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Phase II Environmental Site Assessment

35-37 William Street
Ottawa, Ontario

Prepared For
Vittoria Trattoria

December 3, 2019

Report: PE4720-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the property addressed 35-37 William Street, in the City of Ottawa, Ontario. It should be noted that the Phase I Property includes part of 62 York Street and a laneway adjacent to the east of 62 York Street (addressed as part of 87 George Street (geoOttawa)). The purpose of the Phase II ESA was to assess the soil and groundwater quality on or beneath the Phase II Property, within potential areas of environmental concern (APECs) identified during the Phase I ESA carried out by Paterson and dated November 21, 2019.

The Phase II ESA consisted of drilling 3 boreholes across the Phase II Property, each of which were cored into the bedrock to intercept the groundwater table, and constructed with a monitoring well installation. Three (3) shallow grab samples of native soil, were recovered from within the footprint of 35-37 William Street, from which the floor and underlying soil had been removed during the rehabilitation of the property subsequent to damage from a fire in April of 2019.

All soil samples obtained were screened for combustible vapours with an RKI Eagle Gastech, as well as for visual and olfactory indications of contamination. Based on the screening results (5ppm or less) in combination with sample depth and location, a total of six (6) soil samples, including a duplicate sample, were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), polynuclear aromatic hydrocarbons (PAHs) and/or metals (including hydride-forming compounds, mercury and hexavalent chromium).

Based on the analytical test results, metal and PAH concentrations were detected in the shallow fill samples. All identified concentrations were in compliance with the MECP Table 7 standards selected for the site. No PAH parameters were identified in the native soil samples recovered from within the footprint of 35-37 William Street, at the location of fire. No BTEX or PHC parameters were identified in the soil samples analysed.

Groundwater samples from monitoring wells installed in BH1, BH2 and BH3 were recovered and analysed for BTEX, PHC (F1-F4) and/or PAH parameters. No free-phase product was observed on the groundwater at any of the monitoring well locations during the November 8, 2019 sampling event. No BTEX, PHC or PAH concentrations were identified above the laboratory method detection limits in the groundwater samples analysed. The results are in compliance with the MECP Table 7 standards.

Conclusion

Based on the findings of the Phase II ESA, the soil and groundwater beneath the Phase II Property are considered to be in compliance with the MECP Table 7 standards selected for the site. No further work is recommended at this time.

1.0 INTRODUCTION

At the request of Vittoria Trattoria, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment (ESA) for the property addressed 35-37 William Street in the City of Ottawa, Ontario, herein referred to as the Phase II Property. It should be noted that the Phase II Property includes Part of 62 York Street and the adjacent laneway to the east (part of 87 George Street according to geoOttawa). The purpose of this Phase II ESA was to address areas of potential environmental concern (APECs) identified in the Phase I ESA conducted by Paterson and dated November 2019.

1.1 Site Description

Address:	35 and 37 William Street, Ottawa, Ontario (also part of 62 York Street and part of 87 George Street)
Legal Description:	Part of Lots 11, 12 and 13, Registered Plan 42482, City of Ottawa.
Property Identification Numbers:	04215-0118; 04215-0119; 04215-0135; and 04215-0165
Location:	The Phase I Property is located on the east side of William Street, in the City of Ottawa. For the purposes of this report, William Street is considered to run in a north-south direction. The subject site is shown on Figure 1 - Key Plan following the body of this report.
Latitude and Longitude:	45° 25' 41.2" N, 75° 41' 31.3" W
Configuration:	Irregular
Site Area:	613m^2 (approximate)

1.2 Property Ownership

The subject property is currently owned by Mr. Domenic Santaguida with Vittoria Trattoria. Paterson was retained to complete this Phase II ESA by Mr. Santaguida, who can be contacted by telephone at 613-868-5536.

1.3 Current and Proposed Future Uses

The Phase II Property is currently used for commercial purposes (former Vittoria Trattoria restaurant and part of existing Starbucks restaurant, formerly Fat Tuesdays restaurant). The Phase II Property will be developed with a 2-4 storey mixed-used development with a ground floor restaurant and upper level residential apartments.

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 the Environment, Conservation and Parks (MECP), April 2011.

The MECP Table 7 Standards are based on the following considerations:

- ❒ Coarse-grained soil conditions;
- ❒ Shallow soils;
- ❒ Non-potable groundwater conditions; and
- ❒ Residential land use.

It should be noted that at the time of the Phase II ESA, the soil from within the footprint of the building addressed 35-37 William Street had been removed to a depth of approximately 1.5m below grade. The soil was removed in conjunction with removal of debris resulting from the April 2019 fire and for the purposes of underpinning several of the remaining wall, which have historical significance. At the time of the Phase II ESA, 1/3 or more of the Phase II Property consisted of soil equal to or less than 2m in depth beneath the soil surface, excluding any no-soil surface treatment such as asphalt, concrete or aggregate.

Section 41 of O.Reg. 153/04 does not apply to the Phase II Property, as the property is not within 30m of an environmentally sensitive area and the pH of the soil is between 5 and 9.

Section 43.1 of O.Reg. 153/04 does apply to the Phase II Property in that the property is a Shallow Soil property; the Phase II Property is not within 30m of a water body.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is situated in a dense urban setting, surrounded by a variety of commercial buildings of various heights. Properties within the 250m study area are provided with municipal services. The setting of the Phase II Property is illustrated on Drawing PE4720-2 – Surrounding Land Use Plan.

At the time of the Phase II ESA, the Phase II Property was occupied by two commercial buildings and several temporary structures. The building at 35-37 William Street was undergoing reconstruction (underpinning) at the time. The building at 62 York Street, adjacent to the Starbucks restaurant and unaccessible at the time of the site visit, is reportedly occupied by a stairwell and kitchen area not currently in use. The remainder of the site is occupied by a paved or concrete laneway to the north of the building addressed 35-37 William Street and a second access laneway and patio covered with brick pavers and/or a wooden deck structure (laneway).

Site topography is relatively flat and is at a slightly higher elevation than the adjacent land to the east. Regional topography slopes slightly down in a northerly direction. Site drainage consists of surface runoff to catch basins on surrounding streets. Utilities servicing the site include natural gas, electricity, telephone and cable as well as municipal water and sewer. Only the building addressed as 62 York Street is currently serviced however, as utilities servicing 35-37 William Street were disconnected as a result of the fire.

2.2 Past Investigations

Phase I Environmental Site Assessment, 2019

Paterson conducted a Phase I ESA, dated November 2019, for the Phase II Property. Based on the findings of the Phase I ESA, several on and off-site PCAs were considered to result in APECs on the Phase II Property as shown in Table 1 below.

Table 1
Area of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern with respect to Phase I Property	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	Eastern portion of the Phase I Property	PCA 31 – Importation of Fill Material of Unknown Quality	On-site	Metals As, Sb, Se Hg CrVI	Soil
APEC 2	Western portion of the Phase I Property	Other - Resulting from the fire at 35-41 ½ William Street	On-site	PAHs	Soil Groundwater
APEC 3	Western and southern portion of the Phase I Property	PCA 28 – Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F_1-F_4)	Soil Groundwater
APEC 4	Eastern portion of Phase I Property	PCA 28 – Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F_1-F_4)	Soil Groundwater

A Phase II ESA was recommended for the subject land, to assess the potential for soil and groundwater impacts.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted during the interim of October 28 through October 30, 2019. The field program consisted of three (3) boreholes to depths ranging from approximately 4.57 to 6.53m below grade. Note that BH3 was completed within the footprint of the building at 35-37 William Street, where the soil had been removed to approximately 1.5m below original grade. Boreholes BH1, BH2 and BH3 were cored into the limestone bedrock and completed with monitoring well installations.

The boreholes were placed to assess APECs identified in Table 1 above. In addition to the boreholes, several grab samples were collected from the native soil base within the building footprint (35-37 William Street), where possible.

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 these media is based on the Contaminants of Potential Concern (CPCs) identified in the Phase I ESA.

As noted in Table 1 in Section 2.2, CPCs for soil or groundwater include petroleum hydrocarbons (PHCs, fractions F1-F4) and benzene, toluene, ethylbenzene and xylenes (BTEX), metals (including arsenic (As), antimony (Sb), selenium (Se), mercury (Hg) and hexavalent chromium (CrVI)) and polynuclear aromatic hydrocarbons (PAHs).

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

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 Phase I Property reportedly consists of interbedded limestone and shale of the Verulam Formation. Based on the maps, the surficial geology consists of glacial till with an overburden thickness ranging from approximately 3 to 5m below grade.

Based on the topography of the site, in combination with the proximity of the Ottawa River and numerous subsurface investigations conducted by Paterson in the downtown area, the groundwater flow is considered to be in a northerly direction, towards the Ottawa River.

Existing Buildings and Structures

The Phase I Property is occupied by two commercial buildings: 35-37 William Street and part of 62 York Street. The building addressed 35-37 William Street occupies the western portion of the site, fronting onto William Street.

As previously discussed the building had been largely destroyed by fire at the time of the site visit. The 2-storey building was constructed with a stone and mortar foundation and finished on the exterior with brick, stone and mortar, and

concrete, with a flat, tar and gravel style roof. A ½ basement level, or crawl space, was reported by Mr. Santaguida to be present beneath the western portion of the building.

The rear building addition of the larger building addressed 62 York Street, occupies the north-eastern portion of the site, situated to the east of 35-37 William Street. The one-storey pre-cast concrete building has a flat, tar and gravel style roof.

A smaller, wooden building structure with a peaked roof covered with asphaltic shingles, is present to the south of the aforementioned building, on the east-central portion of the site. The structure was previously used as a patio bar. Smaller structures including a wooden shed and gazebo were present on the southern portion of the Phase I Property. A wooden patio structure occupied the northeastern portion of the site, adjacent to 62 York Street.

Water Bodies

No creeks, rivers, streams, lakes or any other water body was identified in the Phase I Study Area. The Ottawa River, the closest significant water body, is present approximately 650m west of the Phase I Property at its closest point.

Areas of Natural Significance

No areas of natural significance were identified on the Phase I Property or within the Phase I Study Area.

Drinking Water Wells

According to the MECP well mapping database, there are no drinking water well records for the Phase I Property or for properties within the Phase I study area.

Monitoring Wells

According to the MECP well mapping database, there are no records of monitoring wells for the Phase I Property.

A total of 11 monitoring well records were identified for the following properties within the Phase I Study Area: Rideau Street at Sussex Drive, 137 George Street, 272 and 325 Dalhousie Street, 117 Rideau Street, and 7 Clarence Street.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area primarily consists of commercial land use.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As presented in Table 2 in Section 7.1 of this report, two (2) on-site PCAs and two(2) off-site PCAs are considered to have resulted in four (4) APECs on the Phase I Property.

Contaminants of Potential Concern

As noted in Table 5, CPCs associated with the APECs identified in this Phase I ESA include BTEX, PHCs (F_1-F_4), PAHs and metals (including As, Sb, Se, Hg and CrVI) in the soil and/or groundwater beneath the Phase I Property.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I ESA is considered to be sufficient to conclude that there are areas of potential environmental concern on the Phase I Property.

The presence of potentially contaminating activities was confirmed by a variety of independent sources, 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

The Sampling and Analysis Plan for this project is included in Appendix 1 of this report. Deviations from the Sampling and Analysis Plan include borehole location as a result of impediments discussed in the following section. Otherwise there were no deviations from the Sampling and Analysis Plan.

3.5 Impediments

Physical impediments encountered during the Phase II ESA field program included the on-going underpinning program; heavy equipment and various contractors on-site accounted for much of the available space, limiting the possible locations of the boreholes within the APECs. No other impediments were encountered during the Phase II ESA field program.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation was conducted during the interim of October 28 through October 30, 2019. The field program consisted of three (3) boreholes to depths ranging from approximately 4.57 to 6.53m below grade. Bedrock was cored at each borehole location; all boreholes were completed with monitoring well installations for the purpose of intercepting the groundwater table.

As noted previously, BH3 was completed within the footprint of the building at 35-37 William Street, where the soil had been removed to approximately 1.5m below original grade. The floor of the building and underlying material, where present, were removed in association with the building rehabilitation and underpinning program, in preparation for the redevelopment. The field program also consisted of collecting grab samples from the native soil base within the footprint of 35-37 William Street, where possible.

All boreholes were drilled with portable drilling equipment, provided by Marathon Underground, of Greeley, Ontario, under the full-time supervision of Paterson personnel. Grab samples were recovered using a hand shovel. Borehole and grab sample locations are shown on Drawing PE4720-3 – Test Hole Location Plan, appended to this report.

4.2 Soil Sampling

A total of 15 soil samples were obtained from the boreholes by means of split spoon sampling, and/or shallow grab samples collected by hand. The depths at which grab and split spoon samples were obtained from the boreholes are shown as "**G**" and "**SS**" on the Soil Profile and Test Data Sheets, appended to this report. Grab samples collected from below grade within the footprint of 35-37 William Sheet, were recovered from approximately 0 to 0.3m below existing grade.

The stratigraphy at the borehole locations generally consisted of brick interlock over fill material, underlain by native brown sandy silt to silty sand. Fill material consisted of brown silty sand with traces of gravel and occasional brick fragments (BH1 only), and was approximately 0.6 to 0.76m in thickness. Fill material was not identified in BH3. Glacial till was identified above the bedrock at BH1. Borehole locations and grab sample locations are shown on Drawing PE4720-3 – Test Hole Location Plan.

4.3 Field Screening Measurements

All soil samples collected were subjected to a preliminary screening procedure, which included visual screening for colour/staining and evidence of fill material/ metal impacts. Soil vapour screening with an RKI Eagle gas detector with methane elimination and calibrated to hexane was conducted on samples recovered from the boreholes.

The combustible vapours for soil samples collected from BH1 through BH3 and grab samples were measured by inserting the analyzer probe into the nominal headspace above the soil sample. Samples were then agitated/manipulated gently as the measurements were taken. The peak reading registered within the first 15 seconds was recorded as the vapour measurement.

The parts per million (ppm) scale is used to measure concentrations of hydrocarbon vapours that are too low to register on the Lower Explosive Limit (LEL) scale. The explosive point, 100% LEL, represents the leanest mixture which will burn (or explode) if ignited.

The maximum combustible vapour reading measured was 5ppm and therefore the results of the vapour screening were not considered to be indicative of potential contamination. Vapour readings obtained from the borehole samples are noted on the Soil Profile and Test Data Sheets in Appendix 1.

No visual or olfactory indications of potential hydrocarbons, or visual indications of deleterious fill material or metal impacts, were identified in the soil samples. Soil samples were selected based on a combination of the results of the vapour screening, visual screening, sample depth and/or sample location.

