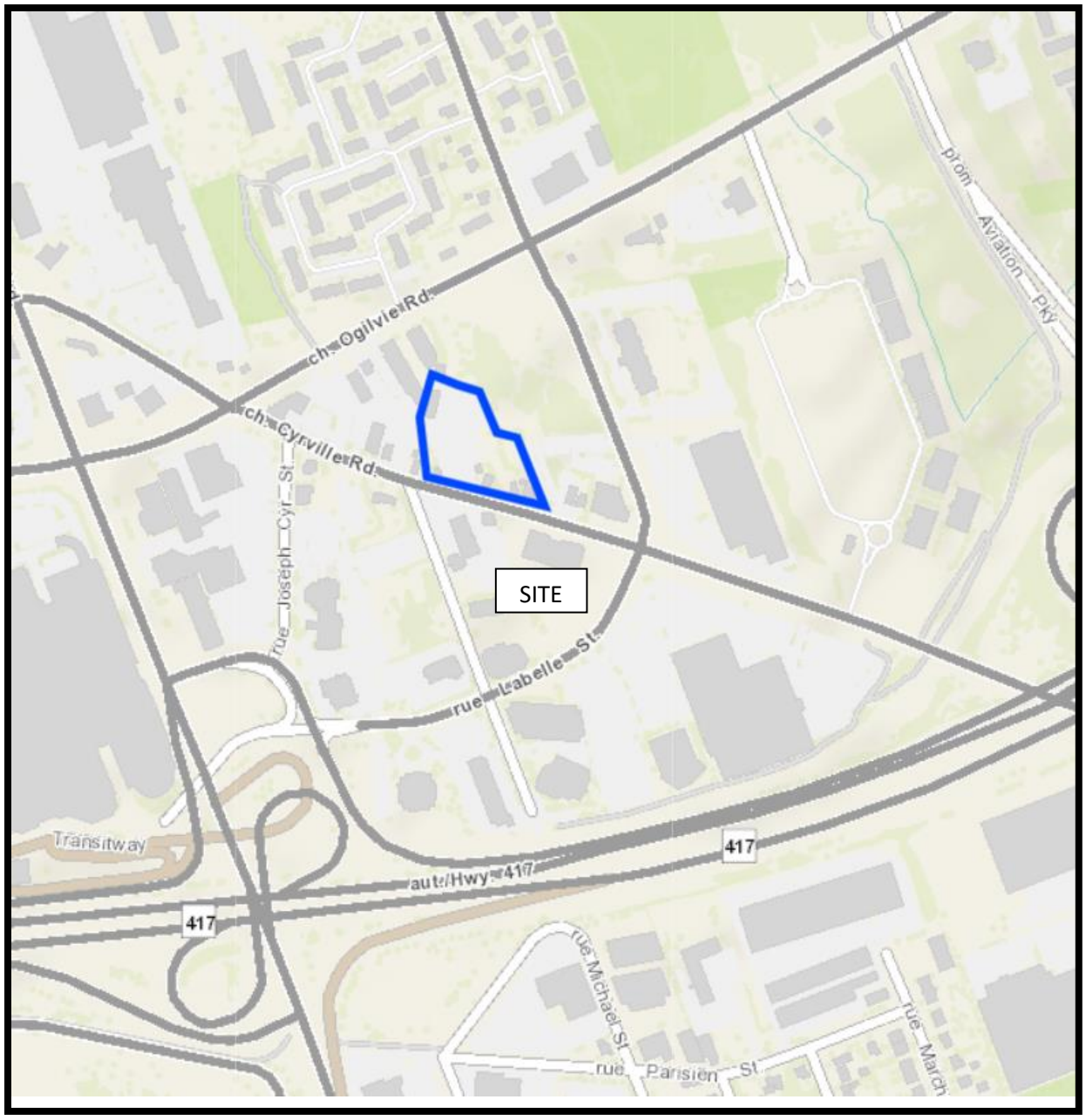
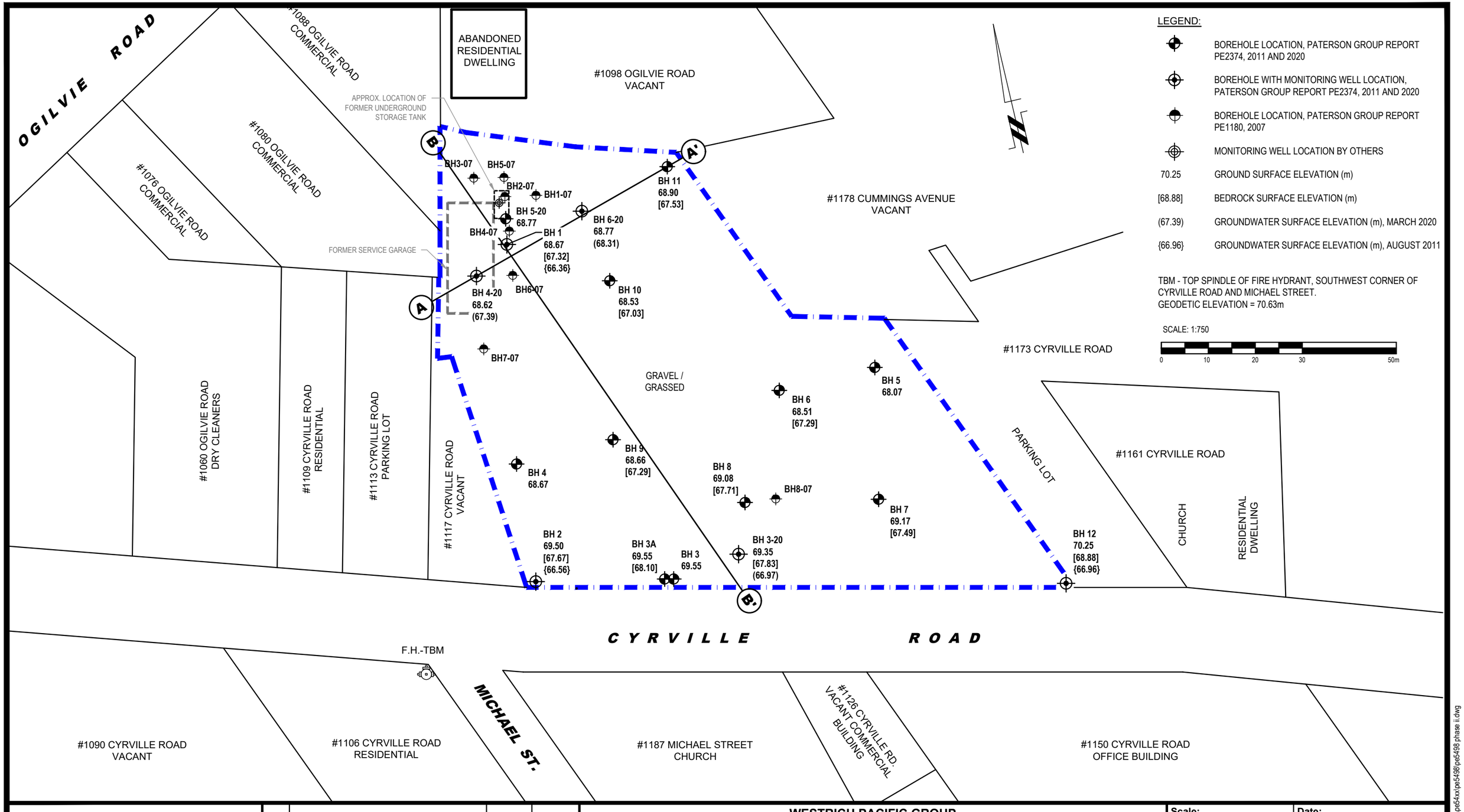


FIGURE 1

KEY PLAN



LEGEND:

- BOREHOLE LOCATION, PATERSON GROUP REPORT PE2374, 2011 AND 2020
- BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP REPORT PE2374, 2011 AND 2020
- BOREHOLE LOCATION, PATERSON GROUP REPORT PE1180, 2007
- MONITORING WELL LOCATION BY OTHERS
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- [68.88] BEDROCK SURFACE ELEVATION (m)
- (67.39) GROUNDWATER SURFACE ELEVATION (m), MARCH 2020
- {66.96} GROUNDWATER SURFACE ELEVATION (m), AUGUST 2011

TBM - TOP SPINDLE OF FIRE HYDRANT, SOUTHWEST CORNER OF CYRVILLE ROAD AND MICHAEL STREET.
GEODETIC ELEVATION = 70.63m

SCALE: 1:750

0 10 20 30 50m

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NO.	REVISIONS	DATE	INITIAL

WESTRICH PACIFIC GROUP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1125 TO 1149 CYRVILLE ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:750	Date: 11/2021
Drawn by: MPG	Report No.: PE5498-2
Checked by: MW	Dwg. No.: PE5498-3
Approved by: MSD	Revision No.:

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OGILVIE ROAD

ABANDONED RESIDENTIAL DWELLING

BH2-AU1	0.5-0.61m	11-July-2007
Parameter	Results (ug/g)	Table 7 (ug/g)
PHC F3	478	300
BTEX comply with the MECP Table 7 Standards		

BH2-SS2	0.76-1.15m	11-July-2007
Parameter	Results (ug/g)	Table 7 (ug/g)
PHC F1	100	55
PHC F2	103	98
PHC F3	368	300
Benzene	0.33	0.21

BH5-SS2	0.76-1.15m	11-July-2007
Parameter	Results (ug/g)	Table 7 (ug/g)
PHC F2	151	98
BTEX comply with the MECP Table 7 Standards		

BH1-SS2	0.76-1.15m	11-July-2007
Parameter	Results (ug/g)	Table 7 (ug/g)
PHC F2	103	98
BTEX comply with the MECP Table 7 Standards		

BH5-20-AU1 0.0-0.6m 21-Feb-2020
Metals comply with MECP Table 7 Standards
Pb, Hg and CrVI comply with MECP Table 7

BH5-20-SS3/SS4	0.76-1.40m	21-Feb-2020
Parameter	Results (ug/g)	Table 7 (ug/g)
Toluene	2.93	2.3
Xylenes	17.7	3.1
PHC F1	308	55
PHC F2	129	98
Molybdenum	10.3	6.9
Pb, Hg and CrVI comply with the MECP Table 7		

BH6-20-AU1 0.0-0.6m 21-Feb-2020
Metals comply with MECP Table 7 Standards
Pb, Hg and CrVI comply with MECP Table 7

BH1-SS2 0.76-1.37m 17-Aug-2011
BTEX comply with MECP Table 7 Standards
PHCS comply with MECP Table 7 Standards

BH4-SS2SS/3	0.76-1.57m	11-July-2007
Parameter	Results (ug/g)	Table 7 (ug/g)
Benzene	2.82	0.21
Xylenes	7.16	3.1
PHC F1	100	55
PHC F2	192	98
PHC F3	450	300

BH6-AU1/SS1 0.0-0.6m 17-Aug-2011
Lead (Pb) complies with MECP Table 7 Standards

BH10-SS2 0.76-1.37m 17-Aug-2011
Metals comply with MECP Table 7 Standards
Pb, Hg and CrVI comply with MECP Table 7 Standards

BH4-20-SS2A 0.76-1.37m 21-Feb-2020
BTEX comply with MECP Table 7 Standards
PHCs comply with MECP Table 7 Standards
Metals comply with MECP Table 7 Standards
Pb, Hg and CrVI comply with MECP Table 7

BH9-SS1 0.76-1.37m 17-Aug-2011
Lead (Pb) complies with MECP Table 7 Standards

BH7-SS1 0.0-0.6m 17-Aug-2011
Lead (Pb) complies with MECP Table 7 Standards

BH2-SS2	0.76-1.57m	11-July-2007
Parameter	Results (ug/g)	Table 7 (ug/g)
Benzene	0.33	0.21

BH2-SS2 0.76-1.37m 17-Aug-2011
BTEX comply with MECP Table 7 Standards
PHCs comply with MECP Table 7 Standards
VOCs comply with MECP Table 7 Standards

BH12-SS2 0.76-1.37m 17-Aug-2011
BTEX comply with MECP Table 7 Standards
PHCs comply with MECP Table 7 Standards

BH7-SS1 0.0-0.6m 17-Aug-2011
Lead (Pb) complies with MECP Table 7

BH3-20-SS2	0.76-1.37m	21-Feb-2020
Parameter	Results (ug/g)	Table 7 (ug/g)
Lead	337	120
Mercury	6.9	0.27
Zinc	366	340

BH8-SS1	0.76-1.37m	17-Aug-11
Parameter	Results (ug/g)	Table 7 (ug/g)
Cadmium	4.1	1.2
Lead	143	120
Mercury	0.5	0.27
Zinc	711	340

BH3-07
BH5-07
BH2-07
BH1-07
BH 5-20
68.77
BH4-07
BH 1
68.67
[67.32]
{66.36}
BH6-07
BH 4-20
68.62
(67.39)
BH7-07
APPROX. LOCATION OF FORMER UNDERGROUND STORAGE TANK
BH 11
68.90
[67.53]
BH 6-20
68.77
(68.31)
BH 10
68.53
[67.03]
FORMER SERVICE GARAGE
GRAVEL / GRASSED
BH 6
68.51
[67.29]
BH 5
68.07
BH 9
68.66
[67.29]
BH 4
68.67
BH 8
69.08
[67.71]
BH8-07
BH 7
69.17
[67.49]
BH 2
69.50
[67.67]
{66.56}
BH 3A
69.55
[68.10]
BH 3-20
69.35
[67.83]
(66.97)
BH 3
69.55
BH 12
70.25
[68.88]
{66.96}
CYRVILLE ROAD
F.H.-TBM
MICHAEL ST.

LEGEND:

- BOREHOLE LOCATION, PATERSON GROUP REPORT PE2374, 2011 AND 2020
- BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP REPORT PE2374, 2011 AND 2020
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- [68.88] BEDROCK SURFACE ELEVATION (m)
- (67.39) GROUNDWATER SURFACE ELEVATION (m), MARCH 2020
- {66.96} GROUNDWATER SURFACE ELEVATION (m), AUGUST 2011
- PHASE I AND PHASE II PROPERTY

SOIL RESULTS EXCEED MECP TABLE 7 STANDARDS

SOIL RESULTS COMPLY WITH MECP TABLE 7 STANDARDS

TBM - TOP SPINDLE OF FIRE HYDRANT, SOUTHWEST CORNER OF CYRVILLE ROAD AND MICHAEL STREET.
GEODETIC ELEVATION = 70.63m

SCALE: 1:750
0 10 20 30 50m

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NO.	REVISIONS	DATE	INITIAL

WESTRICH PACIFIC GROUP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1125 TO 1149 CYRVILLE ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:750	Date: 11/2021
Drawn by: MPG	Report No.: PE5498-2
Checked by: MW	Dwg. No.: PE5498-4
Approved by: MSD	Revision No.:

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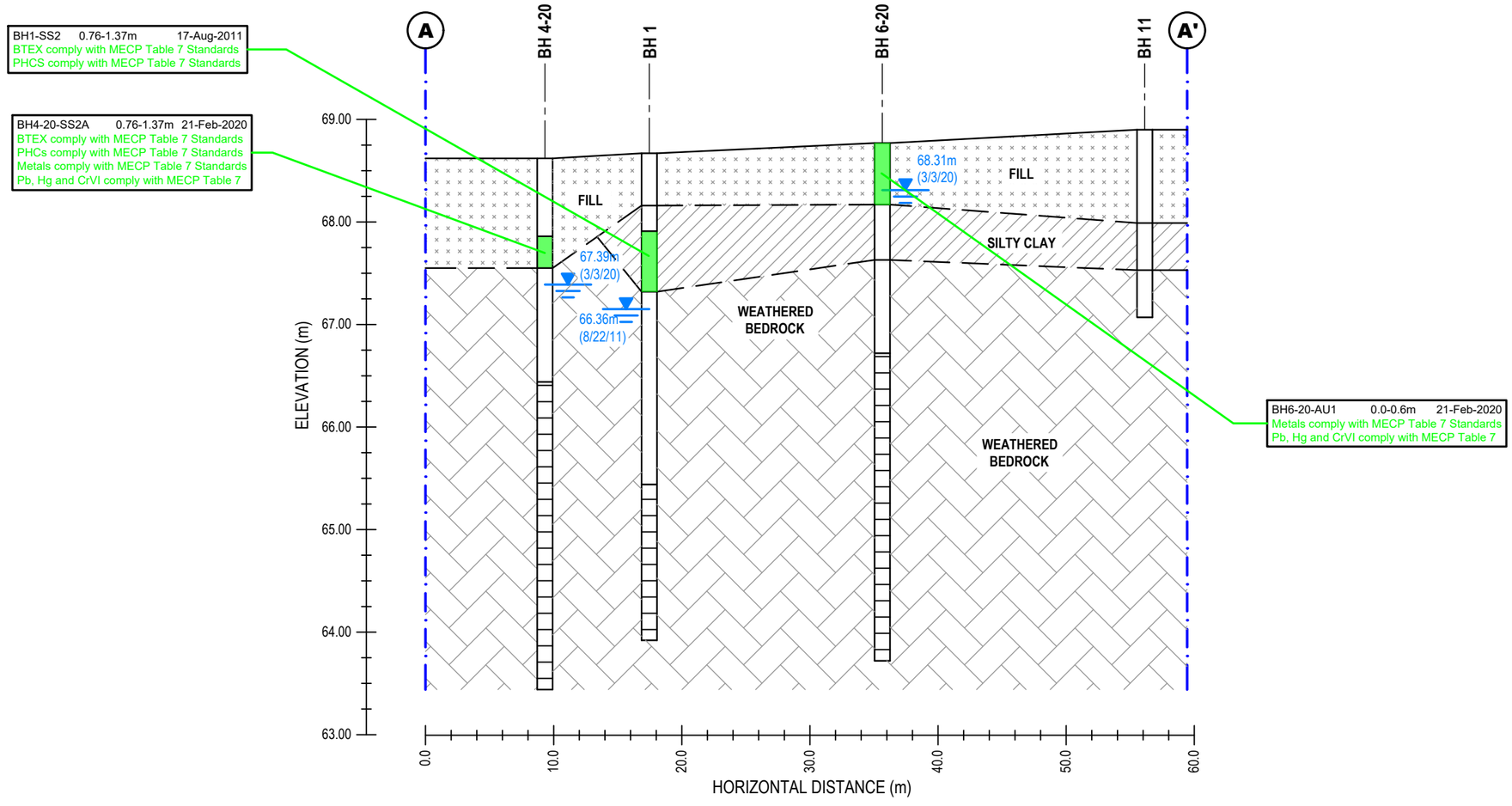

SOIL RESULTS COMPLY WITH MECP TABLE 7 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 7 STANDARDS

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WESTRICH PACIFIC GROUP

PHASE II ENVIRONMENTAL SITE ASSESSMENT
1125 TO 1149 CYRVILLE ROAD

OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - SOIL

Scale: AS SHOWN	Date: 11/2021
Drawn by: MPG	Report No.: PE5498-2
Checked by: MW	Dwg. No.: PE5498-4A
Approved by: MSD	Revision No.:

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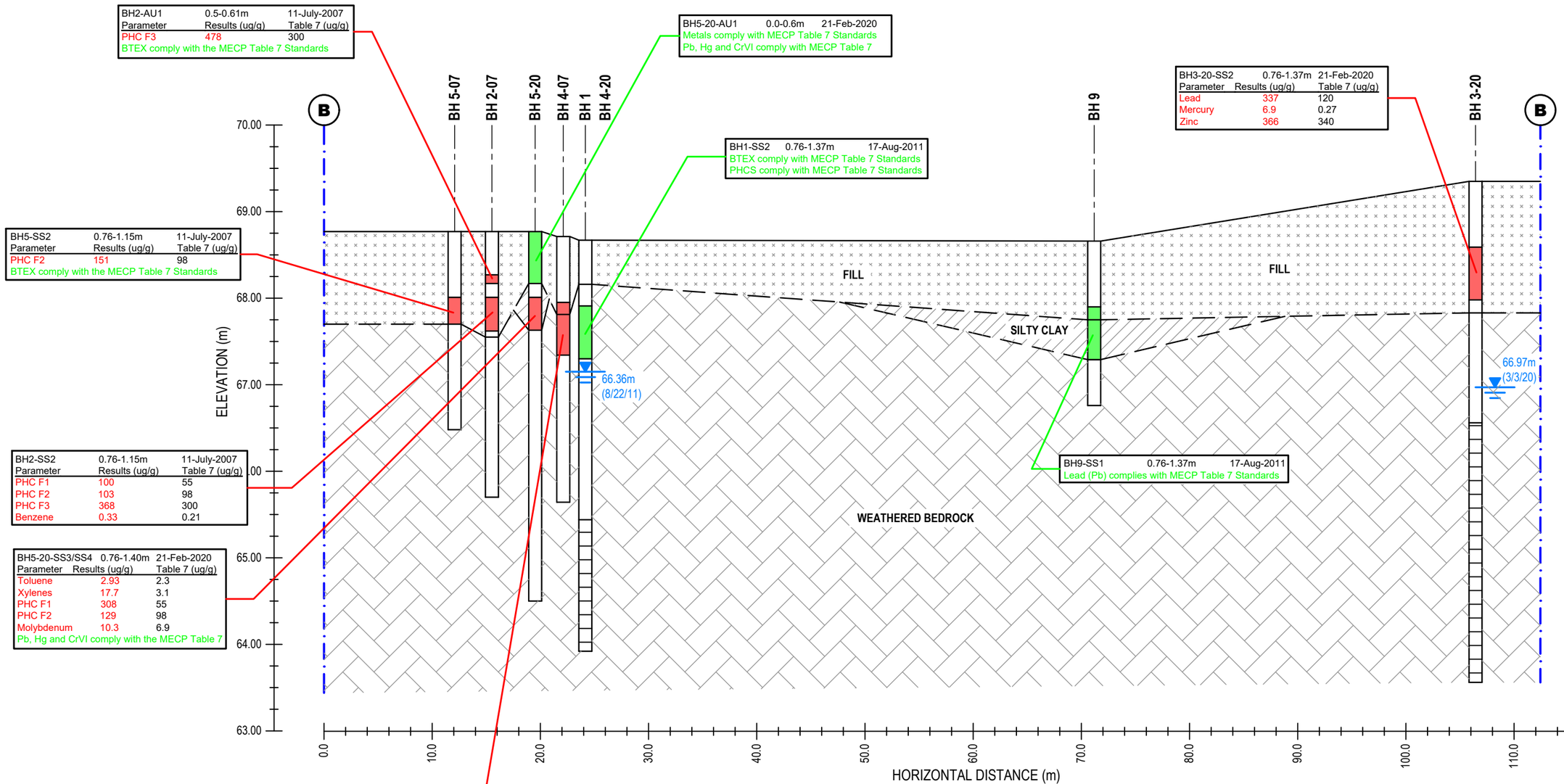