4.4 Groundwater Monitoring Well Installation

Three (3) groundwater monitoring wells were installed on the Phase II Property, at boreholes BH1, BH2, and BH3. The monitoring wells consisted of 32mm 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.

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	63.21	6.25	4.12-6.25	3.80-6.25	0.03-3.80	Stick-up
BH2	63.47	6.53	4.40-6.53	4.15-6.53	0.30-4.15	Stick-up
BH3	61.86	4.57	2.44-4.57	2.0-4.57	0.30-2.0	Stick-up

4.5 Field Measurement of Water Quality Parameters

Groundwater sampling was conducted at BH1, BH2 and BH3 on November 8, 2019, 2019. Water quality parameters were measured in the field using a multi-parameter analyzer. Parameters measured in the field included temperature, pH, and electrical conductivity.

Field parameters were measured after each well volume purged. Wells were purged prior to sampling until at least three well volumes had been removed, the field parameters were relatively stable or the well was dry. Stabilized field parameter values are summarized in Table 3. Note that insufficient water was available for BH2 and BH3.

Table 3: Field Measurement of Water Quality Parameters – Nov.8, 2019			
Parameter	**BH1**	**BH2**	**BH3**
Temperature (°C)	4.0	-	-
pH	7	-	-
Electrical Conductivity (µS/cm)	1,417	-	-

4.6 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 monitoring wells installed in BH1, BH2 and BH3 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.

4.7 Analytical Testing

Based on the guidelines outlined in the Sampling and Analysis Plan appended to this report, the soil and groundwater samples submitted for analytical testing are outlined in Tables 4 and 5.

Table 4: Soil Samples Submitted

Sample ID	Sample Depth/ Stratigraphic Unit	Parameters Analyzed						Rationale
		BTEX	PHCs (F_1-F_4)	Metals (including As, Se, Sb)	Hg, CrVI	PAH	pH	
BH1-SS1	0.08-0.60m; Fill			X	X	X		Assessment of fill identified during field program.
BH1-SS3	1.2-1.8m; Silty Sand	X	X				X	Assess potential for impacts from off-site UST.
BH2-G1	0.08-0.60m; Fill			X	X	X		Assessment of fill and potential impacts from the April 2019 fire.
BH3-G1	0-0.6m; Silty Sand (depth with respect to existing grade)	X	X			X	X	Assessment of potential impacts from fuel release at 41-41 ½ William Street and the April 2019 fire.
G3	0-0.30m; Silty Sand					X		Assessment of potential impacts resulting from the April 2019 fire.
DUP[1]	0.08-0.60m; Fill			X	X	X		QA/QC

Notes:
- 1 – duplicate of Sample BH1-SS1

Table 5: Groundwater Samples Submitted

Sample ID	Sample Depth/ Stratigraphic Unit	Parameters Analyzed			Rationale
		BTEX	PHCs (F_1-F_4)	PAHs	
BH1-GW1	4.12-6.25m; bedrock	X	X		To investigate potential groundwater impacts resulting from the off-site fuel sources and from the April 2019 fire.
BH2-GW1	4.40-6.53m; bedrock	X	X	X	
BH3-GW1	2.44-4.57m; bedrock	X	X	X	
DUP[1]	2.44-4.57m; bedrock	X			QA/QC

Notes:
- 1 – duplicate of Sample BH3-GW1

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.

4.8 Residue Management

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

4.9 Elevation Surveying

The monitoring well locations were selected, located and surveyed in the field by Paterson. The ground surface elevations at the monitoring well locations are referenced to a geodetic datum provided by Annis, O'Sullivan, Vollebekk Ltd. and are presented on Drawing PE4720-3 - Test Hole Location Plan appended to this report.

4.10 Quality Assurance and Quality Control Measures

A summary of quality assurance and quality control (QA/QC) measures, including sampling containers, preservation, labelling, handling, 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

Based on the information obtained during the current subsurface investigation, site soils generally consist of a sand and gravel fill material over native silty sand. Glacial till was encountered above the limestone bedrock, in BH1.

Groundwater was encountered at depths ranging from approximately 0.97 (below basement level) to 2.36m below grade, during the November 8, 2019 sampling event.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling event on November 8, 2019, using an electronic water level meter. Groundwater levels are summarized below in Table 6. Based on the groundwater elevations, contour mapping was completed. Groundwater contours as shown on Drawing PE4720-3 – Test Hole Location Plan, indicate that the groundwater beneath the Phase II Property flows in a northwesterly direction. A hydraulic gradient of approximately 0.018m/m was calculated.

Table 6: Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1	63.21	1.94	61.27	November 8, 2019
BH2	63.47	2.36	61.11	
BH3	61.86	0.97	60.89	

5.3 Fine-Coarse Soil Texture

Based on observations made in the field, the more stringent coarse-grained soil standards are applicable to the Phase II Property.

5.4 Soil: Field Screening

Field screening of the soil samples resulted in maximum combustible vapour readings 5ppm. Field screening results of individual soil samples from BH1 through BH3 are provided on the Soil Profile and Test Data Sheets appended to this report.

5.5 Soil Quality

Based on the findings of the field screening, in combination with sample depth and location, a total of 6 soil samples were submitted for analysis of a combination of BTEX, PHCs (F_1-F_4), metals (including hydride-forming compounds, mercury and hexavalent chromium), polynuclear aromatic hydrocarbons (PAHs) and/or pH. The results of the analytical testing are presented below in Tables 7 through 10. Maximum soil concentrations are presented in Table 11. The laboratory certificates of analysis are provided in Appendix 1.

Table 7: Analytical Test Results – Soil
BTEX and PHCs (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g)		MECP Table 7 Residential Standards (µg/g)
		October 29, 2019	October 30, 2019	
		BH1-SS3 (1.2-1.8m)	BH3-G1 (0-0.60m[1])	
Benzene	0.02	nd	nd	0.21
Ethylbenzene	0.05	nd	nd	2
Toluene	0.05	nd	nd	2.3
Xylenes (Total)	0.05	nd	nd	3.1
PHC F1	7	nd	nd	55
PHC F2	4	nd	nd	98
PHC F3	8	nd	nd	300
PHC F4	6	nd	nd	2,800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- 1 – depth with respect to existing grade (approximately 1.5m lower than surrounding grade)

BTEX and PHC parameters were not identified above the laboratory method detection limits, in any of the soil samples submitted for analytical testing. The test results are in compliance with the MECP Table 7 standards.

Table 8: Analytical Test Results – Soil
Metals (including As, Sb, Se, Hg and CrVI)

Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 7 Residential Standards (µg/g)
		Oct.29, 2019	Oct.28, 2019	Oct.29, 2019	
		BH1-SS1 (0.08-0.60m)	BH2-G1 (0.08-0.60m)	DUP (0.08-0.60m)	
Antimony	1.0	nd	nd	nd	7.5
Arsenic	1.0	4.5	14.5	4.4	18
Barium	1.0	47.0	22.0	32.6	390
Beryllium	0.5	nd	nd	nd	4
Boron	5.0	5.4	8.8	nd	120
Cadmium	0.5	nd	nd	nd	1.2
Chromium	5.0	11.7	14.1	12.9	160
Chromium (VI)	0.2	nd	nd	nd	8
Cobalt	1.0	3.8	10.5	4.1	22
Copper	5.0	16.4	51.4	16.9	140
Lead	1.0	14.5	35.3	12.6	120
Mercury	0.1	nd	nd	nd	0.27
Molybdenum	1.0	2.5	3.4	2.9	6.9
Nickel	5.0	8.3	16.6	9.0	100
Selenium	1.0	nd	nd	nd	2.4
Silver	0.3	0.3	0.4	nd	20
Thallium	1.0	nd	nd	nd	1
Uranium	1.0	nd	nd	nd	23
Vanadium	10.0	15.6	10.3	14.5	86
Zinc	20.0	45.9	82.9	45.9	340

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- DUP – duplicate of Sample BH1-SS1

Metal parameters identified in each of the soil samples analysed comply with the MECP Table 7 standards.

Table 9: Analytical Test Results – Soil
Polynuclear Aromatic Hydrocarbons (PAHs)

Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 7 Standards Residential (µg/g)
		Oct.29, 2019	Oct. 28, 2019	Oct.30, 2019	Nov.9, 2019	
		BH1-SS1 (0.08-0.60m)	BH2-G1 (0.08-0.60m)	BH3-G1 (0-0.60m)	G3 (0.08-0.60m)	
Acenaphthene	0.02	0.02	0.03	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	nd	0.15
Anthracene	0.02	0.05	0.07	nd	nd	0.67
Benzo[a]anthracene	0.02	0.17	0.15	nd	nd	0.5
Benzo[a]pyrene	0.02	0.11	0.11	nd	nd	0.3
Benzo[b]fluoranthene	0.02	0.17	0.17	nd	nd	0.78
Benzo[g,h,i]perylene	0.02	0.08	0.08	nd	nd	6.6
Benzo[k]fluoranthene	0.02	0.10	0.08	nd	nd	0.78
Chrysene	0.02	0.16	0.18	nd	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	nd	0.1
Fluoranthene	0.02	0.34	0.38	nd	nd	0.69
Fluorene	0.02	0.02	0.03	nd	nd	62
Indeno[1,2,3-cd]pyrene	0.02	0.07	0.08	nd	nd	0.38
Methylnapthalene (1&2)	0.04	nd	nd	nd	nd	0.99
Naphthalene	0.01	0.02	0.02	nd	nd	0.6
Phenanthrene	0.02	0.20	0.30	nd	nd	6.2
Pyrene	0.02	0.32	0.31	nd	nd	78

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

PAH parameters were identified in the shallow samples collected from the fill material on the eastern and southern portions of the site. All detected parameters were in compliance with the MECP Table 7 standards. No PAH concentrations were detected in the shallow native soil samples collected from within the footprint of 35-37 William Street.

Table 10: Analytical Test Results - Soil
pH

Parameter	MDL	Soil Samples		MECP Table 7 Standards (µg/g)
		Oct. 29, 2019	Oct.30, 2019	
		BH1-SS3 (1.2-1.8m)	BH3-G1 (0-0.60m)[1]	
pH – surface	-	8.52	-	5-9
pH - subsurface	-	-	8.60	5-11

Notes:
- 1 - relative existing grade within 35-37 William Street (1.5m lower than surrounding grade)

The pH samples are between 5 and 9 and therefore the Phase II Property is not a sensitive site in accordance with Section 41 of the Regulation.

5.6 Maximum Concentrations

Table 11 : Maximum Soil Concentrations

Parameter	Maximum Concentration (µg/g)	Borehole/Sample	Depth Interval (m BGS)
Metals			
Arsenic	14.5	BH2-G1	0-0.60
Barium	47	BH1-SS1	0.08-0.60
Boron	8.8	BH2-G1	0-0.60
Chromium	14.1	BH2-G1	0-0.60
Cobalt	10.5	BH2-G1	0-0.60
Copper	51.4	BH2-G1	0-0.60
Lead	35.3	BH2-G1	0-0.60
Molybdenum	3.4	BH2-G1	0-0.60
Nickel	16.6	BH2-G1	0-0.60
Silver	0.4	BH2-G1	0-0.60
Vanadium	15.6	BH1-SS1	0.08-0.60
Zinc	82.9	BH2-G1	0-0.60
PAHs			
Acenaphthene	0.03	BH2-G1	0-0.60
Anthracene	0.07	BH2-G1	0-0.60
Benzo[a]anthracene	0.04	BH1-SS1	0.08-0.60
Benzo[a]pyrene	0.11	BH1-SS1 and BH2-G1	0-0.60
Benzo[b]fluoranthene	0.17		
Benzo[g,h,i]perylene	0.08		
Benzo[k]fluoranthene	0.10	BH1-SS1	0.08-0.60
Chrysene	0.18	BH2-G1	0-0.60
Fluoranthene	0.38	BH2-G1	0-0.60
Fluorene	0.02	BH2-G1	0-0.60
Indeno[1,2,3-cd]pyrene	0.08	BH2-G1	0-0.60
Naphthalene	0.02	BH1-SS1 and BH2-G1	0-0.60
Phenanthrene	0.30	BH2-G1	0-0.60
Pyrene	0.32	BH1-SS1	0.08-0.60

Remaining parameters were not detected above the laboratory method detection limits.

5.7 Groundwater Quality

Groundwater samples from monitoring wells installed in BH1, BH2 and BH3 were submitted for laboratory analysis of BTEX and PHC (F_1-F_4) and/or PAHs. The groundwater samples were obtained from the screened intervals noted on Table 2. No visual or olfactory evidence of petroleum hydrocarbons was noted on the groundwater at any of the borehole locations. The results of the analytical testing are presented below in Tables 12 to 13. The laboratory Certificates of Analysis are provided in Appendix 1.

Table 12: Analytical Test Results - Groundwater
BTEX and PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) Nov.8, 2019				MECP Table 7 Standards (µg/L)
		BH1-GW1 (4.12-6.25m)	BH2-GW1 (4.40-6.53m)	BH3-GW1 (2.44-4.57m)	DUP (2.44-4.57m)	
Benzene	0.5	nd	nd	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	nd	nd	54
Toluene	0.5	nd	nd	nd	nd	320
Xylenes (Total)	0.5	nd	nd	nd	nd	72
PHC F1	25	nd	nd	nd	nt	420
PHC F2	100	nd	nd	nd	nt	150
PHC F3	100	nd	nd	nd	nt	500
PHC F4	100	nd	nd	nd	nt	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- nt – not tested for this parameter
- DUP – duplicate sample of BH3-GW1

No BTEX or PHC parameters were detected above the laboratory method detection limits in any of the groundwater samples submitted for analytical testing. The results are in compliance with the MECP Table 7 standards.

It is our interpretation that the analyzed parameter concentrations do not indicate the potential presence of light non-aqueous phase liquids (LNAPLs). As previously noted, no free phase hydrocarbons were noted in the wells at the time of groundwater sampling event.

Table 13: Analytical Test Results – Groundwater
Polynuclear Aromatic Hydrocarbons (PAHs)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) November 8, 2019		MECP Table 7 Standards Residential (µg/L)
		BH2-GW1 (4.40-6.53m)	BH3-GW1 (2.44-4.57m)	
Acenaphthene	0.05	nd	nd	17
Acenaphthylene	0.05	nd	nd	1
Anthracene	0.01	nd	nd	1
Benzo[a]anthracene	0.01	nd	nd	1.8
Benzo[a]pyrene	0.01	nd	nd	0.81
Benzo[b]fluoranthene	0.05	nd	nd	0.75
Benzo[g,h,i]perylene	0.05	nd	nd	0.2
Benzo[k]fluoranthene	0.05	nd	nd	0.4
Chrysene	0.05	nd	nd	0.7
Dibenzo[a,h]anthracene	0.05	nd	nd	0.4
Fluoranthene	0.01	nd	nd	44
Fluorene	0.05	nd	nd	290
Indeno[1,2,3-cd]pyrene	0.05	nd	nd	0.2
Methylnapthalene (1&2)	0.01	nd	nd	1,500
Naphthalene	0.05	nd	nd	7
Phenanthrene	0.05	nd	nd	380
Pyrene	0.01	nd	nd	5.7

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

No PAH parameters were identified in the groundwater samples submitted for analysis. The results are in compliance with the MECP Table 7 standards.

5.8 Quality Assurance and Quality Control Results

As per the Sampling and Analysis Plans duplicates of soil Sample BH1 was analysed for metals. The RPD calculations for the original and duplicate samples are provided below in Table 14.

Table 14
QA/QC Calculations – Soil

Parameter	MDL (µg/g)	BH1-SS1 (0.08-0.60m)	DUP (0.08-0.60m)	RPD (%)	QA/QC Result
Arsenic	1.0	4.5	4.4	2.2	Acceptable
Barium	1.0	47.0	32.6	36	Not Acceptable
Boron[1]	5.0	5.4	nd	7.8	Acceptable
Chromium	5.0	11.7	12.9	9.7	Acceptable
Cobalt	1.0	3.8	4.1	7.6	Acceptable
Copper	5.0	16.4	16.9	3.0	Acceptable
Lead	1.0	14.5	12.6	14	Acceptable
Molybdenum	1.0	2.5	2.9	14.8	Acceptable
Nickel	5.0	8.3	9.0	8.1	Acceptable
Silver[1]	0.3	0.3	nd	0	Acceptable
Vanadium	10.0	15.6	14.5	7.3	Acceptable
Zinc	20.0	45.9	45.9	0	Acceptable

Notes:
- 1 – where the duplicate concentration was not detected above the laboratory mdl, the mdl was used for the calculation of the RPD

It should be noted that all other parameters were not identified above the method detection limits and as such, were considered to be within the acceptable range. As noted above, in the case where a parameter concentration was identified in the original sample and not identified above the method detection limit in the duplicate sample, the method detection limit was used for the calculation.

Although the RPD calculated for barium is outside of the acceptable range, the remaining RPDs are within the acceptable range. The findings of the Phase II ESA are not considered to have been affected by the difference between these two samples.

A duplicate groundwater sample (DUP) was obtained from BH3 during the November 8, 2019 groundwater sampling event. Both the original and duplicate sample were analysed for BTEX parameters. No parameter concentrations were detected in either sample.

All soil and groundwater samples were handled in accordance with the Analytical Protocol with respect to holding time, preservation method, storage requirement, and container type. Overall, the quality of the field data collected during this Phase II ESA is considered to be sufficient to meet the overall objectives of this assessment.

As per Subsection 47(3) of O.Reg. 153/04 as amended by O.Reg. 269/11, a Certificate of Analysis has been received for each sample submitted for analysis and all Certificates of Analysis are appended to this report.

5.9 Phase II Conceptual Site Model

The following section has been prepared in general accordance with the requirements of the MECP Record of Site Condition Regulation, O.Reg. 153/04, as amended, made under the Environmental Protection Act. Conclusions and recommendations are discussed in a subsequent section.

Site Description

The Phase II Property is located on the east side of William Street, between York Street and George Street, in the City of Ottawa. The Phase II Property has an approximate area of 613 m^2. At the time of the 2019 Phase I ESA, the subject building fronting onto William Street had been recently destroyed by a fire (April 2019). The subject building addressed as part of 62 York Street was inaccessible at the time of the site visit; this building reportedly houses a stairwell associated with the original portion of the building fronting onto York Street, and an unused kitchen (associated with the former tenant). At the time of the Phase I site visit and at the time of the Phase II field program, demolition and subsequent reconstruction activities were underway on the property.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Based on the findings of the Phase I ESA, the fire and on-site fill material identified during the Phase II ESA field program were considered to be PCAs representing APECs 1 and 2 on the Phase II Property. A reported spill of furnace oil on the adjacent property to the south was considered to represent an APEC (APEC 3) on the Phase II Property and the presence of an underground storage tank (UST) at 87 George Street, adjacent to the east of the Phase II Property, was considered to result in APEC 4. Remaining off-site PCAs were not considered to represent APECs on the Phase II Property based on their separation distances and/or orientations with respect to the subject land.

The rationale for identifying the above PCAs is based on a review of aerial photographs, fire insurance plans, historical source information, as well as field observations and personal interviews.

The aforementioned APECs are shown on Drawing PE4720-1 – Site Plan, appended to the Phase I ESA. Other PCAs identified within the 250m Phase I Study Area, not considered to represent APECs on the Phase II Property, are shown on Drawing PE4270-2 – Surrounding Land Use Plan, appended to the Phase I ESA.

Contaminants of Potential Concern and Impacted Media

Based on the findings of the Phase I and Phase II ESA, the following Contaminants of Potential Concern (CPC) were identified with respect to the soil and/or groundwater beneath the Phase II Property:

- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- Petroleum Hydrocarbons, Fractions 1 through 4 (PHCs F_1-F_4);
- Metals (including As, Sb and Se, Hg and CrVI); and
- Polynuclear Aromatic Hydrocarbons (PAHs).

Subsurface Structures and Utilities

No subsurface structures were present on the Phase II Property. Utilities include natural gas, electricity, telephone, cable and municipal water and sewer services.

Physical Setting

Site Stratigraphy

The site stratigraphy, is presented on Drawings PE4720-4 – Cross-Section A-A' and PE4720-5 – Cross-Section B-B' and generally consists of the following:

- Brick pavers over fill material (BH1 and BH2). Fill material consisted of silty sand with some gravel and occasional brick fragments, and extended to a maximum depth of approximately 0.76m below grade.
- Native silty sand was identified beneath the fill material and from ground surface at BH3.
- Glacial till consisting of silty sand with gravel and cobbles was encountered at BH1 at an approximate depth of 2.44m below grade.
- Limestone bedrock was encountered beneath the sand or glacial till at depths ranging from approximately 3.02 to 3.43m below grade (BH1 and BH2), and approximately 1.55m below grade at BH3 where soil had been removed to a depth of approximately 1.5m below original/surrounding grade.

  Boreholes were terminated in the limestone bedrock at depths ranging from approximately 4.57 to 6.53m below grade.

Hydrogeological Characteristics

Groundwater was encountered in the limestone bedrock beneath the RSC Property. Groundwater flow was measured in a westerly direction, towards the Ottawa River, with a hydraulic gradient of approximately 0.018m/m. Groundwater contours based on the most recent November 9, 2019 sampling event, are shown on Drawing PE4720-3 – Test Hole Location Plan. It should be noted that based on the regional topography, regional groundwater is expected to be in a northerly direction.

Approximate Depth to Bedrock

Bedrock was encountered at depths ranging from approximately 1.55 to 3.43m below grade, during the drilling program. Based on information reported by NRCAN, bedrock in the area of the Phase I Property reportedly consists of interbedded limestone and shale of the Verulam Formation. Based on the maps, the surficial geology consists of glacial till with an overburden thickness ranging from approximately 3 to 5m below grade.

Approximate Depth to Water Table

Depth to the water table at the RSC Property varied between approximately 0.97 (basement level) and 2.36m below existing grade, during the sampling event carried out on November 9, 2019.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation does not apply to the Phase II Property, in that the Phase II Property is not within 30m of an environmentally sensitive area, and the pH of soil is between 5 and 9.

As discussed previously, at the time of the Phase II field program, soil within the footprint of 35-37 William Street had been removed to an approximate depth of 1.5m below original grade. As such, bedrock is located at less than 2m depth across more than 1/3 of the site. Therefore the site is a shallow soil property and Section 43.1 of the Regulation is considered to apply to the Phase II Property.

Areas Where Soil Has Been Brought to the Phase I Property

Sand and gravel fill is present on the eastern and southern portion of the Phase II Property, beneath the brick pavers. The material consists of sand with some gravel. No deleterious materials or visual or olfactory signs of contamination were observed in the fill at the time of the Phase II ESA field work.

Proposed Buildings and Other Structures

The Phase II Property will be developed with a mixed-use building, housing a ground-floor restaurant and upper-level residential apartment units. The building will have one basement level.

Existing Buildings and Structures

The Phase I Property is occupied by two commercial buildings: 35-37 William Street and part of 62 York Street. The building addressed 35-37 William Street occupies the western portion of the site, fronting onto William Street.

As previously discussed, the building had been largely destroyed by fire at the time of the site visit. The 2-storey building was constructed with a stone and mortar foundation and finished on the exterior with brick, stone and mortar, and concrete, with a flat, tar and gravel style roof. A ½ basement level, or crawl space, was reported by Mr. Santaguida to be present beneath the western portion of the building.

The rear building addition of the larger building addressed 62 York Street, occupies the north-eastern portion of the site, situated to the east of 35-37 William Street. The two-storey building has a concrete foundation and is finished on the exterior with concrete blocks and a flat, tar and gravel style roof.

A smaller, wooden building structure with a peaked roof covered with asphaltic shingles, is present to the south of the aforementioned building, on the east-central portion of the site. The structure was previously used as a patio bar. Smaller structures including a wooden shed and gazebo were present on the southern portion of the Phase I Property. A wooden patio structure occupied the northeastern portion of the site, adjacent to 62 York Street.

Water Bodies

No creeks, rivers, streams, lakes or any other water body was identified in the Phase I Study Area. The Ottawa River, the closest significant water body, is present approximately 650m west of the Phase I Property at its closest point.

Areas of Natural Significance

No areas of natural significance are present on or within 250m of the Phase II Property.

Environmental Condition

Based on the findings of the Phase II ESA, soil and groundwater results are in compliance with the MECP Table 7 standards and there are no contaminants present on the Phase II Property.

Analytical test results are presented on Drawing PE4720--4 – Analytical Testing Plan – Soil and Drawing PE4720-5 – Analytical Testing Plan - Groundwater.

Types of Contaminants

Based on the findings of the Phase II ESA, no contaminants are present in the soil or groundwater on or beneath the Phase II Property.

Contaminated Media

Based on the findings of the Phase II ESA, contaminated media is not present on or beneath the Phase II Property.

What Is Known About Areas Where Contaminants Are Present

No contaminants exceeding MECP Table 7 standards are present in the soil or groundwater on or beneath the Phase II Property.

Distribution of Contaminants

No contaminants exceeding MECP Table 7 standards are present in the soil or groundwater on or beneath the Phase II Property. Therefore, no distribution of contaminants has occurred on the Phase II Property.

Discharge of Contaminants

Based on the findings of the Phase II ESA, no contaminants are present on the Phase II Property.

Migration of Contaminants

No contaminants are present on the Phase II Property and therefore contaminant migration has not occurred on the Phase II Property.

Climatic and Meteorological Conditions

No contaminants are present in the soil or groundwater beneath the Phase II Property and therefore climatic and meteorological conditions are not considered to have affected contaminant transport.

Potential for Vapour Intrusion

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

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the property addressed 35-37 William Street, in the City of Ottawa, Ontario. It should be noted that the Phase I Property includes part of 62 York Street and a laneway adjacent to the east of 62 York Street (addressed as part of 87 George Street (geoOttawa)). The purpose of the Phase II ESA was to assess the soil and groundwater quality on or beneath the Phase II Property, within potential areas of environmental concern (APECs) identified during the Phase I ESA carried out by Paterson and dated November 21, 2019.

The Phase II ESA consisted of drilling 3 boreholes across the Phase II Property, each of which were cored into the bedrock to intercept the groundwater table, and constructed with a monitoring well installation. Three (3) shallow grab samples of native soil, were recovered from within the footprint of 35-37 William Street, from which the floor and underlying soil had been removed during the rehabilitation of the property subsequent to damage from a fire in April of 2019.

All soil samples obtained were screened for combustible vapours with an RKI Eagle Gastech, as well as for visual and olfactory indications of contamination. Based on the screening results (5ppm or less) in combination with sample depth and location, a total of six (6) soil samples, including a duplicate sample, were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), polynuclear aromatic hydrocarbons (PAHs) and/or metals (including hydride-forming compounds, mercury and hexavalent chromium).

Based on the analytical test results, metal and PAH concentrations were detected in the shallow fill samples. All identified concentrations were in compliance with the MECP Table 7 standards selected for the site. No PAH parameters were identified in the native soil samples recovered from within the footprint of 35-37 William Street, at the location of fire. No BTEX or PHC parameters were identified in the soil samples analysed.

Groundwater samples from monitoring wells installed in BH1, BH2 and BH3 were recovered and analysed for BTEX, PHC (F1-F4) and/or PAH parameters. No free-phase product was observed on the groundwater at any of the monitoring well locations during the November 8, 2019 sampling event. No BTEX, PHC or PAH concentrations were identified above the laboratory method detection limits in the groundwater samples analysed. The results are in compliance with the MECP Table 7 standards.

Conclusion

Based on the findings of the Phase II ESA, the soil and groundwater beneath the Phase II Property are considered to be in compliance with the MECP Table 7 standards selected for the site. No further work is recommended at this time.

7.0 STATEMENT OF LIMITATIONS

This Phase II - Environmental Site Assessment report has been prepared 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.

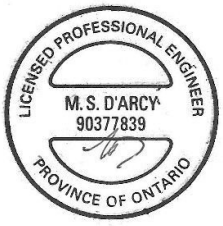
The client should be aware that any information pertaining to soils and all test hole logs are furnished as a matter of general information only and test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the test holes themselves.

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 Vittoria Trattoria. Notification from Vittoria Trattoria and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

Karyn Munch, P.Eng., QP$_{ESA}$



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

Report Distribution:

- ❒ Vittoria Trattoria
- ❒ Paterson Group Inc.