SOIL RESULTS COMPLY WITH MECP TABLE 7 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 7 STANDARDS

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WESTRICH PACIFIC GROUP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1125 TO 1149 CYRVILLE ROAD

OTTAWA, ONTARIO

Title:

CROSS-SECTION B-B' - SOIL

Scale: AS SHOWN	Date: 11/2021
Drawn by: MPG	Report No.: PE5498-2
Checked by: MW	Dwg. No.: PE5498-4B
Approved by: MSD	Revision No.:

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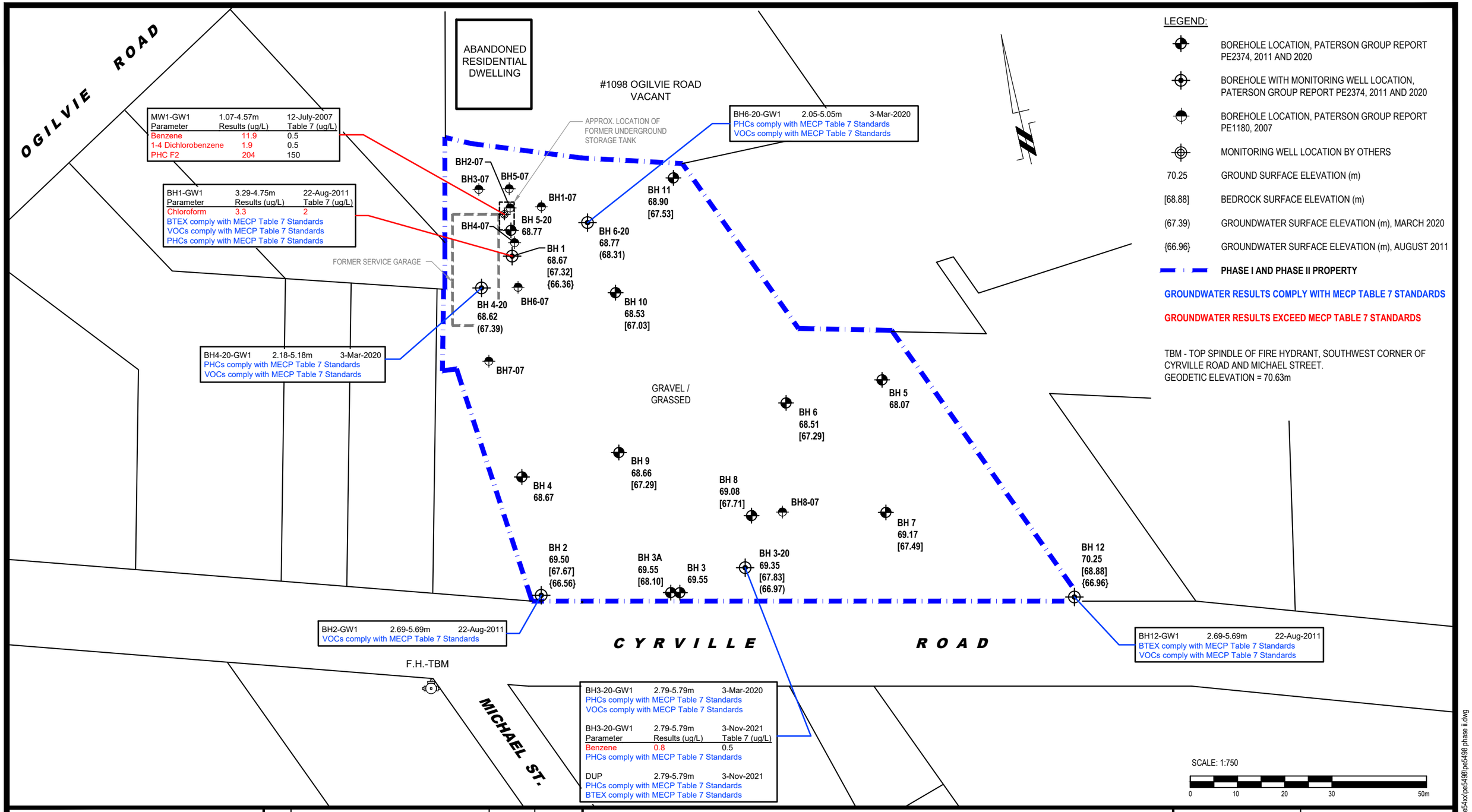

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- {66.96} GROUNDWATER SURFACE ELEVATION (m), AUGUST 2011
- **PHASE I AND PHASE II PROPERTY**

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 7 STANDARDS

GROUNDWATER RESULTS EXCEED MECP TABLE 7 STANDARDS

TBM - TOP SPINDLE OF FIRE HYDRANT, SOUTHWEST CORNER OF CYRVILLE ROAD AND MICHAEL STREET.
GEODETIC ELEVATION = 70.63m

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NO.	REVISIONS	DATE	INITIAL

WESTRICH PACIFIC GROUP

PHASE I-II ENVIRONMENTAL SITE ASSESSMENT
1125 TO 1149 CYRVILLE ROAD

OTTAWA, ONTARIO

Title:
ANALYTICAL TESTING PLAN - GROUNDWATER

Scale: 1:750	Date: 11/2021
Drawn by: MPG	Report No.: PE5498-2
Checked by: MW	Dwg. No.: PE5498-5
Approved by: MSD	Revision No.:

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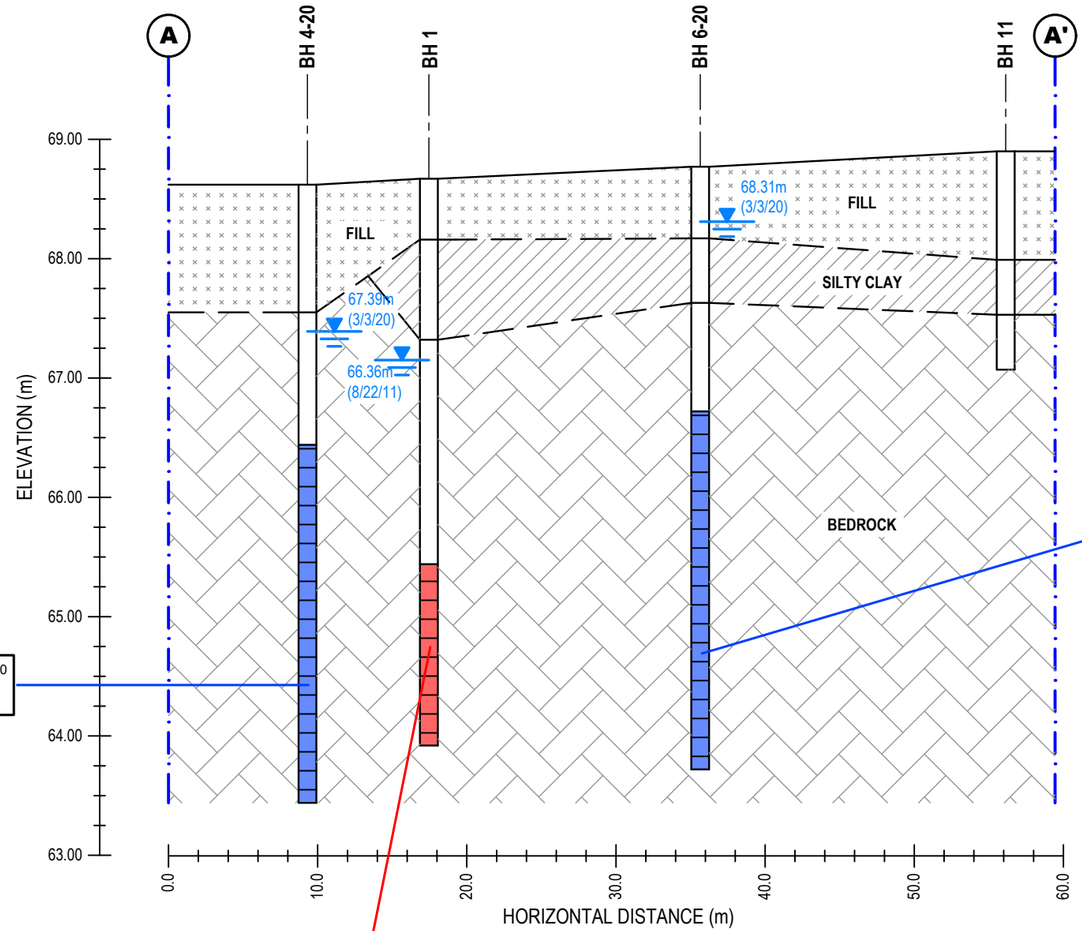

BH6-20-GW1 2.05-5.05m 3-Mar-2020
PHCs comply with MECP Table 7 Standards
VOCs comply with MECP Table 7 Standards

BH4-20-GW1 2.18-5.18m 3-Mar-2020
PHCs comply with MECP Table 7 Standards
VOCs comply with MECP Table 7 Standards

BH1-GW1	3.29-4.75m	22-Aug-2011
Parameter	Results (ug/L)	Table 7 (ug/L)
Chloroform	3.3	2

BTEX comply with MECP Table 7 Standards
VOCs comply with MECP Table 7 Standards
PHCs comply with MECP Table 7 Standards

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 7 STANDARDS

GROUNDWATER RESULTS EXCEED MECP TABLE 7 STANDARDS

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NO.	REVISIONS	DATE	INITIAL
0			

WESTRICH PACIFIC GROUP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1125 TO 1149 CYRVILLE ROAD

OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - GROUNDWATER

Scale: AS SHOWN	Date: 11/2021
Drawn by: MPG	Report No.: PE5498-2
Checked by: MW	Dwg. No.: PE5498-5A
Approved by: MSD	Revision No.:

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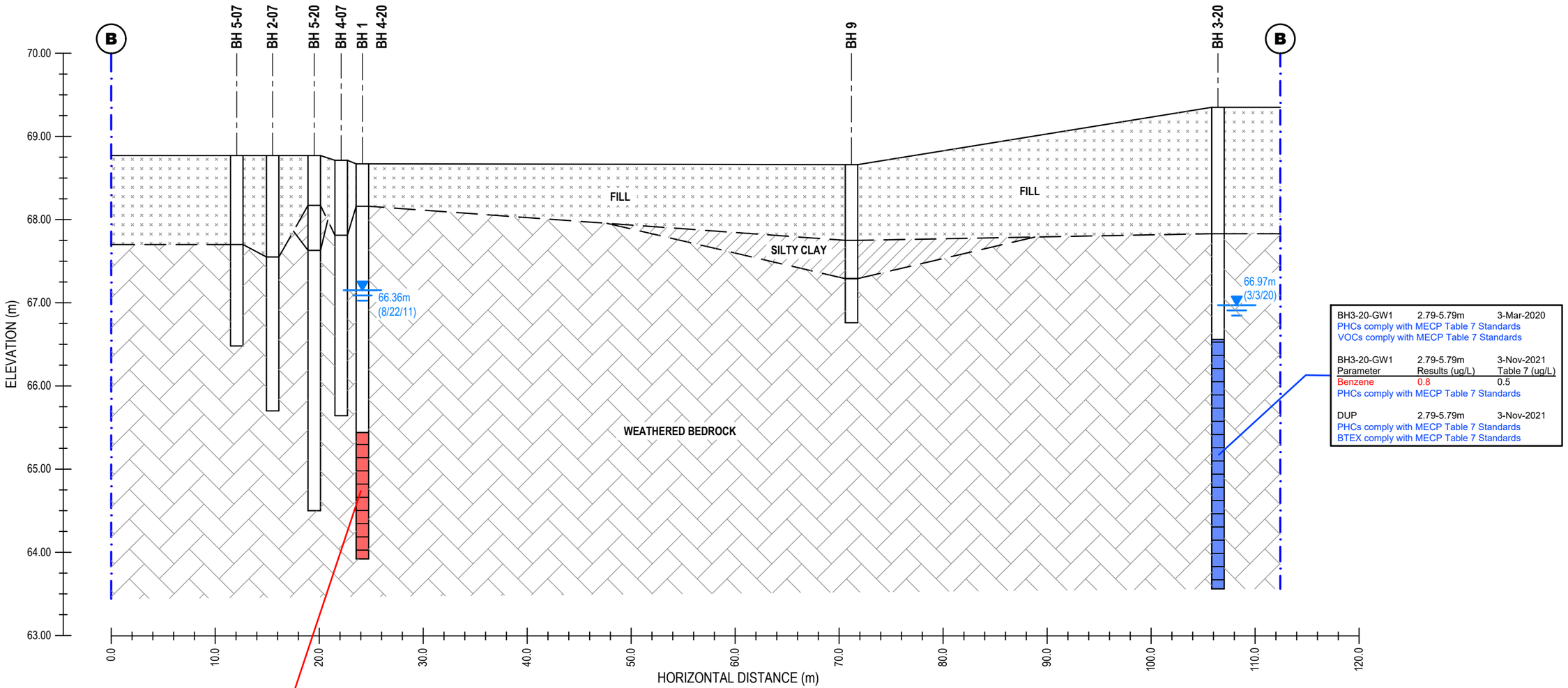

BH3-20-GW1	2.79-5.79m	3-Mar-2020
PHCs comply with MECP Table 7 Standards		
VOCs comply with MECP Table 7 Standards		
BH3-20-GW1	2.79-5.79m	3-Nov-2021
Parameter	Results (ug/L)	Table 7 (ug/L)
Benzene	0.8	0.5
PHCs comply with MECP Table 7 Standards		
DUP	2.79-5.79m	3-Nov-2021
PHCs comply with MECP Table 7 Standards		
BTEX comply with MECP Table 7 Standards		

BH1-GW1	3.29-4.75m	22-Aug-2011
Parameter	Results (ug/L)	Table 7 (ug/L)
Chloroform	3.3	2
BTEX comply with MECP Table 7 Standards		
VOCs comply with MECP Table 7 Standards		
PHCs comply with MECP Table 7 Standards		

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 7 STANDARDS

GROUNDWATER RESULTS EXCEED MECP TABLE 7 STANDARDS

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NO.	REVISIONS	DATE	INITIAL
0			

WESTRICH PACIFIC GROUP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1125 TO 1149 CYRVILLE ROAD

OTTAWA, ONTARIO

Title:

CROSS-SECTION B-B' - GROUNDWATER

Scale: AS SHOWN	Date: 11/2021
Drawn by: MPG	Report No.: PE5498-2
Checked by: MW	Dwg. No.: PE5498-5B
Approved by: MSD	Revision No.:

11x17

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

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Sampling & Analysis Plan

Phase II Environmental Site Assessment
1125 – 1149 Cyrville Road, Ottawa, Ontario

Prepared For

Westrich Pacific Group

February 2020

Report: PE5498-SAP

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Mr. David Sanche of Westrich Pacific Group to conduct a Supplemental Phase II Environmental Site Assessment (ESA) for the Phase II ESA Property addressed 1125-1149 Cyrville Road, Ottawa, Ontario.

The Phase II ESA was carried out to address the APECs identified in the Paterson Phase I ESAs. The following subsurface investigations were developed to identify and delineate potential environmental concerns.

Borehole	Location & Rationale	Proposed Depth & Rationale
August 2011		
BH1	Assess soil and groundwater conditions on the subject site due to APECs 1 and 2.	Boreholes to be advanced to approximately 4.7 mbgs to intercept the groundwater table.
BH2	Assess soil and groundwater conditions on the subject site due to APEC 4	Boreholes to be advanced to approximately 5.5 mbgs to intercept the groundwater table.
BH3	Assess the quality of fill material.	Boreholes to be advanced to practical refusal.
BH4	Assess the quality of fill material.	Boreholes to be advanced to approximately 2.0 mbgs.
BH5	Assess the quality of fill material.	Boreholes to be advanced to practical refusal
BH6	Assess the quality of fill material.	Boreholes to be advanced to approximately 2.0 mbgs
BH7	Assess the quality of fill material.	Boreholes to be advanced to approximately 2.0 mbgs
BH8	Assess the quality of fill material.	Boreholes to be advanced to approximately 2.0 mbgs
BH9	Assess the quality of fill material.	Boreholes to be advanced to approximately 2.0 mbgs
BH10	Assess the quality of fill material.	Boreholes to be advanced to approximately 2.0 mbgs
BH11	Assess the quality of fill material.	Boreholes to be advanced to approximately 2.0 mbgs
BH12	Assess soil and groundwater conditions on the subject site due to APEC 5	Boreholes to be advanced to approximately 5.5 mbgs to intercept the groundwater table.
February 2020		
BH3-20	Assess soil and groundwater conditions on the subject site due to APECs 3 and 5.	Boreholes to be advanced to approximately 5.7 mbgs to intercept the groundwater table.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH4-20	Assess soil and groundwater conditions on the subject site due to APECs 1 and 3	Boreholes to be advanced to approximately 5.0 mbgs to intercept the groundwater table.
BH5-20	Assess soil condition on the subject site due to APECs 2 and 3	Boreholes to be advanced to approximately 5.0 mbgs
BH6-02	Assess soil and groundwater conditions on the subject site due to APECs 1 and 3	Boreholes to be advanced to approximately 5.0 mbgs to intercept the groundwater table.

At each borehole, split-spoon samples of overburden soils will be obtained at 0.76 m (2'6") intervals until groundwater was intercepted. All soil samples will be retained, and samples will be selected for submission following a preliminary screening analysis.

Following borehole drilling, monitoring wells will be installed in selected boreholes (as above) for the measurement of water levels and the collection of groundwater samples. Borehole locations are shown on the Test Hole Location Plan appended to the main report.

2.0 ANALYTICAL TESTING PROGRAM

The analytical testing program for soil at the subject site is based on the following general considerations:

- ❒ At least one sample from each borehole should be submitted, in order to delineate the horizontal extent of contamination across the site.
- ❒ At least one sample from each stratigraphic unit should be submitted, in order to delineate the vertical extent of contamination at the site.
- ❒ In boreholes where there is visual or olfactory evidence of contamination, or where organic vapour meter or photoionization detector readings indicate the presence of contamination, the 'worst-case' sample from each borehole should be submitted for comparison with MECP's site condition standards.
- ❒ In boreholes with evidence of contamination as described above, a sample should be submitted from the stratigraphic unit below the 'worst-case' sample to determine whether the contaminant(s) have migrated downward.
- ❒ Parameters analyzed should be consistent with the Contaminants of Potential Concern identified in the Phase I ESA.

The analytical testing program for groundwater at the subject site is based on the following general considerations:

- ❒ Groundwater monitoring wells should be installed in all boreholes with visual or olfactory evidence of soil contamination, in stratigraphic units where soil contamination was encountered, where those stratigraphic units are at or below the water table (i.e. a water sample can be obtained).
- ❒ Groundwater monitoring well screens should straddle the water table at sites where the contaminants of concern are suspected to be LNAPLs.
- ❒ At least one groundwater monitoring well should be installed in a stratigraphic unit below the suspected contamination, where said stratigraphic unit is water-bearing.
- ❒ Parameters analyzed should be consistent with the Contaminants of Concern identified in the Phase I ESA and with the contaminants identified in the soil samples.

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

The purpose of environmental boreholes is to identify and/or delineate contamination within the soil and/or to install groundwater monitoring wells in order to identify contamination within the groundwater.

Equipment

The following is a list of equipment that is in addition to regular drilling equipment stated in the geotechnical drilling SOP:

- ❒ glass soil sample jars
- ❒ two buckets
- ❒ cleaning brush (toilet brush works well)
- ❒ dish detergent
- ❒ methyl hydrate
- ❒ water (if not available on site - water jugs available in trailer)
- ❒ latex or nitrile gloves (depending on suspected contaminant)
- ❒ RKI Eagle organic vapour meter or MiniRae photoionization detector (depending on contamination suspected)

Determining Borehole Locations

If conditions on site are not as suspected, and planned borehole locations cannot be drilled, **call the office to discuss**. Alternative borehole locations will be determined in conversation with the field technician and supervising engineer.

After drilling is completed a plan with the borehole locations must be provided. Distances should be measured using a measuring tape or wheel rather than paced off. Elevations were surveyed at geodetic elevations by Paterson personnel.

Drilling Procedure

The actual drilling procedure for environmental boreholes is the same as geotechnical boreholes (see SOP for drilling and sampling) with a few exceptions as follows:

- ❒ Continuous split spoon samples (every 0.6 m or 2') or semi-continuous (every 0.76 m or 2'6") are required.

- ❒ Make sure samples are well sealed in plastic bags with no holes prior to screening and are kept cool but unfrozen.
- ❒ If sampling for VOCs, BTEX, or PHCs F1, a soil core from each soil sample which may be analyzed must be taken and placed in the laboratory-provided methanol vial.
- ❒ Note all and any odours or discolouration of samples.
- ❒ Split spoon samplers must be washed between samples.
- ❒ If obvious contamination is encountered, continue sampling until vertical extent of contamination is delineated.
- ❒ As a general rule, environmental boreholes should be deep enough to intercept the groundwater table (unless this is impossible/impractical - call project manager to discuss).
- ❒ If at all possible, soil samples should be submitted to a preliminary screening procedure on site, either using a RKI Eagle, PID, etc. depending on type of suspected contamination.

Spoon Washing Procedure

All sampling equipment (spilt spoons, etc.) must be washed between samples in order to prevent cross contamination of soil samples.

- ❒ Obtain two buckets of water (preferably hot if available)
- ❒ Add a small amount of dish soap to one bucket
- ❒ Scrub spoons with brush in soapy water, inside and out, including tip
- ❒ Rinse in clean water
- ❒ Apply a small amount of methyl hydrate to the inside of the spoon. (A spray bottle or water bottle with a small hole in the cap works well)
- ❒ Allow to dry (takes seconds)
- ❒ Rinse with distilled water, a spray bottle works well.

The methyl hydrate eliminates any soap residue that may be on the spoon, and is especially important when dealing with suspected VOCs.

Screening Procedure

The RKI Eagle is used to screen most soil samples, particularly where petroleum hydrocarbon contamination is suspected. The MiniRae is used when VOCs are suspected, however it also can be useful for detecting petroleum. These tools are for screening purposes only and cannot be used in place of laboratory testing. Vapour results obtained from the RKI Eagle and the PID are relative and must be interpreted.

Screening equipment should be calibrated on an approximately monthly basis, more frequently if heavily used.

- ❒ Samples should be brought to room temperature; this is specifically important in colder weather. Soil must not be frozen.
- ❒ Turn instrument on and allow to come to zero - calibrate if necessary
- ❒ If using RKI Eagle, ensure instrument is in methane elimination mode unless otherwise directed.
- ❒ Ensure measurement units are ppm (parts per million) initially. RKI Eagle will automatically switch to %LEL (lower explosive limit) if higher concentrations are encountered.
- ❒ Break up large lumps of soil in the sample bag, taking care not to puncture bag.
- ❒ Insert probe into soil bag, creating a seal with your hand around the opening.
- ❒ Gently manipulate soil in bag while observing instrument readings.
- ❒ Record the highest value obtained in the first 15 to 25 seconds
- ❒ Make sure to indicate scale (ppm or LEL); also note which instrument was used (RKI Eagle 1 or 2, or MiniRae).
- ❒ Jar samples and refrigerate as per Sampling and Analysis Plan.