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE4720-3 – TEST HOLE LOCATION PLAN

DRAWING PE4720-4 – ANALYTICAL TESTING PLAN – SOIL

DRAWING PE4720-5 – ANALYTICAL TESTING PLAN - GROUNDWATER

DRAWING PE4720-6 – CROSS-SECTION A-A' – SOIL

DRAWING PE4720-7 – CROSS-SECTION A-A' - GROUNDWATER

DRAWING PE4720-8 – CROSS-SECTION B-B' - SOIL

DRAWING PE4720-9 – CROSS-SECTION B-B' - GROUNDWATER

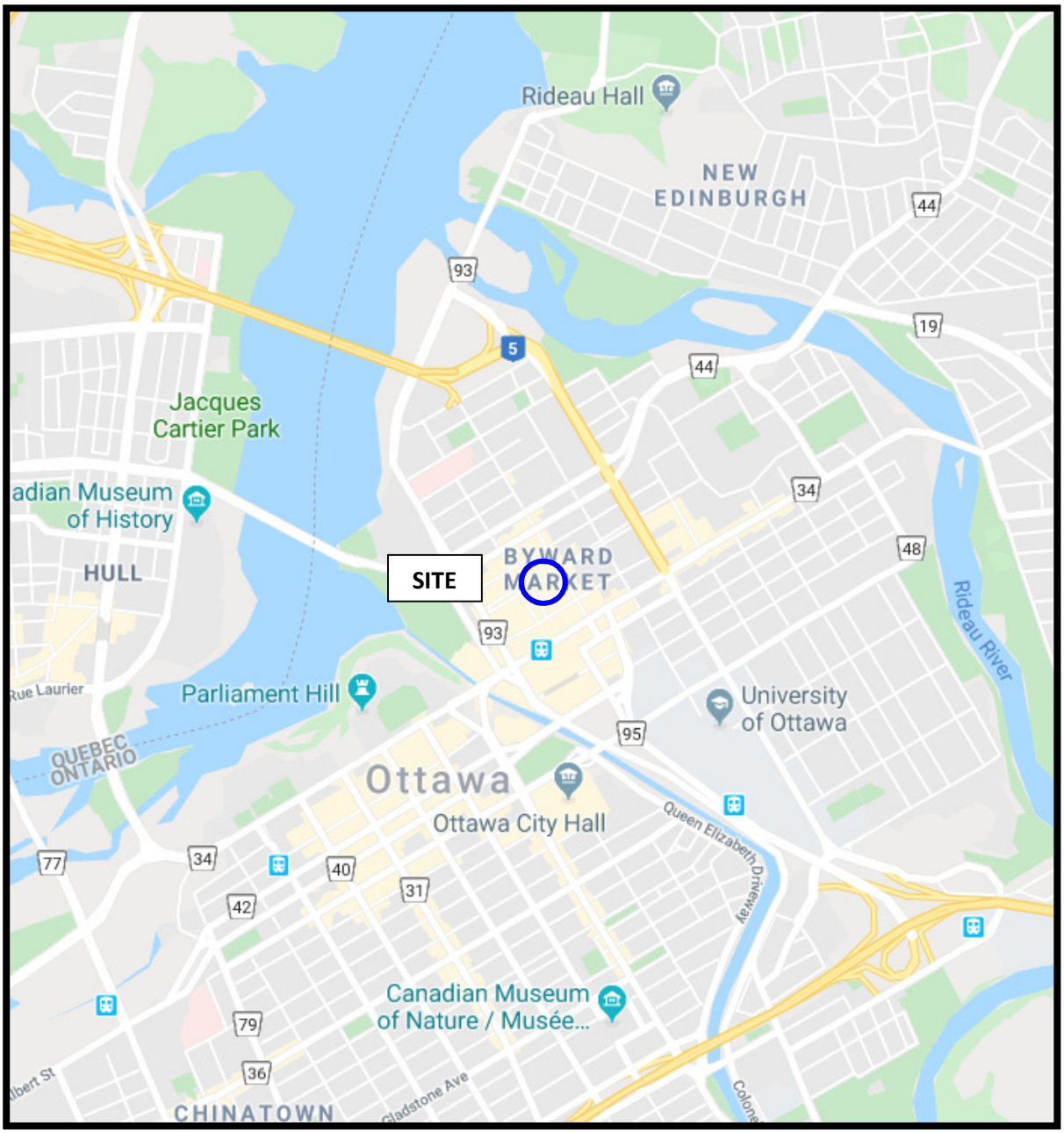


FIGURE 1

KEY PLAN

#87 GEORGE STREET
CTV OTTAWA

#61 YORK STREET
COMMERCIAL (RESTAURANTS)

YORK STREET

BRICK INTERLOCK LANEWAY

WOODEN DECKS

#62 WILLIAM STREET
RESIDENTIAL OVER GROUND
FLOOR COMMERCIAL
RESTAURANT (STARBUCKS)

1-STOREY PRECAST
BUILDING

WOODEN
BUILDING

BRICK INTERLOCK

WOODEN
SHED

A

B

A'

BM

APPROX. LOCATION
OF UNDERGROUND
STORAGE TANK

BH 1
63.21
[60.19]
(61.27)

BH 2
63.47
[60.04]
(61.11)

61.2

61.1

61.1

(0.018m/m)

61

60.9

SOIL WITHIN BUILDING FOOTPRINT
REMOVED TO AN APPROXIMATE DEPTH
OF 1.5m BELOW ORIGINAL GRADE

x G1

x G2

x G3

BH 3
61.86
[60.31]
(60.89)

B'

#35 & 37 WILLIAM ST.
FORMER VITTORIA
TRATTORIA RESTAURANT
(DESTROYED BY FIRE)

AREA INACCESSIBLE DUE
TO UNDERPINNING
PROGRAM

ASPHALTIC CONCRETE LANEWAY

REMAINS OF STONE WALL

REMAINS OF STONE WALL

#54 WILLIAM STREET
RESIDENTIAL OVER GROUND
FLOOR COMMERCIAL
RESTAURANT (THE FISH MARKET)

#41 WILLIAM STREET
FORMER COMMERCIAL
(DAMAGED BY FIRE)

#41½ WILLIAM STREET
FORMER COMMERCIAL
(DAMAGED BY FIRE)

#43 WILLIAM STREET
COMMERCIAL

#45 WILLIAM STREET
COMMERCIAL

WILLIAM STREET

#55 BYWARD MARKET SQUARE
COMMERCIAL RETAIL

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- 63.21 GROUND SURFACE ELEVATION (m)
- [60.19] BEDROCK SURFACE ELEVATION (m)
- (61.27) GROUNDWATER SURFACE ELEVATION (m)
- x G1 GRAB SAMPLE LOCATION
- A — A' CROSS-SECTION LOCATION
- 61.1 GROUNDWATER CONTOUR
- (0.018m/m) APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

BM - NAIL AND WASHER. GEODETIC ELEVATION = 63.34m,
PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

VITTORIA TRATTORIA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
35 AND 37 WILLIAM STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:200	Date: 11/2019
Drawn by: MPG	Report No.: PE4720-2
Checked by: KM	Dwg. No.: PE4720-3
Approved by: MSD	Revision No.:

11x17

p:\autocad drawings\environmental\pe4720\pe4720-2 phase ii.dwg

#87 GEORGE STREET
CTV OTTAWA

BH1-SS1 (0-0.61m) 29-OCT-19
Metals (including As, Sb, Se, Hg and CrVI) and PAHs comply with MECP Table 7

BH1-SS3 (1.22-1.83m) 10-OCT-19
BTEX and PHCs comply with MECP Table 7
pH=8.52

BM

APPROX. LOCATION OF UNDERGROUND STORAGE TANK

BRICK INTERLOCK LANEWAY

WOODEN DECKS

BH 1
63.21
[60.19]
(61.27)

WOODEN SHED

BH 2
63.47
[60.04]
(61.11)

#62 WILLIAM STREET
RESIDENTIAL OVER GROUND FLOOR COMMERCIAL
RESTAURANT (STARBUCKS)

1-STOREY PRECAST BUILDING

WOODEN BUILDING

BRICK INTERLOCK

BH2-G1 (0.08-0.61m) 28-OCT-19
Metals (including As, Sb, Se, Hg and CrVI) and PAHs comply with MECP Table 7

#61 YORK STREET
COMMERCIAL (RESTAURANTS)

YORK STREET

SOIL WITHIN BUILDING FOOTPRINT REMOVED TO AN APPROXIMATE DEPTH OF 1.5m BELOW ORIGINAL GRADE

G3 (0-0.30m) 08-NOV-19
PAHs comply with MECP Table 7

x G2

x G3

x G1

BH 3
61.86
[60.31]
(60.89)

#54 WILLIAM STREET
RESIDENTIAL OVER GROUND FLOOR COMMERCIAL
RESTAURANT (THE FISH MARKET)

ASPHALTIC CONCRETE LANEWAY

REMAINS OF STONE WALL

#35 & 37 WILLIAM ST.
FORMER VITTORIA TRATTORIA RESTAURANT
(DESTROYED BY FIRE)

REMAINS OF STONE WALL

AREA INACCESSIBLE DUE TO UNDERPINNING PROGRAM

#41 WILLIAM STREET
FORMER COMMERCIAL
(DAMAGED BY FIRE)

#41 ½ WILLIAM STREET
FORMER COMMERCIAL
(DAMAGED BY FIRE)

#43 WILLIAM STREET
COMMERCIAL

#45 WILLIAM STREET
COMMERCIAL

BH3-G1 (0-0.61m) 30-OCT-19
BTEX, PHCs and PAHs comply with MECP Table 7
pH = 8.60

WILLIAM STREET

#55 BYWARD MARKET SQUARE
COMMERCIAL RETAIL

LEGEND:

SOIL PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

⊕ BOREHOLE WITH MONITORING WELL LOCATION

63.21 GROUND SURFACE ELEVATION (m)

[60.19] BEDROCK SURFACE ELEVATION (m)

(61.27) GROUNDWATER SURFACE ELEVATION (m)

BM - NAIL AND WASHER. GEODETIC ELEVATION = 63.34m, PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

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NO.	REVISIONS	DATE	INITIAL

VITTORIA TRATTORIA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
35 AND 37 WILLIAM STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:200	Date: 11/2019
Drawn by: MPG	Report No.: PE4720-2
Checked by: KM	Dwg. No.: PE4720-4
Approved by: MSD	Revision No.:

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11x17

#87 GEORGE STREET
CTV OTTAWA

BH1-GW1 (4.12-6.25m) 8-NOV-19
BTEX and PHCs comply with MECP Table 7

BRICK INTERLOCK LANEWAY

WOODEN DECKS

BH 1
63.21
[60.19]
(61.27)

BM

APPROX. LOCATION OF UNDERGROUND STORAGE TANK

WOODEN SHED

BH2-GW1 (4.40-6.53m) 8-NOV-19
BTEX, PAHs and PHCs comply with MECP Table 7

#61 YORK STREET
COMMERCIAL (RESTAURANTS)

#62 WILLIAM STREET
RESIDENTIAL OVER GROUND
FLOOR COMMERCIAL
RESTAURANT (STARBUCKS)

1-STOREY PRECAST BUILDING

WOODEN BUILDING

BRICK INTERLOCK

BH 2
63.47
[60.04]
(61.11)

YORK STREET

SOIL WITHIN BUILDING FOOTPRINT
REMOVED TO AN APPROXIMATE DEPTH
OF 1.5m BELOW ORIGINAL GRADE

x G2

x G3

BH 3
61.86
[60.31]
(60.89)

x G1

#54 WILLIAM STREET
RESIDENTIAL OVER GROUND
FLOOR COMMERCIAL
RESTAURANT (THE FISH MARKET)

ASPHALTIC CONCRETE LANEWAY

REMAINS OF STONE WALL

#35 & 37 WILLIAM ST.
FORMER VITTORIA
TRATTORIA RESTAURANT
(DESTROYED BY FIRE)

REMAINS OF STONE WALL

AREA INACCESSIBLE DUE TO UNDERPINNING PROGRAM

#41 WILLIAM STREET
FORMER COMMERCIAL
(DAMAGED BY FIRE)

#41½ WILLIAM STREET
FORMER COMMERCIAL
(DAMAGED BY FIRE)

#43 WILLIAM STREET
COMMERCIAL

#45 WILLIAM STREET
COMMERCIAL

BH3-GW1 (2.44-4.57m) 8-NOV-19
BTEX, PAHs and PHCs comply with MECP Table 7

WILLIAM STREET

#55 BYWARD MARKET SQUARE
COMMERCIAL RETAIL

LEGEND:

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE STANDARDS

- BOREHOLE WITH MONITORING WELL LOCATION
- 63.21 GROUND SURFACE ELEVATION (m)
- [60.19] BEDROCK SURFACE ELEVATION (m)
- (61.27) GROUNDWATER SURFACE ELEVATION (m)

BM - NAIL AND WASHER. GEODETIC ELEVATION = 63.34m, PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

patersongroup
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154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

VITTORIA TRATTORIA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
35 AND 37 WILLIAM STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - GROUNDWATER

Scale: 1:200	Date: 11/2019
Drawn by: MPG	Report No.: PE4720-2
Checked by: KM	Dwg. No.: PE4720-5
Approved by: MSD	Revision No.:

11x17

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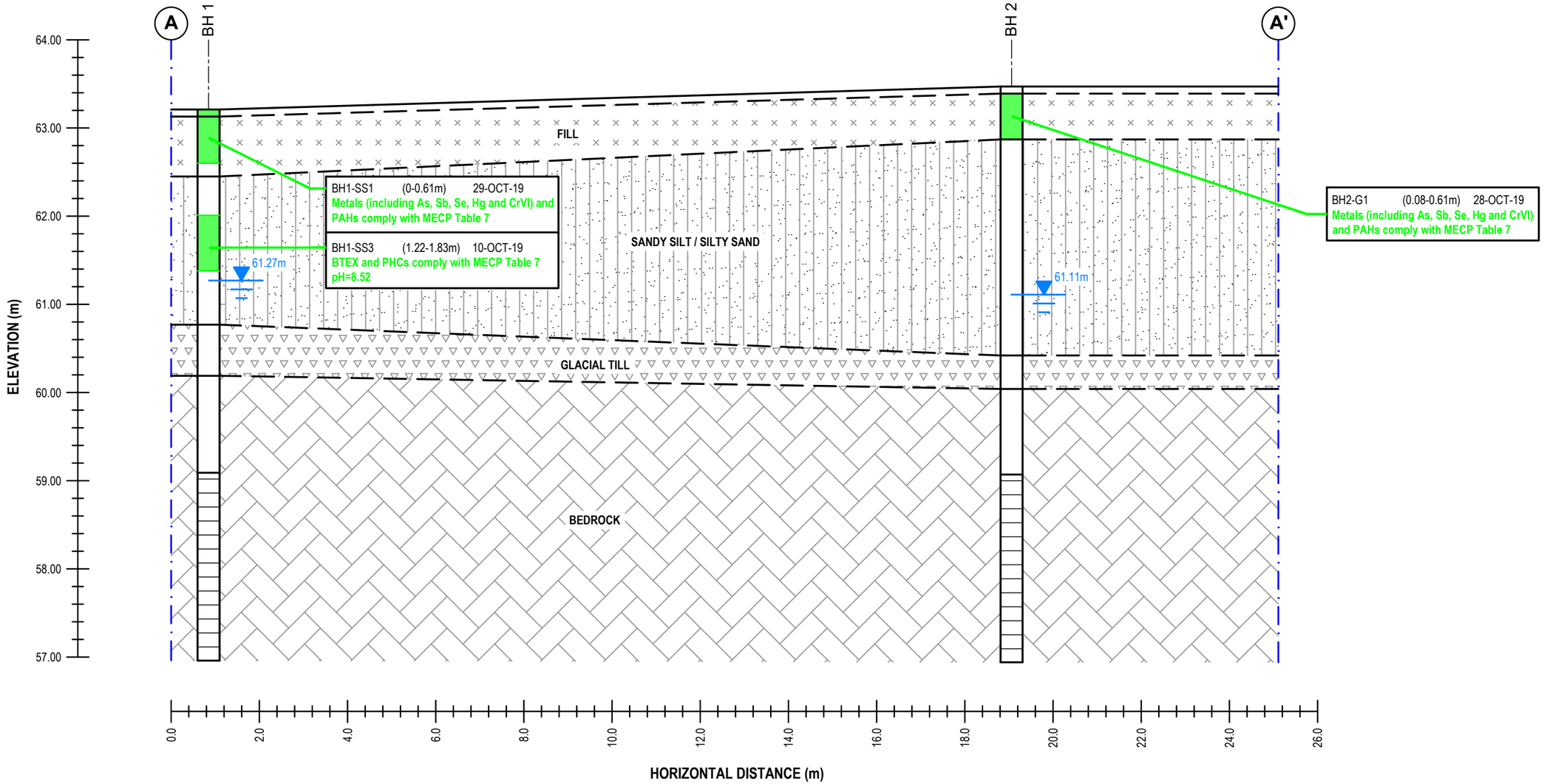

SOIL PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

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NO.	REVISIONS	DATE	INITIAL
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VITTORIA TRATTORIA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
35 AND 37 WILLIAM STREET

OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - SOIL

Scale: AS SHOWN	Date: 11/2019
Drawn by: MPG	Report No.: PE4720-2
Checked by: KM	PE4720-6
Approved by: MSD	Revision No.:

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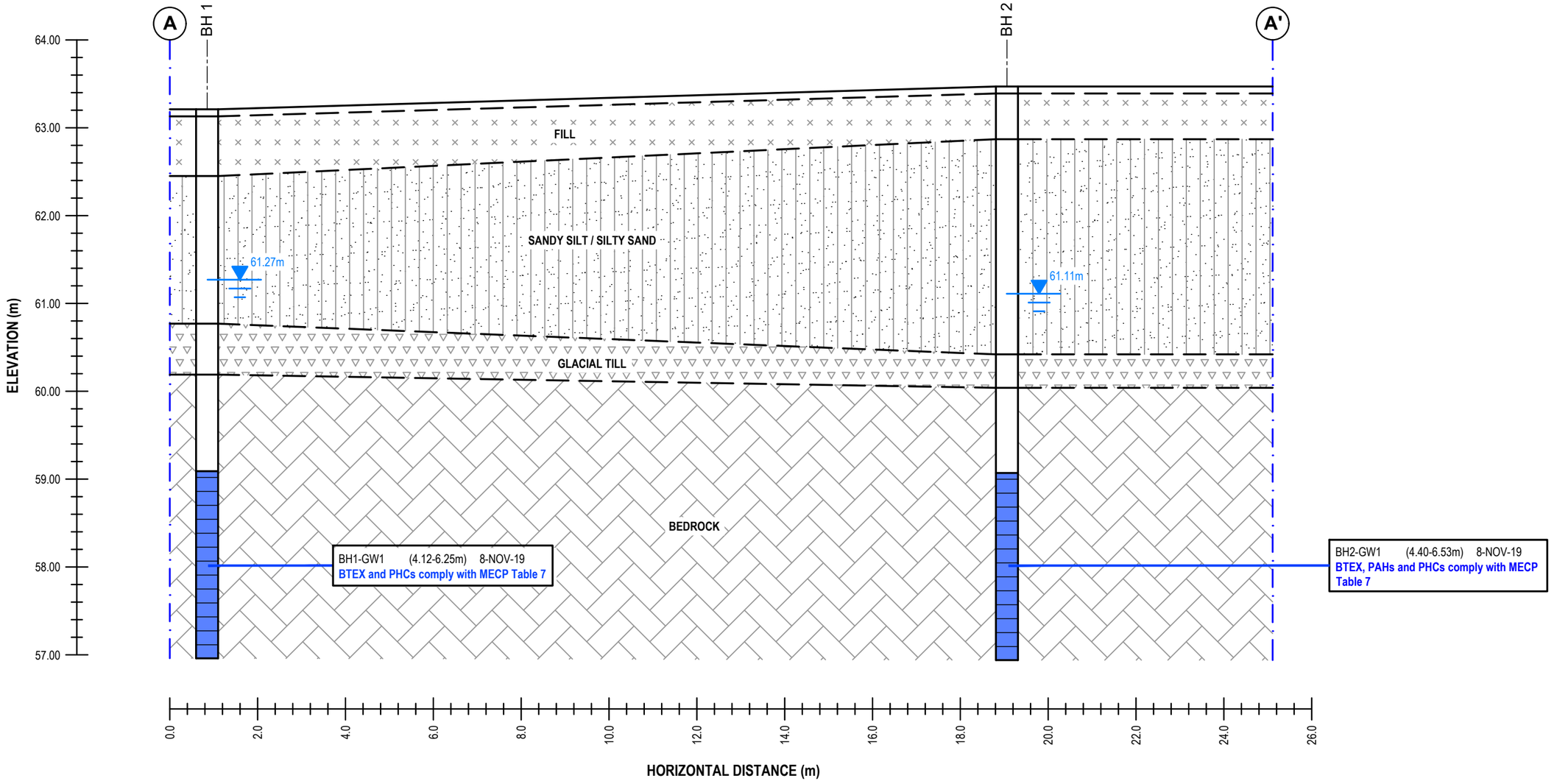

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

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VITTORIA TRATTORIA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
35 AND 37 WILLIAM STREET

OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - GROUNDWATER

Scale: AS SHOWN	Date: 11/2019
Drawn by: MPG	Report No.: PE4720-2
Checked by: KM	PE4720-7
Approved by: MSD	Revision No.:

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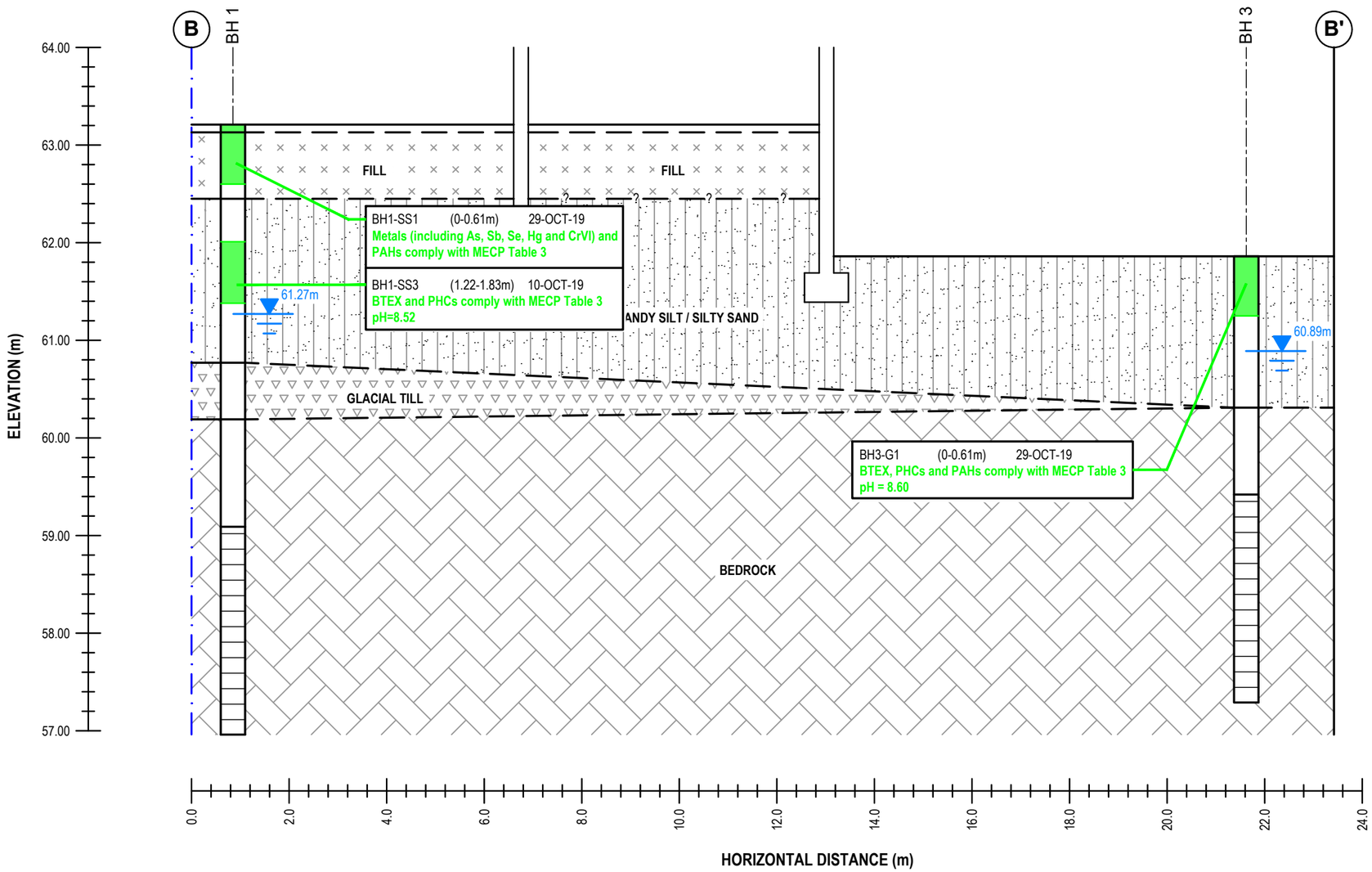

SOIL PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

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NO.	REVISIONS	DATE	INITIAL
0			

VITTORIA TRATTORIA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
35 AND 37 WILLIAM STREET

OTTAWA, ONTARIO

Title:

CROSS-SECTION B-B' - SOIL

Scale: AS SHOWN	Date: 11/2019
Drawn by: MPG	Report No.: PE4720-2
Checked by: KM	PE4720-8
Approved by: MSD	Revision No.:

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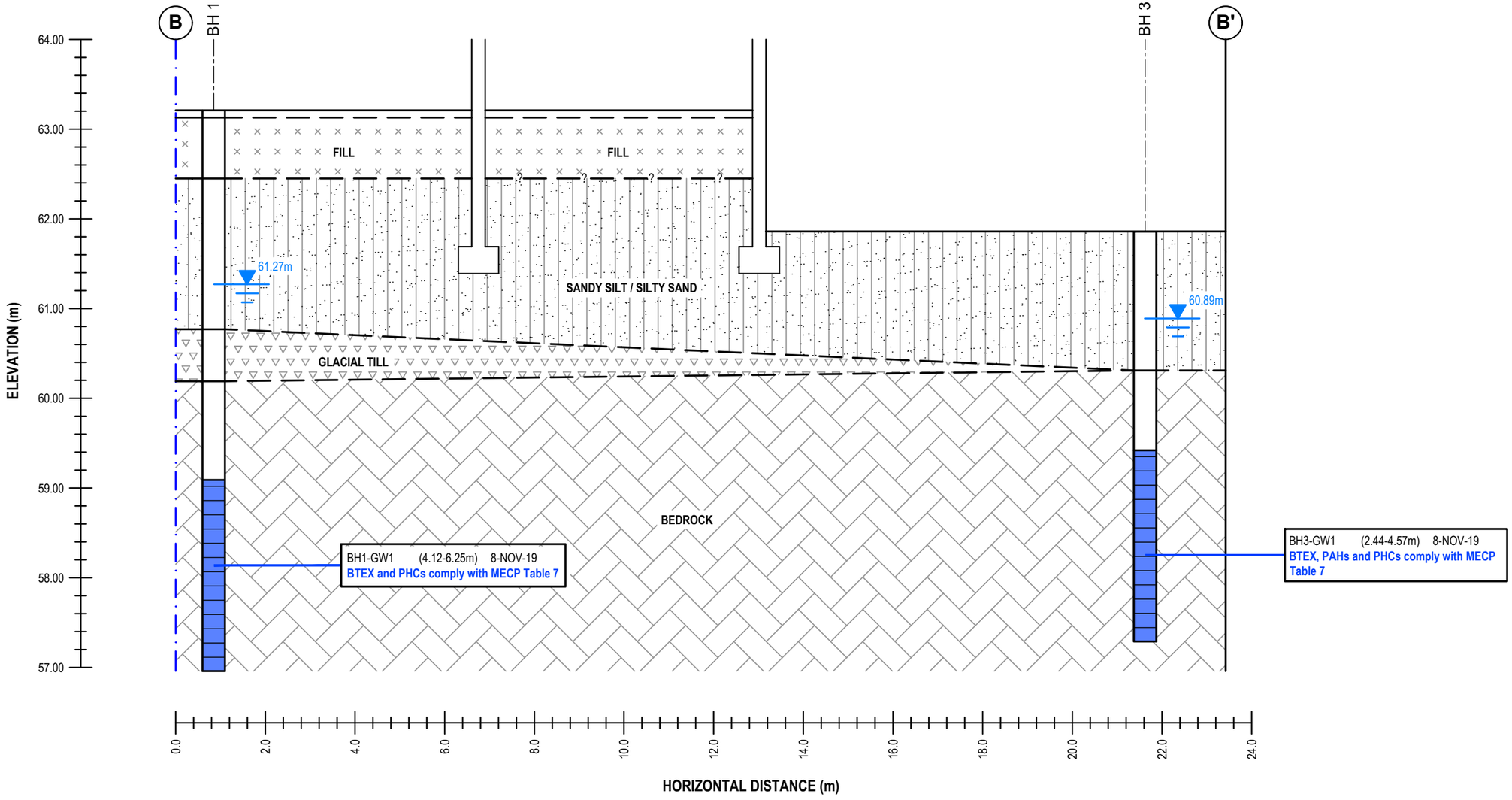

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

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0			

VITTORIA TRATTORIA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
35 AND 37 WILLIAM STREET

OTTAWA, ONTARIO

Title:

CROSS-SECTION B-B' - GROUNDWATER

Scale: AS SHOWN	Date: 11/2019
Drawn by: MPG	Report No.: PE4720-2
Checked by: KM	PE4720-9
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

Archaeological Services

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Sampling & Analysis Plan

Phase II Environmental Site Assessment
35-37 William Street
Ottawa, Ontario

Prepared For

Vittoria Trattoria

October 2019

Report: PE4720-SAP

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Vittoria Trattoria to conduct a Phase II Environmental Site Assessment (ESA) for the property addressed 35-37 William Street in the City of Ottawa, Ontario. It should be noted that the Phase II Property also includes part of 62 York Street and a laneway adjacent to the east of 62 York Street, addressed as part of 87 George Street (geoOttawa). A subsurface investigation program, consisting of borehole drilling and grab sampling from within the footprint of 35-37 William Street, will be carried out. The purpose of the Phase II ESA is to investigate the soil and groundwater quality within the areas of potential environmental concern (APEC) identified in the Phase I ESA carried out by Paterson.