3.2 Monitoring Well Installation Procedure

Equipment

- ❒ 5' x 2" [1.52 m x 50 mm] threaded sections of Schedule 40 PVC slotted well screen (5' x 1 ¼" [1.52 m x 32 mm] if installing in cored hole in bedrock)
- ❒ 5' x 2" [1.52 m x 50 mm] threaded sections of Schedule 40 PVC riser pipe (5' x 1 ¼" [1.52 m x 32 mm] if installing in cored hole in bedrock)
- ❒ Threaded end-cap
- ❒ Slip-cap or J-plug
- ❒ Asphalt cold patch or concrete
- ❒ Silica Sand
- ❒ Bentonite chips (Holeplug)
- ❒ Steel flushmount casing

Procedure

- ❒ Drill borehole to required depth, using drilling and sampling procedures described above.
- ❒ If borehole is deeper than required monitoring well, backfill with bentonite chips to required depth. This should only be done on wells where contamination is not suspected, in order to prevent downward migration of contamination.
- ❒ Only one monitoring well should be installed per borehole.
- ❒ Monitoring wells should not be screened across more than one stratigraphic unit to prevent potential migration of contaminants between units.
- ❒ Where LNAPLs are the suspected contaminants of concern, monitoring wells should be screened straddling the water table in order to capture any free product floating on top of the water table.
- ❒ Thread the end cap onto a section of screen. Thread second section of screen if required. Thread risers onto screen. Lower into borehole to required depth. Ensure slip-cap or J-plug is inserted to prevent backfill materials entering well.
- ❒ As drillers remove augers, backfill borehole annulus with silica sand until the level of sand is approximately 0.3 m above the top of the screen.
- ❒ Backfill with holeplug until at least 0.3 m of holeplug is present above the top of the silica sand.
- ❒ Backfill remainder of borehole with holeplug or with auger cuttings (if contamination is not suspected).
- ❒ Install flushmount casing. Seal space between flushmount and borehole annulus with concrete, cold patch, or holeplug to match surrounding ground surface.

3.3 Monitoring Well Sampling Procedure

Equipment

- ❒ Water level metre or interface probe on hydrocarbon/LNAPL sites
- ❒ Spray bottles containing water and methanol to clean water level tape or interface probe
- ❒ Peristaltic pump
- ❒ Polyethylene tubing for peristaltic pump
- ❒ Flexible tubing for peristaltic pump
- ❒ Latex or nitrile gloves (depending on suspected contaminant)
- ❒ Allen keys and/or 9/16" socket wrench to remove well caps
- ❒ Graduated bucket with volume measurements
- ❒ pH/Temperature/Conductivity combo pen
- ❒ Laboratory-supplied sample bottles

Sampling Procedure

- ❒ Locate well and use socket wrench or Allan key to open metal flush mount protector cap. Remove plastic well cap.
- ❒ Measure water level, with respect to existing ground surface, using water level meter or interface probe. If using interface probe on suspected NAPL site, measure the thickness of free product.
- ❒ Measure total depth of well.
- ❒ Clean water level tape or interface probe using methanol and water. Change gloves between wells.
- ❒ Calculate volume of standing water within well and record.
- ❒ Insert polyethylene tubing into well and attach to peristaltic pump. Turn on peristaltic pump and purge into graduated bucket. Purge at least three well volumes of water from the well. Measure and record field chemistry. Continue to purge, measuring field chemistry after every well volume purged, until appearance or field chemistry stabilizes.
- ❒ Note appearance of purge water, including colour, opacity (clear, cloudy, silty), sheen, presence of LNAPL, and odour. Note any other unusual features (particulate matter, effervescence (bubbling) of dissolved gas, etc.).
- ❒ Fill required sample bottles. If sampling for metals, attach 75-micron filter to discharge tube and filter metals sample. If sampling for VOCs, use low flow rate to ensure continuous stream of non-turbulent flow into sample bottles. Ensure no headspace is present in VOC vials.
- ❒ Replace well cap and flushmount casing cap.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The QA/QC program for this Phase II ESA is as follows:

- ❒ All non-dedicated sampling equipment (split spoons) will be decontaminated according to the SOPs listed above.
- ❒ All groundwater sampling equipment is dedicated (polyethylene and flexible peristaltic tubing is replaced for each well).
- ❒ Where groundwater samples are to be analyzed for VOCs, one laboratory-provided trip blank will be submitted for analysis with every laboratory submission.
- ❒ Approximately one (1) field duplicate will be submitted for every ten (10) samples submitted for laboratory analysis. A minimum of one (1) field duplicate per project will be submitted. Field duplicates will be submitted for soil and groundwater samples
- ❒ Where combo pens are used to measure field chemistry, they will be calibrated on an approximately monthly basis, according to frequency of use.

5.0 DATA QUALITY OBJECTIVES

The purpose of setting data quality objectives (DQOs) is to ensure that the level of uncertainty in data collected during the Phase II ESA is low enough that decision-making is not affected, and that the overall objectives of the investigation are met.

The quality of data is assessed by comparing field duplicates with original samples. If the relative percent difference (RPD) between the duplicate and the sample is within 20%, the data are considered to be of sufficient quality so as not to affect decision-making. The RPD is calculated as follows:

$$RPD = \left| \frac{x_1 - x_2}{(x_1 + x_2)/2} \right| \times 100\%$$

Where x_1 is the concentration of a given parameter in an original sample and x_2 is the concentration of that same parameter in the field duplicate sample.

For the purpose of calculating the RPD, it is desirable to select field duplicates from samples for which parameters are present in concentrations above laboratory detection limits, i.e. samples which are expected to be contaminated. If parameters are below laboratory detection limits for selected samples or duplicates, the RPD may be calculated using a concentration equal to one half (0.5 x) the laboratory detection limit.

It is also important to consider data quality in the overall context of the project. For example, if the DQOs are not met for a given sample, yet the concentrations of contaminants in both the sample and the duplicate exceed the MOE site remediation standards by a large margin, the decision-making usefulness of the sample may not be considered to be impaired. The proximity of other samples which meet the DQOs must also be considered in developing the Phase II Conceptual Site Model; often there are enough data available to produce a reliable Phase II Conceptual Site Model even if DQOs are not met for certain individual samples.

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

- ❒ The location of underground utilities
- ❒ Poor recovery of split-spoon soil samples
- ❒ Insufficient groundwater volume for groundwater samples
- ❒ Breakage of sampling containers following sampling or while in transit to the laboratory
- ❒ Elevated detection limits due to matrix interference (generally related to soil colour or presence of organic material)
- ❒ Elevated detection limits due to high concentrations of certain parameters, necessitating dilution of samples in laboratory
- ❒ Drill rig breakdowns
- ❒ Winter conditions
- ❒ Other site-specific impediments

Site-specific impediments to the Sampling and Analysis plan are discussed in the body of the Phase II ESA report.

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Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE & TEST DATA

Phase I-II Environmental Site Assessment
1133 Cyrville Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY CME 55 Power Auger

DATE 11 JUL 07

FILE NO. PE1180

HOLE NO. BH 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	
FILL: Crushed stone							
0.30							
FILL: Dark brown silty sand with gravel		AU	1				
		SS	2	35	62+	1	
		SS	3	0	50+		
		SS	4	0	50+	2	
BEDROCK: Weathered, black to brown shale		SS	5	0	50+	3	
		SS	6	100	50+	4	
4.57							
End of Borehole							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Lower Explosive Limit %

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

Photo Ionization Detector

△ Volatile Organic Rdg. (ppm)

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Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE & TEST DATA

Phase I-II Environmental Site Assessment
1133 Cyrville Road
Ottawa, Ontario

DATUM

REMARKS

FILE NO. PE1180

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger DATE 11 JUL 07

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0			
FILL: Crushed stone 0.20									
FILL: Dark brown silty sand with gravel		AU	1						
		SS	2	25	18	1			
1.22									
		SS	3	100	50+				
BEDROCK: Weathered black shale						2			
		SS	4	0	50+				
3.07		SS	5	0	50+	3			
End of Borehole									

20 40 60 80

100 200 300 400 500

Photo Ionization Detector

△ Volatile Organic Rdg. (ppm)

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Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE & TEST DATA

Phase I-II Environmental Site Assessment
1133 Cyrville Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY CME 55 Power Auger DATE 11 JUL 07

FILE NO. PE1180

HOLE NO. BH 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	
FILL: Crushed stone 0.20							
FILL: Brown silty sand with gravel		AU	1				
0.90						1	
Compact, dark brown SILTY SAND, some shale fragments		SS	2	33	16		
1.52		SS	3	100	50+		
BEDROCK: Weathered, black shale						2	
2.29							
End of Borehole							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Lower Explosive Limit %

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

Photo Ionization Detector

△ Volatile Organic Rdg. (ppm)

patersongroup

Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE & TEST DATA

Phase I-II Environmental Site Assessment
1133 Cyrville Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY CME 55 Power Auger DATE 11 JUL 07

FILE NO. PE1180

HOLE NO. BH 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0			
Asphaltic concrete 0.08									
FILL: Crushed stone 0.15									
FILL: Black silty clay with sand		AU	1						
0.90		SS	2	40	50+	1			
		SS	3	50	50+				
BEDROCK: Weathered, black shale						2			
		SS	4	25	50				
3.07		SS	5		50+	3			
End of Borehole									

○ Lower Explosive Limit %: 20 40 60 80

100 200 300 400 500

Photo Ionization Detector

△ Volatile Organic Rdg. (ppm)

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Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE & TEST DATA

Phase I-II Environmental Site Assessment
1133 Cyrville Road
Ottawa, Ontario

DATUM

REMARKS

FILE NO. PE1180

HOLE NO. BH 5

BORINGS BY CME 55 Power Auger DATE 11 JUL 07

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	
FILL: Crushed stone 0.15							
FILL: Brown silty sand with gravel		AU	1				
1.07		SS	2	78	39	1	
BEDROCK: Weathered, black shale		SS	3	100	50+		
2.29						2	
End of Borehole							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Lower Explosive Limit %

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

Photo Ionization Detector

△ Volatile Organic Rdg. (ppm)

patersongroup

Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE & TEST DATA

Phase I-II Environmental Site Assessment
1133 Cyrville Road
Ottawa, Ontario

DATUM

REMARKS

FILE NO. PE1180

HOLE NO. BH 6

BORINGS BY CME 55 Power Auger DATE 11 JUL 07

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	
Asphaltic concrete 0.10							
FILL: Crushed stone 0.30							
FILL: Grey silty clay		AU	1				
0.76							
Very dense, grey SANDY SILT 1.06		SS	2	100	54+	1	
BEDROCK: Weathered, black shale		SS	3	67	50+	2	
2.29							
End of Borehole							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Lower Explosive Limit %
20 40 60 80

Monitoring Well Construction

100 200 300 400 500
Photo Ionization Detector
△ Volatile Organic Rdg. (ppm)

patersongroup

Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE & TEST DATA

Phase I-II Environmental Site Assessment
1133 Cyrville Road
Ottawa, Ontario

DATUM

REMARKS

FILE NO. PE1180

HOLE NO. BH 7

BORINGS BY CME 55 Power Auger DATE 11 JUL 07

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0			
FILL: Crushed stone									
0.30									
FILL: Black sandy silt with gravel and shale		AU	1						
0.76									
		SS	2	67	60+	1			
BEDROCK: Weathered black shale with silt seams									
		SS	3	100	50+				
						2			
2.29									
End of Borehole									

20 40 60 80

100 200 300 400 500

Photo Ionization Detector

△ Volatile Organic Rdg. (ppm)

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Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE & TEST DATA

Phase I-II Environmental Site Assessment
1133 Cyrville Road
Ottawa, Ontario

DATUM

REMARKS

FILE NO. PE1180

HOLE NO. BH 8

BORINGS BY CME 55 Power Auger DATE 11 JUL 07

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0			
TOPSOIL 0.05									
FILL: Dark brown silty sand with gravel		AU	1						
0.60									
		SS	2	78	33	1			
BEDROCK: Weathered black shale		SS	3	100	50+				
						2			
2.29									
End of Borehole									

Lower Explosive Limit % scale: 20 40 60 80

Photo Ionization Detector: 100 200 300 400 500

△ Volatile Organic Rdg. (ppm)

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 1

BORINGS BY CME 55 Power Auger **DATE** 2011 August 16

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
25mm Asphaltic concrete		AU	1			0	68.67		
FILL: Crushed stone									
0.51									
Brown **SILTY CLAY,** trace shale and organics		SS	2	46	10	1	67.67		
1.35		SS	3	0	50+				
BEDROCK: Heavily fractured and weathered, black shale		AU	4			2	66.67		
- moderately fractured by 3.0m depth						3	65.67		
		RC	1	100	93				
						4	64.67		
		RC	2	100	96				
4.75									
End of Borehole									
(GWL @ 2.29m-Aug. 22/11)									

Lower Explosive Limit %: 20 40 60 80

RKI Eagle Rdg. (ppm): 100 200 300 400 500

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger **DATE** 2011 August 16

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	69.50		
13mm Asphaltic concrete (0.25)		AU	1						
FILL: Crushed stone									
FILL: Brown silty clay with sand, trace shale and gravel		SS	2	50	12	1	68.50		
(1.45)									
Black **SILTY CLAY** with sand seams and topsoil (1.83)		SS	3		50+				
		RC	1	62	0	2	67.50		
BEDROCK: Heavily fractured and weathered, black shale		RC	2	95	0	3	66.50		
		RC	3	87	0	4	65.50		
		RC	4	97	14	5	64.50		
(5.69)									
End of Borehole									
(GWL @ 2.94m-Aug. 22/11)									

Lower Explosive Limit % scale: 20 40 60 80

RKI Eagle Rdg. (ppm): 100 200 300 400 500

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 3

BORINGS BY CME 55 Power Auger **DATE** 2011 August 16

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	69.55		
FILL: Crushed stone									
0.30									
FILL: Brown silty clay with sand, gravel, trace shale									
0.76									
End of Borehole									
Practical refusal to augering @ 0.76m depth									

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 3A

BORINGS BY CME 55 Power Auger **DATE** 2011 August 16

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	69.55		
FILL: Crushed stone 0.25		AU	1						
FILL: Brown silty sand with organics 1.07		SS	2	50	17	1	68.55		
Brown **SILTY CLAY** with sand 1.45		SS	3	43	50+				
BEDROCK: Heavily fractured and weathered, black shale with mud seams 2.03						2	67.55		
End of Borehole Practical refusal to augering @ 2.03m depth									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 4

BORINGS BY CME 55 Power Auger **DATE** 2011 August 16

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	68.67		
FILL: Crushed stone 0.25									
FILL: Brown silty sand, trace gravel 0.89									
TOPSOIL, trace clay and sand 1.09		SS	1	88	50+	1	67.67		
BEDROCK: Heavily fractured and weathered, black shale 1.22									
End of Borehole									
Practical refusal to augering @ 1.22m depth									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 5

BORINGS BY CME 55 Power Auger **DATE** 2011 August 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	68.07		
FILL: Brown silty sand with gravel and shale		SS	1	83	50+				
0.46									
End of Borehole									
Practical refusal to augering @ 0.46m depth									

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80
△
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 6

BORINGS BY CME 55 Power Auger **DATE** 2011 August 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	68.51		
FILL: Brown silty sand with gravel and fractured shale		SS	1	42	8				
0.60									
Brown **SILTY CLAY** with sand and fractured shale		SS	2	82	17	1	67.51		
1.22									
BEDROCK: Heavily fractured and weathered, black shale		SS	3	20	50+				
2.06						2	66.51		
End of Borehole									
Practical refusal to augering @ 2.06m depth									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 7

BORINGS BY CME 55 Power Auger **DATE** 2011 August 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	69.17		
FILL: Crushed stone									
0.25									
FILL: Brown silty sand with crushed stone, trace concrete		SS	1	54	38				
0.76									
TOPSOIL with silty clay, trace gravel		SS	2	79	5	1	68.17		
1.68		SS	3	100	50+				
BEDROCK: Heavily fractured and weathered, black shale									
1.93									
End of Borehole									
Practical refusal to augering @ 1.93m depth									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 8

BORINGS BY CME 55 Power Auger **DATE** 2011 August 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	69.08		
FILL: Crushed stone									
0.33									
Brown **SILTY CLAY** with sand, gravel, trace organics		SS	1	15	6	1	68.08		
1.37									
BEDROCK: Heavily fractured, weathered, black shale		SS	2	27	50+				
1.83									
End of Borehole									
Practical refusal to augering @ 1.83m depth									

Lower Explosive Limit % scale: 20 40 60 80

RKI Eagle Rdg. (ppm): 100 200 300 400 500

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 9

BORINGS BY CME 55 Power Auger **DATE** 2011 August 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	68.66		
FILL: Crushed stone (0.25)									
FILL: Brown silty sand, some crushed stone (0.60)		SS	1	42	23				
FILL: Brown silty sand (0.91)									
Dark brown **SILTY CLAY** with sand and topsoil (1.37)		SS	2	19	7	1	67.66		
BEDROCK: Heavily fractured and weathered, black shale (1.90)		SS	3	67	50+				
End of Borehole									
Practical refusal to augering @ 1.90m depth									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH10

BORINGS BY CME 55 Power Auger **DATE** 2011 August 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	68.53		
FILL: Crushed stone									
0.25		SS	1	46	41				
FILL: Brown silty sand with gravel									
0.76									
Brown **SILTY CLAY,** trace gravel and organics		SS	2	58	12	1	67.53		
1.50									
BEDROCK: Heavily fractured and weathered, black shale	1.65	SS	3	60	50+				
End of Borehole									
Practical refusal to augering @ 1.65m depth									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH11

BORINGS BY CME 55 Power Auger **DATE** 2011 August 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	68.90		
FILL: Crushed stone 0.15									
FILL: Brown silty sand with gravel and shale, trace clay 0.60		SS	1	50	18				
FILL: Brown silty sand with gravel 0.91						1	67.90		
TOPSOIL 1.22		SS	2	46	8				
Brown **SILTY CLAY** with sand and roots 1.37									
BEDROCK: Heavily fractured and weathered, black shale 1.83		SS	3	50	50+				
End of Borehole									
Practical refusal to augering @ 1.83m depth									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 to 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH12

BORINGS BY CME 55 Power Auger **DATE** 2011 August 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	70.25
TOPSOIL 0.15							
FILL: Brown silty sand with clay and shale 0.60		AU	1				
FILL: Brown silty sand with clay, gravel and shale, some organics 1.37		SS	2	42	7	1	69.25
BEDROCK: Heavily fractured and weathered, black shale		SS	3	96	38	2	68.25
2.40		SS	4	100	50+		
		RC	1	70	21	3	67.25
BEDROCK: Fractured, black shale						4	66.25
		RC	2	87	42	5	65.25
5.61 End of Borehole							
(GWL @ 3.29m-Aug. 22/11)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 - 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 3-20

BORINGS BY CME-55 Low Clearance Drill **DATE** 2020 February 21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	69.35
FILL: Brown silty sand with gravel, some clay		AU	1				
0.60							
FILL: Brown silty sand with gravel and weathered shale		SS	2	25	7	1	68.35
1.52							
		SS	3	100	50+	2	67.35
		SS	4	100	50+		
		SS	5	20		3	66.35
BEDROCK: Weathered shale							
		SS	6	75		4	65.35
		SS	7	50			
		SS	8	75		5	64.35
5.79							
End of Borehole							
Practical refusal to augering at 5.79m depth							
(GWL @ 2.38m - March 3, 2020)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 - 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 4-20

BORINGS BY CME-55 Low Clearance Drill **DATE** 2020 February 21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit % (20, 40, 60, 80)	Monitoring Well Construction
GROUND SURFACE						0	68.62		
FILL: Brown silty sand with clay and gravel		AU	1						
1.07		SS	2	67	23	1	67.62		
		SS	3	56	50+				
						2	66.62		
Compact to very dense, brown **SILTY SAND** with weathered shale, trace clay		AU	4						
		SS	5	50	50+	3	65.62		
						4	64.62		
		SS	6	40	50+				
5.18						5	63.62		
End of Borehole									
Practical refusal to augering at 5.18m depth									
(GWL @ 1.23m - March 3, 2020)									

RKI Eagle Rdg. (ppm): 100, 200, 300, 400, 500

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 - 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 5-20

BORINGS BY CME-55 Low Clearance Drill **DATE** 2020 February 21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	68.77		
FILL: Brown silty sand with gravel, trace asphalt		AU	1						
0.60		SS	3	60	50+				
Very dense, brown **SILTY SAND** with clay and gravel									
0.94		SS	2	100	50+	1	67.77		
						2	66.77		
		SS	4	50	50+				
Very dense, brown **SILTY SAND** with weathered shale									
		SS	5	50	50+	3	65.77		
		SS	6	25	50+				
						4	64.77		
4.27									
End of Borehole									
Practical refusal to augering at 4.27m depth									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1125 - 1149 Cyrville Road
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant, southwest corner of the intersection of Cyrville Road and Michael Street. Geodetic elevation = 70.63m.

FILE NO. PE2374

REMARKS

HOLE NO. BH 6-20

BORINGS BY CME-55 Low Clearance Drill **DATE** 2020 February 21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	68.77		
FILL: Brown silty sand with gravel, trace cobbles		AU	1						
0.60									
Brown **SILTY CLAY,** trace gravel		SS	2	88	50+	1	67.77		
1.14									
		SS	3	80	50+				
						2	66.77		
		SS	4	80	50+				
Very dense, brown **SILTY SAND** with weathered shale									
		SS	5	75	50+	3	65.77		
		AU	6						
		SS	7	20	50+				
						4	64.77		
		SS	8	20	50+				
5.05						5	63.77		
End of Borehole									
Practical refusal to augering at 5.05m depth									
(GWL @ 0.46m - March 3, 2020)									

Lower Explosive Limit % scale: 20 40 60 80

RKI Eagle Rdg. (ppm): 100 200 300 400 500

▲ Full Gas Resp. △ Methane Elim.

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the relative strength of cohesionless soils is the compactness condition, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm. An SPT N value of "P" denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

Compactness Condition	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their "sensitivity". The sensitivity, S_t, is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

Low Sensitivity:	$S_t < 2$
Medium Sensitivity:	$2 < S_t < 4$
Sensitive:	$4 < S_t < 8$
Extra Sensitive:	$8 < S_t < 16$
Quick Clay:	$S_t > 16$

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NQ or larger size core. However, it can be used on smaller core sizes, such as BQ, if the bulk of the fractures caused by drilling stresses (called "mechanical breaks") are easily distinguishable from the normal in situ fractures.