Borehole/ Grab Sample	Location & Rationale	Proposed Depth & Rationale
BH1	Place as close as possible to the off-site UST at 87 George Street, to assess the potential for associated soil and groundwater impacts.	Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH2	Place on the southern portion of the site in the vicinity of 41-41 ½ William Street, to assess potential soil and groundwater impacts from the fire and reported fuel release within this building.	Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH3	Place within 35-37 William Street, as close as possible to 41-41 ½ William Street, to asses potential soil and groundwater impacts associated with the fire and with the reported fuel release at 41-41 ½ William Street.	Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
G1-G3	Place to provide coverage of the footprint of the building addressed 35-37 William Street, to asses potential impacts to the soil related from the April 2019 fire.	Grab shallow soil samples with hand shovel. At time of Phase II field program, floor and underlying soil within building footprint had been removed to an approximate depth of 1.5m below grade.

At each borehole, split-spoon samples of overburden soils will be obtained at 0.60 m (2') intervals until practical spoon refusal. 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 Phase II Property 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 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 and orientations of boreholes with respect to site features (buildings, roadways, etc.) must be provided.

Distances should be measured using a measuring tape or wheel rather than paced off. Ground surface elevations at each borehole should be surveyed relative to a cross-cut in the top of the concrete retaining wall, with geodetic elevation of 91.808m above sea level (asl).

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.

patersongroup Consulting Engineers

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
35-37 William Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4720

REMARKS

HOLE NO. BH 1

BORINGS BY Portable Drill **DATE** 2019 October 29

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Brick interlock 0.08						0	63.21
FILL: Brown silty sand, trace gravel and brick 0.76		SS	1	42	22		
		SS	2	62	92	1	62.21
Compact to very dense, brown **SANDY SILT**		SS	3	75	58		
		SS	4	0	50+	2	61.21
2.44							
GLACIAL TILL: Very dense, brown silty sand with gravel, cobbles and boulders 3.02		SS	5	0	50+		
		RC	1	100	100	3	60.21
						4	59.21
BEDROCK: Excellent quality, grey limestone		RC	2	100	100		
						5	58.21
		RC	3	100	100		
						6	57.21
6.25							
End of Borehole							
(GWL @ 1.94m - Nov. 9, 2019)							

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

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
35-37 William Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4720

REMARKS

HOLE NO. BH 2

BORINGS BY Portable Drill **DATE** 2019 October 29

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Brick interlock 0.08						0	63.47
FILL: Brown silty sand, some gravel 0.60		G	1				
		SS	2	25	51	1	62.47
Dense to very dense, brown **SILTY SAND**		SS	3	12	47	2	61.47
		SS	4	2	58		
3.05						3	60.47
GLACIAL TILL: Very dense, brown clayey silt, some gravel 3.43		SS	5	20	50-		
		RC	1	96	44	4	59.47
BEDROCK: Excellent quality, grey limestone		RC	2	99	98	5	58.47
		RC	3	100	100	6	57.47
6.53							
End of Borehole							
(GWL @ 2.36m - Nov. 9, 2019)							

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 II - Environmental Site Assessment
35-37 William Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4720

REMARKS

HOLE NO. BH 3

BORINGS BY Portable Drill **DATE** 2019 October 29

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.86
Very dense, brown **SANDY SILT**		G	1				
		G	2			1	60.86
1.55							
BEDROCK: Good to excellent quality, grey limestone		RC	1	97	76	2	59.86
		RC	2	96	96	3	58.86
		RC	3	100	100	4	57.86
4.57							
End of Borehole							
(GWL @ 0.97m - Nov. 9, 2019)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ 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 strength of cohesionless soils is the relative density, 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.

Relative Density	'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 vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

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 is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

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 NXL size core. However, it can be used on smaller core sizes, such as BX, 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
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture 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 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 x 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

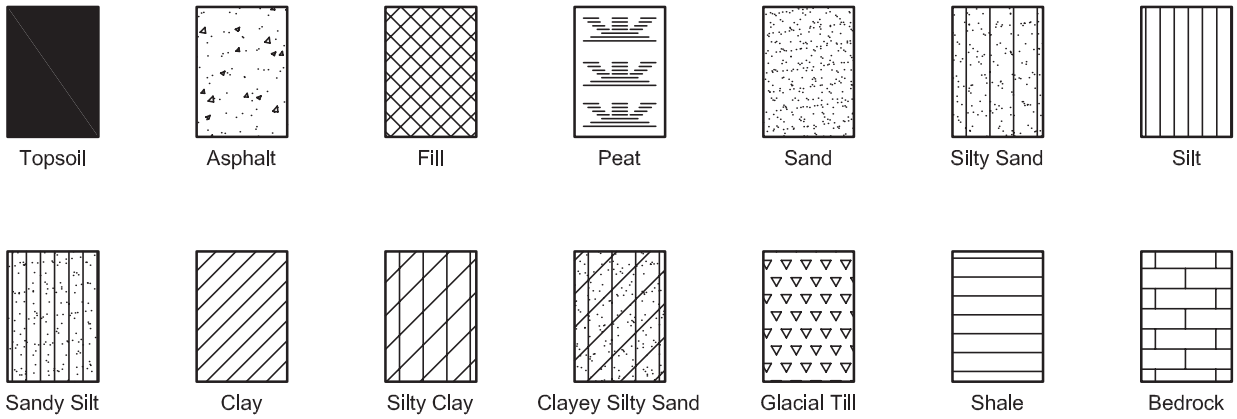
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void 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.

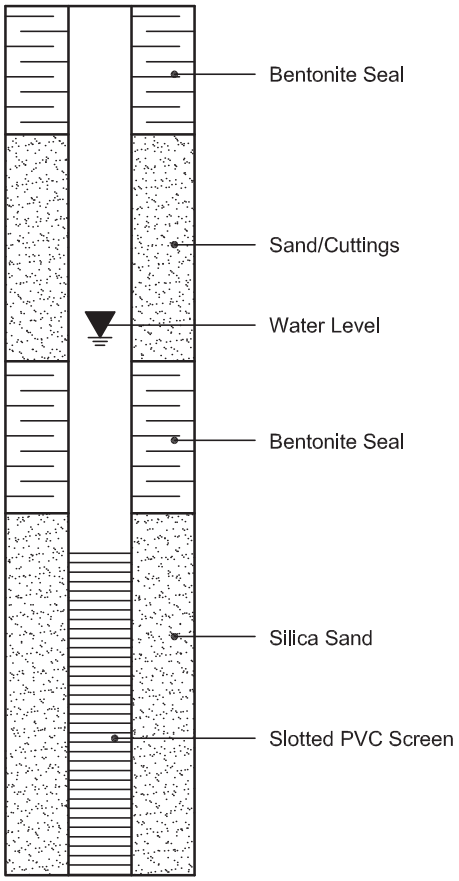
SYMBOLS AND TERMS (continued)

STRATA PLOT

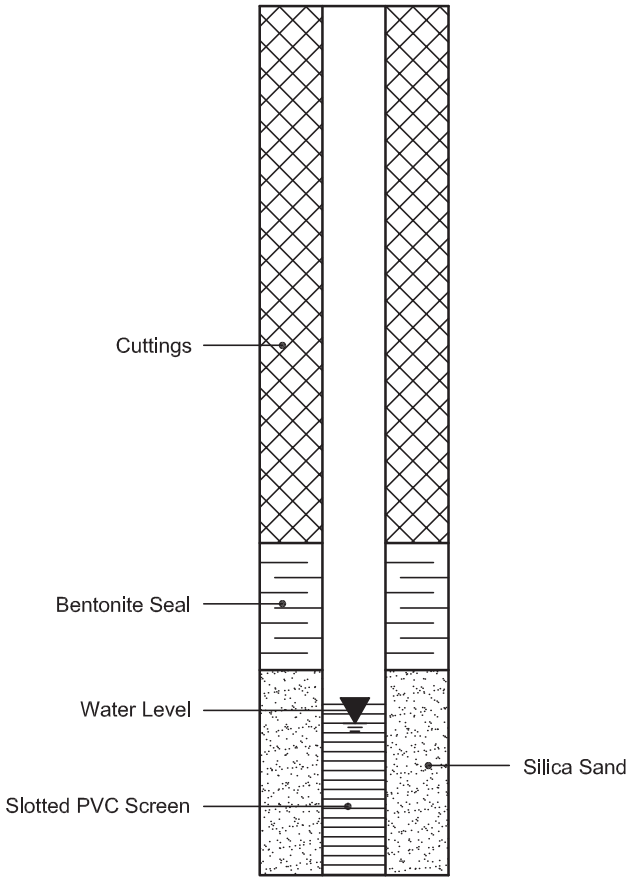


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 28324
Project: PE4720
Custody: 49752

Report Date: 6-Nov-2019
Order Date: 31-Oct-2019

Order #: 1944489

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

Paracel ID	Client ID
1944489-01	BH1-SS1
1944489-02	BH1-SS3
1944489-03	BH2-G1
1944489-04	BH3-G1
1944489-05	DUP1

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 28324

Report Date: 06-Nov-2019
Order Date: 31-Oct-2019
Project Description: PE4720

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	2-Nov-19	4-Nov-19
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	30-Oct-19	4-Nov-19
Mercury by CVAA	EPA 7471B - CVAA, digestion	4-Nov-19	4-Nov-19
PHC F1	CWS Tier 1 - P&T GC-FID	2-Nov-19	4-Nov-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	1-Nov-19	3-Nov-19
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	4-Nov-19	4-Nov-19
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	30-Oct-19	3-Nov-19
Solids, %	Gravimetric, calculation	1-Nov-19	1-Nov-19

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 28324

Report Date: 06-Nov-2019

Order Date: 31-Oct-2019

Project Description: PE4720

	Client ID:	BH1-SS1	BH1-SS3	BH2-G1	BH3-G1
	Sample Date:	29-Oct-19 09:00	29-Oct-19 09:00	28-Oct-19 09:00	30-Oct-19 09:00
	Sample ID:	1944489-01	1944489-02	1944489-03	1944489-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	93.9	81.9	91.8	83.6
Metals					
Antimony	1.0 ug/g dry	<1.0	-	<1.0	-
Arsenic	1.0 ug/g dry	4.5	-	14.5	-
Barium	1.0 ug/g dry	47.0	-	22.2	-
Beryllium	0.5 ug/g dry	<0.5	-	<0.5	-
Boron	5.0 ug/g dry	5.4	-	8.8	-
Cadmium	0.5 ug/g dry	<0.5	-	<0.5	-
Chromium	5.0 ug/g dry	11.7	-	14.1	-
Chromium (VI)	0.2 ug/g dry	<0.2	-	<0.2	-
Cobalt	1.0 ug/g dry	3.8	-	10.5	-
Copper	5.0 ug/g dry	16.4	-	51.4	-
Lead	1.0 ug/g dry	14.5	-	35.3	-
Mercury	0.1 ug/g dry	<0.1	-	<0.1	-
Molybdenum	1.0 ug/g dry	2.5	-	3.4	-
Nickel	5.0 ug/g dry	8.3	-	16.6	-
Selenium	1.0 ug/g dry	<1.0	-	<1.0	-
Silver	0.3 ug/g dry	0.3	-	0.4	-
Thallium	1.0 ug/g dry	<1.0	-	<1.0	-
Uranium	1.0 ug/g dry	<1.0	-	<1.0	-
Vanadium	10.0 ug/g dry	15.6	-	10.3	-
Zinc	20.0 ug/g dry	45.9	-	82.9	-
Volatiles					
Benzene	0.02 ug/g dry	-	<0.02	-	<0.02
Ethylbenzene	0.05 ug/g dry	-	<0.05	-	<0.05
Toluene	0.05 ug/g dry	-	<0.05	-	<0.05
m,p-Xylenes	0.05 ug/g dry	-	<0.05	-	<0.05
o-Xylene	0.05 ug/g dry	-	<0.05	-	<0.05
Xylenes, total	0.05 ug/g dry	-	<0.05	-	<0.05
Toluene-d8	Surrogate	-	113%	-	111%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	-	<7
F2 PHCs (C10-C16)	4 ug/g dry	-	<4	-	<4
F3 PHCs (C16-C34)	8 ug/g dry	-	<8	-	<8
F4 PHCs (C34-C50)	6 ug/g dry	-	<6	-	<6

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 28324

Report Date: 06-Nov-2019

Order Date: 31-Oct-2019

Project Description: PE4720

	Client ID:	BH1-SS1	BH1-SS3	BH2-G1	BH3-G1
	Sample Date:	29-Oct-19 09:00	29-Oct-19 09:00	28-Oct-19 09:00	30-Oct-19 09:00
	Sample ID:	1944489-01	1944489-02	1944489-03	1944489-04
	MDL/Units	Soil	Soil	Soil	Soil
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	-	-	-	<0.02
Acenaphthylene	0.02 ug/g dry	-	-	-	<0.02
Anthracene	0.02 ug/g dry	-	-	-	<0.02
Benzo [a] anthracene	0.02 ug/g dry	-	-	-	<0.02
Benzo [a] pyrene	0.02 ug/g dry	-	-	-	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	-	-	-	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	-	-	-	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	-	-	-	<0.02
Chrysene	0.02 ug/g dry	-	-	-	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	-	-	<0.02
Fluoranthene	0.02 ug/g dry	-	-	-	<0.02
Fluorene	0.02 ug/g dry	-	-	-	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	-	-	<0.02
1-Methylnaphthalene	0.02 ug/g dry	-	-	-	<0.02
2-Methylnaphthalene	0.02 ug/g dry	-	-	-	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	-	-	-	<0.04
Naphthalene	0.01 ug/g dry	-	-	-	<0.01
Phenanthrene	0.02 ug/g dry	-	-	-	<0.02
Pyrene	0.02 ug/g dry	-	-	-	<0.02
2-Fluorobiphenyl	Surrogate	-	-	-	78.5%
Terphenyl-d14	Surrogate	-	-	-	103%

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 28324

Report Date: 06-Nov-2019

Order Date: 31-Oct-2019

Project Description: PE4720

	Client ID:	DUP1	-	-	-
	Sample Date:	29-Oct-19 09:00	-	-	-
	Sample ID:	1944489-05	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	94.2	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	4.4	-	-	-
Barium	1.0 ug/g dry	32.6	-	-	-
Beryllium	0.5 ug/g dry	<0.5	-	-	-
Boron	5.0 ug/g dry	<5.0	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	12.9	-	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	-	-	-
Cobalt	1.0 ug/g dry	4.1	-	-	-
Copper	5.0 ug/g dry	16.9	-	-	-
Lead	1.0 ug/g dry	12.6	-	-	-
Mercury	0.1 ug/g dry	<0.1	-	-	-
Molybdenum	1.0 ug/g dry	2.9	-	-	-
Nickel	5.0 ug/g dry	9.0	-	-	-
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	<1.0	-	-	-
Vanadium	10.0 ug/g dry	14.5	-	-	-
Zinc	20.0 ug/g dry	45.9	-	-	-

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						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*0.978*		*ug/g*		*73.4*	*50-140*			
Surrogate: Terphenyl-d14	*1.44*		*ug/g*		*108*	*50-140*			
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	*3.50*		*ug/g*		*109*	*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				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Metals									
Antimony	1.9	1.0	ug/g dry	ND			0.0	30	
Arsenic	4.4	1.0	ug/g dry	4.5			3.0	30	
Beryllium	ND	0.5	ug/g dry	ND			0.0	30	
Boron	5.6	5.0	ug/g dry	5.4			3.3	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium (VI)	ND	0.2	ug/g dry	ND				35	
Chromium	14.3	5.0	ug/g dry	11.7			19.7	30	
Cobalt	3.9	1.0	ug/g dry	3.8			4.0	30	
Copper	18.0	5.0	ug/g dry	16.4			9.2	30	
Lead	14.3	1.0	ug/g dry	14.5			1.5	30	
Mercury	ND	0.1	ug/g dry	ND			0.0	30	
Molybdenum	3.1	1.0	ug/g dry	2.5			18.8	30	
Nickel	9.9	5.0	ug/g dry	8.3			17.2	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	0.5	0.3	ug/g dry	0.3			53.6	30	QR-01
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND			0.0	30	
Vanadium	14.3	10.0	ug/g dry	15.6			8.6	30	
Zinc	48.8	20.0	ug/g dry	45.9			6.2	30	
Physical Characteristics									
% Solids	93.7	0.1	% by Wt.	95.0			1.4	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND				40	
Anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND				40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND				40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			0.0	40	
Chrysene	ND	0.02	ug/g dry	ND				40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	ND	0.02	ug/g dry	ND			0.0	40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			0.0	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND			0.0	40	
Naphthalene	ND	0.01	ug/g dry	ND				40	
Phenanthrene	ND	0.02	ug/g dry	ND				40	
Pyrene	ND	0.02	ug/g dry	ND			0.0	40	
Surrogate: 2-Fluorobiphenyl	*1.31*		*ug/g dry*		*81.4*	*50-140*			
Surrogate: Terphenyl-d14	*1.32*		*ug/g dry*		*81.6*	*50-140*			
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	*4.13*		*ug/g dry*		*114*	*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)	178	7	ug/g		89.0	80-120			
F2 PHCs (C10-C16)	78	4	ug/g	ND	81.2	60-140			
F3 PHCs (C16-C34)	216	8	ug/g	ND	91.8	60-140			
F4 PHCs (C34-C50)	135	6	ug/g	ND	90.4	60-140			
Metals									
Antimony	40.8		ug/L	ND	81.4	70-130			
Arsenic	47.6		ug/L	1.8	91.5	70-130			
Barium	61.6		ug/L	18.8	85.6	70-130			
Beryllium	49.2		ug/L	ND	98.2	70-130			
Boron	45.1		ug/L	ND	85.8	70-130			
Cadmium	46.4		ug/L	ND	92.8	70-130			
Chromium (VI)	3.7	0.2	ug/g	ND	70.0	70-130			
Chromium	53.1		ug/L	ND	96.8	70-130			
Cobalt	48.0		ug/L	1.5	92.9	70-130			
Copper	52.7		ug/L	6.6	92.4	70-130			
Lead	46.5		ug/L	5.8	81.5	70-130			
Mercury	1.52	0.1	ug/g	ND	101	70-130			
Molybdenum	51.7		ug/L	1.0	101	70-130			
Nickel	50.0		ug/L	ND	93.4	70-130			
Selenium	43.6		ug/L	ND	87.0	70-130			
Silver	44.3		ug/L	ND	88.4	70-130			
Thallium	40.8		ug/L	ND	81.5	70-130			
Uranium	44.8		ug/L	ND	89.4	70-130			
Vanadium	56.1		ug/L	ND	99.8	70-130			
Zinc	63.4		ug/L	ND	90.0	70-130			
Semi-Volatiles									
Acenaphthene	0.140	0.02	ug/g	ND	69.6	50-140			
Acenaphthylene	0.121	0.02	ug/g	ND	59.8	50-140			
Anthracene	0.125	0.02	ug/g	ND	61.8	50-140			
Benzo [a] anthracene	0.158	0.02	ug/g	ND	78.6	50-140			
Benzo [a] pyrene	0.141	0.02	ug/g	ND	69.9	50-140			
Benzo [b] fluoranthene	0.201	0.02	ug/g	ND	99.5	50-140			
Benzo [g,h,i] perylene	0.142	0.02	ug/g	ND	70.3	50-140			
Benzo [k] fluoranthene	0.177	0.02	ug/g	ND	87.7	50-140			
Chrysene	0.159	0.02	ug/g	ND	78.7	50-140			
Dibenzo [a,h] anthracene	0.145	0.02	ug/g	ND	72.0	50-140			
Fluoranthene	0.127	0.02	ug/g	ND	63.1	50-140			
Fluorene	0.135	0.02	ug/g	ND	66.9	50-140			
Indeno [1,2,3-cd] pyrene	0.162	0.02	ug/g	ND	80.2	50-140			
1-Methylnaphthalene	0.163	0.02	ug/g	ND	80.7	50-140			
2-Methylnaphthalene	0.185	0.02	ug/g	ND	91.7	50-140			
Naphthalene	0.161	0.01	ug/g	ND	80.0	50-140			
Phenanthrene	0.132	0.02	ug/g	ND	65.6	50-140			
Pyrene	0.139	0.02	ug/g	ND	69.2	50-140			
Surrogate: 2-Fluorobiphenyl	*1.34*		*ug/g*		*82.8*	*50-140*			
Volatiles									
Benzene	3.31	0.02	ug/g		82.8	60-130			
Ethylbenzene	5.02	0.05	ug/g		126	60-130			
Toluene	4.82	0.05	ug/g		121	60-130			
m,p-Xylenes	9.57	0.05	ug/g		120	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	4.80	0.05	ug/g		120	60-130			

Qualifier Notes:

QC Qualifiers :

QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

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.

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.

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Paracel ID: 1944489

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Chain of Custody
(Lab Use Only)
№ 49752

Page ___ of ___

Client Name: Paterson	Project Reference: PE4720
Contact Name: Karyn Munch	Quote #
Address: 154 Colonnade Rd S.	PO # 28324
Telephone: 613-226-7381	Email Address: kmunch@patersongroup.ca

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

Criteria: ☑ O. Reg. 153/04 (As Amended) Table 3 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ 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: 1944489 / Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Metals, Hg, CrVI	BTEX PHCs (F1-F4)	PAHs								
1	BH1-SS1	S		1	Oct. 29/19		✓										
2	BH1-SS3	S		2	"			✓								120 x NA	
3	BH2-~~SS1~~ G1	S		1	Oct. 28/19		✓										
4	BH3-G1	S		2	Oct. 30/19			✓	✓							120 x Vial	
5	DUP1	S		1			✓									120 ml	
6																	
7																	
8																	
9																	
10																	

Comments:

Method of Delivery: Paracel

Relinquished By (Sign): KMunch	Received by Driver/Depot: T. Teague	Received at Lab: DRM	Verified By: DRM
Relinquished By (Print): KMunch	Date/Time: 31/10/19 4:40 PM	Date/Time: 10/31/19 17:55	Date/Time: 10/31/19 18:36
Date/Time: Oct. 31/19	Temperature: ___ °C	Temperature: 11.9 °C	pH Verified [ ] By: NA

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 28327
Project: PE4720
Custody: 49752

Report Date: 15-Nov-2019
Order Date: 12-Nov-2019

Order #: 1946153

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

Paracel ID	Client ID
1946153-01	BH1-SS1
1946153-02	BH2-G1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 28327

Report Date: 15-Nov-2019
Order Date: 12-Nov-2019
Project Description: PE4720

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	11-Nov-19	14-Nov-19
Solids, %	Gravimetric, calculation	12-Nov-19	12-Nov-19

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 28327

Report Date: 15-Nov-2019

Order Date: 12-Nov-2019

Project Description: PE4720

	Client ID:	BH1-SS1	BH2-G1	-	-
	Sample Date:	29-Oct-19 09:00	28-Oct-19 09:00	-	-
	Sample ID:	1946153-01	1946153-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	93.0	92.0	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	0.02	0.03	-	-
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	-	-
Anthracene	0.02 ug/g dry	0.05	0.07	-	-
Benzo [a] anthracene	0.02 ug/g dry	0.17	0.15	-	-
Benzo [a] pyrene	0.02 ug/g dry	0.11	0.11	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	0.17	0.17	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.08	0.08	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	0.10	0.08	-	-
Chrysene	0.02 ug/g dry	0.16	0.18	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	-	-
Fluoranthene	0.02 ug/g dry	0.34	0.38	-	-
Fluorene	0.02 ug/g dry	0.02	0.03	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.07	0.08	-	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	-	-
Naphthalene	0.01 ug/g dry	0.02	0.02	-	-
Phenanthrene	0.02 ug/g dry	0.20	0.30	-	-
Pyrene	0.02 ug/g dry	0.32	0.31	-	-
2-Fluorobiphenyl	Surrogate	96.2%	95.8%	-	-
Terphenyl-d14	Surrogate	91.9%	107%	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.26*		*ug/g*		*94.1*	*50-140*			
Surrogate: Terphenyl-d14	*1.46*		*ug/g*		*110*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Physical Characteristics									
% Solids	78.1	0.1	% by Wt.	78.4			0.5	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND			0.0	40	
Anthracene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [b] fluoranthene	0.021	0.02	ug/g dry	ND			0.0	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			0.0	40	
Chrysene	ND	0.02	ug/g dry	ND			0.0	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	0.030	0.02	ug/g dry	ND			0.0	40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			0.0	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
Naphthalene	ND	0.01	ug/g dry	ND				40	
Phenanthrene	ND	0.02	ug/g dry	ND			0.0	40	
Pyrene	0.028	0.02	ug/g dry	ND			0.0	40	
Surrogate: 2-Fluorobiphenyl	*1.46*		*ug/g dry*		*97.6*	*50-140*			
Surrogate: Terphenyl-d14	*1.65*		*ug/g dry*		*110*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Semi-Volatiles									
Acenaphthene	0.168	0.02	ug/g	ND	89.5	50-140			
Acenaphthylene	0.144	0.02	ug/g	ND	76.9	50-140			
Anthracene	0.162	0.02	ug/g	ND	86.5	50-140			
Benzo [a] anthracene	0.153	0.02	ug/g	ND	82.0	50-140			
Benzo [a] pyrene	0.138	0.02	ug/g	ND	73.9	50-140			
Benzo [b] fluoranthene	0.197	0.02	ug/g	ND	105	50-140			
Benzo [g,h,i] perylene	0.139	0.02	ug/g	ND	74.2	50-140			
Benzo [k] fluoranthene	0.159	0.02	ug/g	ND	84.8	50-140			
Chrysene	0.202	0.02	ug/g	ND	108	50-140			
Dibenzo [a,h] anthracene	0.141	0.02	ug/g	ND	75.1	50-140			
Fluoranthene	0.170	0.02	ug/g	ND	90.7	50-140			
Fluorene	0.161	0.02	ug/g	ND	86.0	50-140			
Indeno [1,2,3-cd] pyrene	0.141	0.02	ug/g	ND	75.5	50-140			
1-Methylnaphthalene	0.161	0.02	ug/g	ND	86.0	50-140			
2-Methylnaphthalene	0.178	0.02	ug/g	ND	95.3	50-140			
Naphthalene	0.166	0.01	ug/g	ND	88.5	50-140			
Phenanthrene	0.168	0.02	ug/g	ND	89.7	50-140			
Pyrene	0.173	0.02	ug/g	ND	92.7	50-140			
Surrogate: 2-Fluorobiphenyl	*1.27*		*ug/g*		*84.5*	*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.