RQD %	**ROCK QUALITY**
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube, generally recovered using a piston sampler
G	-	"Grab" sample from test pit or surface materials
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

WC%	-	Natural water content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic Limit, % (water content above which soil behaves plastically)
PI	-	Plasticity Index, % (difference between LL and PL)
Dxx	-	Grain size at which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2 / (D10 \times D60)$
Cu	-	Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$
Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

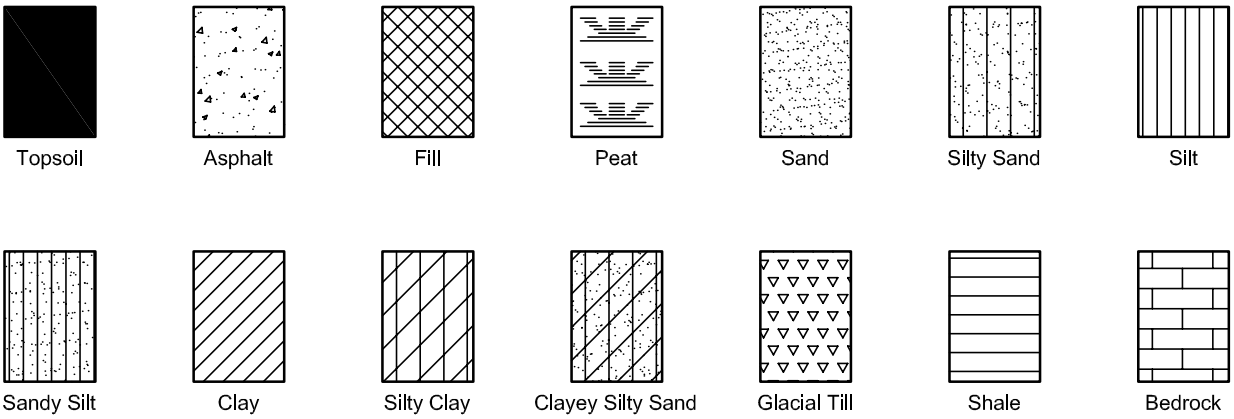
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

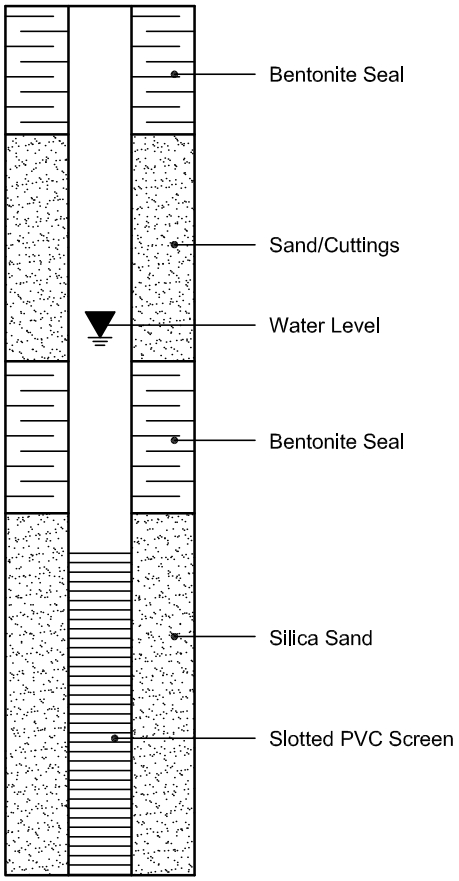
SYMBOLS AND TERMS (continued)

STRATA PLOT

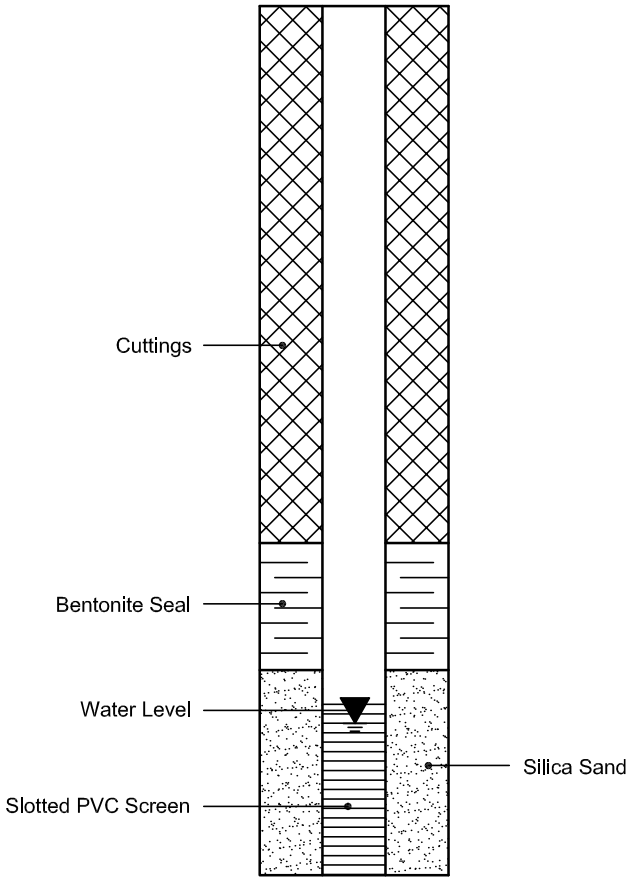


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Mark D'Arcy

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 4743
Project: PE1180
Custody: 33144

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007
Order #: 7280125

This Certificate of Analysis contains analytical data applicable to the following samples submitted:

Paracel ID	Client ID
7280125-01	BH1-SS2
7280125-02	BH2-AU1
7280125-03	BH2-SS2
7280125-04	BH4-SS2&SS3
7280125-05	BH5-SS2

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	12-Jul-07	14-Jul-07
CCME PHC F1	CWS Tier 1 - P&T GC-FID	12-Jul-07	14-Jul-07
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	13-Jul-07	17-Jul-07
Solids, Dry Weight	Gravimetric, calculation	12-Jul-07	12-Jul-07

PARACEL LABORATORIES LTD.

Order #: 7280125

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date:12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

	Client ID:	BH1-SS2	BH2-AU1	BH2-SS2	BH4-SS2&SS3
	Sample Date:	11-Jul-07	11-Jul-07	11-Jul-07	11-Jul-07
	Sample ID:	7280125-01	7280125-02	7280125-03	7280125-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	91.2	93.9	91.8	93.9
Volatiles					
Benzene	0.03 ug/g dry	0.04 [2]	0.17 [2]	0.33 [2]	2.82 [2]
Ethylbenzene	0.05 ug/g dry	<0.05 [2]	0.16 [2]	0.28 [2]	1.17 [2]
Toluene	0.05 ug/g dry	0.12 [2]	0.11 [2]	0.25 [2]	0.31 [2]
m,p-Xylenes	0.05 ug/g dry	0.09 [2]	0.36 [2]	0.91 [2]	6.36 [2]
o-Xylene	0.05 ug/g dry	<0.05 [2]	0.14 [2]	0.23 [2]	0.80 [2]
Toluene-d8	Surrogate	104% [2]	106% [2]	107% [2]	107% [2]
Hydrocarbons					
F1 PHCs (C6-C10)	20 ug/g dry	<20	40	100	100
F2 PHCs (C10-C16)	10 ug/g dry	103	54	201	192
F3 PHCs (C16-C34)	10 ug/g dry	207	478	368	450
F4 PHCs (C34-C50)	10 ug/g dry	16	401	296	630

	Client ID:	BH5-SS2	-	-	-
	Sample Date:	11-Jul-07	-	-	-
	Sample ID:	7280125-05	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	90.7	-	-	-
Volatiles					
Benzene	0.03 ug/g dry	<0.03 [2]	-	-	-
Ethylbenzene	0.05 ug/g dry	0.06 [2]	-	-	-
Toluene	0.05 ug/g dry	0.16 [2]	-	-	-
m,p-Xylenes	0.05 ug/g dry	0.72 [2]	-	-	-
o-Xylene	0.05 ug/g dry	0.21 [2]	-	-	-
Toluene-d8	Surrogate	104% [2]	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	20 ug/g dry	30	-	-	-
F2 PHCs (C10-C16)	10 ug/g dry	151	-	-	-
F3 PHCs (C16-C34)	10 ug/g dry	215	-	-	-
F4 PHCs (C34-C50)	10 ug/g dry	173	-	-	-

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	20	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	ug/g						
Volatiles									
Benzene	ND	0.03	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.69*		*ug/g*		*109*	*76-118*			

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**

Client PO: 4743 Project Description: PE1180

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	36	20	ug/g dry	34			5.2	32	
F2 PHCs (C10-C16)	ND	10	ug/g dry	55			200.0	50	QR-01
F3 PHCs (C16-C34)	88	10	ug/g dry	114			25.5	50	
F4 PHCs (C34-C50)	16	10	ug/g dry	21			25.7	50	
Volatiles									
Benzene	ND	0.03	ug/g dry	ND				50	
Ethylbenzene	0.073	0.05	ug/g dry	0.063			15.6	34	
Toluene	0.159	0.05	ug/g dry	0.159			0.4	32	
m,p-Xylenes	0.795	0.05	ug/g dry	0.722			9.7	35	
o-Xylene	0.234	0.05	ug/g dry	0.215			8.6	50	
Surrogate: Toluene-d8	*9.24*		*ug/g dry*	*ND*	*105*	*76-118*			

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date:12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	97	20	ug/g	ND	97.5	80-120			
F2 PHCs (C10-C16)	59	10	ug/g	ND	73.7	61-129			
F3 PHCs (C16-C34)	150	10	ug/g	ND	75.1	61-129			
F4 PHCs (C34-C50)	97	10	ug/g	ND	80.5	61-129			
Volatiles									
Benzene	0.379	0.03	ug/g	ND	102	55-141			
Ethylbenzene	4.23	0.05	ug/g	ND	113	61-139			
Toluene	15.2	0.05	ug/g	ND	97.0	54-136			
m,p-Xylenes	13.9	0.05	ug/g	ND	109	61-139			
o-Xylene	5.29	0.05	ug/g	ND	105	60-142			
Surrogate: Toluene-d8	*7.92*		*ug/g*		*99.0*	*76-118*			

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

Sample and QC Qualifiers Notes

1- QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.
2- VOC02 :Not able to complete VOC-low level analysis due to elevated hydrocarbon background. VOC-high level analysis completed in its place.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Chain of Custody Record
№ 33144
Pg. 1 of 1

Contact: Mark D'Arcy
Company: PATERSON GROUP
Address: 28 Concourse Gate Unit 1
Ottawa ON K2E 7T7
Tel: 226-7381 Fax: 226-6344

Project Ref: PE 1180
PO #: 4743
Quote #: ☐Not Quoted
Email:
Preservative to be added by Paracel? ☐Yes ☒No

REPORTING REQUIREMENTS
[ ] Hard Copy [✓] Email - PDF
[✓] FAX [ ] Email - spreadsheet

TURN AROUND TIME
[ ] 1-day [ ] 2-day [✓] Regular

REGULATORY GUIDELINE REQUIREMENTS
MOE Table 1

Matrix Types: S–Soil/Sed GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer A-Air O-Other

Paracel Order #: 72Y0124-420
72Y0125-421

	Sample Identification	Matrix	# Bottles	Date Sampled d/m/y	Analysis Required: PHCs (F_1-F_4) + VOCs	Analysis Required: BTEX + PHCs
1	~~MW1-GW1~~ MW1-GW1-G	W	1	July 11/07	✓	
2	BH1 - SS2	soil	1			✓
3	BH2 - AU1		1			✓
4	BH2 - SS2		1			✓
5	BH4 - SS2 & SS3		1			✓
6	BH5 - SS2	↓	1	↓		✓
7						
8						
9						
10						

Comments:

Relinquished by: [illegible]
Date: July 12/07 Time: 10h10

Received by: [signature]
Date: 07/07/12 Time: 10

Verified by: [signature]
Date: 07/07/12 Time: 1:25

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Certificate of Analysis

Paterson Group Consulting Engineers
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Attn: Mark D'Arcy

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 4743
Project: PE1180
Custody: 33144

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007
Order #: 7280124

This Certificate of Analysis contains analytical data applicable to the following samples submitted:

Paracel ID	Client ID
7280124-01	MW1-GW1

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME PHC F1	CWS Tier 1 - P&T GC-FID	12-Jul-07	12-Jul-07
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	13-Jul-07	16-Jul-07
VOCs	EPA 624 - P&T GC-MS	12-Jul-07	12-Jul-07

PARACEL LABORATORIES LTD.

Order #: 7280124

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743
Project Description: PE1180

	Client ID:	MW1-GW1	-	-	-
	Sample Date:	11-Jul-07	-	-	-
	Sample ID:	7280124-01	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
Benzene	0.5 ug/L	11.9	-	-	-
Bromodichloromethane	0.4 ug/L	<0.4	-	-	-
Bromoform	0.8 ug/L	<0.8	-	-	-
Bromomethane	1.0 ug/L	<1.0	-	-	-
Carbon Tetrachloride	0.5 ug/L	<0.5	-	-	-
Chlorobenzene	0.4 ug/L	<0.4	-	-	-
Chloroethane	1.0 ug/L	<1.0	-	-	-
Chloroform	0.6 ug/L	<0.6	-	-	-
Chloromethane	3.0 ug/L	<3.0	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
1,2-Dibromoethane	1.0 ug/L	<1.0	-	-	-
1,2-Dichlorobenzene	0.4 ug/L	<0.4	-	-	-
1,3-Dichlorobenzene	0.4 ug/L	<0.4	-	-	-
1,4-Dichlorobenzene	0.4 ug/L	1.9	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.6 ug/L	<0.6	-	-	-
cis-1,2-Dichloroethylene	0.4 ug/L	1.0	-	-	-
trans-1,2-Dichloroethylene	1.0 ug/L	<1.0	-	-	-
1,2-Dichloropropane	0.7 ug/L	<0.7	-	-	-
cis-1,3-Dichloropropylene	0.4 ug/L	<0.4	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	8.3	-	-	-
Methylene Chloride	4.0 ug/L	<4.0	-	-	-
Styrene	0.4 ug/L	<0.4	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.6 ug/L	<0.6	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	4.2	-	-	-
1,1,1-Trichloroethane	0.4 ug/L	<0.4	-	-	-
1,1,2-Trichloroethane	0.6 ug/L	<0.6	-	-	-
Trichloroethylene	0.4 ug/L	<0.4	-	-	-

PARACEL LABORATORIES LTD.

Order #: 7280124

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

	Client ID:	MW1-GW1	-	-	-
	Sample Date:	11-Jul-07	-	-	-
	Sample ID:	7280124-01	-	-	-
	MDL/Units	Water	-	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	2.1	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	4.9	-	-	-
o-Xylene	0.5 ug/L	1.7	-	-	-
4-Bromofluorobenzene	Surrogate	96.0%	-	-	-
Dibromofluoromethane	Surrogate	108%	-	-	-
Toluene-d8	Surrogate	111%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	200 ug/L	<200	-	-	-
F2 PHCs (C10-C16)	100 ug/L	204	-	-	-
F3 PHCs (C16-C34)	100 ug/L	113	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	200	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.4	ug/L						
Bromoform	ND	0.8	ug/L						
Bromomethane	ND	1.0	ug/L						
Carbon Tetrachloride	ND	0.5	ug/L						
Chlorobenzene	ND	0.4	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.6	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
1,2-Dibromoethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.4	ug/L						
1,3-Dichlorobenzene	ND	0.4	ug/L						
1,4-Dichlorobenzene	ND	0.4	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.6	ug/L						
cis-1,2-Dichloroethylene	ND	0.4	ug/L						
trans-1,2-Dichloroethylene	ND	1.0	ug/L						
1,2-Dichloropropane	ND	0.7	ug/L						
cis-1,3-Dichloropropylene	ND	0.4	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Methylene Chloride	ND	4.0	ug/L						
Styrene	ND	0.4	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.6	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.4	ug/L						
1,1,2-Trichloroethane	ND	0.6	ug/L						
Trichloroethylene	ND	0.4	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
1,3,5-Trimethylbenzene	ND	0.5	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*77.6*		*ug/L*		*97.0*	*83-134*			
Surrogate: Dibromofluoromethane	*85.1*		*ug/L*		*106*	*78-124*			
Surrogate: Toluene-d8	*89.8*		*ug/L*		*112*	*76-118*			

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	200	ug/L	ND				32	
Volatiles									
Benzene	ND	0.5	ug/L	ND				20	
Bromodichloromethane	ND	0.4	ug/L	ND				25	
Bromoform	ND	0.8	ug/L	ND				25	
Bromomethane	ND	1.0	ug/L	ND				25	
Carbon Tetrachloride	ND	0.5	ug/L	ND				25	
Chlorobenzene	ND	0.4	ug/L	ND				25	
Chloroethane	ND	1.0	ug/L	ND				25	
Chloroform	1.90	0.6	ug/L	1.89			0.5	19	
Chloromethane	ND	3.0	ug/L	ND				25	
Dibromochloromethane	ND	0.5	ug/L	ND				25	
1,2-Dibromoethane	ND	1.0	ug/L	ND				25	
1,2-Dichlorobenzene	ND	0.4	ug/L	ND				25	
1,3-Dichlorobenzene	ND	0.4	ug/L	ND				25	
1,4-Dichlorobenzene	ND	0.4	ug/L	ND				25	
1,1-Dichloroethane	ND	0.5	ug/L	ND				21	
1,2-Dichloroethane	ND	0.5	ug/L	ND				25	
1,1-Dichloroethylene	ND	0.6	ug/L	ND				21	
cis-1,2-Dichloroethylene	ND	0.4	ug/L	ND				20	
trans-1,2-Dichloroethylene	ND	1.0	ug/L	ND				25	
1,2-Dichloropropane	ND	0.7	ug/L	ND				25	
cis-1,3-Dichloropropylene	ND	0.4	ug/L	ND				25	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				25	
Ethylbenzene	ND	0.5	ug/L	ND				35	
Methylene Chloride	ND	4.0	ug/L	ND				25	
Styrene	ND	0.4	ug/L	ND				25	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				25	
1,1,2,2-Tetrachloroethane	ND	0.6	ug/L	ND				25	
Tetrachloroethylene	ND	0.5	ug/L	ND				31	
Toluene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.4	ug/L	ND				25	
1,1,2-Trichloroethane	ND	0.6	ug/L	ND				25	
Trichloroethylene	ND	0.4	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				25	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				20	
Vinyl chloride	ND	0.5	ug/L	ND				25	
m,p-Xylenes	ND	0.5	ug/L	ND				34	
o-Xylene	ND	0.5	ug/L	ND				32	
Surrogate: 4-Bromofluorobenzene	*77.5*		*ug/L*	*ND*	*96.9*	*83-134*			
Surrogate: Dibromofluoromethane	*86.0*		*ug/L*	*ND*	*107*	*78-124*			
Surrogate: Toluene-d8	*89.6*		*ug/L*	*ND*	*112*	*76-118*			

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1930	200	ug/L	ND	96.4	68-117			
F2 PHCs (C10-C16)	1490	100	ug/L	ND	93.2	61-129			
F3 PHCs (C16-C34)	3450	100	ug/L	ND	86.2	61-129			
F4 PHCs (C34-C50)	1960	100	ug/L	ND	81.5	61-129			
Volatiles									
Benzene	43.5	0.5	ug/L	ND	109	55-141			
Bromodichloromethane	41.5	0.4	ug/L	ND	104	52-139			
Bromoform	40.1	0.8	ug/L	ND	100	52-170			
Bromomethane	31.5	1.0	ug/L	ND	78.8	32-138			
Carbon Tetrachloride	39.6	0.5	ug/L	ND	99.1	49-149			
Chlorobenzene	40.1	0.4	ug/L	ND	100	64-137			
Chloroethane	33.2	1.0	ug/L	ND	83.0	39-152			
Chloroform	41.5	0.6	ug/L	ND	104	58-138			
Chloromethane	34.3	3.0	ug/L	ND	85.7	24-163			
Dibromochloromethane	39.3	0.5	ug/L	ND	98.2	61-153			
1,2-Dibromoethane	39.9	1.0	ug/L	ND	99.8	61-145			
1,2-Dichlorobenzene	40.9	0.4	ug/L	ND	102	60-150			
1,3-Dichlorobenzene	41.4	0.4	ug/L	ND	103	62-149			
1,4-Dichlorobenzene	42.3	0.4	ug/L	ND	106	63-132			
1,1-Dichloroethane	43.3	0.5	ug/L	ND	108	51-156			
1,2-Dichloroethane	38.5	0.5	ug/L	ND	96.2	50-140			
1,1-Dichloroethylene	43.1	0.6	ug/L	ND	108	43-153			
cis-1,2-Dichloroethylene	40.5	0.4	ug/L	ND	101	58-145			
trans-1,2-Dichloroethylene	43.1	1.0	ug/L	ND	108	51-145			
1,2-Dichloropropane	45.5	0.7	ug/L	ND	114	56-136			
cis-1,3-Dichloropropylene	46.9	0.4	ug/L	ND	117	54-141			
trans-1,3-Dichloropropylene	46.6	0.5	ug/L	ND	116	61-140			
Ethylbenzene	42.8	0.5	ug/L	ND	107	61-139			
Methylene Chloride	38.0	4.0	ug/L	ND	95.1	58-149			
Styrene	43.7	0.4	ug/L	ND	109	63-143			
1,1,1,2-Tetrachloroethane	40.0	0.5	ug/L	ND	99.9	61-148			
1,1,2,2-Tetrachloroethane	47.8	0.6	ug/L	ND	120	50-157			
Tetrachloroethylene	39.0	0.5	ug/L	ND	97.4	51-145			
Toluene	45.5	0.5	ug/L	ND	114	54-136			
1,1,1-Trichloroethane	41.6	0.4	ug/L	ND	104	55-140			
1,1,2-Trichloroethane	43.9	0.6	ug/L	ND	110	63-144			
Trichloroethylene	37.4	0.4	ug/L	ND	93.5	52-135			
Trichlorofluoromethane	37.2	1.0	ug/L	ND	93.0	37-155			
1,3,5-Trimethylbenzene	42.7	0.5	ug/L	ND	107	61-151			
Vinyl chloride	35.1	0.5	ug/L	ND	87.8	31-159			
m,p-Xylenes	87.8	0.5	ug/L	ND	110	61-139			
o-Xylene	42.3	0.5	ug/L	ND	106	60-142			
Surrogate: 4-Bromofluorobenzene	*77.0*		*ug/L*		*96.2*	*83-134*			
Surrogate: Dibromofluoromethane	*85.8*		*ug/L*		*107*	*78-124*			
Surrogate: Toluene-d8	*81.0*		*ug/L*		*101*	*76-118*			

Certificate of Analysis

Report Date: 17-Jul-2007
Order Date: 12-Jul-2007

Client: **Paterson Group Consulting Engineers**
Client PO: 4743 Project Description: PE1180

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Chain of Custody Record
№ 33144
Pg. 1 of 1

Contact: Mark D'Arcy
Company: PATERSON GROUP
Address: 28 Concourse Gate UNIT 1
Ottawa ON K2E 7T7
Tel: 226-7381 Fax: 226-6344

Project Ref: PE 1180
PO #: 4743
Quote #: ☐Not Quoted
Email:
Preservative to be added by Paracel? ☐Yes ☒No

REPORTING REQUIREMENTS
[ ] Hard Copy [✓] Email PDF
[✓] FAX [ ] Email - spreadsheet

TURN AROUND TIME
[ ] 1-day [ ] 2-day [✓] Regular

REGULATORY GUIDELINE REQUIREMENTS
MoE Table 1

Matrix Types: S–Soil/Sed GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer A-Air O-Other

	Sample Information				Analysis Required	
	Paracel Order #: 72Y0124-H20 72X0125-S01:1 / Sample Identification	Matrix	# Bottles	Date Sampled d/m/y	PHC's (F1-F4) + Vocs	BTEX + PHC's
1	~~MW1-GW1~~ MW1-GW1	W	1	July 11/07	✓	
2	BH1 - SS2	soil	1			✓
3	BH2 - AU1		1			✓
4	BH2 - SS2		1			✓
5	BH4 - SS2 & SS3		1			✓
6	BH5 - SS2		1			✓
7						
8						
9						
10						

Comments:

Relinquished by: [illegible]
Date: July 12/07 Time: 10h10

Received by: [illegible]
Date: 07/07/12 Time: 10

Verified by: [illegible]
Date: 07/07/12 Time: 1:25

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Luke Lopers

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 11955
Project: PE2374
Custody: 85635

Report Date: 6-Sep-2011
Order Date: 1-Sep-2011
Order #: 1136191

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1136191-01	BH3-SS2
1136191-02	BH6-AU1
1136191-03	BH7-SS1
1136191-04	BH9-SS2

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955 Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals	EPA 6020 - Digestion - ICP-MS	2-Sep-11	2-Sep-11
Solids, %	Gravimetric, calculation	6-Sep-11	6-Sep-11

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955

Project Description: PE2374

	Client ID:	BH3-SS2	BH6-AU1	BH7-SS1	BH9-SS2
	Sample Date:	16-Aug-11	16-Aug-11	16-Aug-11	16-Aug-11
	Sample ID:	1136191-01	1136191-02	1136191-03	1136191-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	94.5	95.2	95.9	93.3
Metals					
Lead	1 ug/g dry	70	28	68	5

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955

Project Description: PE2374

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Lead	ND	1	ug/g						

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955

Project Description: PE2374

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Lead	22.6	1	ug/g dry	22.2			2.1	30	
Physical Characteristics									
% Solids	91.1	0.1	% by Wt.	90.9			0.2	25	

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955 Project Description: PE2374

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Lead	54.9		ug/L	8.9	92.0	70-130			

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955 Project Description: PE2374

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

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Chain of Custody
(Lab Use Only)
Nº 85635

Page 1 of 1

Client Name: Paterson Group
Contact Name: Luke Lopers
Address: 1-28 Concourse Gate
Telephone: 613-226-7381

Project Reference: PE2374
Quote #
PO # 11955
Email Address: llopers@patersongroup.ca

TAT: [ ] Regular [X] 2 Day [ ] 1 Day [ ] Same Day
Date Required: _____

Samples Submitted Under: [ ] O. Reg. 153/04 Table __ [X] O. Reg 511/09 Table 1 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1136191

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Lead										
1	BH3-SS2	S		1	Aug. 16, 2011		X		60 ml								
2	BH6-AU1	S		1	Aug 17, 2011		X		↓								
3	BH7-SS1	S		1	Aug 17, 2011		X										
4	BH9-SS2	S		1	Aug 17, 2011		X		↓								
5																	
6																	
7																	
8																	
9																	
10																	

Comments:

Method of Delivery: Paracel

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
	A. Bedouse	M/C	M/C
Date/Time: August 31, 2011	Date/Time: 01/09/11 10:57am	Date/Time: Sept 1/11 11:25	Date/Time: Sept 1/11 11:29
	Temperature: ____ °C	Temperature: 13.4 °C	pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Luke Lopers

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 11951
Project: PE2374
Custody: 85657

Report Date: 23-Aug-2011
Order Date: 17-Aug-2011
Order #: 1134169

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1134169-01	BH1-SS2
1134169-02	BH2-SS2

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951 Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	19-Aug-11	23-Aug-11
CCME PHC F1	CWS Tier 1 - P&T GC-FID	19-Aug-11	23-Aug-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	18-Aug-11	19-Aug-11
Solids, %	Gravimetric, calculation	22-Aug-11	22-Aug-11
VOCs	EPA 8260 - P&T GC-MS	19-Aug-11	23-Aug-11

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

	Client ID:	BH1-SS2	BH2-SS2	-	-
	Sample Date:	16-Aug-11	16-Aug-11	-	-
	Sample ID:	1134169-01	1134169-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	84.0	86.4	-	-
Volatiles					
Acetone	0.5 ug/g dry	-	<0.5	-	-
Benzene	0.02 ug/g dry	-	<0.02	-	-
Bromodichloromethane	0.05 ug/g dry	-	<0.05	-	-
Bromoform	0.05 ug/g dry	-	<0.05	-	-
Bromomethane	0.05 ug/g dry	-	<0.05	-	-
Carbon Tetrachloride	0.05 ug/g dry	-	<0.05	-	-
Chlorobenzene	0.05 ug/g dry	-	<0.05	-	-
Chloroethane	0.05 ug/g dry	-	<0.05	-	-
Chloroform	0.05 ug/g dry	-	<0.05	-	-
Chloromethane	0.2 ug/g dry	-	<0.2	-	-
Dibromochloromethane	0.05 ug/g dry	-	<0.05	-	-
Dichlorodifluoromethane	0.05 ug/g dry	-	<0.05	-	-
1,2-Dibromoethane	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,1-Dichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichloroethylene, total	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichloropropane	0.05 ug/g dry	-	<0.05	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	<0.05	-	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	-	-
Hexane	0.05 ug/g dry	-	<0.05	-	-
Methyl Ethyl Ketone (2-Butanone)	0.5 ug/g dry	-	<0.5	-	-
Methyl Butyl Ketone (2-Hexanone)	2.0 ug/g dry	-	<2.0	-	-
Methyl Isobutyl Ketone	0.5 ug/g dry	-	<0.5	-	-

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

	Client ID:	BH1-SS2	BH2-SS2	-	-
	Sample Date:	16-Aug-11	16-Aug-11	-	-
	Sample ID:	1134169-01	1134169-02	-	-
	MDL/Units	Soil	Soil	-	-
Methyl tert-butyl ether	0.05 ug/g dry	-	<0.05	-	-
Methylene Chloride	0.05 ug/g dry	-	<0.05	-	-
Styrene	0.05 ug/g dry	-	<0.05	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	-	-
Tetrachloroethylene	0.05 ug/g dry	-	<0.05	-	-
Toluene	0.05 ug/g dry	-	<0.05	-	-
1,2,4-Trichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	<0.05	-	-
Trichloroethylene	0.05 ug/g dry	-	<0.05	-	-
Trichlorofluoromethane	0.05 ug/g dry	-	<0.05	-	-
1,3,5-Trimethylbenzene	0.05 ug/g dry	-	<0.05	-	-
Vinyl chloride	0.02 ug/g dry	-	<0.02	-	-
m,p-Xylenes	0.05 ug/g dry	-	<0.05	-	-
o-Xylene	0.05 ug/g dry	-	<0.05	-	-
Xylenes, total	0.05 ug/g dry	-	<0.05	-	-
4-Bromofluorobenzene	Surrogate	-	112%	-	-
Dibromofluoromethane	Surrogate	-	101%	-	-
Toluene-d8	Surrogate	-	107%	-	-
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	106%	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	10 ug/g dry	<10	-	-	-
F2 PHCs (C10-C16)	10 ug/g dry	<10	-	-	-
F3 PHCs (C16-C34)	10 ug/g dry	<10	-	-	-
F4 PHCs (C34-C50)	10 ug/g dry	<10	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	ug/g						
Volatiles									
Acetone	ND	0.5	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroethane	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Chloromethane	ND	0.2	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dibromoethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloroethylene, total	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.5	ug/g						
Methyl Butyl Ketone (2-Hexanone)	ND	2.0	ug/g						
Methyl Isobutyl Ketone	ND	0.5	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,2,4-Trichlorobenzene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
1,3,5-Trimethylbenzene	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*9.23*		*ug/g*		*115*	*50-140*			
Surrogate: Dibromofluoromethane	*7.72*		*ug/g*		*96.5*	*50-140*			
Surrogate: Toluene-d8	*8.27*		*ug/g*		*103*	*50-140*			
Benzene	ND	0.02	ug/g						

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.27*		*ug/g*		*103*	*50-140*			

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	10	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	10	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	10	ug/g dry	ND				30	
Physical Characteristics									
% Solids	91.3	0.1	% by Wt.	91.2			0.1	25	
Volatiles									
Acetone	ND	0.5	ug/g dry	ND				50	
Benzene	ND	0.02	ug/g dry	ND				50	
Bromodichloromethane	ND	0.05	ug/g dry	ND				50	
Bromoform	ND	0.05	ug/g dry	ND				50	
Bromomethane	ND	0.05	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND				50	
Chlorobenzene	ND	0.05	ug/g dry	ND				50	
Chloroethane	ND	0.05	ug/g dry	ND				50	
Chloroform	ND	0.05	ug/g dry	ND				50	
Chloromethane	ND	0.2	ug/g dry	ND				50	
Dibromochloromethane	ND	0.05	ug/g dry	ND				50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND				50	
1,2-Dibromoethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Hexane	ND	0.05	ug/g dry	ND				50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.5	ug/g dry	ND				50	
Methyl Butyl Ketone (2-Hexanone)	ND	2.0	ug/g dry	ND				50	
Methyl Isobutyl Ketone	ND	0.5	ug/g dry	ND				50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND				50	
Methylene Chloride	ND	0.05	ug/g dry	ND				50	
Styrene	ND	0.05	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
1,2,4-Trichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND				50	
Trichloroethylene	ND	0.05	ug/g dry	ND				50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND				50	
1,3,5-Trimethylbenzene	ND	0.05	ug/g dry	ND				50	
Vinyl chloride	ND	0.02	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	*5.71*		*ug/g dry*	*ND*	*113*	*50-140*			
Surrogate: Dibromofluoromethane	*4.97*		*ug/g dry*	*ND*	*98.1*	*50-140*			
Surrogate: Toluene-d8	*5.33*		*ug/g dry*	*ND*	*105*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*5.33*		*ug/g dry*	*ND*	*105*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	191	10	ug/g	ND	95.5	80-120			
F2 PHCs (C10-C16)	65	10	ug/g	ND	81.1	80-120			
F3 PHCs (C16-C34)	162	10	ug/g	ND	81.2	80-120			
F4 PHCs (C34-C50)	109	10	ug/g	ND	91.1	80-120			
Volatiles									
Acetone	10.2	0.5	ug/g	ND	102	50-140			
Benzene	3.6	0.02	ug/g	ND	90.3	60-130			
Bromodichloromethane	3.2	0.05	ug/g	ND	80.3	60-130			
Bromoform	3.3	0.05	ug/g	ND	81.4	60-130			
Bromomethane	3.9	0.05	ug/g	ND	96.4	50-140			
Carbon Tetrachloride	3.7	0.05	ug/g	ND	92.6	60-130			
Chlorobenzene	3.2	0.05	ug/g	ND	80.2	60-130			
Chloroethane	3.6	0.05	ug/g	ND	90.4	50-140			
Chloroform	3.7	0.05	ug/g	ND	91.8	60-130			
Chloromethane	3.4	0.2	ug/g	ND	85.4	50-140			
Dibromochloromethane	3.6	0.05	ug/g	ND	88.8	60-130			
Dichlorodifluoromethane	3.3	0.05	ug/g	ND	82.8	50-140			
1,2-Dibromoethane	3.5	0.05	ug/g	ND	88.2	60-130			
1,2-Dichlorobenzene	3.5	0.05	ug/g	ND	87.9	60-130			
1,3-Dichlorobenzene	3.5	0.05	ug/g	ND	86.3	60-130			
1,4-Dichlorobenzene	3.1	0.05	ug/g	ND	78.2	60-130			
1,1-Dichloroethane	3.6	0.05	ug/g	ND	89.3	60-130			
1,2-Dichloroethane	4.0	0.05	ug/g	ND	99.3	60-130			
1,1-Dichloroethylene	2.7	0.05	ug/g	ND	67.3	60-130			
cis-1,2-Dichloroethylene	3.2	0.05	ug/g	ND	80.9	60-130			
trans-1,2-Dichloroethylene	3.5	0.05	ug/g	ND	88.4	60-130			
1,2-Dichloropropane	3.6	0.05	ug/g	ND	89.1	60-130			
cis-1,3-Dichloropropylene	3.3	0.05	ug/g	ND	83.7	60-130			
trans-1,3-Dichloropropylene	3.4	0.05	ug/g	ND	85.1	60-130			
Ethylbenzene	3.4	0.05	ug/g	ND	84.0	60-130			
Hexane	2.8	0.05	ug/g	ND	69.8	60-130			
Methyl Ethyl Ketone (2-Butanone)	10.3	0.5	ug/g	ND	103	50-140			
Methyl Butyl Ketone (2-Hexanone)	8.4	2.0	ug/g	ND	83.9	50-140			
Methyl Isobutyl Ketone	10.1	0.5	ug/g	ND	101	50-140			
Methyl tert-butyl ether	10.6	0.05	ug/g	ND	106	50-140			
Methylene Chloride	3.3	0.05	ug/g	ND	83.4	60-130			
Styrene	2.9	0.05	ug/g	ND	72.0	60-130			
1,1,1,2-Tetrachloroethane	3.3	0.05	ug/g	ND	81.6	60-130			
1,1,2,2-Tetrachloroethane	3.0	0.05	ug/g	ND	74.6	60-130			
Tetrachloroethylene	2.9	0.05	ug/g	ND	72.4	60-130			
Toluene	3.4	0.05	ug/g	ND	86.1	60-130			
1,2,4-Trichlorobenzene	2.6	0.05	ug/g	ND	66.2	60-130			
1,1,1-Trichloroethane	4.0	0.05	ug/g	ND	99.6	60-130			
1,1,2-Trichloroethane	4.3	0.05	ug/g	ND	108	60-130			
Trichloroethylene	3.4	0.05	ug/g	ND	85.8	60-130			
Trichlorofluoromethane	4.2	0.05	ug/g	ND	104	50-140			
1,3,5-Trimethylbenzene	3.6	0.05	ug/g	ND	90.4	60-130			
Vinyl chloride	4.4	0.02	ug/g	ND	109	50-140			
m,p-Xylenes	5.3	0.05	ug/g	ND	66.1	60-130			

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	3.2	0.05	ug/g	ND	80.7	60-130			
Surrogate: 4-Bromofluorobenzene	*7.29*		*ug/g*		*91.1*	*50-140*			
Benzene	3.61	0.02	ug/g	ND	90.3	60-130			
Ethylbenzene	3.36	0.05	ug/g	ND	84.0	60-130			
Toluene	3.44	0.05	ug/g	ND	86.1	60-130			
m,p-Xylenes	5.29	0.05	ug/g	ND	66.1	60-130			
o-Xylene	3.23	0.05	ug/g	ND	80.7	60-130			

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Chain of Custody
(Lab Use Only)
Nº 85657

Page 1 of 1

Client Name: Paterson Group	Project Reference: PE2374	TAT: [X] Regular
Contact Name: Luke Lopers	Quote #	[ ] 2 Day
Address: 1-28 Concourse Gate	PO # 11951	[ ] 1 Day
	Email Address: llopers@patersongroup.ca	[ ] Same Day
Telephone: 613-226-7381		Date Required:

Samples Submitted Under: [ ] O. Reg. 153/04 Table __ [X] O. Reg 511/09 Table 1 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1134169

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analyses: VOCs	BTEX's/PHC's (F1-F4)								
1	BH1-SS2	S		2	Aug 16, 2011			X			120 ml + vial					
2	BH2-SS2	S		2	"		X				"					
3																
4																
5																
6																
7																
8																
9																
10																

Comments:

Method of Delivery: Walk-in

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
		MC	MC
Date/Time:	Date/Time:	Date/Time: Aug 17/11 5:30	Date/Time: Aug 17/11 5:54
Date/Time:	Temperature: ___ °C	Temperature: 24.5 °C	pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Luke Lopers

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 11953
Project: PE2374
Custody: 87567

Report Date: 24-Aug-2011
Order Date: 18-Aug-2011
Order #: 1134221

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1134221-01	BH8-SS1
1134221-02	BH10-SS2
1134221-03	BH12-SS2

Approved By:

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 24-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Aug-2011

Client PO: 11953 Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	23-Aug-11	23-Aug-11
CCME PHC F1	CWS Tier 1 - P&T GC-FID	23-Aug-11	23-Aug-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	20-Aug-11	20-Aug-11
Chromium, hexavalent	MOE E3056 - Extraction, colourimetric	19-Aug-11	22-Aug-11
Mercury	EPA 7471A - CVAA, digestion	22-Aug-11	22-Aug-11
Metals	EPA 6020 - Digestion - ICP-MS	19-Aug-11	19-Aug-11
Solids, %	Gravimetric, calculation	22-Aug-11	22-Aug-11

PARACEL LABORATORIES LTD.

Order #: 1134221

Certificate of Analysis

Report Date: 24-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Aug-2011

Client PO: 11953

Project Description: PE2374

	Client ID:	BH8-SS1	BH10-SS2	BH12-SS2	-
	Sample Date:	17-Aug-11	17-Aug-11	17-Aug-11	-
	Sample ID:	1134221-01	1134221-02	1134221-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	77.9	94.9	91.9	-
Metals					
Antimony	1 ug/g dry	<1	<1	-	-
Arsenic	1 ug/g dry	11	2	-	-
Barium	1 ug/g dry	120	96	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	6.2	<5.0	-	-
Cadmium	0.5 ug/g dry	4.1	<0.5	-	-
Chromium	5 ug/g dry	24	22	-	-
Chromium (VI)	0.4 ug/g dry	<0.4	<0.4	-	-
Cobalt	1 ug/g dry	12	9	-	-
Copper	5 ug/g dry	49	42	-	-
Lead	1 ug/g dry	143	53	-	-
Mercury	0.1 ug/g dry	0.5	<0.1	-	-
Molybdenum	1 ug/g dry	6	2	-	-
Nickel	5 ug/g dry	43	29	-	-
Selenium	1 ug/g dry	1	<1	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1 ug/g dry	<1	<1	-	-
Uranium	1 ug/g dry	4	2	-	-
Vanadium	10 ug/g dry	29	28	-	-
Zinc	20 ug/g dry	711	61	-	-
Volatiles					
Benzene	0.02 ug/g dry	-	-	<0.02	-
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	-
Toluene	0.05 ug/g dry	-	-	<0.05	-
m,p-Xylenes	0.05 ug/g dry	-	-	<0.05	-
o-Xylene	0.05 ug/g dry	-	-	<0.05	-
Xylenes, total	0.05 ug/g dry	-	-	<0.05	-
Toluene-d8	Surrogate	-	-	118%	-
Hydrocarbons					
F1 PHCs (C6-C10)	10 ug/g dry	-	-	<10	-
F2 PHCs (C10-C16)	10 ug/g dry	-	-	<10	-
F3 PHCs (C16-C34)	10 ug/g dry	-	-	<10	-

Certificate of Analysis

Report Date: 24-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Aug-2011

Client PO: 11953

Project Description: PE2374

	Client ID:	BH8-SS1	BH10-SS2	BH12-SS2	-
	Sample Date:	17-Aug-11	17-Aug-11	17-Aug-11	-
	Sample ID:	1134221-01	1134221-02	1134221-03	-
	MDL/Units	Soil	Soil	Soil	-
F4 PHCs (C34-C50)	10 ug/g dry	-	-	<10	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	ug/g						
Metals									
Antimony	ND	1	ug/g						
Arsenic	ND	1	ug/g						
Barium	ND	1	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.4	ug/g						
Chromium	ND	5	ug/g						
Cobalt	ND	1	ug/g						
Copper	ND	5	ug/g						
Lead	ND	1	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1	ug/g						
Nickel	ND	5	ug/g						
Selenium	ND	1	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1	ug/g						
Uranium	ND	1	ug/g						
Vanadium	ND	10	ug/g						
Zinc	ND	20	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*9.01*		*ug/g*		*113*	*50-140*			

Certificate of Analysis

Report Date: 24-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Aug-2011

Client PO: 11953 Project Description: PE2374

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	56	10	ug/g dry	65			16.1	40	
Metals									
Antimony	ND	1	ug/g dry	ND				30	
Arsenic	1.7	1	ug/g dry	1.5			16.4	30	
Barium	222	1	ug/g dry	215			3.2	30	
Beryllium	0.67	0.5	ug/g dry	0.56			16.6	30	
Boron	6.8	5.0	ug/g dry	ND				30	
Cadmium	ND	0.5	ug/g dry	ND				30	
Chromium (VI)	ND	0.4	ug/g dry	ND				35	
Chromium	48.4	5	ug/g dry	46.1			5.0	30	
Cobalt	14.5	1	ug/g dry	13.9			4.1	30	
Copper	25.3	5	ug/g dry	23.9			5.4	30	
Lead	9.6	1	ug/g dry	9.1			6.0	30	
Mercury	ND	0.1	ug/g dry	ND				35	
Molybdenum	1.1	1	ug/g dry	ND				30	
Nickel	30.2	5	ug/g dry	28.9			4.4	30	
Selenium	1.3	1	ug/g dry	ND				30	
Silver	0.31	0.3	ug/g dry	ND				30	
Thallium	ND	1	ug/g dry	ND				30	
Uranium	ND	1	ug/g dry	ND				30	
Vanadium	58.7	10	ug/g dry	55.7			5.2	30	
Zinc	72.7	20	ug/g dry	70.4			3.2	30	
Physical Characteristics									
% Solids	91.3	0.1	% by Wt.	91.2			0.1	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*8.73*		*ug/g dry*	*ND*	*104*	*50-140*			

Certificate of Analysis

Report Date: 24-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Aug-2011

Client PO: 11953 Project Description: PE2374

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	210	10	ug/g	ND	105	80-120			
F2 PHCs (C10-C16)	56	10	ug/g	ND	70.0	80-120			QS-02
F3 PHCs (C16-C34)	119	10	ug/g	ND	59.3	80-120			QS-02
F4 PHCs (C34-C50)	78	10	ug/g	ND	65.0	80-120			QS-02
Metals									
Antimony	51.9		ug/L	ND	104	70-130			
Arsenic	49.5		ug/L	ND	99.1	70-130			
Barium	47.2		ug/L	ND	94.4	70-130			
Beryllium	52.2		ug/L	ND	104	70-130			
Boron	48.0		ug/L	ND	95.9	70-130			
Cadmium	48.6		ug/L	ND	97.2	70-130			
Chromium (VI)	5.0	0.4	ug/g	ND	101	89-123			
Chromium	49.5		ug/L	ND	98.9	70-130			
Cobalt	53.2		ug/L	ND	106	70-130			
Copper	50.5		ug/L	ND	101	70-130			
Lead	53.0		ug/L	ND	106	70-130			
Mercury	1.48	0.1	ug/g	ND	98.9	72-128			
Molybdenum	49.1		ug/L	ND	98.2	70-130			
Nickel	51.1		ug/L	ND	102	70-130			
Selenium	50.2		ug/L	ND	100	70-130			
Silver	49.1		ug/L	ND	98.3	70-130			
Thallium	52.8		ug/L	ND	106	70-130			
Uranium	48.3		ug/L	ND	96.6	70-130			
Vanadium	51.3		ug/L	ND	103	70-130			
Zinc	52.3		ug/L	ND	105	70-130			
Volatiles									
Benzene	3.60	0.02	ug/g	ND	90.0	60-130			
Ethylbenzene	3.64	0.05	ug/g	ND	91.0	60-130			
Toluene	3.21	0.05	ug/g	ND	80.1	60-130			
m,p-Xylenes	5.44	0.05	ug/g	ND	68.0	60-130			
o-Xylene	3.39	0.05	ug/g	ND	84.8	60-130			
Surrogate: Toluene-d8	*7.31*		*ug/g*		*91.4*	*50-140*			

Sample and QC Qualifiers Notes

QS-02: Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Chain of Custody
(Lab Use Only)
Nº 87567

Page 1 of 1

Client Name: Paterson Group	Project Reference: PE2374	TAT: [X] Regular
Contact Name: Luke Lopers	Quote #	[ ] 2 Day
Address: 1-28 Concourse Gate	PO # 11953	[ ] 1 Day
	Email Address: llopers@patersongroup.ca	[ ] Same Day
Telephone: 226-7381		Date Required:

Samples Submitted Under: [ ] O. Reg. 153/04 Table __ [X] O. Reg 511/09 Table 1 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1134221

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	BTEX/PHCs	Metals (Full List)									
1	BH8 - SS1	S		1	Aug 17, 2011			X		120 ml							1
2	BH10 - SS2	S		1	↓			X		↓							1
3	BH12 - SS2	S		2	↓		X			↓ + vial							1
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: Full metals list & sub-surface samples per Luke - MJC

Method of Delivery: Paracel

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
	T. Brouse	SUNEEPORN	MJC
Date/Time: Aug 17, 2011 / 11:35 AM	Date/Time: 18/08/11 11:35AM	Date/Time: AUG 18,11 13:30	Date/Time: Aug 18/11 4:24
	Temperature: ___ °C	Temperature: 20.6 °C	pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Luke Lopers

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 11951
Project: PE2374
Custody: 85657

Report Date: 23-Aug-2011
Order Date: 17-Aug-2011
Order #: 1134169

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1134169-01	BH1-SS2
1134169-02	BH2-SS2

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	19-Aug-11	23-Aug-11
CCME PHC F1	CWS Tier 1 - P&T GC-FID	19-Aug-11	23-Aug-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	18-Aug-11	19-Aug-11
Solids, %	Gravimetric, calculation	22-Aug-11	22-Aug-11
VOCs	EPA 8260 - P&T GC-MS	19-Aug-11	23-Aug-11

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

	Client ID:	BH1-SS2	BH2-SS2	-	-
	Sample Date:	16-Aug-11	16-Aug-11	-	-
	Sample ID:	1134169-01	1134169-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	84.0	86.4	-	-
Volatiles					
Acetone	0.5 ug/g dry	-	<0.5	-	-
Benzene	0.02 ug/g dry	-	<0.02	-	-
Bromodichloromethane	0.05 ug/g dry	-	<0.05	-	-
Bromoform	0.05 ug/g dry	-	<0.05	-	-
Bromomethane	0.05 ug/g dry	-	<0.05	-	-
Carbon Tetrachloride	0.05 ug/g dry	-	<0.05	-	-
Chlorobenzene	0.05 ug/g dry	-	<0.05	-	-
Chloroethane	0.05 ug/g dry	-	<0.05	-	-
Chloroform	0.05 ug/g dry	-	<0.05	-	-
Chloromethane	0.2 ug/g dry	-	<0.2	-	-
Dibromochloromethane	0.05 ug/g dry	-	<0.05	-	-
Dichlorodifluoromethane	0.05 ug/g dry	-	<0.05	-	-
1,2-Dibromoethane	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,1-Dichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichloroethylene, total	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichloropropane	0.05 ug/g dry	-	<0.05	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	<0.05	-	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	-	-
Hexane	0.05 ug/g dry	-	<0.05	-	-
Methyl Ethyl Ketone (2-Butanone)	0.5 ug/g dry	-	<0.5	-	-
Methyl Butyl Ketone (2-Hexanone)	2.0 ug/g dry	-	<2.0	-	-
Methyl Isobutyl Ketone	0.5 ug/g dry	-	<0.5	-	-

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

	Client ID:	BH1-SS2	BH2-SS2	-	-
	Sample Date:	16-Aug-11	16-Aug-11	-	-
	Sample ID:	1134169-01	1134169-02	-	-
	MDL/Units	Soil	Soil	-	-
Methyl tert-butyl ether	0.05 ug/g dry	-	<0.05	-	-
Methylene Chloride	0.05 ug/g dry	-	<0.05	-	-
Styrene	0.05 ug/g dry	-	<0.05	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	-	-
Tetrachloroethylene	0.05 ug/g dry	-	<0.05	-	-
Toluene	0.05 ug/g dry	-	<0.05	-	-
1,2,4-Trichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	<0.05	-	-
Trichloroethylene	0.05 ug/g dry	-	<0.05	-	-
Trichlorofluoromethane	0.05 ug/g dry	-	<0.05	-	-
1,3,5-Trimethylbenzene	0.05 ug/g dry	-	<0.05	-	-
Vinyl chloride	0.02 ug/g dry	-	<0.02	-	-
m,p-Xylenes	0.05 ug/g dry	-	<0.05	-	-
o-Xylene	0.05 ug/g dry	-	<0.05	-	-
Xylenes, total	0.05 ug/g dry	-	<0.05	-	-
4-Bromofluorobenzene	Surrogate	-	112%	-	-
Dibromofluoromethane	Surrogate	-	101%	-	-
Toluene-d8	Surrogate	-	107%	-	-
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	106%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	10 ug/g dry	<10	-	-	-
F2 PHCs (C10-C16)	10 ug/g dry	<10	-	-	-
F3 PHCs (C16-C34)	10 ug/g dry	<10	-	-	-
F4 PHCs (C34-C50)	10 ug/g dry	<10	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	ug/g						
Volatiles									
Acetone	ND	0.5	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroethane	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Chloromethane	ND	0.2	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dibromoethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloroethylene, total	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.5	ug/g						
Methyl Butyl Ketone (2-Hexanone)	ND	2.0	ug/g						
Methyl Isobutyl Ketone	ND	0.5	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,2,4-Trichlorobenzene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
1,3,5-Trimethylbenzene	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*9.23*		*ug/g*		*115*	*50-140*			
Surrogate: Dibromofluoromethane	*7.72*		*ug/g*		*96.5*	*50-140*			
Surrogate: Toluene-d8	*8.27*		*ug/g*		*103*	*50-140*			
Benzene	ND	0.02	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.27*		*ug/g*		*103*	*50-140*			

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	10	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	10	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	10	ug/g dry	ND				30	
Physical Characteristics									
% Solids	91.3	0.1	% by Wt.	91.2			0.1	25	
Volatiles									
Acetone	ND	0.5	ug/g dry	ND				50	
Benzene	ND	0.02	ug/g dry	ND				50	
Bromodichloromethane	ND	0.05	ug/g dry	ND				50	
Bromoform	ND	0.05	ug/g dry	ND				50	
Bromomethane	ND	0.05	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND				50	
Chlorobenzene	ND	0.05	ug/g dry	ND				50	
Chloroethane	ND	0.05	ug/g dry	ND				50	
Chloroform	ND	0.05	ug/g dry	ND				50	
Chloromethane	ND	0.2	ug/g dry	ND				50	
Dibromochloromethane	ND	0.05	ug/g dry	ND				50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND				50	
1,2-Dibromoethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Hexane	ND	0.05	ug/g dry	ND				50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.5	ug/g dry	ND				50	
Methyl Butyl Ketone (2-Hexanone)	ND	2.0	ug/g dry	ND				50	
Methyl Isobutyl Ketone	ND	0.5	ug/g dry	ND				50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND				50	
Methylene Chloride	ND	0.05	ug/g dry	ND				50	
Styrene	ND	0.05	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
1,2,4-Trichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND				50	
Trichloroethylene	ND	0.05	ug/g dry	ND				50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND				50	
1,3,5-Trimethylbenzene	ND	0.05	ug/g dry	ND				50	
Vinyl chloride	ND	0.02	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	*5.71*		*ug/g dry*	*ND*	*113*	*50-140*			
Surrogate: Dibromofluoromethane	*4.97*		*ug/g dry*	*ND*	*98.1*	*50-140*			
Surrogate: Toluene-d8	*5.33*		*ug/g dry*	*ND*	*105*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*5.33*		*ug/g dry*	*ND*	*105*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	191	10	ug/g	ND	95.5	80-120			
F2 PHCs (C10-C16)	65	10	ug/g	ND	81.1	80-120			
F3 PHCs (C16-C34)	162	10	ug/g	ND	81.2	80-120			
F4 PHCs (C34-C50)	109	10	ug/g	ND	91.1	80-120			
Volatiles									
Acetone	10.2	0.5	ug/g	ND	102	50-140			
Benzene	3.6	0.02	ug/g	ND	90.3	60-130			
Bromodichloromethane	3.2	0.05	ug/g	ND	80.3	60-130			
Bromoform	3.3	0.05	ug/g	ND	81.4	60-130			
Bromomethane	3.9	0.05	ug/g	ND	96.4	50-140			
Carbon Tetrachloride	3.7	0.05	ug/g	ND	92.6	60-130			
Chlorobenzene	3.2	0.05	ug/g	ND	80.2	60-130			
Chloroethane	3.6	0.05	ug/g	ND	90.4	50-140			
Chloroform	3.7	0.05	ug/g	ND	91.8	60-130			
Chloromethane	3.4	0.2	ug/g	ND	85.4	50-140			
Dibromochloromethane	3.6	0.05	ug/g	ND	88.8	60-130			
Dichlorodifluoromethane	3.3	0.05	ug/g	ND	82.8	50-140			
1,2-Dibromoethane	3.5	0.05	ug/g	ND	88.2	60-130			
1,2-Dichlorobenzene	3.5	0.05	ug/g	ND	87.9	60-130			
1,3-Dichlorobenzene	3.5	0.05	ug/g	ND	86.3	60-130			
1,4-Dichlorobenzene	3.1	0.05	ug/g	ND	78.2	60-130			
1,1-Dichloroethane	3.6	0.05	ug/g	ND	89.3	60-130			
1,2-Dichloroethane	4.0	0.05	ug/g	ND	99.3	60-130			
1,1-Dichloroethylene	2.7	0.05	ug/g	ND	67.3	60-130			
cis-1,2-Dichloroethylene	3.2	0.05	ug/g	ND	80.9	60-130			
trans-1,2-Dichloroethylene	3.5	0.05	ug/g	ND	88.4	60-130			
1,2-Dichloropropane	3.6	0.05	ug/g	ND	89.1	60-130			
cis-1,3-Dichloropropylene	3.3	0.05	ug/g	ND	83.7	60-130			
trans-1,3-Dichloropropylene	3.4	0.05	ug/g	ND	85.1	60-130			
Ethylbenzene	3.4	0.05	ug/g	ND	84.0	60-130			
Hexane	2.8	0.05	ug/g	ND	69.8	60-130			
Methyl Ethyl Ketone (2-Butanone)	10.3	0.5	ug/g	ND	103	50-140			
Methyl Butyl Ketone (2-Hexanone)	8.4	2.0	ug/g	ND	83.9	50-140			
Methyl Isobutyl Ketone	10.1	0.5	ug/g	ND	101	50-140			
Methyl tert-butyl ether	10.6	0.05	ug/g	ND	106	50-140			
Methylene Chloride	3.3	0.05	ug/g	ND	83.4	60-130			
Styrene	2.9	0.05	ug/g	ND	72.0	60-130			
1,1,1,2-Tetrachloroethane	3.3	0.05	ug/g	ND	81.6	60-130			
1,1,2,2-Tetrachloroethane	3.0	0.05	ug/g	ND	74.6	60-130			
Tetrachloroethylene	2.9	0.05	ug/g	ND	72.4	60-130			
Toluene	3.4	0.05	ug/g	ND	86.1	60-130			
1,2,4-Trichlorobenzene	2.6	0.05	ug/g	ND	66.2	60-130			
1,1,1-Trichloroethane	4.0	0.05	ug/g	ND	99.6	60-130			
1,1,2-Trichloroethane	4.3	0.05	ug/g	ND	108	60-130			
Trichloroethylene	3.4	0.05	ug/g	ND	85.8	60-130			
Trichlorofluoromethane	4.2	0.05	ug/g	ND	104	50-140			
1,3,5-Trimethylbenzene	3.6	0.05	ug/g	ND	90.4	60-130			
Vinyl chloride	4.4	0.02	ug/g	ND	109	50-140			
m,p-Xylenes	5.3	0.05	ug/g	ND	66.1	60-130			

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951

Project Description: PE2374

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	3.2	0.05	ug/g	ND	80.7	60-130			
Surrogate: 4-Bromofluorobenzene	*7.29*		*ug/g*		*91.1*	*50-140*			
Benzene	3.61	0.02	ug/g	ND	90.3	60-130			
Ethylbenzene	3.36	0.05	ug/g	ND	84.0	60-130			
Toluene	3.44	0.05	ug/g	ND	86.1	60-130			
m,p-Xylenes	5.29	0.05	ug/g	ND	66.1	60-130			
o-Xylene	3.23	0.05	ug/g	ND	80.7	60-130			

Certificate of Analysis

Report Date: 23-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:17-Aug-2011

Client PO: 11951 Project Description: PE2374

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Page 1 of 1

Client Name: Paterson Group	Project Reference: PE2374	TAT: [X] Regular
Contact Name: Luke Lopers	Quote #	[ ] 2 Day
Address: 1-28 Concourse Gate	PO # 11951	[ ] 1 Day
	Email Address: llopers@patersongroup.ca	[ ] Same Day
Telephone: 613-226-7381		Date Required:

Samples Submitted Under: [ ] O. Reg. 153/04 Table __ [X] O. Reg 511/09 Table 1 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1134169

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: VOCs	BTEX's/PHC's (F1-F4)								
1	BH1-SS2	S		2	Aug 16, 2011			X			120 ml + vial					
2	BH2-SS2	S		2	"		X				"					
3																
4																
5																
6																
7																
8																
9																
10																

Comments:

Method of Delivery: Walk-in

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
		MC	MC
Date/Time:	Date/Time:	Date/Time: Aug 17/11 5:30	Date/Time: Aug 17/11 5:54
Date/Time:	Temperature: °C	Temperature: 24.5 °C	pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Luke Lopers

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 11953
Project: PE2374
Custody: 87567

Report Date: 24-Aug-2011
Order Date: 18-Aug-2011
Order #: 1134221

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1134221-01	BH8-SS1
1134221-02	BH10-SS2
1134221-03	BH12-SS2

Approved By:

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 24-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Aug-2011

Client PO: 11953 Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	23-Aug-11	23-Aug-11
CCME PHC F1	CWS Tier 1 - P&T GC-FID	23-Aug-11	23-Aug-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	20-Aug-11	20-Aug-11
Chromium, hexavalent	MOE E3056 - Extraction, colourimetric	19-Aug-11	22-Aug-11
Mercury	EPA 7471A - CVAA, digestion	22-Aug-11	22-Aug-11
Metals	EPA 6020 - Digestion - ICP-MS	19-Aug-11	19-Aug-11
Solids, %	Gravimetric, calculation	22-Aug-11	22-Aug-11

PARACEL LABORATORIES LTD.

Order #: 1134221

Certificate of Analysis

Report Date: 24-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Aug-2011

Client PO: 11953

Project Description: PE2374

	Client ID:	BH8-SS1	BH10-SS2	BH12-SS2	-
	Sample Date:	17-Aug-11	17-Aug-11	17-Aug-11	-
	Sample ID:	1134221-01	1134221-02	1134221-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	77.9	94.9	91.9	-
Metals					
Antimony	1 ug/g dry	<1	<1	-	-
Arsenic	1 ug/g dry	11	2	-	-
Barium	1 ug/g dry	120	96	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	6.2	<5.0	-	-
Cadmium	0.5 ug/g dry	4.1	<0.5	-	-
Chromium	5 ug/g dry	24	22	-	-
Chromium (VI)	0.4 ug/g dry	<0.4	<0.4	-	-
Cobalt	1 ug/g dry	12	9	-	-
Copper	5 ug/g dry	49	42	-	-
Lead	1 ug/g dry	143	53	-	-
Mercury	0.1 ug/g dry	0.5	<0.1	-	-
Molybdenum	1 ug/g dry	6	2	-	-
Nickel	5 ug/g dry	43	29	-	-
Selenium	1 ug/g dry	1	<1	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1 ug/g dry	<1	<1	-	-
Uranium	1 ug/g dry	4	2	-	-
Vanadium	10 ug/g dry	29	28	-	-
Zinc	20 ug/g dry	711	61	-	-
Volatiles					
Benzene	0.02 ug/g dry	-	-	<0.02	-
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	-
Toluene	0.05 ug/g dry	-	-	<0.05	-
m,p-Xylenes	0.05 ug/g dry	-	-	<0.05	-
o-Xylene	0.05 ug/g dry	-	-	<0.05	-
Xylenes, total	0.05 ug/g dry	-	-	<0.05	-
Toluene-d8	Surrogate	-	-	118%	-
Hydrocarbons					
F1 PHCs (C6-C10)	10 ug/g dry	-	-	<10	-
F2 PHCs (C10-C16)	10 ug/g dry	-	-	<10	-
F3 PHCs (C16-C34)	10 ug/g dry	-	-	<10	-

Certificate of Analysis

Report Date: 24-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Aug-2011

Client PO: 11953

Project Description: PE2374

	Client ID:	BH8-SS1	BH10-SS2	BH12-SS2	-
	Sample Date:	17-Aug-11	17-Aug-11	17-Aug-11	-
	Sample ID:	1134221-01	1134221-02	1134221-03	-
	MDL/Units	Soil	Soil	Soil	-
F4 PHCs (C34-C50)	10 ug/g dry	-	-	<10	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	ug/g						
Metals									
Antimony	ND	1	ug/g						
Arsenic	ND	1	ug/g						
Barium	ND	1	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.4	ug/g						
Chromium	ND	5	ug/g						
Cobalt	ND	1	ug/g						
Copper	ND	5	ug/g						
Lead	ND	1	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1	ug/g						
Nickel	ND	5	ug/g						
Selenium	ND	1	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1	ug/g						
Uranium	ND	1	ug/g						
Vanadium	ND	10	ug/g						
Zinc	ND	20	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*9.01*		*ug/g*		*113*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	56	10	ug/g dry	65			16.1	40	
Metals									
Antimony	ND	1	ug/g dry	ND				30	
Arsenic	1.7	1	ug/g dry	1.5			16.4	30	
Barium	222	1	ug/g dry	215			3.2	30	
Beryllium	0.67	0.5	ug/g dry	0.56			16.6	30	
Boron	6.8	5.0	ug/g dry	ND				30	
Cadmium	ND	0.5	ug/g dry	ND				30	
Chromium (VI)	ND	0.4	ug/g dry	ND				35	
Chromium	48.4	5	ug/g dry	46.1			5.0	30	
Cobalt	14.5	1	ug/g dry	13.9			4.1	30	
Copper	25.3	5	ug/g dry	23.9			5.4	30	
Lead	9.6	1	ug/g dry	9.1			6.0	30	
Mercury	ND	0.1	ug/g dry	ND				35	
Molybdenum	1.1	1	ug/g dry	ND				30	
Nickel	30.2	5	ug/g dry	28.9			4.4	30	
Selenium	1.3	1	ug/g dry	ND				30	
Silver	0.31	0.3	ug/g dry	ND				30	
Thallium	ND	1	ug/g dry	ND				30	
Uranium	ND	1	ug/g dry	ND				30	
Vanadium	58.7	10	ug/g dry	55.7			5.2	30	
Zinc	72.7	20	ug/g dry	70.4			3.2	30	
Physical Characteristics									
% Solids	91.3	0.1	% by Wt.	91.2			0.1	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*8.73*		*ug/g dry*	*ND*	*104*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	210	10	ug/g	ND	105	80-120			
F2 PHCs (C10-C16)	56	10	ug/g	ND	70.0	80-120			QS-02
F3 PHCs (C16-C34)	119	10	ug/g	ND	59.3	80-120			QS-02
F4 PHCs (C34-C50)	78	10	ug/g	ND	65.0	80-120			QS-02
Metals									
Antimony	51.9		ug/L	ND	104	70-130			
Arsenic	49.5		ug/L	ND	99.1	70-130			
Barium	47.2		ug/L	ND	94.4	70-130			
Beryllium	52.2		ug/L	ND	104	70-130			
Boron	48.0		ug/L	ND	95.9	70-130			
Cadmium	48.6		ug/L	ND	97.2	70-130			
Chromium (VI)	5.0	0.4	ug/g	ND	101	89-123			
Chromium	49.5		ug/L	ND	98.9	70-130			
Cobalt	53.2		ug/L	ND	106	70-130			
Copper	50.5		ug/L	ND	101	70-130			
Lead	53.0		ug/L	ND	106	70-130			
Mercury	1.48	0.1	ug/g	ND	98.9	72-128			
Molybdenum	49.1		ug/L	ND	98.2	70-130			
Nickel	51.1		ug/L	ND	102	70-130			
Selenium	50.2		ug/L	ND	100	70-130			
Silver	49.1		ug/L	ND	98.3	70-130			
Thallium	52.8		ug/L	ND	106	70-130			
Uranium	48.3		ug/L	ND	96.6	70-130			
Vanadium	51.3		ug/L	ND	103	70-130			
Zinc	52.3		ug/L	ND	105	70-130			
Volatiles									
Benzene	3.60	0.02	ug/g	ND	90.0	60-130			
Ethylbenzene	3.64	0.05	ug/g	ND	91.0	60-130			
Toluene	3.21	0.05	ug/g	ND	80.1	60-130			
m,p-Xylenes	5.44	0.05	ug/g	ND	68.0	60-130			
o-Xylene	3.39	0.05	ug/g	ND	84.8	60-130			
Surrogate: Toluene-d8	*7.31*		*ug/g*		*91.4*	*50-140*			

Sample and QC Qualifiers Notes

QS-02: Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Page 1 of 1

Client Name: Paterson Group	Project Reference: PE2374
Contact Name: Luke Lopers	Quote #
Address: 1-28 Concourse Gate	PO # 11953
Telephone: 226-7381	Email Address: llopers@patersongroup.ca

TAT: [X] Regular [ ] 2 Day [ ] 1 Day [ ] Same Day
Date Required: _____

Samples Submitted Under: [ ] O. Reg. 153/04 Table ___ [X] O. Reg 511/09 Table 1 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] Other: _____

Matrix Type: **S** (Soil/Sed.) **GW** (Ground Water) **SW** (Surface Water) **SS** (Storm/Sanitary Sewer) **P** (Paint) **A** (Air) **O** (Other)

Paracel Order Number: 1134221

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	BTEX/PHCs	Metals (Full List)									
1	BH8 - SS1	S		1	Aug 17, 2011			X		120 ml							✓
2	BH10 - SS2	S		1	↓			X		↓							✓
3	BH12 - SS2	S		2	↓		X			↓ + vial							✓
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: Full metals list & sub-surface samples per Luke - MJC

Method of Delivery: Paracel

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
	T. Brouse	SUNEEPORN	MJC
Date/Time: Aug 17, 2011 / 11:35 AM	Date/Time: 18/08/11 11:35AM	Date/Time: AUG 18,11 9:30	Date/Time: Aug 18/11 4:24
	Temperature: ___ °C	Temperature: 20.6 °C	pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Luke Lopers

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 11955
Project: PE2374
Custody: 85635

Report Date: 6-Sep-2011
Order Date: 1-Sep-2011
Order #: 1136191

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1136191-01	BH3-SS2
1136191-02	BH6-AU1
1136191-03	BH7-SS1
1136191-04	BH9-SS2

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955 Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals	EPA 6020 - Digestion - ICP-MS	2-Sep-11	2-Sep-11
Solids, %	Gravimetric, calculation	6-Sep-11	6-Sep-11

PARACEL LABORATORIES LTD.

Order #: 1136191

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955

Project Description: PE2374

	Client ID:	BH3-SS2	BH6-AU1	BH7-SS1	BH9-SS2
	Sample Date:	16-Aug-11	16-Aug-11	16-Aug-11	16-Aug-11
	Sample ID:	1136191-01	1136191-02	1136191-03	1136191-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	94.5	95.2	95.9	93.3
Metals					
Lead	1 ug/g dry	70	28	68	5

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955

Project Description: PE2374

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Lead	ND	1	ug/g						

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955

Project Description: PE2374

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Lead	22.6	1	ug/g dry	22.2			2.1	30	
Physical Characteristics									
% Solids	91.1	0.1	% by Wt.	90.9			0.2	25	

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955

Project Description: PE2374

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Lead	54.9		ug/L	8.9	92.0	70-130			

Certificate of Analysis

Report Date: 06-Sep-2011

Client: **Paterson Group Consulting Engineers**

Order Date:1-Sep-2011

Client PO: 11955 Project Description: PE2374

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

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Nº 85635

Page 1 of 1

Client Name: Paterson Group
Contact Name: Luke Lopers
Address: 1-28 Concourse Gate
Telephone: 613-226-7381

Project Reference: PE2374
Quote #
PO # 11955
Email Address: llopers@patersongroup.ca

TAT: [ ] Regular [X] 2 Day [ ] 1 Day [ ] Same Day
Date Required: _____

Samples Submitted Under: [ ] O. Reg. 153/04 Table __ [X] O. Reg 511/09 Table 1 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1136191

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Lead										
1	BH3-SS2	S		1	Aug. 16, 2011		X		60 ml								
2	BH6-AU1	S		1	Aug 17, 2011		X		↓								
3	BH7-SS1	S		1	Aug 17, 2011		X										
4	BH9-SS2	S		1	Aug 17, 2011		X		↓								
5																	
6																	
7																	
8																	
9																	
10																	

Comments:

Method of Delivery: Paracel

Relinquished By (Print & Sign): _____
Date/Time: August 31, 2011

Received by Driver/Depot: A. Bedouse
Date/Time: 01/09/11 10:57am
Temperature: ____ °C

Received at Lab: M/C
Date/Time: Sept 1/11 11:25
Temperature: 13.4 °C

Verified By: M/C
Date/Time: Sept 1/11 11:29
pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Luke Lopers

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 11954
Project: PE2374
Custody: 85638

Report Date: 29-Aug-2011
Order Date: 23-Aug-2011
Order #: 1135086

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1135086-01	BH1-GW1
1135086-02	BH2-GW1
1135086-03	BH12-GW1

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 624 - P&T GC-MS	24-Aug-11	25-Aug-11
CCME PHC F1	CWS Tier 1 - P&T GC-FID	24-Aug-11	25-Aug-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	23-Aug-11	24-Aug-11
VOCs	EPA 624 - P&T GC-MS	24-Aug-11	25-Aug-11

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

	Client ID:	BH1-GW1	BH2-GW1	BH12-GW1	-
	Sample Date:	22-Aug-11	22-Aug-11	22-Aug-11	-
	Sample ID:	1135086-01	1135086-02	1135086-03	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	90.7	<5.0	-	-
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroethane	1.0 ug/L	<1.0	<1.0	-	-
Chloroform	0.5 ug/L	3.3	<0.5	-	-
Chloromethane	3.0 ug/L	<3.0	<3.0	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Hexane	1.0 ug/L	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

	Client ID:	BH1-GW1	BH2-GW1	BH12-GW1	-
	Sample Date:	22-Aug-11	22-Aug-11	22-Aug-11	-
	Sample ID:	1135086-01	1135086-02	1135086-03	-
	MDL/Units	Water	Water	Water	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	1.6	<0.5	-	-
Xylenes, total	0.5 ug/L	1.6	<0.5	-	-
4-Bromofluorobenzene	Surrogate	104%	114%	-	-
Dibromofluoromethane	Surrogate	123%	125%	-	-
Toluene-d8	Surrogate	95.6%	97.8%	-	-
Benzene	0.5 ug/L	-	-	<0.5	-
Ethylbenzene	0.5 ug/L	-	-	<0.5	-
Toluene	0.5 ug/L	-	-	<0.5	-
m,p-Xylenes	0.5 ug/L	-	-	<0.5	-
o-Xylene	0.5 ug/L	-	-	<0.5	-
Xylenes, total	0.5 ug/L	-	-	<0.5	-
Toluene-d8	Surrogate	-	-	95.6%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	<100	-
F1 + F2 PHCs	125 ug/L	-	-	<125	-
F1 + F2 PHCs	125 ug/L	<125	-	-	-
F3 + F4 PHCs	200 ug/L	-	-	<200	-
F3 + F4 PHCs	200 ug/L	<200	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloroethylene, total	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,2,4-Trichlorobenzene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
1,3,5-Trimethylbenzene	ND	0.5	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*38.1*		*ug/L*		*119*	*50-140*			
Surrogate: Dibromofluoromethane	*29.4*		*ug/L*		*91.7*	*50-140*			
Surrogate: Toluene-d8	*31.7*		*ug/L*		*99.2*	*50-140*			
Benzene	ND	0.5	ug/L						

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*31.7*		*ug/L*		*99.2*	*50-140*			

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
F2 PHCs (C10-C16)	ND	100	ug/L	ND				30	
F3 PHCs (C16-C34)	468	100	ug/L	381			20.4	30	
F4 PHCs (C34-C50)	337	100	ug/L	290			15.0	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*31.8*		*ug/L*	*ND*	*99.4*	*50-140*			
Surrogate: Dibromofluoromethane	*37.5*		*ug/L*	*ND*	*117*	*50-140*			
Surrogate: Toluene-d8	*31.6*		*ug/L*	*ND*	*98.8*	*50-140*			
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	*31.6*		*ug/L*	*ND*	*98.8*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1680	25	ug/L	ND	84.2	68-117			
F2 PHCs (C10-C16)	1390	100	ug/L	ND	86.6	60-140			
F3 PHCs (C16-C34)	3390	100	ug/L	ND	84.7	60-140			
F4 PHCs (C34-C50)	2300	100	ug/L	ND	95.8	60-140			
Volatiles									
Acetone	111	5.0	ug/L	ND	111	50-140			
Benzene	36.6	0.5	ug/L	ND	91.6	60-130			
Bromodichloromethane	34.7	0.5	ug/L	ND	86.8	60-130			
Bromoform	29.7	0.5	ug/L	ND	74.2	60-130			
Bromomethane	29.9	0.5	ug/L	ND	74.8	50-140			
Carbon Tetrachloride	33.8	0.2	ug/L	ND	84.5	60-130			
Chlorobenzene	31.4	0.5	ug/L	ND	78.6	60-130			
Chloroethane	32.5	1.0	ug/L	ND	81.3	50-140			
Chloroform	36.1	0.5	ug/L	ND	90.3	60-130			
Chloromethane	32.9	3.0	ug/L	ND	82.4	50-140			
Dibromochloromethane	30.9	0.5	ug/L	ND	77.3	60-130			
Dichlorodifluoromethane	30.6	1.0	ug/L	ND	76.6	50-140			
1,2-Dibromoethane	30.0	0.2	ug/L	ND	75.0	60-130			
1,2-Dichlorobenzene	39.0	0.5	ug/L	ND	97.4	60-130			
1,3-Dichlorobenzene	38.0	0.5	ug/L	ND	95.1	60-130			
1,4-Dichlorobenzene	39.5	0.5	ug/L	ND	98.8	60-130			
1,1-Dichloroethane	37.1	0.5	ug/L	ND	92.8	60-130			
1,2-Dichloroethane	35.9	0.5	ug/L	ND	89.6	60-130			
1,1-Dichloroethylene	38.3	0.5	ug/L	ND	95.6	60-130			
cis-1,2-Dichloroethylene	37.6	0.5	ug/L	ND	94.0	60-130			
trans-1,2-Dichloroethylene	41.5	0.5	ug/L	ND	104	60-130			
1,2-Dichloropropane	36.4	0.5	ug/L	ND	91.0	60-130			
cis-1,3-Dichloropropylene	37.8	0.5	ug/L	ND	94.4	60-130			
trans-1,3-Dichloropropylene	40.6	0.5	ug/L	ND	102	60-130			
Ethylbenzene	30.3	0.5	ug/L	ND	75.8	60-130			
Hexane	39.7	1.0	ug/L	ND	99.3	60-130			
Methyl Ethyl Ketone (2-Butanone)	102	5.0	ug/L	ND	102	50-140			
Methyl Butyl Ketone (2-Hexanone)	98.8	10.0	ug/L	ND	98.8	50-140			
Methyl Isobutyl Ketone	106	5.0	ug/L	ND	106	50-140			
Methyl tert-butyl ether	96.3	2.0	ug/L	ND	96.3	50-140			
Methylene Chloride	40.4	5.0	ug/L	ND	101	60-130			
Styrene	31.7	0.5	ug/L	ND	79.3	60-130			
1,1,1,2-Tetrachloroethane	29.3	0.5	ug/L	ND	73.2	60-130			
1,1,2,2-Tetrachloroethane	25.5	0.5	ug/L	ND	63.7	60-130			
Tetrachloroethylene	30.0	0.5	ug/L	ND	75.0	60-130			
Toluene	34.5	0.5	ug/L	ND	86.3	60-130			
1,2,4-Trichlorobenzene	32.2	0.5	ug/L	ND	80.4	60-130			
1,1,1-Trichloroethane	33.4	0.5	ug/L	ND	83.5	60-130			
1,1,2-Trichloroethane	35.5	0.5	ug/L	ND	88.6	60-130			
Trichloroethylene	30.1	0.5	ug/L	ND	75.3	60-130			
Trichlorofluoromethane	32.7	1.0	ug/L	ND	81.8	60-130			
1,3,5-Trimethylbenzene	36.1	0.5	ug/L	ND	90.3	60-130			
Vinyl chloride	28.3	0.5	ug/L	ND	70.6	50-140			
m,p-Xylenes	59.7	0.5	ug/L	ND	74.6	60-130			

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	29.9	0.5	ug/L	ND	74.7	60-130			
Surrogate: 4-Bromofluorobenzene	*32.5*		*ug/L*		*102*	*50-140*			
Benzene	36.6	0.5	ug/L	ND	91.6	60-130			
Ethylbenzene	30.3	0.5	ug/L	ND	75.8	60-130			
Toluene	34.5	0.5	ug/L	ND	86.3	60-130			
m,p-Xylenes	59.7	0.5	ug/L	ND	74.6	60-130			
o-Xylene	29.9	0.5	ug/L	ND	74.7	60-130			

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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www.paracellabs.com

Chain of Custody
(Lab Use Only)
Nº 85638

Page 1 of 1

Client Name: Paterson Group
Contact Name: Luke Lopers
Address: 1-28 Concourse Gate
Telephone: 226-7381

Project Reference: PE2374
Quote #
PO # 11954
Email Address: llopers@patersongroup.ca

TAT: [X] Regular [ ] 2 Day [ ] 1 Day [ ] Same Day
Date Required: _____

Samples Submitted Under: [ ] O. Reg. 153/04 Table __ [X] O. Reg 511/09 Table 1 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1135086

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs (F1-F4) BTEX	VOCs									
1	BH1-GW1	GW		3	Aug 22, 2011	2:00 PM	X	X									
2	BH2-GW1	GW		3	↓	↓		X	→ 1L bottle Submitted as well?								
3	BH12-GW1	GW		3	↓	↓	X										
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: #No visible sediment. SC

Method of Delivery: Paracel

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
	T. Dedouse		M/C
Date/Time: Aug 22, 2011	Date/Time: 23/08/11 10:41 am	Date/Time: Aug 23/11 11:45	Date/Time: Aug 23/11 12:41
	Temperature: ____ °C	Temperature: 11.8 °C	pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mark D'Arcy

Client PO: 29583
Project: PE2374
Custody: 52335

Report Date: 3-Mar-2020
Order Date: 26-Feb-2020

Order #: 2009284

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2009284-01	BH3-SS2
2009284-02	BH4-SS2A
2009284-03	BH5-AU1
2009284-04	BH5-SS3/SS4
2009284-05	BH6-AU1

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 03-Mar-2020

Client: Paterson Group Consulting Engineers

Order Date: 26-Feb-2020

Client PO: 29583

Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	27-Feb-20	28-Feb-20
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	27-Feb-20	2-Mar-20
Mercury by CVAA	EPA 7471B - CVAA, digestion	2-Mar-20	3-Mar-20
PHC F1	CWS Tier 1 - P&T GC-FID	27-Feb-20	28-Feb-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	27-Feb-20	29-Feb-20
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	27-Feb-20	27-Feb-20
Solids, %	Gravimetric, calculation	28-Feb-20	28-Feb-20

Certificate of Analysis

Report Date: 03-Mar-2020

Client: Paterson Group Consulting Engineers

Order Date: 26-Feb-2020

Client PO: 29583

Project Description: PE2374

	Client ID:	BH3-SS2	BH4-SS2A	BH5-AU1	BH5-SS3/SS4
	Sample Date:	21-Feb-20 09:00	21-Feb-20 09:00	21-Feb-20 09:00	21-Feb-20 09:00
	Sample ID:	2009284-01	2009284-02	2009284-03	2009284-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	78.3	80.1	84.1	91.1
Metals					
Antimony	1.0 ug/g dry	1.1	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	8.2	6.0	6.1	10.4
Barium	1.0 ug/g dry	193	163	103	144
Beryllium	0.5 ug/g dry	0.7	<0.5	<0.5	0.9
Boron	5.0 ug/g dry	6.2	6.1	5.4	11.6
Cadmium	0.5 ug/g dry	0.9	<0.5	<0.5	0.6
Chromium	5.0 ug/g dry	29.1	37.2	27.6	26.2
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	7.9	9.6	8.0	16.3
Copper	5.0 ug/g dry	31.8	30.3	30.3	56.1
Lead	1.0 ug/g dry	337	42.0	25.7	21.5
Mercury	0.1 ug/g dry	6.9	<0.1	0.2	0.1
Molybdenum	1.0 ug/g dry	2.2	2.6	2.6	10.3
Nickel	5.0 ug/g dry	25.7	33.0	24.3	68.2
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	1.2
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	1.3	<1.0	<1.0	4.4
Vanadium	10.0 ug/g dry	29.4	36.9	36.5	41.7
Zinc	20.0 ug/g dry	366	166	53.2	102
Volatiles					
Benzene	0.02 ug/g dry	-	<0.02	-	0.12
Ethylbenzene	0.05 ug/g dry	-	<0.05	-	0.88
Toluene	0.05 ug/g dry	-	<0.05	-	2.93
m,p-Xylenes	0.05 ug/g dry	-	<0.05	-	14.0
o-Xylene	0.05 ug/g dry	-	<0.05	-	3.72
Xylenes, total	0.05 ug/g dry	-	<0.05	-	17.7
Toluene-d8	Surrogate	-	112%	-	96.5%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	-	308
F2 PHCs (C10-C16)	4 ug/g dry	-	<4	-	129
F3 PHCs (C16-C34)	8 ug/g dry	-	51	-	166
F4 PHCs (C34-C50)	6 ug/g dry	-	<6	-	72

Certificate of Analysis

Report Date: 03-Mar-2020

Client: Paterson Group Consulting Engineers

Order Date: 26-Feb-2020

Client PO: 29583

Project Description: PE2374

	Client ID:	BH6-AU1	-	-	-
	Sample Date:	21-Feb-20 09:00	-	-	-
	Sample ID:	2009284-05	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	88.8	-	-	-
Metals					
Antimony	1.0 ug/g dry	1.5	-	-	-
Arsenic	1.0 ug/g dry	4.8	-	-	-
Barium	1.0 ug/g dry	121	-	-	-
Beryllium	0.5 ug/g dry	0.5	-	-	-
Boron	5.0 ug/g dry	10.0	-	-	-
Cadmium	0.5 ug/g dry	0.6	-	-	-
Chromium	5.0 ug/g dry	20.1	-	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	-	-	-
Cobalt	1.0 ug/g dry	6.5	-	-	-
Copper	5.0 ug/g dry	85.6	-	-	-
Lead	1.0 ug/g dry	91.7	-	-	-
Mercury	0.1 ug/g dry	<0.1	-	-	-
Molybdenum	1.0 ug/g dry	2.4	-	-	-
Nickel	5.0 ug/g dry	20.1	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	1.1	-	-	-
Vanadium	10.0 ug/g dry	23.9	-	-	-
Zinc	20.0 ug/g dry	84.8	-	-	-

Certificate of Analysis

Report Date: 03-Mar-2020

Client: Paterson Group Consulting Engineers

Order Date: 26-Feb-2020

Client PO: 29583

Project Description: PE2374

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.39*		*ug/g*		*106*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			NC	30	
Arsenic	2.3	1.0	ug/g dry	2.4			4.4	30	
Barium	19.3	1.0	ug/g dry	22.8			16.6	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	ND	5.0	ug/g dry	ND			NC	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	8.7	5.0	ug/g dry	8.7			0.7	30	
Cobalt	3.8	1.0	ug/g dry	3.9			1.9	30	
Copper	8.1	5.0	ug/g dry	8.6			5.9	30	
Lead	6.3	1.0	ug/g dry	6.7			7.1	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	5.9	5.0	ug/g dry	6.0			2.5	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	18.9	10.0	ug/g dry	18.6			1.8	30	
Zinc	ND	20.0	ug/g dry	ND			NC	30	
Physical Characteristics									
% Solids	88.3	0.1	% by Wt.	88.1			0.2	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	*3.82*		*ug/g dry*		*112*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	182	7	ug/g	ND	90.9	80-120			
F2 PHCs (C10-C16)	77	4	ug/g	ND	82.9	60-140			
F3 PHCs (C16-C34)	216	8	ug/g	ND	94.7	60-140			
F4 PHCs (C34-C50)	141	6	ug/g	ND	97.9	60-140			
Metals									
Antimony	38.6	1.0	ug/g	ND	77.0	70-130			
Arsenic	46.8	1.0	ug/g	1.0	91.8	70-130			
Barium	52.1	1.0	ug/g	9.1	85.9	70-130			
Beryllium	45.4	0.5	ug/g	ND	90.7	70-130			
Boron	42.3	5.0	ug/g	ND	82.3	70-130			
Cadmium	43.9	0.5	ug/g	ND	87.7	70-130			
Chromium (VI)	0.1	0.2	ug/g	ND	59.5	70-130			QM-05
Chromium	50.6	5.0	ug/g	ND	94.2	70-130			
Cobalt	46.6	1.0	ug/g	1.6	90.2	70-130			
Copper	47.3	5.0	ug/g	ND	87.8	70-130			
Lead	45.6	1.0	ug/g	2.7	85.9	70-130			
Mercury	1.62	0.1	ug/g	ND	108	70-130			
Molybdenum	44.8	1.0	ug/g	ND	89.1	70-130			
Nickel	47.4	5.0	ug/g	ND	90.1	70-130			
Selenium	45.0	1.0	ug/g	ND	89.8	70-130			
Silver	44.8	0.3	ug/g	ND	89.6	70-130			
Thallium	45.4	1.0	ug/g	ND	90.7	70-130			
Uranium	47.4	1.0	ug/g	ND	94.4	70-130			
Vanadium	53.9	10.0	ug/g	ND	93.0	70-130			
Zinc	50.0	20.0	ug/g	ND	87.1	70-130			
Volatiles									
Benzene	2.80	0.02	ug/g	ND	70.1	60-130			
Ethylbenzene	4.05	0.05	ug/g	ND	101	60-130			
Toluene	3.83	0.05	ug/g	ND	95.8	60-130			
m,p-Xylenes	8.15	0.05	ug/g	ND	102	60-130			
o-Xylene	4.27	0.05	ug/g	ND	107	60-130			
Surrogate: Toluene-d8	*2.77*		*ug/g*		*86.5*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QM-05 : The spike recovery was outside acceptance limits for the matrix spike due to matrix interference.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
NC: Not Calculated

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

PARA
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Paracel ID: 2009284

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2009284	Nº 52335

Client Name: Paterson Group
Contact Name: Mark D'Arcy / Mandy Witteman
Address: 154 Colonnade Rd S.
Telephone: (613) 226-7381

Project Ref: PE2374
Quote #:
PO #: 29583
E-mail: mwitteman@patersongroup.ca

Page __ of __

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular
Date Required: _____

Regulation 153/04: ☐ Table 1 ☐ Res/Park ☐ Med/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☒ Table
For RSC: ☐ Yes ☒ No

Other Regulation: ☐ REG 558 ☐ PWQO ☐ CCME ☐ MISA ☐ SU - Sani ☐ SU - Storm
Mun: _____
☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analysis: BTEX + PHC	Required Analysis: Metals (Hg + CrVI)
1	BH3-SS2	S		1	Feb 21/20			X
2	BH4-SS2A	S		2	↓		X	X
3	BH5-All	S		1				X
4	BH5-SS3/SS4	S		2			X	X
5	BH6-All	S		1	↓			X
6								
7								
8								
9								
10								

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received By Driver/Depot: A. Scouse	Received at Lab: Jumeeporn Dohmai	Verified By:
Relinquished By (Print): Mandy Witteman	Date/Time: 25/02/20 1:20	Date/Time: Feb 26, 2020 16:50	Date/Time: 02-26-20 16:5
Date/Time: Feb 25/20	Temperature: °C	Temperature: 11.3 °C	pH Verified: ☐ By:

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e: paracel@paracellabs.com
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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Luke Lopers

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 11954
Project: PE2374
Custody: 85638

Report Date: 29-Aug-2011
Order Date: 23-Aug-2011
Order #: 1135086

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1135086-01	BH1-GW1
1135086-02	BH2-GW1
1135086-03	BH12-GW1

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954 Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 624 - P&T GC-MS	24-Aug-11	25-Aug-11
CCME PHC F1	CWS Tier 1 - P&T GC-FID	24-Aug-11	25-Aug-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	23-Aug-11	24-Aug-11
VOCs	EPA 624 - P&T GC-MS	24-Aug-11	25-Aug-11

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

	Client ID:	BH1-GW1	BH2-GW1	BH12-GW1	-
	Sample Date:	22-Aug-11	22-Aug-11	22-Aug-11	-
	Sample ID:	1135086-01	1135086-02	1135086-03	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	90.7	<5.0	-	-
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroethane	1.0 ug/L	<1.0	<1.0	-	-
Chloroform	0.5 ug/L	3.3	<0.5	-	-
Chloromethane	3.0 ug/L	<3.0	<3.0	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Hexane	1.0 ug/L	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

	Client ID:	BH1-GW1	BH2-GW1	BH12-GW1	-
	Sample Date:	22-Aug-11	22-Aug-11	22-Aug-11	-
	Sample ID:	1135086-01	1135086-02	1135086-03	-
	MDL/Units	Water	Water	Water	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	1.6	<0.5	-	-
Xylenes, total	0.5 ug/L	1.6	<0.5	-	-
4-Bromofluorobenzene	Surrogate	104%	114%	-	-
Dibromofluoromethane	Surrogate	123%	125%	-	-
Toluene-d8	Surrogate	95.6%	97.8%	-	-
Benzene	0.5 ug/L	-	-	<0.5	-
Ethylbenzene	0.5 ug/L	-	-	<0.5	-
Toluene	0.5 ug/L	-	-	<0.5	-
m,p-Xylenes	0.5 ug/L	-	-	<0.5	-
o-Xylene	0.5 ug/L	-	-	<0.5	-
Xylenes, total	0.5 ug/L	-	-	<0.5	-
Toluene-d8	Surrogate	-	-	95.6%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	<100	-
F1 + F2 PHCs	125 ug/L	-	-	<125	-
F1 + F2 PHCs	125 ug/L	<125	-	-	-
F3 + F4 PHCs	200 ug/L	-	-	<200	-
F3 + F4 PHCs	200 ug/L	<200	-	-	-

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloroethylene, total	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,2,4-Trichlorobenzene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
1,3,5-Trimethylbenzene	ND	0.5	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*38.1*		*ug/L*		*119*	*50-140*			
Surrogate: Dibromofluoromethane	*29.4*		*ug/L*		*91.7*	*50-140*			
Surrogate: Toluene-d8	*31.7*		*ug/L*		*99.2*	*50-140*			
Benzene	ND	0.5	ug/L						

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*31.7*		*ug/L*		*99.2*	*50-140*			

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
F2 PHCs (C10-C16)	ND	100	ug/L	ND				30	
F3 PHCs (C16-C34)	468	100	ug/L	381			20.4	30	
F4 PHCs (C34-C50)	337	100	ug/L	290			15.0	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*31.8*		*ug/L*	*ND*	*99.4*	*50-140*			
Surrogate: Dibromofluoromethane	*37.5*		*ug/L*	*ND*	*117*	*50-140*			
Surrogate: Toluene-d8	*31.6*		*ug/L*	*ND*	*98.8*	*50-140*			
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	*31.6*		*ug/L*	*ND*	*98.8*	*50-140*			

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1680	25	ug/L	ND	84.2	68-117			
F2 PHCs (C10-C16)	1390	100	ug/L	ND	86.6	60-140			
F3 PHCs (C16-C34)	3390	100	ug/L	ND	84.7	60-140			
F4 PHCs (C34-C50)	2300	100	ug/L	ND	95.8	60-140			
Volatiles									
Acetone	111	5.0	ug/L	ND	111	50-140			
Benzene	36.6	0.5	ug/L	ND	91.6	60-130			
Bromodichloromethane	34.7	0.5	ug/L	ND	86.8	60-130			
Bromoform	29.7	0.5	ug/L	ND	74.2	60-130			
Bromomethane	29.9	0.5	ug/L	ND	74.8	50-140			
Carbon Tetrachloride	33.8	0.2	ug/L	ND	84.5	60-130			
Chlorobenzene	31.4	0.5	ug/L	ND	78.6	60-130			
Chloroethane	32.5	1.0	ug/L	ND	81.3	50-140			
Chloroform	36.1	0.5	ug/L	ND	90.3	60-130			
Chloromethane	32.9	3.0	ug/L	ND	82.4	50-140			
Dibromochloromethane	30.9	0.5	ug/L	ND	77.3	60-130			
Dichlorodifluoromethane	30.6	1.0	ug/L	ND	76.6	50-140			
1,2-Dibromoethane	30.0	0.2	ug/L	ND	75.0	60-130			
1,2-Dichlorobenzene	39.0	0.5	ug/L	ND	97.4	60-130			
1,3-Dichlorobenzene	38.0	0.5	ug/L	ND	95.1	60-130			
1,4-Dichlorobenzene	39.5	0.5	ug/L	ND	98.8	60-130			
1,1-Dichloroethane	37.1	0.5	ug/L	ND	92.8	60-130			
1,2-Dichloroethane	35.9	0.5	ug/L	ND	89.6	60-130			
1,1-Dichloroethylene	38.3	0.5	ug/L	ND	95.6	60-130			
cis-1,2-Dichloroethylene	37.6	0.5	ug/L	ND	94.0	60-130			
trans-1,2-Dichloroethylene	41.5	0.5	ug/L	ND	104	60-130			
1,2-Dichloropropane	36.4	0.5	ug/L	ND	91.0	60-130			
cis-1,3-Dichloropropylene	37.8	0.5	ug/L	ND	94.4	60-130			
trans-1,3-Dichloropropylene	40.6	0.5	ug/L	ND	102	60-130			
Ethylbenzene	30.3	0.5	ug/L	ND	75.8	60-130			
Hexane	39.7	1.0	ug/L	ND	99.3	60-130			
Methyl Ethyl Ketone (2-Butanone)	102	5.0	ug/L	ND	102	50-140			
Methyl Butyl Ketone (2-Hexanone)	98.8	10.0	ug/L	ND	98.8	50-140			
Methyl Isobutyl Ketone	106	5.0	ug/L	ND	106	50-140			
Methyl tert-butyl ether	96.3	2.0	ug/L	ND	96.3	50-140			
Methylene Chloride	40.4	5.0	ug/L	ND	101	60-130			
Styrene	31.7	0.5	ug/L	ND	79.3	60-130			
1,1,1,2-Tetrachloroethane	29.3	0.5	ug/L	ND	73.2	60-130			
1,1,2,2-Tetrachloroethane	25.5	0.5	ug/L	ND	63.7	60-130			
Tetrachloroethylene	30.0	0.5	ug/L	ND	75.0	60-130			
Toluene	34.5	0.5	ug/L	ND	86.3	60-130			
1,2,4-Trichlorobenzene	32.2	0.5	ug/L	ND	80.4	60-130			
1,1,1-Trichloroethane	33.4	0.5	ug/L	ND	83.5	60-130			
1,1,2-Trichloroethane	35.5	0.5	ug/L	ND	88.6	60-130			
Trichloroethylene	30.1	0.5	ug/L	ND	75.3	60-130			
Trichlorofluoromethane	32.7	1.0	ug/L	ND	81.8	60-130			
1,3,5-Trimethylbenzene	36.1	0.5	ug/L	ND	90.3	60-130			
Vinyl chloride	28.3	0.5	ug/L	ND	70.6	50-140			
m,p-Xylenes	59.7	0.5	ug/L	ND	74.6	60-130			

Certificate of Analysis

Report Date: 29-Aug-2011

Client: **Paterson Group Consulting Engineers**

Order Date:23-Aug-2011

Client PO: 11954

Project Description: PE2374

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	29.9	0.5	ug/L	ND	74.7	60-130			
Surrogate: 4-Bromofluorobenzene	*32.5*		*ug/L*		*102*	*50-140*			
Benzene	36.6	0.5	ug/L	ND	91.6	60-130			
Ethylbenzene	30.3	0.5	ug/L	ND	75.8	60-130			
Toluene	34.5	0.5	ug/L	ND	86.3	60-130			
m,p-Xylenes	59.7	0.5	ug/L	ND	74.6	60-130			
o-Xylene	29.9	0.5	ug/L	ND	74.7	60-130			

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Head Office
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody
(Lab Use Only)
Nº 85638

Page 1 of 1

Client Name: Paterson Group	Project Reference: PE2374	TAT: [X] Regular
Contact Name: Luke Lopers	Quote #	[ ] 2 Day
Address: 1-28 Concourse Gate	PO # 11954	[ ] 1 Day
	Email Address: llopers@patersongroup.ca	[ ] Same Day
Telephone: 226-7381		Date Required:

Samples Submitted Under: [ ] O. Reg. 153/04 Table __ [X] O. Reg 511/09 Table 1 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1135086

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs (F1-F4) BTEX	VOCs									
1	BH1-GW1	GW		3	Aug 22, 2011	2:00 PM	X	X									
2	BH2-GW1	GW		3	↓	↓		X	→ 1L bottle Submitted as well?								
3	BH12-GW1	GW		3	↓	↓	X										
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: #No visible Sediment. SC

Method of Delivery: Paracel

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
	T. Dedouse		MC
Date/Time: Aug 22, 2011	Date/Time: 23/08/11 10:41 am	Date/Time: Aug 23/11 11:45	Date/Time: Aug 23/11 12:41
	Temperature: ___ °C	Temperature: 11.8 °C	pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mark D'Arcy

Client PO: 29553
Project: PE2374
Custody: 126017

Report Date: 5-Mar-2020
Order Date: 3-Mar-2020

Order #: 2010206

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2010206-01	BH3-GW1
2010206-02	BH4-GW1
2010206-03	BH6-GW1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 05-Mar-2020

Client: Paterson Group Consulting Engineers

Order Date: 3-Mar-2020

Client PO: 29553

Project Description: PE2374

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	4-Mar-20	4-Mar-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	4-Mar-20	4-Mar-20
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	4-Mar-20	4-Mar-20

Certificate of Analysis

Report Date: 05-Mar-2020

Client: Paterson Group Consulting Engineers

Order Date: 3-Mar-2020

Client PO: 29553

Project Description: PE2374

	Client ID:	BH3-GW1	BH4-GW1	BH6-GW1	-
	Sample Date:	03-Mar-20 09:00	03-Mar-20 09:00	03-Mar-20 09:00	-
	Sample ID:	2010206-01	2010206-02	2010206-03	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	-
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	-
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-

Certificate of Analysis

Report Date: 05-Mar-2020

Client: Paterson Group Consulting Engineers

Order Date: 3-Mar-2020

Client PO: 29553

Project Description: PE2374

	Client ID:	BH3-GW1	BH4-GW1	BH6-GW1	-
	Sample Date:	03-Mar-20 09:00	03-Mar-20 09:00	03-Mar-20 09:00	-
	Sample ID:	2010206-01	2010206-02	2010206-03	-
	MDL/Units	Water	Water	Water	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
4-Bromofluorobenzene	Surrogate	119%	126%	115%	-
Dibromofluoromethane	Surrogate	106%	104%	101%	-
Toluene-d8	Surrogate	108%	107%	107%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*92.7*		*ug/L*		*116*	*50-140*			
Surrogate: Dibromofluoromethane	*76.1*		*ug/L*		*95.1*	*50-140*			
Surrogate: Toluene-d8	*88.0*		*ug/L*		*110*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	2.99	0.5	ug/L	2.68			10.9	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*95.1*		*ug/L*		*119*	*50-140*			
Surrogate: Dibromofluoromethane	*78.3*		*ug/L*		*97.9*	*50-140*			
Surrogate: Toluene-d8	*84.8*		*ug/L*		*106*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2050	25	ug/L	ND	102	68-117			
F2 PHCs (C10-C16)	1550	100	ug/L	ND	96.7	60-140			
F3 PHCs (C16-C34)	3980	100	ug/L	ND	102	60-140			
F4 PHCs (C34-C50)	1960	100	ug/L	ND	79.0	60-140			
Volatiles									
Acetone	58.9	5.0	ug/L	ND	58.9	50-140			
Benzene	33.1	0.5	ug/L	ND	82.8	60-130			
Bromodichloromethane	35.3	0.5	ug/L	ND	88.3	60-130			
Bromoform	45.4	0.5	ug/L	ND	113	60-130			
Bromomethane	29.4	0.5	ug/L	ND	73.6	50-140			
Carbon Tetrachloride	37.4	0.2	ug/L	ND	93.4	60-130			
Chlorobenzene	36.7	0.5	ug/L	ND	91.8	60-130			
Chloroform	33.4	0.5	ug/L	ND	83.6	60-130			
Dibromochloromethane	42.2	0.5	ug/L	ND	105	60-130			
Dichlorodifluoromethane	32.9	1.0	ug/L	ND	82.2	50-140			
1,2-Dichlorobenzene	40.9	0.5	ug/L	ND	102	60-130			
1,3-Dichlorobenzene	39.6	0.5	ug/L	ND	99.1	60-130			
1,4-Dichlorobenzene	40.2	0.5	ug/L	ND	100	60-130			
1,1-Dichloroethane	28.8	0.5	ug/L	ND	71.9	60-130			
1,2-Dichloroethane	34.6	0.5	ug/L	ND	86.6	60-130			
1,1-Dichloroethylene	32.7	0.5	ug/L	ND	81.7	60-130			
cis-1,2-Dichloroethylene	31.8	0.5	ug/L	ND	79.5	60-130			
trans-1,2-Dichloroethylene	31.8	0.5	ug/L	ND	79.6	60-130			
1,2-Dichloropropane	31.1	0.5	ug/L	ND	77.7	60-130			
cis-1,3-Dichloropropylene	36.0	0.5	ug/L	ND	90.1	60-130			
trans-1,3-Dichloropropylene	37.0	0.5	ug/L	ND	92.4	60-130			
Ethylbenzene	38.5	0.5	ug/L	ND	96.2	60-130			
Ethylene dibromide (dibromoethane, 1,2-	37.5	0.2	ug/L	ND	93.6	60-130			
Hexane	31.1	1.0	ug/L	ND	77.8	60-130			
Methyl Ethyl Ketone (2-Butanone)	63.2	5.0	ug/L	ND	63.2	50-140			
Methyl Isobutyl Ketone	81.0	5.0	ug/L	ND	81.0	50-140			
Methyl tert-butyl ether	81.3	2.0	ug/L	ND	81.3	50-140			
Methylene Chloride	27.6	5.0	ug/L	ND	69.0	60-130			
Styrene	42.1	0.5	ug/L	ND	105	60-130			
1,1,1,2-Tetrachloroethane	40.7	0.5	ug/L	ND	102	60-130			
1,1,2,2-Tetrachloroethane	36.4	0.5	ug/L	ND	90.9	60-130			
Tetrachloroethylene	40.2	0.5	ug/L	ND	101	60-130			
Toluene	34.4	0.5	ug/L	ND	86.0	60-130			
1,1,1-Trichloroethane	37.1	0.5	ug/L	ND	92.6	60-130			
1,1,2-Trichloroethane	33.7	0.5	ug/L	ND	84.3	60-130			
Trichloroethylene	34.2	0.5	ug/L	ND	85.5	60-130			
Trichlorofluoromethane	30.7	1.0	ug/L	ND	76.7	60-130			
Vinyl chloride	34.6	0.5	ug/L	ND	86.6	50-140			
m,p-Xylenes	79.3	0.5	ug/L	ND	99.2	60-130			
o-Xylene	41.0	0.5	ug/L	ND	102	60-130			
Surrogate: 4-Bromofluorobenzene	*81.9*		*ug/L*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*77.5*		*ug/L*		*96.9*	*50-140*			
Surrogate: Toluene-d8	*78.2*		*ug/L*		*97.7*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
NC: Not Calculated

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES LTD.

Paracel ID: 2010206

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2010206	№ 126017

Client Name: Paterson Group | Project Ref: PE2374 | Page 1 of 1

Contact Name: Mark D'Arcy | Quote #:

Address: 154 Colonnade Rd. S | PO #: 79553

E-mail: mdarcy@patersongroup.ca

Telephone: 613-226-7381

Turnaround Time

☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular

Date Required:

Regulation 153/04	Other Regulation
☐ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA
☒ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm
☐ Table ___	Mun:
For RSC: ☒ Yes ☐ No	☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4 +BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH3-GW1	GW		3	Mar. 3/20	AM	X	X					
2	BH4-GW1	〃		〃	〃	〃	X	X					
3	BH6-GW1	〃		〃	〃	〃	X	X					
4													
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received By Driver/Depot: T. Jeouse	Received at Lab:	Verified By:
Relinquished By (Print): Mark D'Arcy	Date/Time: 03/03/20 3:20	Date/Time: 03-03-20 15:55	Date/Time: 03/03/2020 15:59
Date/Time: Mar. 3, 2020	Temperature: °C FH.	Temperature: 11.4 °C	pH Verified: ☐ By:

PARACEL LABORATORIES LTD.

Paracel ID: 2010206

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2010206	Nº 126017

Client Name: Paterson Group | Project Ref: PE2374 | Page 1 of 1

Contact Name: Mark D'Arcy | Quote #:

Address: 154 Colonnade Rd. S. | PO #: 79553

E-mail: mdarcy@patersongroup.ca

Telephone: 613-226-7381

Turnaround Time

☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular

Date Required:

Regulation 153/04

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table

For RSC: ☒ Yes ☐ No

Other Regulation

☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun:
☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4 ~~BTEX~~	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH3-GW1	GW		3	Mar. 3/20	AM	X	X					
2	BH4-GW1	〃		〃	〃	〃	X	X					
3	BH6-GW1	〃		〃	〃	〃	X	X					
4													
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received By Driver/Depot: A. Jeouse	Received at Lab:	Verified By:
Relinquished By (Print): Mark D'Arcy	Date/Time: 03/03/20 3:20	Date/Time: 03-03-20 15:55	Date/Time: 03/03/2020 15:59
Date/Time: Mar. 3, 2020	Temperature: °C FR.	Temperature: 11.4 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mandy Witteman

Client PO: 33351
Project: PE5498
Custody: 131541

Report Date: 11-Nov-2021
Order Date: 4-Nov-2021

Order #: 2145509

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2145509-01	BH3-20
2145509-02	DUP

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 33351

Report Date: 11-Nov-2021

Order Date: 4-Nov-2021

Project Description: PE5498

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	10-Nov-21	7-Nov-21
PHC F1	CWS Tier 1 - P&T GC-FID	9-Nov-21	7-Nov-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	10-Nov-21	11-Nov-21

Certificate of Analysis

Report Date: 11-Nov-2021

Client: Paterson Group Consulting Engineers

Order Date: 4-Nov-2021

Client PO: 33351

Project Description: PE5498

	Client ID:	BH3-20	DUP	-	-
	Sample Date:	03-Nov-21 09:00	03-Nov-21 09:00	-	-
	Sample ID:	2145509-01	2145509-02	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Benzene	0.5 ug/L	0.8	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	-	-
Toluene-d8	Surrogate	84.4%	83.6%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 33351

Report Date: 11-Nov-2021

Order Date: 4-Nov-2021

Project Description: PE5498

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*69.8*		*ug/L*		*87.2*	*50-140*			

Certificate of Analysis

Report Date: 11-Nov-2021

Client: Paterson Group Consulting Engineers

Order Date: 4-Nov-2021

Client PO: 33351

Project Description: PE5498

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*68.1*		*ug/L*		*85.1*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1820	25	ug/L	ND	91.0	68-117			
F2 PHCs (C10-C16)	1000	100	ug/L	ND	62.5	60-140			
F3 PHCs (C16-C34)	3780	100	ug/L	ND	96.4	60-140			
F4 PHCs (C34-C50)	2310	100	ug/L	ND	93.0	60-140			
Volatiles									
Benzene	39.8	0.5	ug/L	ND	99.4	60-130			
Ethylbenzene	37.9	0.5	ug/L	ND	94.8	60-130			
Toluene	43.8	0.5	ug/L	ND	110	60-130			
m,p-Xylenes	67.9	0.5	ug/L	ND	84.8	60-130			
o-Xylene	43.1	0.5	ug/L	ND	108	60-130			
Surrogate: Toluene-d8	*57.9*		*ug/L*		*72.4*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
NC: Not Calculated

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2145508	Nº 131541

Client Name: Paterson	Project Ref: PE5498	Page __ of __
Contact Name: Mandy Witteman	Quote #:	Turnaround Time
Address: 154 Colonnade	PO #: 33351	☐ 1 day ☐ 3 day
	E-mail: MWitteman@patersongroup.ca	☐ 2 day ☒ Regular
Telephone: 613 226 7381		Date Required:

Regulation 153/04	Other Regulation
☐ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA
☐ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm
☒ Table 7	Mun:
For RSC: ☐ Yes ☐ No	☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	F1 + BTEX
1	BH3-20	GW		3	Nov 2/3 2021		✓							
2	Dup	GW		2	Nov 3 2021									✓
3														
4														
5														
6														
7														
8														
9														
10														

Comments: BH3-20 500ML taken Nov 2 vials taken Nov 3

Method of Delivery: Drop Box

Relinquished By (Sign): G Pat	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Grant Paterson	Date/Time:	Date/Time: Nov 4, 2021 16:00	Date/Time: Nov 4 2021 5:59
Date/Time: Nov 4 2021	Temperature: °C	Temperature: 11.9 °C	pH Verified ☐ By