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
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Page ___ of ___

Client Name: Paterson	Project Reference: PE4720	**Turnaround Time:**
Contact Name: Karyn Munch	Quote #	☐ 1 Day ☐ 3 Day
Address: 154 Colonnade Rd S.	PO #: ~~28324~~ 28327	☐ 2 Day ☒ Regular
Telephone: 613-226-7381	Email Address: kmunch@patersongroup.ca	Date Required:

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 3 ☐ RSC Filing ☐ O. Reg 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ___ ☐ 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: 1946153 ~~1941495~~

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Metals, Hg, CrVI	BTEX, PHCs (F1-F4)	PAHs								
1	BH1-SS1	S		1	Oct. 29/19		✓		✓								
2	BH1-SS3	S		2	"			✓								120 x VOC	
3	BH2-~~SS1~~ G1	S		1	Oct. 28/19		✓		✓								
4	BH3-G1	S		2	Oct. 30/19			✓	✓							120 x VOC	
5	DUP1	S		1			✓									120 M	
6																	
7																	
8																	
9																	
10																	

Comments: add PAH to BH1-SS1 & BH2-G1 PO# 28327 as per Karyn DNov 29

Method of Delivery: Paracel

Relinquished By (Sign): KMunch	Received by Driver/Depot:	Received at Lab: DRM	Verified By: DRM
Relinquished By (Print): KMunch	Date/Time: 31/10/19 4:40 PM	Date/Time: 10/31/19 17:55	Date/Time: 10/31/19 18:36
Date/Time: Oct. 31/19	Temperature: ___ °C	Temperature: 11.9 °C	pH Verified [ ] By: NA

Chain of Custody (Blank) - Rev 0.4 Feb 2016

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 28326
Project: PE4720
Custody: 51674

Report Date: 15-Nov-2019
Order Date: 12-Nov-2019

Order #: 1946132

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

Paracel ID	Client ID
1946132-01	G3

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 28326

Report Date: 15-Nov-2019
Order Date: 12-Nov-2019
Project Description: PE4720

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	11-Nov-19	14-Nov-19
Solids, %	Gravimetric, calculation	12-Nov-19	12-Nov-19

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 28326

Report Date: 15-Nov-2019

Order Date: 12-Nov-2019

Project Description: PE4720

	Client ID:	G3	-	-	-
	Sample Date:	08-Nov-19 09:00	-	-	-
	Sample ID:	1946132-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	88.4	-	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	-	-
Acenaphthylene	0.02 ug/g dry	<0.02	-	-	-
Anthracene	0.02 ug/g dry	<0.02	-	-	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	-	-	-
Benzo [a] pyrene	0.02 ug/g dry	<0.02	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	-	-	-
Chrysene	0.02 ug/g dry	<0.02	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	-	-	-
Fluoranthene	0.02 ug/g dry	<0.02	-	-	-
Fluorene	0.02 ug/g dry	<0.02	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	-	-	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	-	-
Naphthalene	0.01 ug/g dry	<0.01	-	-	-
Phenanthrene	0.02 ug/g dry	<0.02	-	-	-
Pyrene	0.02 ug/g dry	<0.02	-	-	-
2-Fluorobiphenyl	Surrogate	74.4%	-	-	-
Terphenyl-d14	Surrogate	99.1%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.26*		*ug/g*		*94.1*	*50-140*			
Surrogate: Terphenyl-d14	*1.46*		*ug/g*		*110*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Physical Characteristics									
% Solids	78.1	0.1	% by Wt.	78.4			0.5	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND			0.0	40	
Anthracene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [b] fluoranthene	0.021	0.02	ug/g dry	ND			0.0	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			0.0	40	
Chrysene	ND	0.02	ug/g dry	ND			0.0	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	0.030	0.02	ug/g dry	ND			0.0	40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			0.0	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
Naphthalene	ND	0.01	ug/g dry	ND				40	
Phenanthrene	ND	0.02	ug/g dry	ND			0.0	40	
Pyrene	0.028	0.02	ug/g dry	ND			0.0	40	
Surrogate: 2-Fluorobiphenyl	*1.46*		*ug/g dry*		*97.6*	*50-140*			
Surrogate: Terphenyl-d14	*1.65*		*ug/g dry*		*110*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Semi-Volatiles									
Acenaphthene	0.168	0.02	ug/g	ND	89.5	50-140			
Acenaphthylene	0.144	0.02	ug/g	ND	76.9	50-140			
Anthracene	0.162	0.02	ug/g	ND	86.5	50-140			
Benzo [a] anthracene	0.153	0.02	ug/g	ND	82.0	50-140			
Benzo [a] pyrene	0.138	0.02	ug/g	ND	73.9	50-140			
Benzo [b] fluoranthene	0.197	0.02	ug/g	ND	105	50-140			
Benzo [g,h,i] perylene	0.139	0.02	ug/g	ND	74.2	50-140			
Benzo [k] fluoranthene	0.159	0.02	ug/g	ND	84.8	50-140			
Chrysene	0.202	0.02	ug/g	ND	108	50-140			
Dibenzo [a,h] anthracene	0.141	0.02	ug/g	ND	75.1	50-140			
Fluoranthene	0.170	0.02	ug/g	ND	90.7	50-140			
Fluorene	0.161	0.02	ug/g	ND	86.0	50-140			
Indeno [1,2,3-cd] pyrene	0.141	0.02	ug/g	ND	75.5	50-140			
1-Methylnaphthalene	0.161	0.02	ug/g	ND	86.0	50-140			
2-Methylnaphthalene	0.178	0.02	ug/g	ND	95.3	50-140			
Naphthalene	0.166	0.01	ug/g	ND	88.5	50-140			
Phenanthrene	0.168	0.02	ug/g	ND	89.7	50-140			
Pyrene	0.173	0.02	ug/g	ND	92.7	50-140			
Surrogate: 2-Fluorobiphenyl	*1.27*		*ug/g*		*84.5*	*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.

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.

PARACEL LABORATORIES LTD.

Paracel ID: 1946132

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
946130 (water) 946132 (soil)	№ 51674

Client Name: Paterson Group	Project Ref: PE4720
Contact Name: Karyn Munch	Quote #:
Address: 154 Colonade Rd	PO #: 283276
Telephone: 613 226 7381	E-mail: kMunch@patersongroup.ca

Page 1 of 1

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	Required Analysis: BTEX/PHCs	DOC	BTEX
1	BH1-GW1	W		3	5 Nov 2019		✓		
2	BH2-GW1	W		4			✓	✓	
3	BH3-GW1	W		4			✓	✓	
4	DUP	W		2					✓
5	TB	S		1	"			✓	
6									
7									
8									
9									
10									

Comments: $Na_2S_2O_3$ + $5H_2O$ vials

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Method of Delivery: Paracel
Relinquished By (Print):	Date/Time: 12/11/19 10 10	Date/Time: 11/12/19 12:49	Verified By:
Date/Time: 12.19	Temperature: °C	Temperature: 8.7 °C	Date/Time: 12-12-19 1838
			pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 28328
Project: PE4720
Custody: 51700

Report Date: 18-Nov-2019
Order Date: 15-Nov-2019

Order #: 1946527

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

Paracel ID	Client ID
1946527-01	BH1-SS3
1946527-02	BH3-G1

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

PARACEL LABORATORIES LTD.

Order #: 1946527

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 28328

Report Date: 18-Nov-2019
Order Date: 15-Nov-2019
Project Description: PE4720

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	18-Nov-19	18-Nov-19

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.

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

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 28328

Report Date: 18-Nov-2019
Order Date: 15-Nov-2019
Project Description: PE4720

Sample Results

pH

Matrix: Soil
Sample Date: 30-Oct-19

Paracel ID	Client ID	Units	MDL	Result
1946527-01	BH1-SS3	pH Units	0.05	8.52
1946527-02	BH3-G1	pH Units	0.05	8.60

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Matrix Duplicate									
pH	**8.32**	**0.05**	**pH Units**	**8.32**			**0.0**	**2.3**	

Paracel ID: 1946527

PARACEL LABORATORIES LTD.

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
1946527	№ 51700

Client Name: Paterson Group Inc.	Project Ref: PE4720	Page 1 of 1
Contact Name: Karyn Munch	Quote #:	Turnaround Time
Address: 154 Colonnade Rd. S.	PO #: 28328	☐ 1 day ☐ 3 day
	E-mail: kmunch@patersongroup.ca	☐ 2 day ☒ Regular
Telephone: 613-226-7381		Date Required:

Regulation 153/04	Other Regulation	Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)
☐ 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:	

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analysis: pH											
1	~~BH3-G1~~ BH1-SS3	S		1	Oct.30/19		✓							120ml				
2	BH3-G1	S		1	Oct.30/19		✓							↓				
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel

Relinquished By (Sign): KMunch	Received By Driver/Depot: M. Dlouie	Received at Lab: Suneeparn Dohmai	Verified By: [signature]
Relinquished By (Print): K. Munch	Date/Time: 15/11/19 1:05	Date/Time: Nov 15, 2019 04.14	Date/Time: 15 Nov 19 / 6:20
Date/Time: Nov.15/19	Temperature: °C PH	Temperature: 12.0 °C	pH Verified: ☐ By: NA

Chain of Custody (Blank).xlsx

Revision 3.0

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 28326
Project: PE4720
Custody: 51674

Report Date: 18-Nov-2019
Order Date: 12-Nov-2019

Order #: 1946130

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

Paracel ID	Client ID
1946130-01	BH1-GW1
1946130-02	BH2-GW1
1946130-03	BH3-GW1
1946130-04	DUP

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 28326

Report Date: 18-Nov-2019
Order Date: 12-Nov-2019
Project Description: PE4720

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	15-Nov-19	15-Nov-19
PHC F1	CWS Tier 1 - P&T GC-FID	14-Nov-19	15-Nov-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	14-Nov-19	16-Nov-19
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	14-Nov-19	15-Nov-19

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 28326

Report Date: 18-Nov-2019

Order Date: 12-Nov-2019

Project Description: PE4720

	Client ID:	BH1-GW1	BH2-GW1	BH3-GW1	DUP
	Sample Date:	08-Nov-19 09:00	08-Nov-19 09:00	08-Nov-19 09:00	08-Nov-19 09:00
	Sample ID:	1946130-01	1946130-02	1946130-03	1946130-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene-d8	Surrogate	94.2%	95.5%	98.6%	95.6%
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	-
Semi-Volatiles					
Acenaphthene	0.05 ug/L	-	<0.05	<0.05	-
Acenaphthylene	0.05 ug/L	-	<0.05	<0.05	-
Anthracene	0.01 ug/L	-	<0.01	<0.01	-
Benzo [a] anthracene	0.01 ug/L	-	<0.01	<0.01	-
Benzo [a] pyrene	0.01 ug/L	-	<0.01	<0.01	-
Benzo [b] fluoranthene	0.05 ug/L	-	<0.05	<0.05	-
Benzo [g,h,i] perylene	0.05 ug/L	-	<0.05	<0.05	-
Benzo [k] fluoranthene	0.05 ug/L	-	<0.05	<0.05	-
Chrysene	0.05 ug/L	-	<0.05	<0.05	-
Dibenzo [a,h] anthracene	0.05 ug/L	-	<0.05	<0.05	-
Fluoranthene	0.01 ug/L	-	<0.01	<0.01	-
Fluorene	0.05 ug/L	-	<0.05	<0.05	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	-	<0.05	<0.05	-
1-Methylnaphthalene	0.05 ug/L	-	<0.05	<0.05	-
2-Methylnaphthalene	0.05 ug/L	-	<0.05	<0.05	-
Methylnaphthalene (1&2)	0.10 ug/L	-	<0.10	<0.10	-
Naphthalene	0.05 ug/L	-	<0.05	<0.05	-
Phenanthrene	0.05 ug/L	-	<0.05	<0.05	-
Pyrene	0.01 ug/L	-	<0.01	<0.01	-
2-Fluorobiphenyl	Surrogate	-	103%	96.5%	-
Terphenyl-d14	Surrogate	-	125%	122%	-

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						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						
Benzo [k] fluoranthene	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	*22.8*		*ug/L*		*114*	*50-140*			
Surrogate: Terphenyl-d14	*22.6*		*ug/L*		*113*	*50-140*			
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	*74.7*		*ug/L*		*93.4*	*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)	13700	1250	ug/L	14200			3.2	30	
Volatiles									
Benzene	332	25.0	ug/L	714			73.0	30	VOC06
Ethylbenzene	1150	25.0	ug/L	3010			89.2	30	VOC06
Toluene	674	25.0	ug/L	1960			97.6	30	VOC06
m,p-Xylenes	7440	25.0	ug/L	17200			79.3	30	VOC06
o-Xylene	1240	25.0	ug/L	2820			77.9	30	VOC06
Surrogate: Toluene-d8	*74.5*		*ug/L*		*93.2*	*50-140*			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 28326

Report Date: 18-Nov-2019
Order Date: 12-Nov-2019
Project Description: PE4720

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1660	25	ug/L		82.9	68-117			
F2 PHCs (C10-C16)	1570	100	ug/L		97.9	60-140			
F3 PHCs (C16-C34)	3580	100	ug/L		91.3	60-140			
F4 PHCs (C34-C50)	2510	100	ug/L		101	60-140			
Semi-Volatiles									
Acenaphthene	4.42	0.05	ug/L		88.4	50-140			
Acenaphthylene	3.78	0.05	ug/L		75.6	50-140			
Anthracene	4.23	0.01	ug/L		84.6	50-140			
Benzo [a] anthracene	3.77	0.01	ug/L		75.5	50-140			
Benzo [a] pyrene	3.67	0.01	ug/L		73.3	50-140			
Benzo [b] fluoranthene	5.10	0.05	ug/L		102	50-140			
Benzo [g,h,i] perylene	3.68	0.05	ug/L		73.5	50-140			
Benzo [k] fluoranthene	5.79	0.05	ug/L		116	50-140			
Chrysene	4.92	0.05	ug/L		98.3	50-140			
Dibenzo [a,h] anthracene	3.90	0.05	ug/L		78.0	50-140			
Fluoranthene	4.56	0.01	ug/L		91.2	50-140			
Fluorene	3.95	0.05	ug/L		79.0	50-140			
Indeno [1,2,3-cd] pyrene	3.92	0.05	ug/L		78.4	50-140			
1-Methylnaphthalene	4.59	0.05	ug/L		91.9	50-140			
2-Methylnaphthalene	5.11	0.05	ug/L		102	50-140			
Naphthalene	4.65	0.05	ug/L		93.1	50-140			
Phenanthrene	3.85	0.05	ug/L		76.9	50-140			
Pyrene	4.79	0.01	ug/L		95.9	50-140			
Surrogate: 2-Fluorobiphenyl	*23.5*		*ug/L*		*117*	*50-140*			
Volatiles									
Benzene	44.8	0.5	ug/L		112	60-130			
Ethylbenzene	34.6	0.5	ug/L		86.5	60-130			
Toluene	45.3	0.5	ug/L		113	60-130			
m,p-Xylenes	79.2	0.5	ug/L		99.0	60-130			
o-Xylene	35.5	0.5	ug/L		88.8	60-130			

Qualifier Notes:

QC Qualifiers :

VOC06 : VOC result based on an analysis taken from a previously analyzed sample vial (due to multiple dilutions). Results may be biased low.

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.

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: 1946130

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
1946130 (water) 1946132 (soil)	№ 51674

Client Name: Paterson Group	Project Ref: PE4720	Page 1 of 1
Contact Name: Karyn Munch	Quote #:	Turnaround Time
Address: 154 Colonade Rd	PO #: 28326	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613 226 7381	E-mail: KMunch@patersongroup.ca	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	Required Analysis: BTEX/PHCs	PHCs	BTEX
1	BH1-GW1	W		3	8 Nov 2019		✓		
2	BH2-GW1	W		4	↓		✓	✓	
3	BH3-GW1	W		4			✓	✓	
4	DUP read (DUP-01)	W		2	↓				✓
5	G3	S		1	"			✓	
6									
7									
8									
9									
10									

Comments: $Na_2S_2O_3 + 5H_2O$ vials

Method of Delivery: Paracel

Relinquished By (Sign): N. Sullivan	Received By Driver/Depot: T. Krouse	Received at Lab: Ben	Verified By:
Relinquished By (Print): Nick Sullivan	Date/Time: 12/11/19 10 10	Date/Time: 11/12/19 12:49	Date/Time: 12-12-19 18:26
Date/Time: Nov. 12. 19	Temperature: °C AM.	Temperature: 8.3 °C	pH Verified: ☐ By: