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Phase II – Environmental Site Assessment

1649 Montreal Road & 741 Blair Road
Ottawa, Ontario

Prepared For

10869279 Canada Inc.

October 30, 2020

Report: PE5061-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the properties addressed 1649 Montreal Road and 741 Blair Road, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the subject site.

The subsurface investigation for this assessment was conducted on October 15, 16, and 21, 2020. The field program consisted of drilling seven (7) boreholes on the subject site (BH1-BH7), of which five (5) were instrumented with groundwater monitoring wells (BH1, BH2, BH3, BH6, and BH7). The boreholes were advanced to depths ranging from approximately 1.98 m to 6.48 m below ground surface and terminated within the bedrock.

Nine (9) soil samples, recovered from the boreholes, were submitted for laboratory analysis of either: BTEX, PHCs (F_1-F_4), metals, and/or pH. According to the analytical test results, the concentration of PHCs F_3 identified in soil sample BH5-20-AU1 is in excess of the selected MECP Table 7 residential standards.

Five (5) groundwater samples were recovered from the monitoring wells installed in BH1, BH2, BH3, BH6, and BH7 and submitted for laboratory analysis of either: BTEX, VOCs, and/or PHCs (F_1-F_4). According to the analytical test results, all detected parameter concentrations in the groundwater samples analyzed comply with the selected MECP Table 7 residential standards.

Recommendations

Based on the findings of this assessment, PHC contaminated soil/fill material was identified in BH5, located at the rear of the auto service garage situated at 1649 Montreal Road, requiring some remedial work.

It should be noted that the concentration of PHC F_2 identified in soil sample BH1-20-SS3 (fill material) is in excess of the MECP Table 1 standards. This exceedance is not considered to pose an environmental concern to the subject site, however, if the soil is ever to be removed from the property, it should be classified as contaminated and disposed of at a licensed waste disposal site. Additional testing of this fill may be required to further assess its quality.

It is our understanding that the subject site is to be redeveloped for residential purposes in the future. It is our recommendation that an environmental site remediation program be completed in conjunction with site redevelopment. This will require the segregation of clean soil from impacted soils, the latter of which will require disposal at an approved waste disposal facility.

It is expected that pockets of impacted fill material (soil with contaminant concentrations in excess of the MECP Table 1 standards) will be encountered elsewhere on-site during future redevelopment activities, such as beneath the garage service bays (based on prior information). Additional testing of this soil will be required to further assess its quality prior to off-site disposal.

Prior to off-site disposal at a licensed landfill, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with Ontario Regulation 347/558.

It is recommended that Paterson personnel be present on-site during remediation activities to direct the excavation and segregation of impacted soil, as well as to conduct confirmatory sampling as required.

The concentration of chloroform detected in groundwater sample BH6-20-GW1 is marginally in excess of the selected MECP Table 7 residential standards. This exceedance is inferred to be a result of municipal water used during the rock coring process and is expected to dissipate in the near future. It is recommended that additional groundwater sampling be conducted at BH6 to confirm the dissipation of the chloroform.

If the groundwater monitoring wells installed in BH1, BH2, BH3, BH6, and BH7 are not going to be used in the future, or will be destroyed during future redevelopment activities, then they must be decommissioned according to Ontario Regulation Reg. 903 (Ontario Water Resources Act). The monitoring wells will be registered with the MECP under this regulation. Further information can be provided upon request in this regard.

1.0 INTRODUCTION

At the request of 10869279 Canada Inc., Paterson Group (Paterson) conducted a Phase II – Environmental Site Assessment (Phase II ESA) for the properties addressed 1649 Montreal Road and 741 Blair Road, in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address the areas of potential environmental concern (APECs) identified on the subject site as a result the findings of the Phase I ESA, conducted by Paterson in October 2020.

1.1 Subject Property Information

Address:	1649 Montreal Road, Ottawa, Ontario; 741 Blair Road, Ottawa, Ontario.
Legal Description:	Part of Lot 20, Concession 1 (Ottawa Front), Formerly the Geographic Township of Gloucester, in the City of Ottawa.
Location:	The subject site is located on the north side of Montreal Road, east of Blair Road, in the City of Ottawa, Ontario. Refer to Figure 1 – Key Plan for the site location.
Latitude and Longitude:	45° 26' 49" N, 75° 36' 53" W

Site Description

Configuration:	Irregular
Site Area:	4,850 m^2 (approximate)
Zoning:	R3 – Residential Third Density Zone
Current Use:	The subject site is currently occupied with a one (1) storey auto service garage, as well as a two (2) storey residential dwelling (currently vacant).
Services:	The subject site is located within a municipally serviced area.

1.2 Property Ownership

The subject site is currently owned by Mr. John Goveat. Paterson was retained to complete this Phase II ESA by Mr. Martin Chénier of 10869279 Canada Inc. Mr. Chénier can be reached by telephone at 819-664-4195.

1.3 Current and Proposed Future Uses

The subject site is currently occupied with a one (1) storey auto service garage, as well as a two (2) storey residential dwelling (currently vacant).

1.4 Applicable Site Condition Standard

The site condition standards for the subject site 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 Ministry of the Environment, Conservation and Parks (MECP), and dated April 15, 2011. The selected MECP standards are based on the following considerations:

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

The residential standards were selected based on the future land use of the subject site. Grain size analysis was not conducted as part of this assessment. The coarse-grained soil standards were chosen as a conservative approach.

The MECP Table 1 standards for Full Depth Background Site Conditions were also selected for additional consideration in order to assess the on-site soil conditions for future off-site disposal.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The property addressed 1649 Montreal Road is currently occupied with a one (1) storey auto service garage, located in the eastern portion of the property. The remainder of the property is paved with asphaltic concrete to the north, west, and south of the garage building. The western portion of the property is used for vehicle parking, whereas the northern portion of the property, at the rear of the garage building, is used for general storage.

The property addressed 741 Blair Road is currently occupied with a two (2) storey residential dwelling (currently vacant), located in the northwestern portion of the property. The remainder of the property consists of grassy landscaped areas and mature trees.

The site topography appears to slope down to the south, towards Montreal Road, whereas the regional topography also appears to slope down to the south. Water drainage on the subject site occurs primarily via infiltration in the landscaped areas, as well as via surface run-off towards a catch basin located on Montreal Road.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation for this assessment was conducted on October 15, 16, and 21, 2020. The field program consisted of drilling seven (7) boreholes on the subject site (BH1-BH7), of which five (5) were instrumented with groundwater monitoring wells (BH1, BH2, BH3, BH6, and BH7). The boreholes were advanced to depths ranging from approximately 1.98 m to 6.48 m below ground surface and terminated on or within the bedrock.

Refer to Drawing PE5061-3 – Test Hole Location Plan, appended to this report, for the location of all boreholes drilled on the subject site.

3.2 Media Investigated

During the subsurface investigation, soil 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 identified in the Phase I ESA.

The contaminants of potential concern for the soil and groundwater on the subject site include the following:

- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- Petroleum Hydrocarbons, fractions 1 through 4 (PHCs F_1-F_4);
- Volatile Organic Compounds (VOCs);
- Metals (including mercury and hexavalent chromium).

3.3 Phase I ESA Conceptual Site Model

Geological and Hydrogeological Setting

Based on the available information, the bedrock in the area of the subject site consists of interbedded limestone and dolomite of the Gull River Formation, whereas the surficial geology consists of Paleozoic bedrock with a overburden ranging from approximately 0 m to 1 m in thickness.

Groundwater is anticipated to be encountered within the bedrock and flow in a southerly direction.

Existing Buildings and Structures

The subject site is currently occupied with a one (1) storey auto service garage (1649 Montreal Road) as well as a two (2) storey residential dwelling (741 Blair Road).

Water Bodies and Areas of Natural and Scientific Interest

No water bodies or areas of natural and scientific interest are present on the subject site or within the Phase I study area. The nearest named water body with respect to the subject site is the Ottawa River, located approximately 1.90 km to the north.

Neighbouring Land Use

Neighbouring land use within the Phase I study area consists mainly of residential and commercial properties.

Drinking Water Wells

Based on the availability of municipal services, no drinking water wells are expected to be present within the Phase I study area.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Based on the findings of the Phase I ESA, eleven (11) PCAs, resulting in APECs, were identified on the subject site. These APECs include:

- A former underground fuel storage tank nest, located in the southwestern portion of the subject site;
- A former fuel pump island, located in the southern portion of the subject site;
- A former underground waste oil tank nest, located to the south of the auto service garage;
- A former underground waste oil tank nest, located beneath the western portion of the auto service garage;
- Two (2) former in-ground hydraulic hoists, located in the eastern portion of the auto service garage;
- Fill material of unknown quality, located throughout the southern portion of the subject site;
- An existing auto service garage, located in the southern portion of the subject site;
- An existing aboveground motor oil storage tank, located in the eastern portion of the auto service garage;
- Two (2) existing aboveground waste oil storage tanks, located on the exterior of the east side of the auto service garage;
- An oil/water separator, located in the eastern portion of the auto service garage;
- An oil/water separator, located in the western portion of the auto service garage;

Other off-site PCAs were identified within the Phase I study area but were deemed not to be of concern based on their separation distances as well as their down-gradient or cross-gradient orientations.

Contaminants of Potential Concern

The contaminants of potential concern (CPCs) associated with the aforementioned APECs are considered to be:

- ❒ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- ❒ Petroleum Hydrocarbons, fractions 1 through 4 (PHCs F_1-F_4);
- ❒ Volatile Organic Compounds (VOCs);
- ❒ Metals (including mercury and hexavalent chromium).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the subject site.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of the Phase I ESA is considered to be sufficient to conclude that there are PCAs and APECs associated with the subject site. The presence of these PCAs were 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.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation for this assessment was conducted on October 15, 16, and 21, 2020. The field program consisted of drilling seven (7) boreholes on the subject site (BH1-BH7), of which five (5) were instrumented with groundwater monitoring wells (BH1, BH2, BH3, BH6, and BH7). The boreholes were advanced to depths ranging from approximately 1.98 m to 6.48 m below ground surface and terminated on or within the bedrock.

Under the full-time supervision of Paterson personnel, the boreholes were drilled using a low-clearance drill rig provided by George Downing Estate Drilling of Hawkesbury, Ontario, as well as using a portable drill rig provided by Capital Cutting and Coring of Ottawa, Ontario. The locations of the boreholes are illustrated on Drawing PE5061-3 – Test Hole Location Plan, appended to this report.

4.2 Soil Sampling

Soil 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. The samples were recovered using a stainless-steel split spoon while wearing protective gloves (changed after each sample), and immediately placed into plastic bags. If significant contamination was encountered, the samples were instead placed into glass jars. Sampling equipment was routinely washed in soapy water and rinsed with methylhydrate after each split spoon to prevent any cross contamination of the samples. The samples were also stored in coolers to reduce analyte volatilization during transportation.

Thirty-nine (39) soil samples were obtained from the boreholes by means of auger and split spoon sampling, with samples taken at approximate 0.76 m intervals. The depths at which auger, split spoon, and rock core samples were obtained from the boreholes are shown as "**AU**", "**SS**", and "**RC**", respectively, on the Soil Profile and Test Data Sheets, appended to this report.

Site soils generally consist of asphaltic concrete (BH1-BH5) or poured concrete (BH6 and BH7), underlain by brown silty sand fill material, underlain by native grey/brown silty sand with occasional gravel, overtop of limestone bedrock.

4.3 Field Screening Measurements

All soil samples collected were subjected to a preliminary screening procedure, which included visual screening for colour and evidence of metals, as well as soil vapour screening with a Photo Ionization Detector or with an RKI Eagle Gas Detector, calibrated to hexane.

The recovered soil samples were placed immediately into airtight plastic bags with nominal headspace. All lumps of soil inside the bags were broken by hand, and the soil was allowed to come to room temperature prior to conducting the vapour survey, ensuring consistency of readings between samples. To measure the soil vapours, the analyser probe was inserted into the nominal headspace above the sample. The sample was then agitated and manipulated gently by hand as the measurement was taken. The peak reading registered within the first 15 seconds was recorded as the vapour measurement. The parts per million (ppm) scale was used to measure concentrations of organic vapours.

Samples with the highest vapour readings for a given borehole were generally selected as candidates for laboratory analysis. The results of the vapour survey are presented on the Soil Profile and Test Data Sheets, appended to this report.

4.4 Groundwater Monitoring Well Installation

Five (5) groundwater monitoring wells were installed on the subject site as part of this assessment. These monitoring wells were constructed using 32 mm diameter Schedule 40 threaded PVC risers and screens. A sand pack consisting of silica sand was placed around the screen and a bentonite seal was placed above the screen to minimize cross-contamination. A summary of the monitoring well construction details are listed below in Table 1 as well as on the Soil Profile and Test Data Sheets provided in the appendix.

Upon completion, the groundwater monitoring wells were developed using a dedicated inertial lift pump, with a minimum of three (3) well volumes being removed from the wells at the time of installation. The wells were developed until the appearance of the water was noted to be stabilized. In addition, the ground surface elevations of each borehole were subsequently surveyed with respect to a known geodetic elevation.

Table 1
Monitoring Well Construction Details

Well ID	Ground Surface Elevation (m ASL)	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1	97.76	6.15	3.15-6.15	2.69-6.15	0.20-2.69	Flushmount
BH2	97.48	5.92	4.42-5.92	3.96-5.92	0.23-3.96	Flushmount
BH3	97.66	6.48	4.98-6.48	4.65-6.48	0.20-4.65	Flushmount
BH6	97.92	4.47	2.97-4.47	2.29-4.47	0.10-2.29	Flushmount
BH7	97.98	5.18	3.68-5.18	3.66-5.18	2.90-3.66	Flushmount

4.5 Field Measurement of Water Quality Parameters

Groundwater sampling was conducted at BH1, BH2, BH3, BH6, and BH7 on October 19 and 21, 2020. No water quality parameters were measured in the field at that time.

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. Standing water was purged from each monitoring well prior to the recovery of the groundwater samples using dedicated sampling equipment. The samples were then stored in coolers to reduce possible analyte volatilization during their transportation. Further details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan, appended to this report.

4.7 Residue Management

Soil cuttings, purge water, and equipment cleaning fluids were retained on-site.

4.8 Analytical Testing

The following soil and groundwater samples were submitted for laboratory analysis:

Table 2
Testing Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed				Rationale
		BTEX	PHCs F_1-F_4	Metals[1]	pH	
BH1-20-SS3	1.52 m – 2.13 m Fill Material			X		To assess for potential impacts resulting from the presence of fill material of unknown quality.
BH1-20-SS8	5.33 m – 5.61 m Grey Silty Sand	X	X		X	To assess for potential impacts resulting from the presence of a former underground waste oil storage tank nest.
BH2-20-SS2	0.76 m – 1.37 m Fill Material			X		To assess for potential impacts resulting from the presence of fill material of unknown quality.
BH2-20-SS5	3.05 m – 3.45 m Grey Silty Sand	X	X			To assess for potential impacts resulting from the presence of a former fuel pump area.
BH3-20-SS2	0.76 m – 1.37 m Fill Material			X	X	To assess for potential impacts resulting from the presence of fill material of unknown quality.
BH5-20-AU1	0.00 m – 0.61 m Fill Material	X	X	X		To assess for potential impacts resulting from the presence of fill material of unknown quality, two (2) existing aboveground waste oil storage tanks, as well as the presence of an existing auto service garage.
BH6-20-SS3	1.37 m – 1.75 m Brown Silty Sand	X	X			To assess for potential impacts resulting from the presence of an existing aboveground motor oil storage tank, two (2) aboveground waste oil storage tanks, two (2) former in-ground hoists, an oil/water separator, as well as an auto service garage.
BH7-20-SS3	1.22 m – 1.83 m Brown Silty Sand			X		To assess for potential impacts resulting from the presence of fill material of unknown quality.
BH7-20-SS5	2.44 m – 2.90 m Brown Silty Sand	X	X			To assess for potential impacts resulting from the presence of a former underground fuel storage tank nest, as well as an existing oil/water separator and auto service garage.

1 – Including Mercury and Hexavalent Chromium

Table 3
Testing Parameters for Submitted Groundwater Samples

Sample ID	Screened Interval & Stratigraphic Unit	Parameters Analyzed			Rationale
		BTEX	VOCs	PHCs F_1-F_4	
BH1-20-GW1	3.15 m – 6.15 m Grey Silty Sand	X		X	To assess for potential impacts resulting from the presence of a former underground waste oil storage tank nest.
BH2-20-GW1	4.42 m – 5.92 m Limestone Bedrock	X		X	To assess for potential impacts resulting from the presence of a former fuel pump area.
BH3-20-GW1	4.98 m – 6.48 m Limestone Bedrock	X		X	To assess for potential impacts resulting from the presence of a former underground fuel storage tank nest.
BH6-20-GW1	2.97 m – 4.47 m Limestone Bedrock		X	X	To assess for potential impacts resulting from the presence of an existing aboveground motor oil storage tank, two (2) aboveground waste oil storage tanks, two (2) former in-ground hoists, an oil/water separator, as well as an auto service garage.
BH7-20-GW1	3.68 m – 5.18 m Limestone Bedrock		X	X	To assess for potential impacts resulting from the presence of a former underground fuel storage tank nest, as well as an existing oil/water separator and auto service garage.

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) and is accredited and certified by the SCC/CALA for specific tests registered with the association.

4.9 Elevation Surveying

The ground surface elevations at each borehole location were surveyed using a GPS device by Paterson personnel and referenced to a geodetic datum.

4.10 Quality Assurance and Quality Control Measures

A summary of the quality assurance and quality control (QA/QC) measures, undertaken as part of this assessment, is provided in the Sampling and Analysis Plan in Appendix 1.

5.0 REVIEW AND EVALUATION

5.1 Geology

Generally, the subsurface profile encountered at the borehole locations consists of an asphaltic concrete pavement structure (exterior boreholes) or poured concrete (interior boreholes), underlain by fill material consisting of brown silty sand with crushed stone, underlain by brown silty sand with occasional clay and gravel, underlain by limestone bedrock.

The bedrock was encountered at BH2, BH3, BH6, and BH7 at depths ranging from approximately 1.75 m to 3.83 m below ground surface. Practical refusal to augering on inferred bedrock was encountered at BH1, BH4, and BH5 at depths ranging from approximately 1.96 m to 6.15 m below ground surface.

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

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured using an electronic water level meter at the monitoring wells installed in BH1, BH2, BH3, BH6, and BH7 on October 19 and 21, 2020. The groundwater levels are summarized below in Table 4.

Table 4
Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1	97.76	2.42	95.34	October 19, 2020
BH2	97.48	2.59	94.89	October 19, 2020
BH3	97.66	2.31	95.35	October 19, 2020
BH6	97.92	1.35	96.57	October 19, 2020
BH7	97.98	1.81	96.17	October 21, 2020

The groundwater at the subject site was typically encountered within the overburden, at depths ranging from approximately 1.35 m to 2.59 m below ground surface. No unusual visual or olfactory observations were noted in the groundwater samples recovered from the boreholes.

Using the groundwater elevations recorded during the October 19, 2020 sampling event, groundwater contour mapping was completed as part of this assessment. According to the mapped contour data, illustrated on Drawing PE5061-3 Test Hole Location Plan in the appendix, the groundwater flow on the subject site is interpreted to be in a southerly direction.

A horizontal hydraulic gradient of approximately 0.08 m/m was also calculated as part of this assessment.

It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations.

5.3 Fine/Coarse Soil Texture

Grain size analysis was not completed as part of this investigation. Coarse grained soil standards were chosen based on the nature of the recovered soil samples.

5.4 Field Screening

Field screening of the soil samples collected from the exterior boreholes generally resulted in hydrocarbon vapour readings ranging from approximately 20 ppm to 55 ppm. One (1) soil sample (BH5-20-AU1) contained a hydrocarbon vapour reading of 510 ppm, and as a result, was selected for further laboratory analysis.

Field screening of the soil samples collected from the interior boreholes resulted in organic vapour readings ranging from 0.0 ppm to 1.8 ppm. The organic vapour readings obtained from the field screening indicate that there is a negligible potential for the presence of volatile substances beneath the concrete floor slab.

Field screening results of each individual soil sample are provided on the Soil Profile and Test Data Sheets appended to this report.

5.5 Soil Quality

Nine (9) soil samples, recovered from the boreholes, were submitted for laboratory analysis of either: BTEX, PHCs (F_1-F_4), metals, and/or pH. The results of the analytical testing are presented below in Tables 5 to 7, as well as on the laboratory certificates of analysis included in Appendix 1.

Table 5
Analytical Test Results – Soil
BTEX & PHCs (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 1 Residential Soil Standards (µg/g)	MECP Table 7 Residential Soil Standards (µg/g)
		Oct. 15, 2020			Oct. 16, 2020			
		BH1-20-SS8	BH2-20-SS5	BH5-20-AU1	BH6-20-SS3	BH7-20-SS5		
Benzene	0.05	nd	nd	nd	nd	nd	0.02	0.21
Ethylbenzene	0.05	nd	nd	nd	nd	nd	0.05	2
Toluene	0.05	nd	nd	nd	nd	nd	0.2	2.3
Xylenes	0.05	nd	nd	nd	nd	nd	0.05	3.1
PHCs F_1	7	nd	nd	nd	nd	nd	25	55
PHCs F_2	4	14	nd	nd	nd	nd	10	98
PHCs F_3	8	nd	nd	**429**	nd	nd	240	300
PHCs F_4	6	12	nd	837	nd	nd	120	2,800
PHCs F_{4G}	50	nt	nt	2,050	nt	nt	120	2,800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- nt – not tested for this parameter
- Underlined – Value exceeds MECP Table 1 standards
- **Bold and Underlined** – value exceeds selected MECP standards

The concentration of PHCs F_3 in soil sample BH5-20-AU1 is in excess of the MECP Table 7 residential standards.

The concentration of PHC F_2 in soil sample BH1-20-SS3 is marginally in excess of the MECP Table 1 standards.

Table 6
Analytical Test Results – Soil
Metals

Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 1 Residential Soil Standards (µg/g)	MECP Table 7 Residential Soil Standards (µg/g)
		Oct. 15, 2020				Oct. 16, 2020		
		BH1-20-SS3	BH2-20-SS2	BH3-20-SS2	BH5-20-AU1	BH7-20-SS3		
Antimony	1.0	nd	nd	nd	nd	nd	1.3	7.5
Arsenic	1.0	1.6	2.9	3.0	4.2	3.5	18	18
Barium	1.0	41.8	90.2	55.9	59.2	71.6	220	390
Beryllium	0.5	nd	nd	nd	nd	nd	2.5	4
Boron	5.0	nd	nd	nd	5.3	nd	36	120
Cadmium	0.5	nd	nd	nd	nd	nd	1.2	1.2
Chromium	5.0	12.6	22.5	12.0	9.4	28.9	70	160
Chromium (VI)	0.2	nd	nd	nd	nd	nd	0.66	8
Cobalt	1.0	4.3	6.3	5.2	4.6	6.9	21	22
Copper	5.0	9.4	12.6	15.9	9.9	19.3	92	140
Lead	1.0	2.2	9.2	6.0	20.1	13.3	120	120
Mercury	0.1	nd	nd	nd	nd	nd	0.27	0.27
Molybdenum	1.0	nd	nd	nd	2.1	nd	2	6.9
Nickel	5.0	7.9	12.7	10.2	15.4	15.7	82	100
Selenium	1.0	nd	nd	nd	nd	nd	1.5	2.4
Silver	0.3	nd	nd	nd	nd	nd	0.5	20
Thallium	1.0	nd	nd	nd	nd	nd	1	1
Uranium	1.0	nd	nd	nd	nd	nd	2.5	23
Vanadium	10.0	22.8	30.9	18.8	22.5	33.4	86	86
Zinc	20.0	nd	40.0	23.4	nd	73.5	290	340

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- Underlined – Value exceeds MECP Table 1 standards
- **Bold and Underlined** – value exceeds selected MECP standards

All detected metal concentrations in the soil samples analysed are in compliance with the selected MECP Table 7 standards.

The concentration of molybdenum in soil sample BH5-20-AU1 is marginally in excess of the MECP Table 1 standards.

Table 7
Analytical Test Results – Soil
pH

Parameter	MDL	Soil Samples (µg/g)		MECP Table 1 Residential Soil Standards	MECP Table 7 Residential Soil Standards
		Oct. 15, 2020			
		BH1-20-SS8	BH3-20-SS2		
pH	0.05 units	7.83	7.93	5.00 – 11.00	5.00 – 9.00

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- Underlined – Value exceeds MECP Table 1 standards
- **Bold and Underlined** – value exceeds selected MECP standards

All detected pH levels in the soil samples analyzed are in compliance with the selected MECP Table 7 residential standards.

Table 8
Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Sample ID	Depth Interval (m BGS)
PHCs F_3	**429**	BH5-20-AU1	0.00 m – 0.61 m
PHCs F_4	837	BH5-20-AU1	0.00 m – 0.61 m
PHCs F_{4G}	2,050	BH5-20-AU1	0.00 m – 0.61 m
Arsenic	4.2	BH5-20-AU1	0.00 m – 0.61 m
Barium	90.2	BH2-20-SS2	0.76 m – 1.37 m
Boron	5.3	BH5-20-AU1	0.00 m – 0.61 m
Chromium	22.5	BH2-20-SS2	0.76 m – 1.37 m
Cobalt	6.3	BH2-20-SS2	0.76 m – 1.37 m
Copper	15.9	BH3-20-SS2	0.76 m – 1.37 m
Lead	20.1	BH5-20-AU1	0.00 m – 0.61 m
Molybdenum	2.1	BH5-20-AU1	0.00 m – 0.61 m
Nickel	15.4	BH5-20-AU1	0.00 m – 0.61 m
Vanadium	30.9	BH2-20-SS2	0.76 m – 1.37 m
Zinc	40.0	BH2-20-SS2	0.76 m – 1.37 m
pH	7.93	BH3-20-SS2	0.76 m – 1.37 m

Notes:
- Underlined – Value exceeds MECP Table 1 standards
- **Bold and Underlined** – value exceeds selected MECP standards

All other parameter concentrations analyzed were below the laboratory detection limits. The laboratory certificates of analysis are provided in Appendix 1.

5.6 Groundwater Quality

Groundwater samples were recovered from the monitoring wells installed in BH1, BH2, BH3, BH6, and BH7 and submitted for laboratory analysis of either: BTEX, VOCs, and/or PHCs (F_1-F_4). The results of the analytical testing are presented below in Tables 9 and 10, as well as on the laboratory certificates of analysis included in Appendix 1.

Table 9
Analytical Test Results – Groundwater
BTEX & PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)					MECP Table 7 Residential Groundwater Standards (µg/L)
		Oct. 19, 2020				Oct. 21, 2020	
		BH1-20-GW1	BH2-20-GW1	BH3-20-GW1	BH6-20-GW1	BH7-20-GW1	
Benzene	0.5	nd	nd	nd	nd	nd	0.5
Ethylbenzene	0.5	15.9	nd	nd	nd	nd	54
Toluene	0.5	nd	nd	nd	nd	nd	320
Xylenes	0.5	51.3	nd	nd	nd	nd	72
PHC F_1	25	219	nd	nd	nd	nd	420
PHC F_2	100	nd	nd	nd	nd	nd	150
PHC F_3	100	nd	nd	nd	nd	nd	500
PHC F_4	100	nd	nd	nd	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

All detected BTEX and/or PHC parameters in the groundwater samples analyzed are in compliance with the selected MECP Table 7 standards.

Table 10
Analytical Test Results – Groundwater
VOCs

Parameter	MDL (µg/L)	Groundwater Samples (ug/L)		MECP Table 7 Residential Groundwater Standards (µg/L)
		Oct. 19, 2020	Oct. 21, 2020	
		BH6-20-GW1	BH7-20-GW1	
Acetone	5.0	nd	nd	100,000
Benzene	0.5	nd	nd	0.5
Bromodichloromethane	0.5	nd	nd	67,000
Bromoform	0.5	nd	nd	5
Bromomethane	0.5	nd	nd	0.89
Carbon Tetrachloride	0.2	nd	nd	0.2
Chlorobenzene	0.5	nd	nd	140
Chloroform	0.5	**2.5**	2.0	2
Dibromochloromethane	0.5	nd	nd	65,000
Dichlorodifluoromethane	1.0	nd	nd	3,500
1,2-Dichlorobenzene	0.5	nd	nd	150
1,3-Dichlorobenzene	0.5	nd	nd	7,600
1,4-Dichlorobenzene	0.5	nd	nd	0.5
1,1-Dichloroethane	0.5	nd	nd	11
1,2-Dichloroethane	0.5	nd	nd	0.5
1,1-Dichloroethylene	0.5	nd	nd	0.5
cis-1,2-Dichloroethylene	0.5	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	0.58
1,3-Dichloropropene	0.5	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	54
Ethylene Dibromide	0.2	nd	nd	0.2
Hexane	1.0	nd	nd	5
Methyl Ethyl Ketone	5.0	nd	nd	21,000
Methyl Isobutyl Ketone	5.0	nd	nd	5,200
Methyl tert-butyl ether	2.0	nd	nd	15
Methylene Chloride	5.0	nd	nd	26
Styrene	0.5	nd	nd	43
1,1,1,2-Tetrachloroethane	0.5	nd	nd	1.1
1,1,2,2-Tetrachloroethane	0.5	nd	nd	0.5
Tetrachloroethylene	0.5	nd	nd	0.5
Toluene	0.5	nd	nd	320
1,1,1-Trichloroethane	0.5	nd	nd	23
1,1,2-Trichloroethane	0.5	nd	nd	0.5
Trichloroethylene	0.5	nd	nd	0.5
Trichlorofluoromethane	1.0	nd	nd	2,000
Vinyl Chloride	0.5	nd	nd	0.5
Xylenes	0.5	nd	nd	72

Notes:
- MDL – Method Detection Limit
- nt – not tested for this parameter
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

The concentration of chloroform detected in groundwater sample BH6-20-GW1 is marginally in excess of the MECP Table 7 residential standards. This exceedance is a result of municipal water used during the rock coring process and is expected to dissipate in the near future.

Table 11
Maximum Concentrations – Groundwater

Parameter	Maximum Concentration (µg/L)	Sample ID	Depth Interval (m BGS)
PHCs F_1	219	BH1-20-GW1	3.15 m – 6.15 m
Ethylbenzene	15.9	BH1-20-GW1	3.15 m – 6.15 m
Xylenes	51.3	BH1-20-GW1	3.15 m – 6.15 m
Chloroform	**2.5**	BH6-20-GW1	2.97 m – 4.47 m

Notes:
- **Bold and Underlined** – value exceeds selected MECP standards

All other parameter concentrations analyzed were below the laboratory detection limits. The laboratory certificates of analysis are provided in Appendix 1.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of this Phase II ESA were handled in accordance with the analytical protocols with respect to holding time, preservation method, storage requirement, and container type. As per Subsection 47(3) of O.Reg. 153/04, as amended by the Environmental Protection Act, the certificates of analysis have been received for each sample submitted for laboratory analysis and have been appended to this report.

As per the Sampling and Analysis Plan, a duplicate soil sample was recovered from BH1 and analyzed for BTEX and PHC F_1 parameters. In addition, a duplicate groundwater sample was recovered BH3 and analyzed for BTEX and PHC F_1 parameters. No parameter concentrations were detected in both the original or the duplicate samples, and as such, the RPD results are considered to be acceptable. As a result, 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.

5.8 Phase II Conceptual Site Model

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

Site Description

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As described in the Phase I ESA report, as well as in Section 2.2 of this report, the following PCAs are considered to result in APECs on the subject site:

- *"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"*

This PCA was identified as a result of the presence of a former underground fuel storage tank nest, former fuel pump island, two (2) former underground waste oil storage tank nests, an existing aboveground motor oil storage tank, and two (2) existing aboveground waste oil storage tanks.

- *"Item 30: Importation of Fill Material of Unknown Quality"*

This PCA was identified as a result of the presence of a fill material located throughout the property addressed 1649 Montreal Road.

- *"Item 52: Storage, Maintenance, Fuelling, and Repair of Equipment, Vehicles, and Material Used to Maintain Transportation Systems"*

This PCA was identified as a result of the presence of two (2) former in-ground hydraulic hoists, two (2) existing oil/water separators, as well as an existing auto service garage.

Contaminants of Potential Concern

The contaminants of potential concern (CPCs) associated with the aforementioned APECs are considered to be:

- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- Petroleum Hydrocarbons, fractions 1 - 4 (PHCs F_1-F_4);
- Volatile Organic Compounds (VOCs);
- Metals (including Mercury and Hexavalent Chromium).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the subject site.

Subsurface Structures and Utilities

Underground service locates were completed prior to the subsurface investigation. According to the locates, underground natural gas lines, electrical lines, as well as water and sewer pipes are present beneath the subject site.

Physical Setting

Site Stratigraphy

The stratigraphy of the subject site generally consists of:

- Pavement structure, consisting of a layer of 0.10 m thick asphaltic concrete over brown silty sand and crushed stone (BH1-BH5).
- Fill material, consisting of brown silty sand with occasional clay and/or crushed stone; encountered at depths ranging from approximately 0.08 m to 0.66 m below ground surface.
- Brown silty sand with occasional gravel; encountered at depths ranging from approximately 0.51 m to 1.83 m below ground surface (BH2, BH4, and BH5).
- Glacial till, consisting of compact brown silty sand with clay and gravel; encountered at depths ranging from approximately 2.13 m to 3.05 m below ground surface (BH2, BH3, and BH4).
- Limestone bedrock; encountered at depths ranging between approximately 1.75 m to 3.83 m below ground surface (BH2, BH3, BH6, and BH7).

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is provided in the Soil Profile and Test Data Sheets in Appendix 1.

Hydrogeological Characteristics

The groundwater at the subject site was typically encountered within the overburden, at depths ranging from approximately 1.35 m to 2.59 m below ground surface.

Based on the regional topography, in combination with the measured groundwater levels, the groundwater is interpreted to flow in a southerly direction.

Approximate Depth to Bedrock

Bedrock was encountered at BH2, BH3, BH6, and BH7 at depths ranging from approximately 1.75 m to 3.83 m below ground surface. Practical refusal to augering on inferred bedrock was encountered at BH1, BH4, and BH5 at depths ranging from approximately 1.96 m to 6.15 m below ground surface.

Approximate Depth to Water Table

The depth to the water table is approximately 1.35 m to 2.59 m below the existing ground surface.

Sections 41 and 43.1 of Ontario Regulation 153/04

Section 41 of the Regulation does not apply to the subject site, as there are no bodies of water or areas of natural significance located on or within 30 m of the subject site. The subject site is therefore not considered to be environmentally sensitive.

Section 43.1 of the Regulation applies to the subject site, since the bedrock is situated at a depth of less than 2 m below ground surface, and thus is considered to be a shallow soil property.

Existing Buildings and Structures

The subject site is currently occupied with a one (1) storey auto service garage and a two (2) storey residential dwelling.

Water Bodies and Areas of Natural and Scientific Interest

No water bodies or areas of natural and scientific interest are present on the subject site or within the Phase I study area. The nearest named water body with respect to the subject site is the Ottawa River, located approximately 1.90 km to the north.

Environmental Condition

Areas Where Contaminants are Present

According to the analytical test results, PHC impacted soil/fill was identified in BH5, located at the rear of the auto service garage situated at 1649 Montreal Road.

The concentration of chloroform detected in groundwater sample BH6-20-GW1 is marginally in excess of the MECP Table 7 residential standards. This exceedance is inferred to be a result of municipal water used during the rock coring process and will dissipate in the near future. As a result, this exceedance is not considered to be a contaminant issue for the subject site.

The analytical test results for all soil and groundwater samples tested are shown on the Analytical Testing Plans, appended to this report.

Types of Contaminants

According to the analytical test results, the concentration of PHCs F_3 detected in soil sample BH5-20-AU1 is in excess of the MECP Table 7 residential standards.

Contaminated Media

As noted above, the upper soil/fill in the vicinity of BH5 is contaminated with PHCs. According to the analytical test results, the groundwater beneath the subject site is not contaminated.

What Is Known About Areas Where Contaminants Are Present

BH5 is located at the rear of the auto service garage situated at 1649 Montreal Road. The PHC contaminants identified in this area are likely the result of an unknown discharge on the subject site.

Distribution and Migration of Contaminants

As previously noted, PHC impacted soil/fill was identified at BH5. Based on its low mobility, as well as the clean groundwater test results from other nearby boreholes, it is anticipated that the PHC contaminants are contained within the soil/fill in this portion of the subject site.

Discharge of Contaminants

The PHC impacted soil/fill identified at BH5 is likely to have been a result of spillage directly to the ground surface from the adjacent automotive service garage or as a result of minor spilling produced during the transfer of waste oil into the two (2) exterior storage tanks located in close proximity to this borehole.

Climatic and Meteorological Conditions

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

Downward leaching is not considered to have affected contaminant distribution at the subject site, as the site is largely paved, and the groundwater test results comply with the MECP Table 7 residential standards. Fluctuations in the groundwater level and groundwater flow are not considered to have affected contaminant distribution based on the depth of the water table within the bedrock, well below the shallow fill material.

Potential for Vapour Intrusion

Given the location of the PHC impacted soil in the shallow soil/fill outside of the auto service garage building footprint, as well as the relatively low-volatility of PHC F_3, the potential for vapours to be present within the subject structure are considered to be low and do not pose a safety hazard to the current occupants.

During redevelopment of the subject site, all soils exceeding the selected MECP Table 7 residential standards will be removed and disposed off-site. As such, there is no anticipated potential for future vapour intrusion at the subject site.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the properties addressed 1649 Montreal Road and 741 Blair Road, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the subject site.

The subsurface investigation for this assessment was conducted on October 15, 16, and 21, 2020. The field program consisted of drilling seven (7) boreholes on the subject site (BH1-BH7), of which five (5) were instrumented with groundwater monitoring wells (BH1, BH2, BH3, BH6, and BH7). The boreholes were advanced to depths ranging from approximately 1.98 m to 6.48 m below ground surface and terminated within the bedrock.

Nine (9) soil samples, recovered from the boreholes, were submitted for laboratory analysis of either: BTEX, PHCs (F_1-F_4), metals, and/or pH. According to the analytical test results, the concentration of PHCs F_3 identified in soil sample BH5-20-AU1 is in excess of the selected MECP Table 7 residential standards.

Five (5) groundwater samples were recovered from the monitoring wells installed in BH1, BH2, BH3, BH6, and BH7 and submitted for laboratory analysis of either: BTEX, VOCs, and/or PHCs (F_1-F_4). According to the analytical test results, all detected parameter concentrations in the groundwater samples analyzed comply with the selected MECP Table 7 residential standards.

Recommendations

Based on the findings of this assessment, PHC contaminated soil/fill material was identified in BH5, located at the rear of the auto service garage situated at 1649 Montreal Road, requiring some remedial work.

It should be noted that the concentration of PHC F_2 identified in soil sample BH1-20-SS3 (fill material) is in excess of the MECP Table 1 standards. This exceedance is not considered to pose an environmental concern to the subject site, however, if the soil is ever to be removed from the property, it should be classified as contaminated and disposed of at a licensed waste disposal site. Additional testing of this fill may be required to further assess its quality.

It is our understanding that the subject site is to be redeveloped for residential purposes in the future. It is our recommendation that an environmental site remediation program be completed in conjunction with site redevelopment. This will require the segregation of clean soil from impacted soils, the latter of which will require disposal at an approved waste disposal facility.

It is expected that pockets of impacted fill material (soil with contaminant concentrations in excess of the MECP Table 1 standards) will be encountered elsewhere on-site during future redevelopment activities, such as beneath the garage service bays (based on prior information). Additional testing of this soil will be required to further assess its quality prior to off-site disposal.

Prior to off-site disposal at a licensed landfill, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with Ontario Regulation 347/558.

It is recommended that Paterson personnel be present on-site during remediation activities to direct the excavation and segregation of impacted soil, as well as to conduct confirmatory sampling as required.

The concentration of chloroform detected in groundwater sample BH6-20-GW1 is marginally in excess of the selected MECP Table 7 residential standards. This exceedance is inferred to be a result of municipal water used during the rock coring process and is expected to dissipate in the near future. It is recommended that additional groundwater sampling be conducted at BH6 to confirm the dissipation of the chloroform.

If the groundwater monitoring wells installed in BH1, BH2, BH3, BH6, and BH7 are not going to be used in the future, or will be destroyed during future redevelopment activities, then they must be decommissioned according to Ontario Regulation Reg. 903 (Ontario Water Resources Act). The monitoring wells will be registered with the MECP under this regulation. Further information can be provided upon request in this regard.

7.0 STATEMENT OF LIMITATIONS

This Phase II – Environmental Site Assessment report has been prepared 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 10869279 Canada Inc. Permission and notification from 10869279 Canada Inc. and Paterson Group will be required prior to the release of this report to any other party.

Paterson Group Inc.

Nick Sullivan, B.Sc.

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

Report Distribution:

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- Paterson Group Inc.

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE5061-3 – TEST HOLE LOCATION PLAN

DRAWING PE5061-4 – ANALYTICAL TESTING PLAN – SOIL (PHCs)

DRAWING PE5061-4A – CROSS SECTION A-A' – SOIL (PHCs)

DRAWING PE5061-4B – CROSS SECTION B-B' – SOIL (PHCs)

DRAWING PE5061-5 – ANALYTICAL TESTING PLAN – SOIL (BTEX, METALS, pH)

DRAWING PE5061-5A – CROSS SECTION A-A' – SOIL (BTEX, METALS, pH)

DRAWING PE5061-5B – CROSS SECTION B-B' – SOIL (BTEX, METALS, pH)

DRAWING PE5061-6 – ANALYTICAL TESTING PLAN – GROUNDWATER (BTEX, VOCs, PHCs)

DRAWING PE5061-6A – CROSS SECTION A-A' – GROUNDWATER (BTEX, VOCs, PHCs)

DRAWING PE5061-6B – CROSS SECTION B-B' – GROUNDWATER (BTEX, VOCs, PHCs)

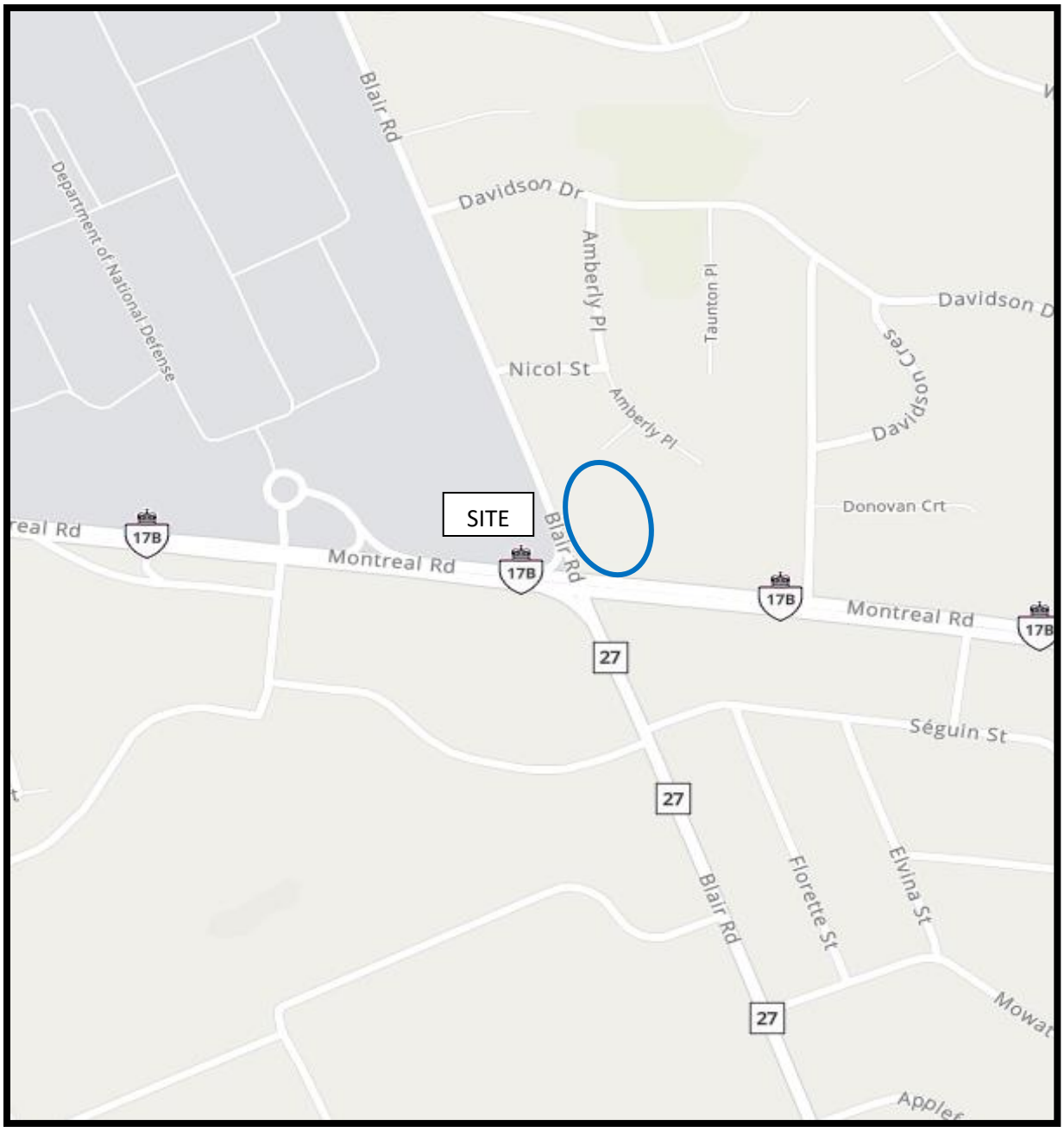
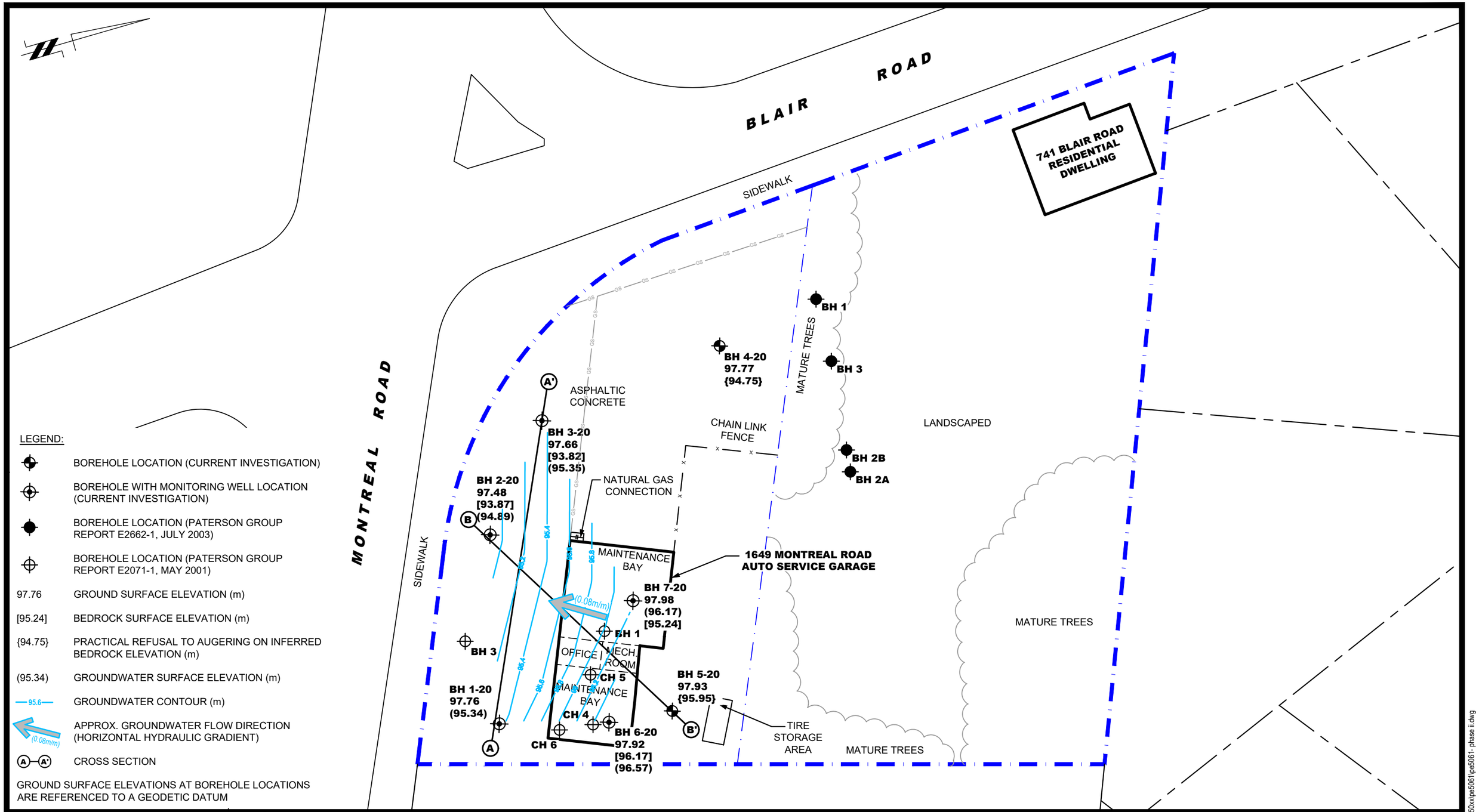


FIGURE 1

KEY PLAN



LEGEND:

- BOREHOLE LOCATION (CURRENT INVESTIGATION)
- BOREHOLE WITH MONITORING WELL LOCATION (CURRENT INVESTIGATION)
- BOREHOLE LOCATION (PATERSON GROUP REPORT E2662-1, JULY 2003)
- BOREHOLE LOCATION (PATERSON GROUP REPORT E2071-1, MAY 2001)
- 97.76 GROUND SURFACE ELEVATION (m)
- [95.24] BEDROCK SURFACE ELEVATION (m)
- {94.75} PRACTICAL REFUSAL TO AUGERING ON INFERRED BEDROCK ELEVATION (m)
- (95.34) GROUNDWATER SURFACE ELEVATION (m)
- 95.6 GROUNDWATER CONTOUR (m)
- (0.08m/m) APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

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NO.	REVISIONS	DATE	INITIAL

10869279 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:400	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
Checked by: NS	Dwg. No.: PE5061-3
Approved by: MSD	Revision No.:

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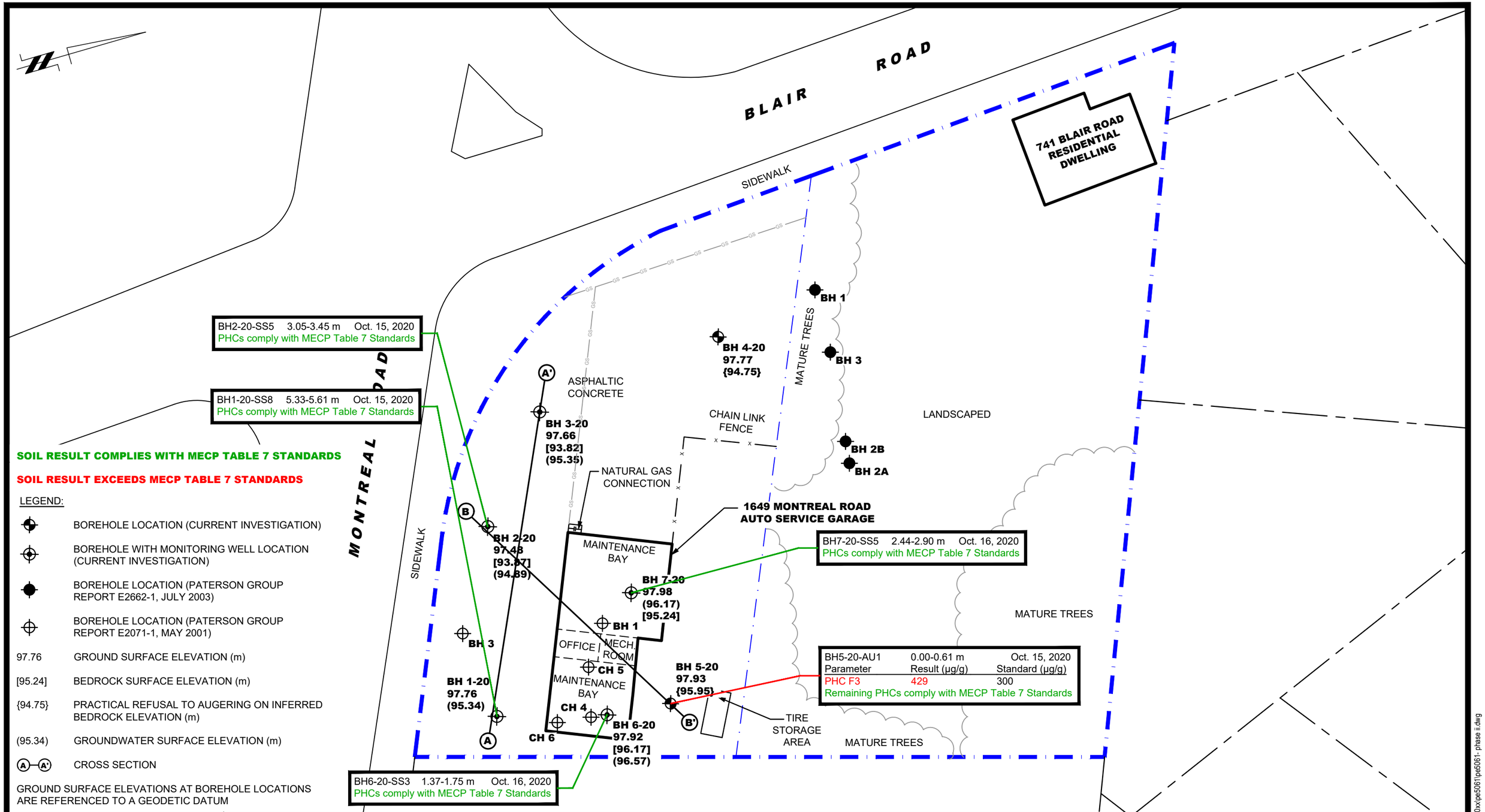

SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

LEGEND:

- BOREHOLE LOCATION (CURRENT INVESTIGATION)
- BOREHOLE WITH MONITORING WELL LOCATION (CURRENT INVESTIGATION)
- BOREHOLE LOCATION (PATERSON GROUP REPORT E2662-1, JULY 2003)
- BOREHOLE LOCATION (PATERSON GROUP REPORT E2071-1, MAY 2001)
- 97.76 GROUND SURFACE ELEVATION (m)
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- {94.75} PRACTICAL REFUSAL TO AUGERING ON INFERRED BEDROCK ELEVATION (m)
- (95.34) GROUNDWATER SURFACE ELEVATION (m)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

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NO.	REVISIONS	DATE	INITIAL

10869279 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (PHCs)

Scale: 1:400	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
Checked by: NS	Dwg. No.: PE5061-4
Approved by: MSD	Revision No.:

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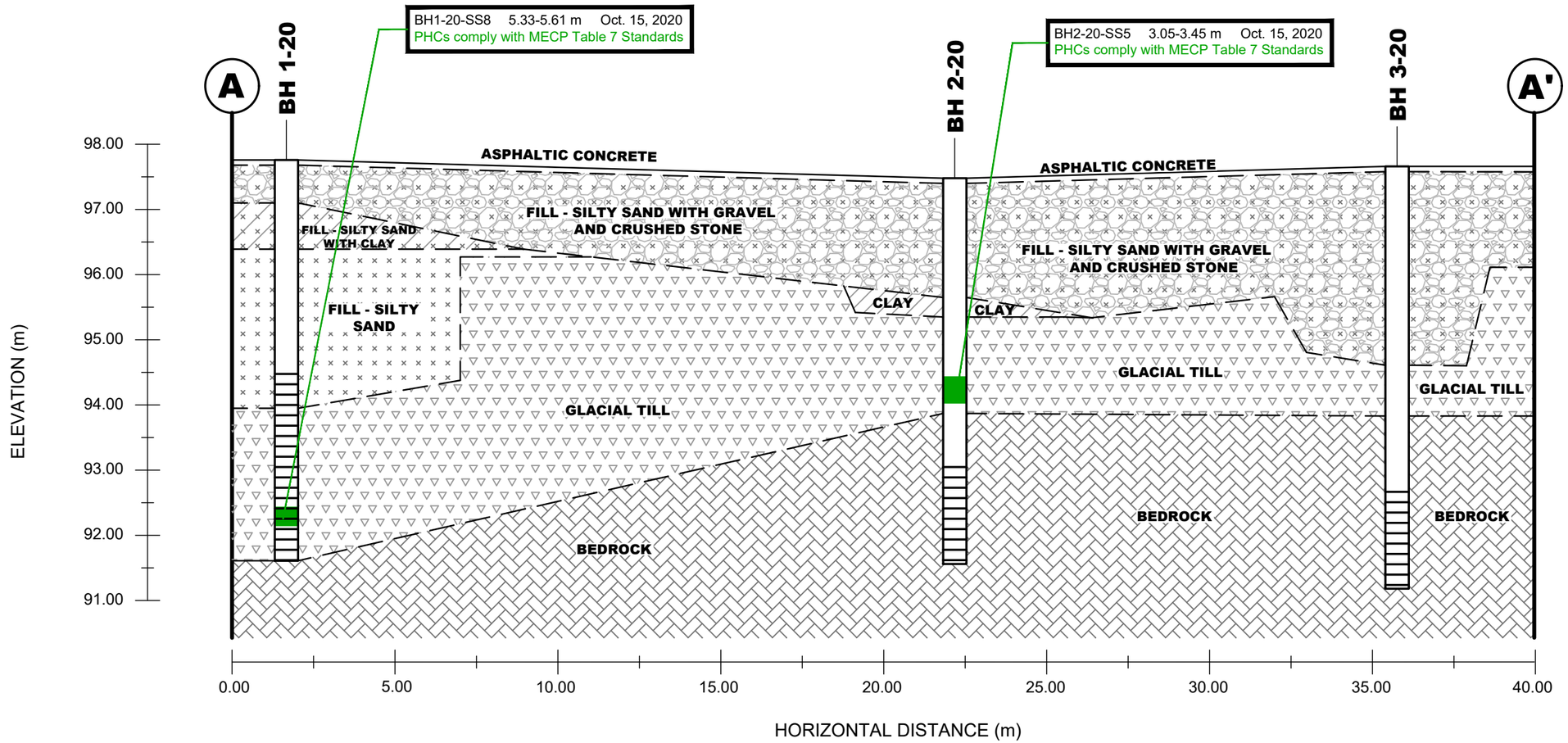

SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (PHCs)

Scale: AS SHOWN	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
Checked by: NS	Dwg. No.: PE5061-4A
Approved by: MSD	Revision No.:

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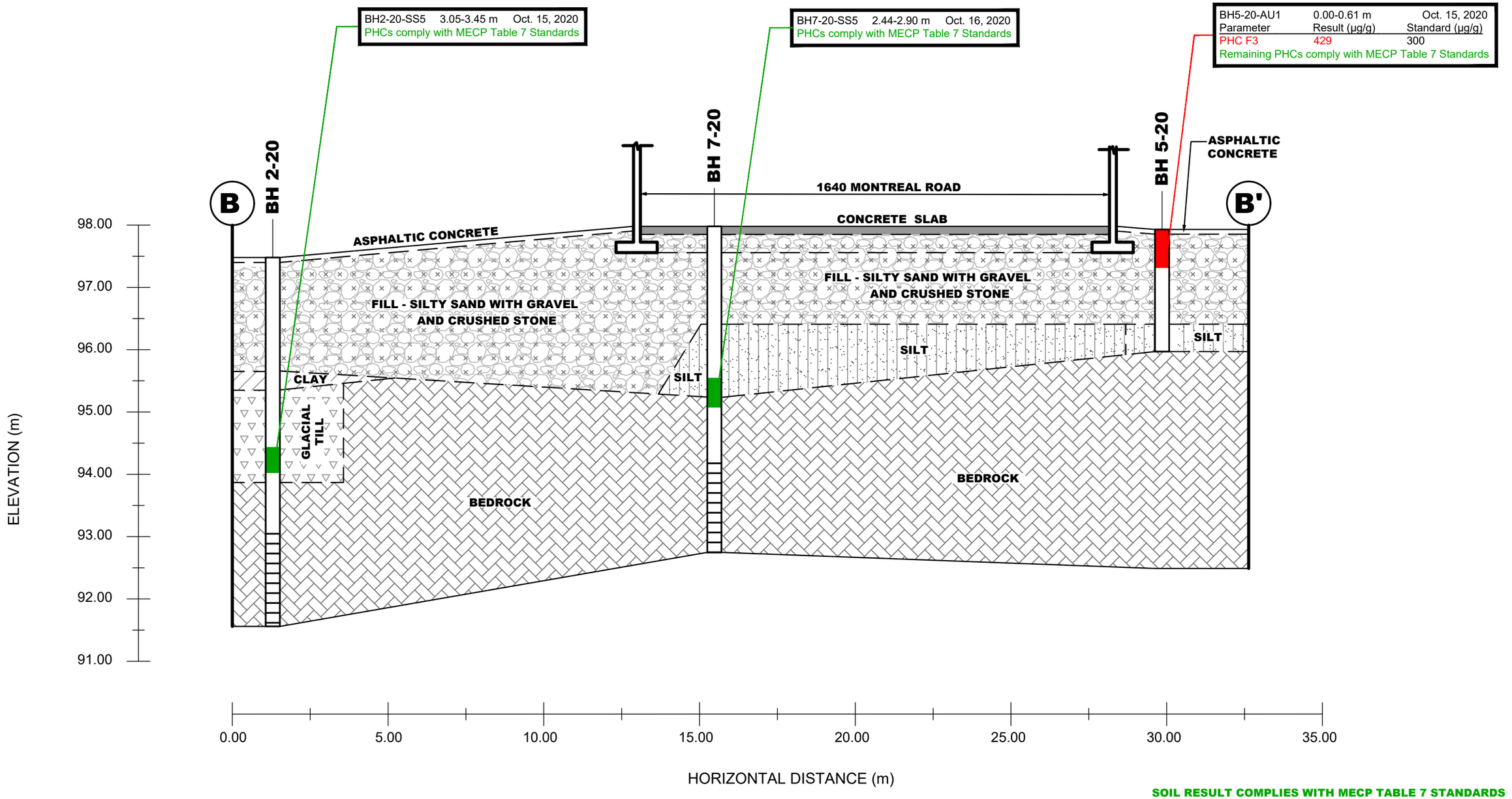
BH2-20-SS5 3.05-3.45 m Oct. 15, 2020
PHCs comply with MECP Table 7 Standards

BH7-20-SS5 2.44-2.90 m Oct. 16, 2020
PHCs comply with MECP Table 7 Standards

BH5-20-AU1	0.00-0.61 m	Oct. 15, 2020
Parameter	Result (µg/g)	Standard (µg/g)
PHC F3	429	300

Remaining PHCs comply with MECP Table 7 Standards



SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

10869279 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (PHCs)

Scale: AS SHOWN	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
Checked by: NS	Dwg. No.: PE5061-4B
Approved by: MSD	Revision No.:

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BLAIR ROAD

741 BLAIR ROAD RESIDENTIAL DWELLING

SIDEWALK

BH3-20-SS2 0.76-1.37 m Oct. 15, 2020
Metals and pH comply with MECP Table 7 Standards

BH2-20-SS2 0.76-1.37 m Oct. 15, 2020
Metals comply with MECP Table 7 Standards

BH2-20-SS5 3.05-3.45 m Oct. 15, 2020
BTEX comply with MECP Table 7 Standards

BH1-20-SS3 1.52-2.13 m Oct. 15, 2020
Metals comply with MECP Table 7 Standards

BH1-20-SS8 5.33-5.61 m Oct. 15, 2020
BTEX and pH comply with MECP Table 7 Standards

SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

LEGEND:

- BOREHOLE LOCATION (CURRENT INVESTIGATION)
- BOREHOLE WITH MONITORING WELL LOCATION (CURRENT INVESTIGATION)
- BOREHOLE LOCATION (PATERSON GROUP REPORT E2662-1, JULY 2003)
- BOREHOLE LOCATION (PATERSON GROUP REPORT E2071-1, MAY 2001)
- 97.76 GROUND SURFACE ELEVATION (m)
- [95.24] BEDROCK SURFACE ELEVATION (m)
- {94.75} PRACTICAL REFUSAL TO AUGERING ON INFERRED BEDROCK ELEVATION (m)
- (95.34) GROUNDWATER SURFACE ELEVATION (m)
- A–A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

MONTREAL ROAD

SIDEWALK

BH 1-20
97.76
(95.34)

BH 2-20
97.48
[93.87]
(94.89)

BH 3-20
97.66
[93.82]
(95.35)

BH 4-20
97.77
{94.75}

BH 1

BH 3

ASPHALTIC CONCRETE

MATURE TREES

CHAIN LINK FENCE

NATURAL GAS CONNECTION

LANDSCAPED

BH 2B

BH 2A

BH7-20-SS3 1.22-1.83 m Oct. 16, 2020
Metals comply with MECP Table 7 Standards

BH7-20-SS5 2.44-2.90 m Oct. 16, 2020
BTEX comply with MECP Table 7 Standards

1649 MONTREAL ROAD AUTO SERVICE GARAGE

MAINTENANCE BAY

BH 7-20
97.98
(96.17)
[95.24]

BH 1

OFFICE

MECH. ROOM

CH 5

MAINTENANCE BAY

CH 4

CH 6

BH 6-20
97.92
[96.17]
(96.57)

BH 5-20
97.93
{95.95}

MATURE TREES

BH5-20-AU1 0.00-0.61 m Oct. 15, 2020
BTEX and Metals comply with MECP Table 7 Standards

TIRE STORAGE AREA

MATURE TREES

BH6-20-SS3 1.37-1.75 m Oct. 16, 2020
BTEX comply with MECP Table 7 Standards

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NO.	REVISIONS	DATE	INITIAL

10869279 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (BTEX, METALS, pH)

Scale: 1:400	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
Checked by: NS	Dwg. No.: PE5061-5
Approved by: MSD	Revision No.:

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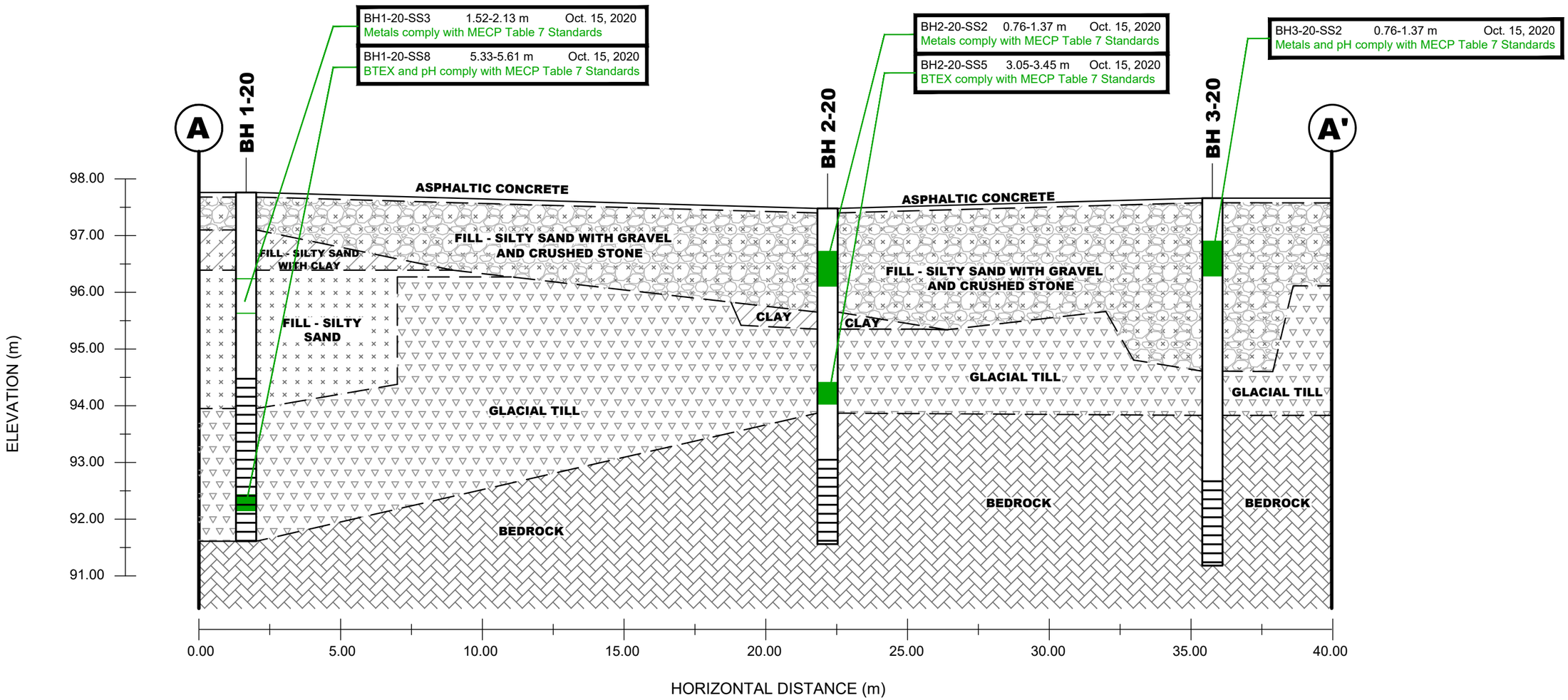

SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

10869279 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD

OTTAWA, ONTARIO

Title:
CROSS SECTION A-A' - SOIL (BTEX, METALS, pH)

Scale: AS SHOWN	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
Checked by: NS	Dwg. No.: PE5061-5A
Approved by: MSD	Revision No.:

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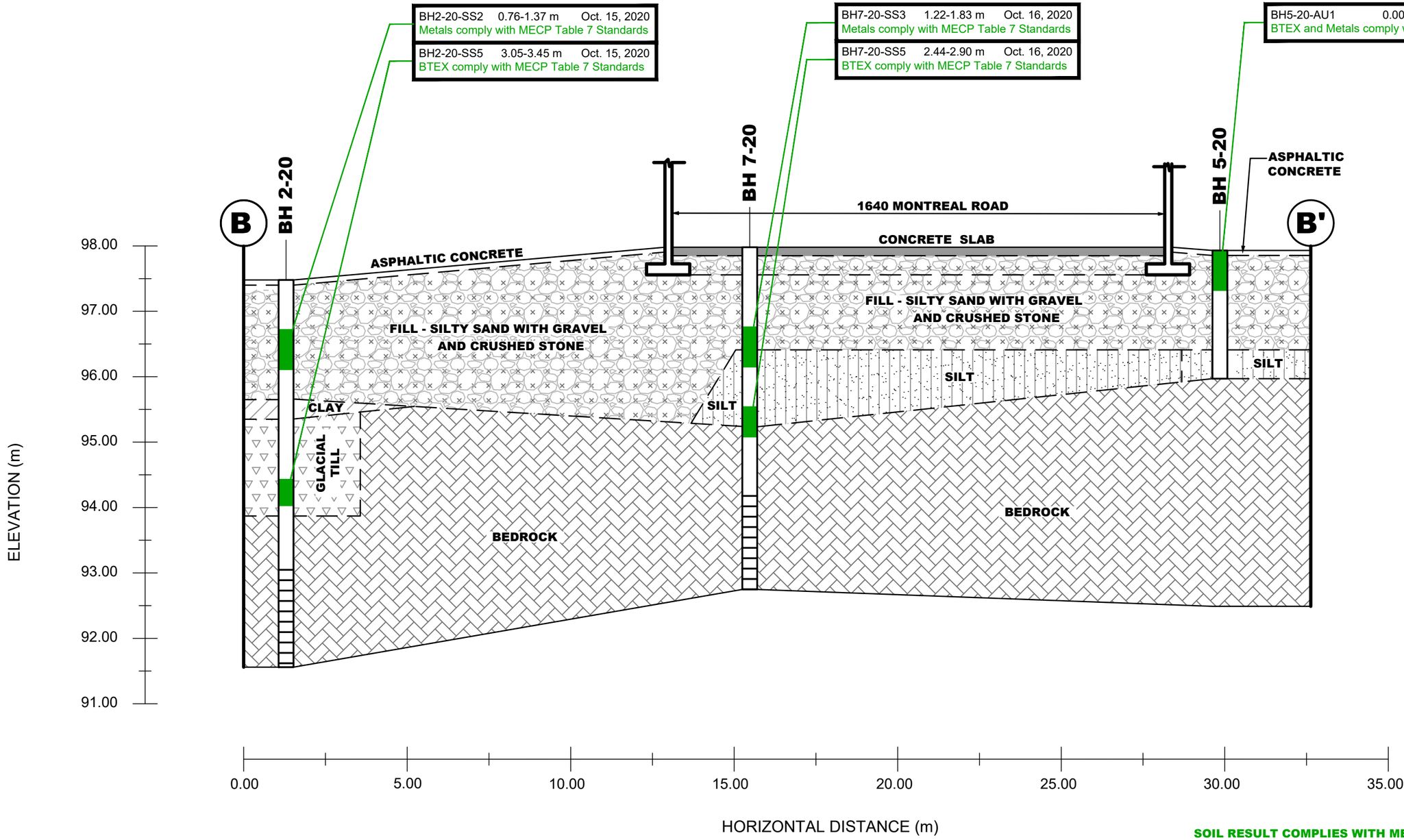
BH2-20-SS2 0.76-1.37 m Oct. 15, 2020
Metals comply with MECP Table 7 Standards

BH2-20-SS5 3.05-3.45 m Oct. 15, 2020
BTEX comply with MECP Table 7 Standards

BH7-20-SS3 1.22-1.83 m Oct. 16, 2020
Metals comply with MECP Table 7 Standards

BH7-20-SS5 2.44-2.90 m Oct. 16, 2020
BTEX comply with MECP Table 7 Standards

BH5-20-AU1 0.00-0.61 m Oct. 15, 2020
BTEX and Metals comply with MECP Table 7 Standards



SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

10869279 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD

OTTAWA, ONTARIO

Title:
CROSS SECTION B-B' - SOIL (BTEX, METALS, pH)

Scale: AS SHOWN	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
Checked by: NS	Dwg. No.: PE5061-5B
Approved by: MSD	Revision No.:

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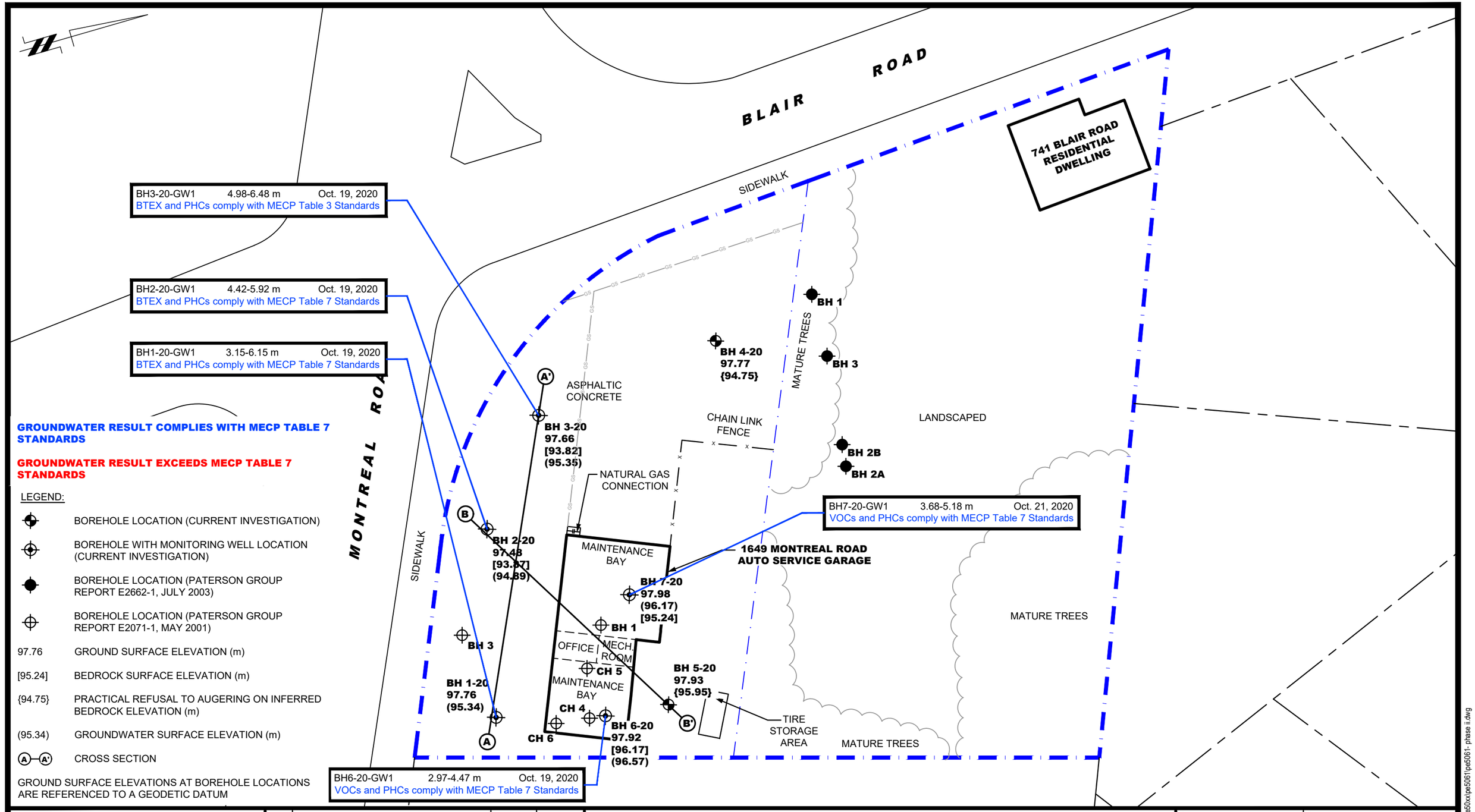

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 7 STANDARDS

LEGEND:

- BOREHOLE LOCATION (CURRENT INVESTIGATION)
- BOREHOLE WITH MONITORING WELL LOCATION (CURRENT INVESTIGATION)
- BOREHOLE LOCATION (PATERSON GROUP REPORT E2662-1, JULY 2003)
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- 97.76 GROUND SURFACE ELEVATION (m)
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- {94.75} PRACTICAL REFUSAL TO AUGERING ON INFERRED BEDROCK ELEVATION (m)
- (95.34) GROUNDWATER SURFACE ELEVATION (m)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

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10869279 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - GROUNDWATER (BTEX, VOCs, PHCs)

Scale: 1:400	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
Checked by: NS	Dwg. No.: PE5061-6
Approved by: MSD	Revision No.:

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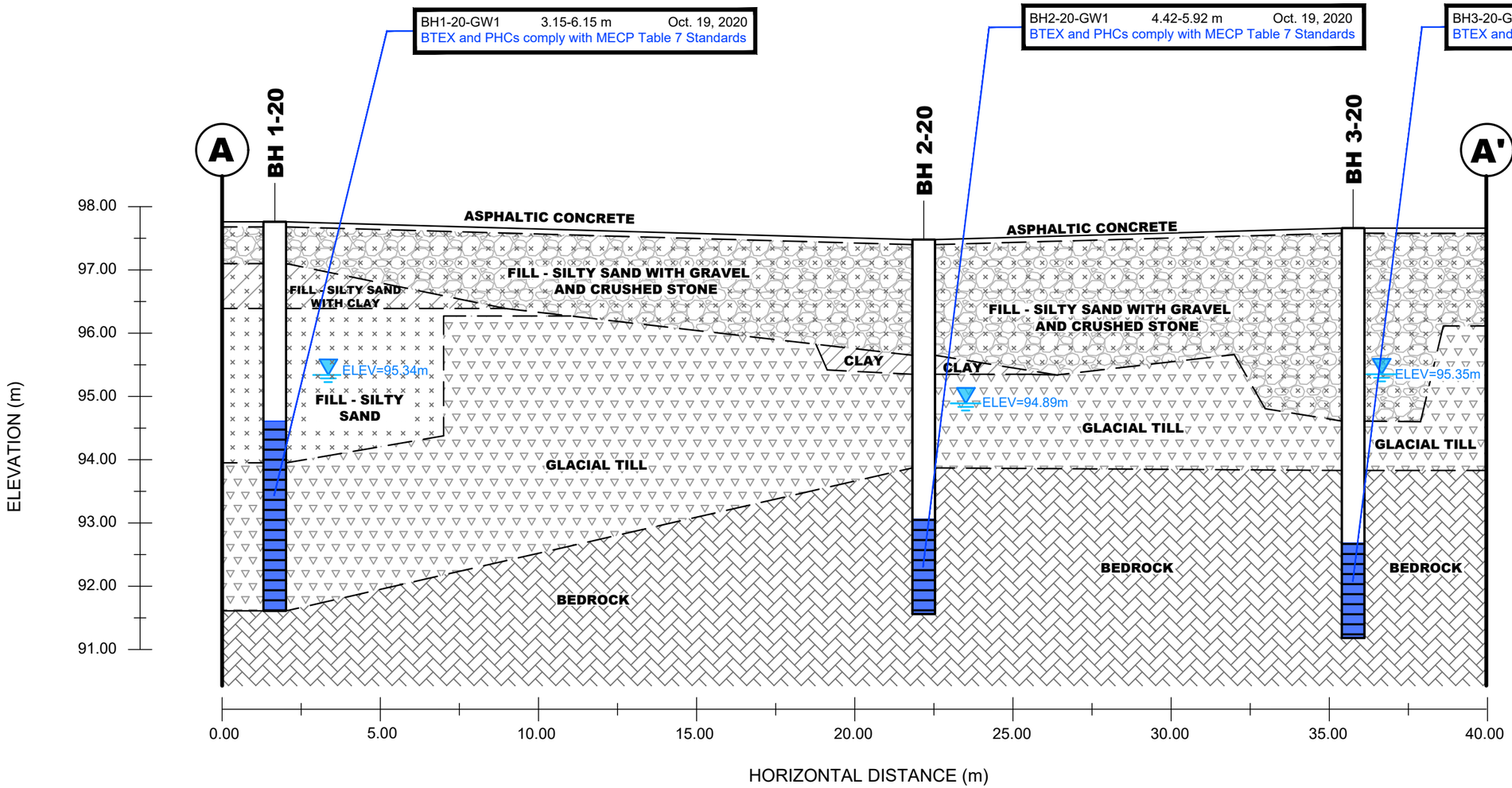
BH1-20-GW1 3.15-6.15 m Oct. 19, 2020
BTEX and PHCs comply with MECP Table 7 Standards

BH2-20-GW1 4.42-5.92 m Oct. 19, 2020
BTEX and PHCs comply with MECP Table 7 Standards

BH3-20-GW1 4.98-6.48 m Oct. 19, 2020
BTEX and PHCs comply with MECP Table 7 Standards



GROUNDWATER RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 7 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD

OTTAWA, ONTARIO

Title:
CROSS SECTION A-A' - GROUNDWATER (BTEX, VOCs, PHCs)

Scale: AS SHOWN	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
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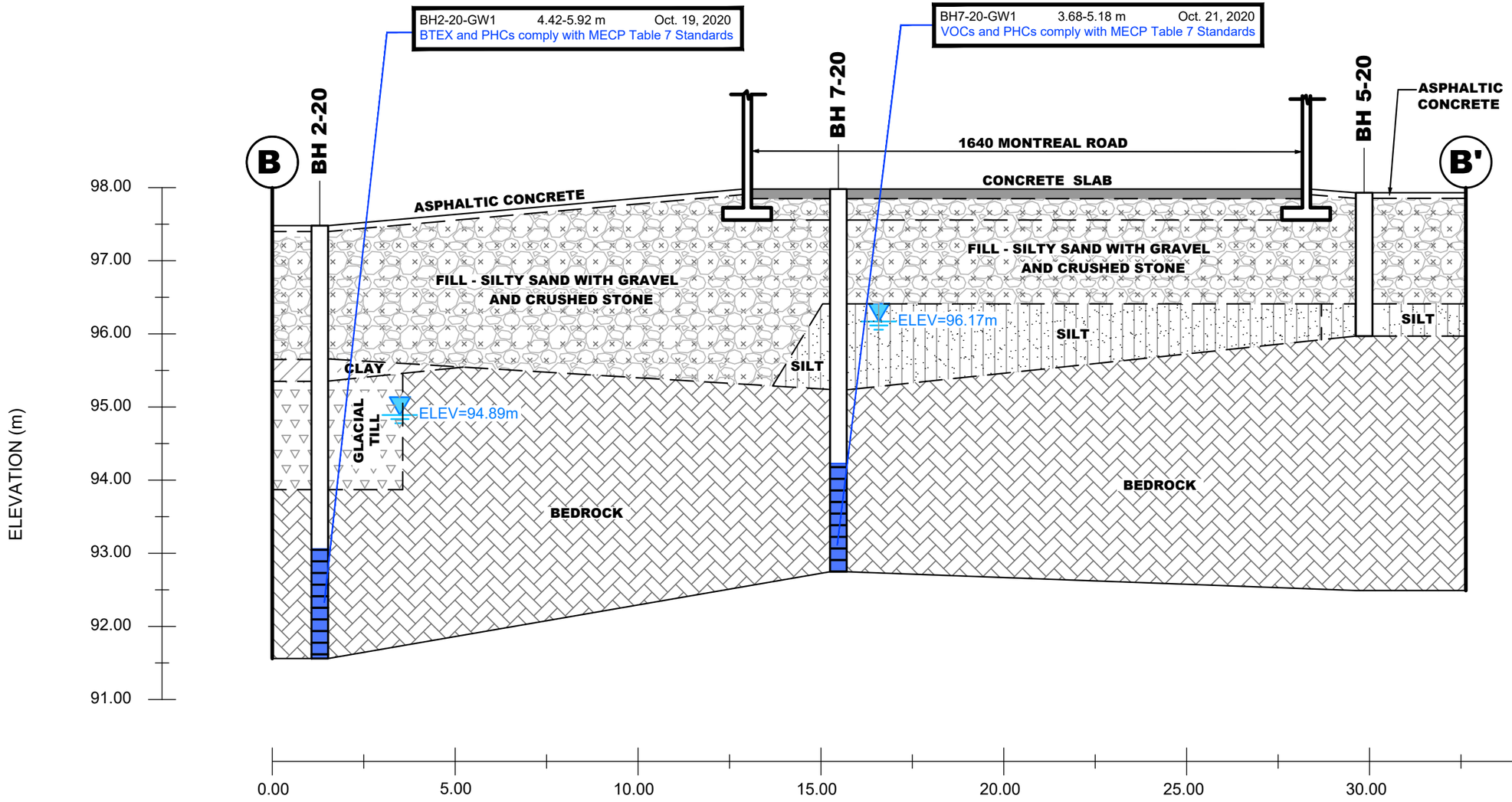

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 7 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1649 MONTREAL ROAD AND 741 BLAIR ROAD
OTTAWA, ONTARIO

Title:
CROSS SECTION B-B' - GROUNDWATER (BTEX, VOCs, PHCs)

Scale: AS SHOWN	Date: 10/2020
Drawn by: YA	Report No.: PE5061-2
Checked by: NS	Dwg. No.: PE5061-6B
Approved by: MSD	Revision No.:

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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
1649 Montreal Road & 741 Blair Road
Ottawa, Ontario

Prepared For

10869279 Canada Inc.

October 1, 2020

Report: PE5061-SAP

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Mr. Martin Chenier to conduct a Phase II – Environmental Site Assessment (Phase II ESA) for the properties addressed 1649 Montreal Road and 741 Blair Road in the City of Ottawa, Ontario. Based on the findings of the Phase I ESA, the following subsurface investigation program was developed.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-20	Southeastern portion of subject site; to assess for potential impacts resulting from the presence of fill material of unknown quality and a former underground waste oil tank nest.	4-7 m; to intercept the groundwater table for the purpose of installing a groundwater monitoring well.
BH2-20	Southern portion of subject site; to assess for potential impacts resulting from the presence of fill material of unknown quality and a former fuel pump island.	4-7 m; to intercept the groundwater table for the purpose of installing a groundwater monitoring well.
BH3-20	Southwestern portion of subject site; to assess for potential impacts resulting from the presence of fill material of unknown quality and a former underground fuel storage tank nest.	4-7 m; to intercept the groundwater table for the purpose of installing a groundwater monitoring well.
BH4-20	Western portion of subject site; to assess for potential impacts resulting from the presence of fill material of unknown quality.	1-3 m; for general coverage purposes.
BH5-20	Eastern portion of subject site; to assess for potential impacts resulting from the presence of fill material of unknown quality, an existing auto service garage, and two (2) aboveground waste oil storage tanks.	1-3 m; for general coverage purposes.
BH6-20	Interior of auto service garage (eastern maintenance bay); to assess for potential impacts resulting from the presence of two (2) former in-ground hoists, an existing auto service garage, an existing oil/water separator, and an aboveground motor oil storage tank.	4-7 m; to intercept the groundwater table for the purpose of installing a groundwater monitoring well.
BH7-20	Interior of auto service garage (western maintenance bay); to assess for potential impacts resulting from the presence of an existing auto service garage, an existing oil/water separator, and former underground waste oil tank nest.	4-7 m; to intercept the groundwater table for the purpose of installing a groundwater monitoring well.

Borehole locations are shown on Drawing PE5061-3 – Test Hole Location Plan, appended to the main report.

At each borehole, split-spoon samples of the overburden soils will be obtained at 0.76 m (2'6") intervals until practical refusal to augering. All soil samples will be retained, and samples will be selected for submission following a preliminary screening analysis. Following the borehole drilling, groundwater monitoring wells will be installed in BH1, BH2, BH3, BH6, and BH7 for the collection of groundwater samples.

2.0 ANALYTICAL TESTING PROGRAM

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

- ❒ At least one sample from each borehole should be submitted, in order to delineate the horizontal extent of contamination across the site.

- ❒ At least one sample from each stratigraphic unit should be submitted, in order to delineate the vertical extent of contamination at the site.

- ❒ In boreholes where there is visual or olfactory evidence of contamination, or where organic vapour meter or photoionization detector readings indicate the presence of contamination, the 'worst-case' sample from each borehole should be submitted for comparison with MECP 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 soil 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 geodetic benchmark, if one is available, or a temporary site benchmark which can be tied in at a later date if necessary.

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 F_1, 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” threaded sections of Schedule 40 PVC slotted well screen (5’ x 1 ¼” if installing in cored hole in bedrock)
- ❒ 5’ x 2” threaded sections of Schedule 40 PVC riser pipe (5’ x 1 ¼” 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 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

Physical impediments to the Sampling and Analysis plan may include:

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

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

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1649 Montreal Road and 741 Blair Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5061

REMARKS

HOLE NO. BH 1-20

BORINGS BY CME-55 Low Clearance Drill **DATE** October 15, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	97.76
Asphaltic concrete 0.08							
FILL: Brown silty sand with crushed stone 0.66		AU	1				
FILL: Brown silty sand with clay 1.37		SS	2	29	7	1	96.76
FILL: Brown silty sand		SS	3	33	7	2	95.76
		SS	4	58	2		
3.81		SS	5	17	W	3	94.76
GLACIAL TILL: Loose to very dense, grey silty sand with gravel		SS	6	75	5	4	93.76
		SS	7	25	14	5	92.76
5.60		SS	8	91	50+		
Weathered **BEDROCK** 6.15		SS	9	50	50+	6	91.76
End of Borehole							
Practical refusal to augering at 6.15m depth							
(GWL @ 2.42m - Oct. 19, 2020)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1649 Montreal Road and 741 Blair Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5061

REMARKS

HOLE NO. BH 2-20

BORINGS BY CME-55 Low Clearance Drill **DATE** October 15, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	97.48
Asphaltic concrete 0.08							
FILL: Brown silty sand, trace crushed stone 0.56		AU	1				
FILL: Grey/black silty sand with gravel and crushed stone		SS	2	54	10	1	96.48
1.83		SS	3	33	7		
Grey **SILTY CLAY,** some sand 2.13						2	95.48
GLACIAL TILL: Compact to dense, brown silty sand with clay and gravel		SS	4	50	14		
		SS	5	25	50+	3	94.48
3.61							
BEDROCK: Poor to fair quality, grey limestone		RC	1	100	45	4	93.48
		RC	2	100	58	5	92.48
5.92							
End of Borehole							
(GWL @ 2.59m - Oct. 19, 2020)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1649 Montreal Road and 741 Blair Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5061

REMARKS

HOLE NO. BH 3-20

BORINGS BY CME-55 Low Clearance Drill **DATE** October 15, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08		AU	1			0	97.66
FILL: Brown silty sand with crushed stone		SS	2	62	27	1	96.66
		SS	3	54	32	2	95.66
		SS	4	46	18		
3.05						3	94.66
GLACIAL TILL: Brown silty sand with gravel		SS	5	17	3		
3.83		SS	6	0	50+	4	93.66
		RC	1	57	45		
BEDROCK: Poor quality, grey limestone						5	92.66
		RC	2	100	48	6	91.66
6.48							
End of Borehole							
(GWL @ 2.31m - Oct. 19, 2020)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1649 Montreal Road and 741 Blair Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5061

REMARKS

HOLE NO. BH 4-20

BORINGS BY CME-55 Low Clearance Drill **DATE** October 15, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	97.77
Asphaltic concrete 0.08							
FILL: Brown silty sand, some crushed stone 0.51		AU	1				
		SS	2	71	16	1	96.77
Compact, brown **SILTY SAND** with gravel		SS	3	62	26	2	95.77
2.29							
GLACIAL TILL: Compact, brown silty sand with gravel, cobbles and boulders		SS		46	15	3	94.77
3.02							
End of Borehole							
Practical refusal to augering at 3.02m depth.							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

△

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1649 Montreal Road and 741 Blair Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5061

REMARKS

HOLE NO. BH 5-20

BORINGS BY CME-55 Low Clearance Drill **DATE** October 15, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	97.93
Asphaltic concrete 0.08							
FILL: Brown silty sand with crushed stone 0.60		AU	1				
FILL: Brown silty sand with gravel		SS	2	33	7	1	96.93
1.52							
Brown **SILT,** some sand and gravel 1.96		SS	3	59	50+		
End of Borehole							
Practical refusal to augering at 1.96m depth							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

510

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
1649 Montreal Road and 741 Blair Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Portable Drill **DATE** October 16, 2020

FILE NO. PE5061

HOLE NO. BH 6-20

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Concrete slab 0.16						0	97.92
FILL: Brown silty sand		SS	1	83			
		SS	2	67		1	96.92
1.75		SS	3	60			
		RC	1	100	42	2	95.92
		RC	2	100	36		
		RC	3	100	47		
BEDROCK: Poor to fair quality, grey limestone interbedded with shale		RC	4	100	0	3	94.92
		RC	5	100	0		
		RC	6	69	0		
		RC	7	100	55	4	93.92
4.47							
End of Borehole							
(GWL @ 1.35m - Oct. 19, 2020)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1649 Montreal Road and 741 Blair Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5061

REMARKS

HOLE NO. BH 7-20

BORINGS BY Portable Drill **DATE** October 16, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	97.98
Concrete slab 0.13							
FILL: Brown silty sand with crushed stone 0.56		SS	1	83			
FILL: Brown silty sand, trace gravel, clay and crushed stone		SS	2	67		1	96.98
1.80		SS	3	42			
Compact, brown **SILT,** some sand, occasional gravel		SS	4	58		2	95.98
2.74		SS	5	58			
BEDROCK: Poor to fair quality, grey limestone interbedded with shale		RC	1	100	70	3	94.98
		RC	2	100	0		
		RC	3	100	50		
		RC	4	100	42	4	93.98
		RC	5	100	31		
		RC	6	100	30		
		RC	7	100	42		
		RC	8	100	33	5	92.98
		RC	98	100	50		
5.49							
End of Borehole							
(GWL @ 1.81m - Oct. 21, 2020)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

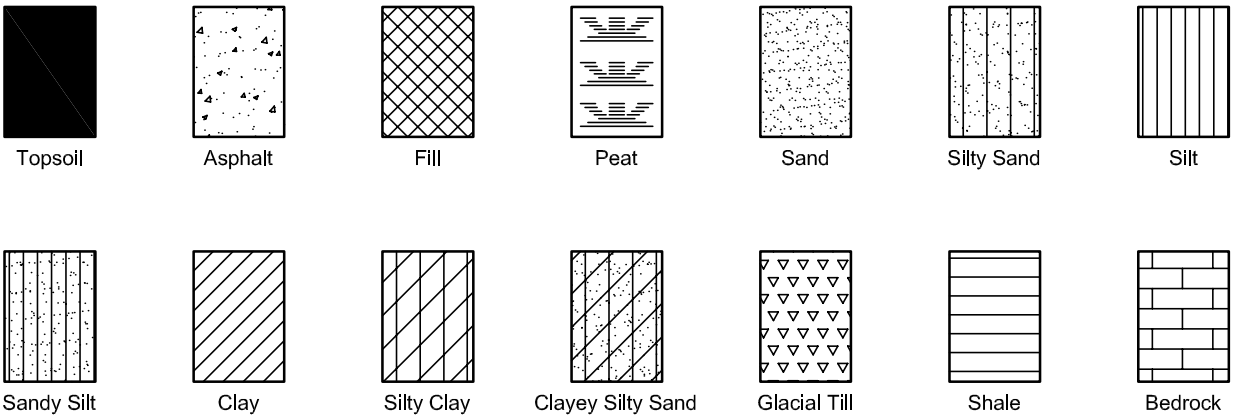
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

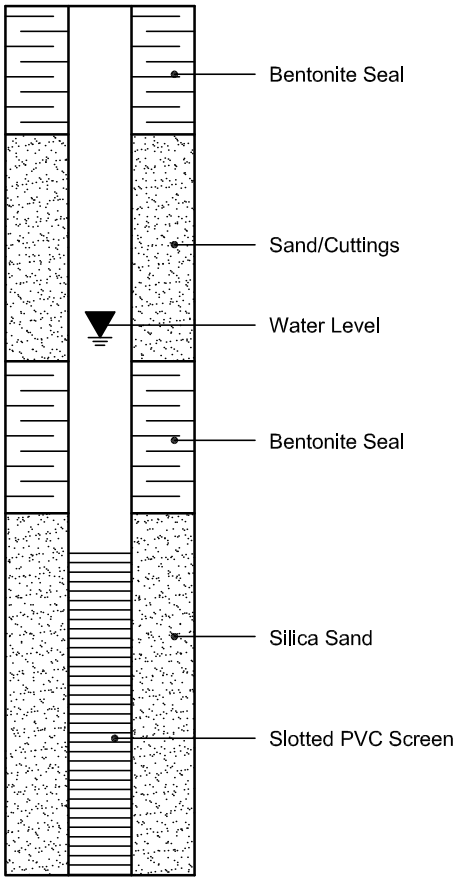
SYMBOLS AND TERMS (continued)

STRATA PLOT

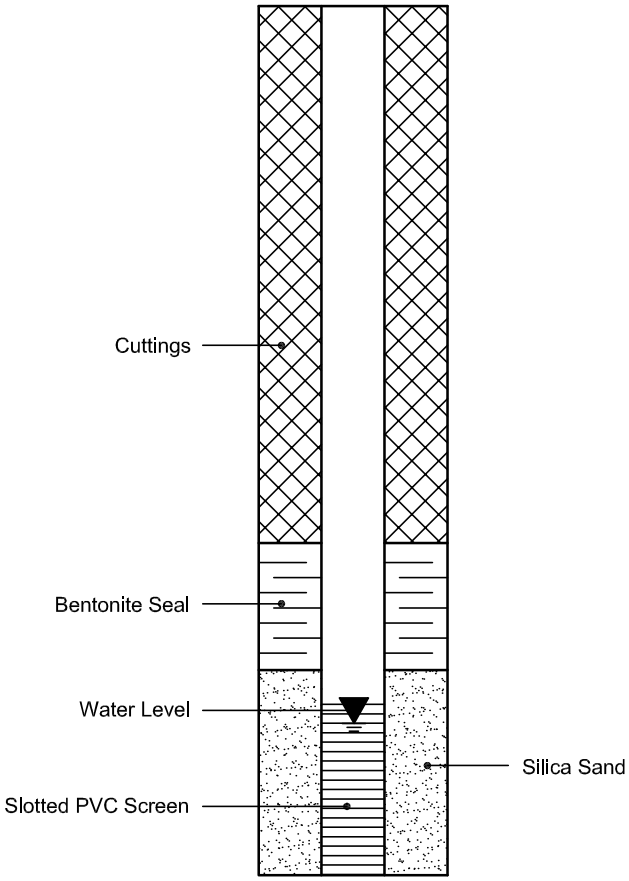


MONITORING WELL AND PIEZOMETER CONSTRUCTION

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: Nick Sullivan

Client PO: 31416
Project: PE5061
Custody:

Report Date: 21-Oct-2020
Order Date: 16-Oct-2020

Order #: 2042566

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

Paracel ID	Client ID
2042566-01	BH1-20-SS3
2042566-02	BH1-20-SS8
2042566-03	BH2-20-SS2
2042566-04	BH2-20-SS5
2042566-05	BH3-20-SS2
2042566-06	BH5-20-AU1
2042566-07	Dup1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 21-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 16-Oct-2020

Client PO: 31416

Project Description: PE5061

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	19-Oct-20	20-Oct-20
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	19-Oct-20	21-Oct-20
Mercury by CVAA	EPA 7471B - CVAA, digestion	20-Oct-20	20-Oct-20
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	19-Oct-20	19-Oct-20
PHC F1	CWS Tier 1 - P&T GC-FID	19-Oct-20	20-Oct-20
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	20-Oct-20	20-Oct-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	19-Oct-20	19-Oct-20
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	19-Oct-20	19-Oct-20
Solids, %	Gravimetric, calculation	16-Oct-20	19-Oct-20

Certificate of Analysis

Report Date: 21-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 16-Oct-2020

Client PO: 31416

Project Description: PE5061

	Client ID:	BH1-20-SS3	BH1-20-SS8	BH2-20-SS2	BH2-20-SS5
	Sample Date:	15-Oct-20 09:00	15-Oct-20 09:00	15-Oct-20 09:00	15-Oct-20 09:00
	Sample ID:	2042566-01	2042566-02	2042566-03	2042566-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	83.4	91.9	82.7	89.1
General Inorganics					
pH	0.05 pH Units	-	7.83	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	<1.0	-
Arsenic	1.0 ug/g dry	1.6	-	2.9	-
Barium	1.0 ug/g dry	41.8	-	90.2	-
Beryllium	0.5 ug/g dry	<0.5	-	<0.5	-
Boron	5.0 ug/g dry	<5.0	-	<5.0	-
Cadmium	0.5 ug/g dry	<0.5	-	<0.5	-
Chromium	5.0 ug/g dry	12.6	-	22.5	-
Chromium (VI)	0.2 ug/g dry	<0.2	-	<0.2	-
Cobalt	1.0 ug/g dry	4.3	-	6.3	-
Copper	5.0 ug/g dry	9.4	-	12.6	-
Lead	1.0 ug/g dry	2.2	-	9.2	-
Mercury	0.1 ug/g dry	<0.1	-	<0.1	-
Molybdenum	1.0 ug/g dry	<1.0	-	<1.0	-
Nickel	5.0 ug/g dry	7.9	-	12.7	-
Selenium	1.0 ug/g dry	<1.0	-	<1.0	-
Silver	0.3 ug/g dry	<0.3	-	<0.3	-
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	22.8	-	30.9	-
Zinc	20.0 ug/g dry	<20.0	-	40.0	-
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	-	117%	-	107%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	-	<7
F2 PHCs (C10-C16)	4 ug/g dry	-	14	-	<4

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 31416

Report Date: 21-Oct-2020

Order Date: 16-Oct-2020

Project Description: PE5061

	Client ID:	BH1-20-SS3	BH1-20-SS8	BH2-20-SS2	BH2-20-SS5
	Sample Date:	15-Oct-20 09:00	15-Oct-20 09:00	15-Oct-20 09:00	15-Oct-20 09:00
	Sample ID:	2042566-01	2042566-02	2042566-03	2042566-04
	MDL/Units	Soil	Soil	Soil	Soil
F3 PHCs (C16-C34)	8 ug/g dry	-	<8	-	<8
F4 PHCs (C34-C50)	6 ug/g dry	-	12	-	<6

Certificate of Analysis

Report Date: 21-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 16-Oct-2020

Client PO: 31416

Project Description: PE5061

	Client ID:	BH3-20-SS2	BH5-20-AU1	Dup1	-
	Sample Date:	15-Oct-20 09:00	15-Oct-20 09:00	15-Oct-20 09:00	-
	Sample ID:	2042566-05	2042566-06	2042566-07	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	95.7	97.9	91.9	-
General Inorganics					
pH	0.05 pH Units	7.93	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	3.0	4.2	-	-
Barium	1.0 ug/g dry	55.9	59.2	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	<5.0	5.3	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	12.0	9.4	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	-	-
Cobalt	1.0 ug/g dry	5.2	4.6	-	-
Copper	5.0 ug/g dry	15.9	9.9	-	-
Lead	1.0 ug/g dry	6.0	20.1	-	-
Mercury	0.1 ug/g dry	<0.1	<0.1	-	-
Molybdenum	1.0 ug/g dry	<1.0	2.1	-	-
Nickel	5.0 ug/g dry	10.2	15.4	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
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	18.8	22.5	-	-
Zinc	20.0 ug/g dry	23.4	<20.0	-	-
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	-	108%	107%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	-	<4	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 31416

Report Date: 21-Oct-2020

Order Date: 16-Oct-2020

Project Description: PE5061

	Client ID:	BH3-20-SS2	BH5-20-AU1	Dup1	-
	Sample Date:	15-Oct-20 09:00	15-Oct-20 09:00	15-Oct-20 09:00	-
	Sample ID:	2042566-05	2042566-06	2042566-07	-
	MDL/Units	Soil	Soil	Soil	-
F3 PHCs (C16-C34)	8 ug/g dry	-	429	-	-
F4 PHCs (C34-C50)	6 ug/g dry	-	837 [1]	-	-
F4G PHCs (gravimetric)	50 ug/g dry	-	2050 [2]	-	-

Certificate of Analysis

Report Date: 21-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 16-Oct-2020

Client PO: 31416

Project Description: PE5061

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						
F4G PHCs (gravimetric)	ND	50	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.50*		*ug/g*		*106*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	7.79	0.05	pH Units	7.83			0.5	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	14	4	ug/g dry	14			1.8	30	
F3 PHCs (C16-C34)	14	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	17	6	ug/g dry	12			NC	30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			NC	30	
Arsenic	2.4	1.0	ug/g dry	1.6			NC	30	
Barium	47.6	1.0	ug/g dry	41.8			13.0	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	ND	5.0	ug/g dry	ND			NC	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	14.6	5.0	ug/g dry	12.6			14.6	30	
Cobalt	5.0	1.0	ug/g dry	4.3			14.1	30	
Copper	10.7	5.0	ug/g dry	9.4			13.6	30	
Lead	2.6	1.0	ug/g dry	2.2			14.0	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	9.7	5.0	ug/g dry	7.9			20.5	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	27.3	10.0	ug/g dry	22.8			18.0	30	
Zinc	21.7	20.0	ug/g dry	ND			NC	30	
Physical Characteristics									
% Solids	82.6	0.1	% by Wt.	80.1			3.1	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	*9.45*		*ug/g dry*		*107*	*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)	162	7	ug/g	ND	81.2	80-120			
F2 PHCs (C10-C16)	69	4	ug/g	14	62.2	60-140			
F3 PHCs (C16-C34)	171	8	ug/g	ND	80.1	60-140			
F4 PHCs (C34-C50)	111	6	ug/g	12	73.3	60-140			
F4G PHCs (gravimetric)	990	50	ug/g	ND	99.0	80-120			
Metals									
Antimony	43.5	1.0	ug/g	ND	87.0	70-130			
Arsenic	49.1	1.0	ug/g	ND	98.2	70-130			
Barium	46.7	1.0	ug/g	ND	93.4	70-130			
Beryllium	46.5	0.5	ug/g	ND	92.9	70-130			
Boron	39.3	5.0	ug/g	ND	78.7	70-130			
Cadmium	47.8	0.5	ug/g	ND	95.7	70-130			
Chromium (VI)	4.6	0.2	ug/g	ND	76.0	70-130			
Chromium	48.9	5.0	ug/g	ND	97.7	70-130			
Cobalt	47.7	1.0	ug/g	ND	95.3	70-130			
Copper	47.5	5.0	ug/g	ND	95.0	70-130			
Lead	45.1	1.0	ug/g	ND	90.1	70-130			
Mercury	1.23	0.1	ug/g	ND	81.8	70-130			
Molybdenum	43.9	1.0	ug/g	ND	87.9	70-130			
Nickel	47.0	5.0	ug/g	ND	94.0	70-130			
Selenium	46.1	1.0	ug/g	ND	92.1	70-130			
Silver	46.5	0.3	ug/g	ND	93.0	70-130			
Thallium	44.2	1.0	ug/g	ND	88.3	70-130			
Uranium	45.4	1.0	ug/g	ND	90.8	70-130			
Vanadium	48.3	10.0	ug/g	ND	96.6	70-130			
Zinc	47.0	20.0	ug/g	ND	93.9	70-130			
Volatiles									
Benzene	3.69	0.02	ug/g	ND	92.3	60-130			
Ethylbenzene	3.58	0.05	ug/g	ND	89.6	60-130			
Toluene	3.59	0.05	ug/g	ND	89.8	60-130			
m,p-Xylenes	7.19	0.05	ug/g	ND	89.8	60-130			
o-Xylene	3.57	0.05	ug/g	ND	89.1	60-130			
Surrogate: Toluene-d8	*8.27*		*ug/g*		*103*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

1 : GC-FID signal did not return to baseline by C50

2 : High non-mineral organic content in sample. Additional silica gel cleanup performed, however, results may be biased high.

QC Qualifiers :

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2042566

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2042566	

Client Name: Paterson Group	Project Ref: PE5061
Contact Name: Nick Sullivan	Quote #:
Address: 154 Colonnade Rd. S.	PO #: 31416
Telephone: 613-226-7381	E-mail: nsullivan@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)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	
1	BH1-20-SS3				Oct. 15. 20					X	X	X		
2	BH1-20-SS6						-	H	O	L	D	-		
3	BH1-20-SS8						X							X
4	BH2-20-SS2									X	X	X		
5	BH2-20-SS3						-	H	O	L	D	-		
6	BH2-20-SS5						X							
7	BH3-20-SS2								X	X	X	X		X
8	BH4-20-AU1						-	H	O	L	D	-		
9	BH5-20-AU1						X			X	X	X		
10	DUP 1						X							

Comments: ↳ DUP1 to be analyzed for BTEX/PHC F1

Method of Delivery: PLB

Relinquished By (Sign): N. Sullivan	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nick Sullivan	Date/Time:	Date/Time: 10-16-20 16:10	Date/Time: 10-16-20 16:23
Date/Time: Oct. 16. 2020	Temperature: °C	Temperature: 20.3 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Nick Sullivan

Client PO: 31419
Project: PE5061
Custody: 55009

Report Date: 26-Oct-2020
Order Date: 20-Oct-2020

Order #: 2043276

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

Paracel ID	Client ID
2043276-01	BH6-20-SS3
2043276-02	BH7-20-SS3
2043276-03	BH7-20-SS5

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 26-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 20-Oct-2020

Client PO: 31419

Project Description: PE5061

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	21-Oct-20	21-Oct-20
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	21-Oct-20	22-Oct-20
Mercury by CVAA	EPA 7471B - CVAA, digestion	23-Oct-20	23-Oct-20
PHC F1	CWS Tier 1 - P&T GC-FID	21-Oct-20	21-Oct-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	21-Oct-20	22-Oct-20
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	22-Oct-20	26-Oct-20
Solids, %	Gravimetric, calculation	21-Oct-20	22-Oct-20

Certificate of Analysis

Report Date: 26-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 20-Oct-2020

Client PO: 31419

Project Description: PE5061

	Client ID:	BH6-20-SS3	BH7-20-SS3	BH7-20-SS5	-
	Sample Date:	16-Oct-20 09:00	16-Oct-20 09:00	16-Oct-20 09:00	-
	Sample ID:	2043276-01	2043276-02	2043276-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	84.6	86.4	87.9	-
Metals					
Antimony	1.0 ug/g dry	-	<1.0	-	-
Arsenic	1.0 ug/g dry	-	3.5	-	-
Barium	1.0 ug/g dry	-	71.6	-	-
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	-	28.9	-	-
Chromium (VI)	0.2 ug/g dry	-	<0.2	-	-
Cobalt	1.0 ug/g dry	-	6.9	-	-
Copper	5.0 ug/g dry	-	19.3	-	-
Lead	1.0 ug/g dry	-	13.3	-	-
Mercury	0.1 ug/g dry	-	<0.1	-	-
Molybdenum	1.0 ug/g dry	-	<1.0	-	-
Nickel	5.0 ug/g dry	-	15.7	-	-
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	-	33.4	-	-
Zinc	20.0 ug/g dry	-	73.5	-	-
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	126%	-	126%	-
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

Report Date: 26-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 20-Oct-2020

Client PO: 31419

Project Description: PE5061

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*9.44*		*ug/g*		*118*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			NC	30	
Arsenic	1.6	1.0	ug/g dry	1.6			1.2	30	
Barium	14.8	1.0	ug/g dry	14.5			2.2	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	ND	5.0	ug/g dry	ND			NC	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	7.8	5.0	ug/g dry	6.9			12.6	30	
Cobalt	2.0	1.0	ug/g dry	1.7			15.9	30	
Copper	ND	5.0	ug/g dry	ND			NC	30	
Lead	3.3	1.0	ug/g dry	2.7			21.0	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	ND	5.0	ug/g dry	ND			NC	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	18.4	10.0	ug/g dry	15.5			16.7	30	
Zinc	ND	20.0	ug/g dry	ND			NC	30	
Physical Characteristics									
% Solids	84.7	0.1	% by Wt.	84.6			0.0	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	*11.9*		*ug/g dry*		*126*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	210	7	ug/g	ND	105	80-120			
F2 PHCs (C10-C16)	108	4	ug/g	ND	128	60-140			
F3 PHCs (C16-C34)	279	8	ug/g	ND	134	60-140			
F4 PHCs (C34-C50)	157	6	ug/g	ND	119	60-140			
Metals									
Antimony	39.2	1.0	ug/g	ND	78.2	70-130			
Arsenic	46.3	1.0	ug/g	ND	91.4	70-130			
Barium	48.8	1.0	ug/g	5.8	86.1	70-130			
Beryllium	45.4	0.5	ug/g	ND	90.6	70-130			
Boron	39.0	5.0	ug/g	ND	77.2	70-130			
Cadmium	41.6	0.5	ug/g	ND	83.1	70-130			
Chromium (VI)	0.1	0.2	ug/g	ND	67.5	70-130			QM-05
Chromium	48.3	5.0	ug/g	ND	91.1	70-130			
Cobalt	46.3	1.0	ug/g	ND	91.3	70-130			
Copper	44.8	5.0	ug/g	ND	87.8	70-130			
Lead	43.8	1.0	ug/g	1.1	85.4	70-130			
Mercury	1.66	0.1	ug/g	ND	111	70-130			
Molybdenum	41.7	1.0	ug/g	ND	83.3	70-130			
Nickel	45.2	5.0	ug/g	ND	87.7	70-130			
Selenium	44.5	1.0	ug/g	ND	88.9	70-130			
Thallium	42.9	1.0	ug/g	ND	85.8	70-130			
Uranium	43.9	1.0	ug/g	ND	87.6	70-130			
Vanadium	51.5	10.0	ug/g	ND	90.5	70-130			
Zinc	46.5	20.0	ug/g	ND	84.9	70-130			
Volatiles									
Benzene	4.56	0.02	ug/g	ND	114	60-130			
Ethylbenzene	4.42	0.05	ug/g	ND	111	60-130			
Toluene	5.01	0.05	ug/g	ND	125	60-130			
m,p-Xylenes	8.74	0.05	ug/g	ND	109	60-130			
o-Xylene	4.50	0.05	ug/g	ND	113	60-130			
Surrogate: Toluene-d8	*8.79*		*ug/g*		*110*	*50-140*			

Certificate of Analysis

Report Date: 26-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 20-Oct-2020

Client PO: 31419

Project Description: PE5061

Qualifier Notes:

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2043276	№ 55009

Client Name: Paterson Group	Project Ref: PE5061		Page 1 of 1
Contact Name: Nick Sullivan	Quote #:		**Turnaround Time**
Address: 154 Colonnade Rd. S.	PO #: 31419		☐ 1 day ☐ 3 day
	E-mail: nsullivan@patersongroup.ca		☐ 2 day ☐ Regular
Telephone: 613-226-7381			Date Required:

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

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	BTEX	PHCs F1-F4	Metals	Hg	Cr6							
1	BH6-20-SS3	S		2	Oct. 16.20		X	X										
2	BH7-20-SS3	S		1	↓				X	X	X							
3	BH7-20-SS4	S		2	↓		~~X~~	~~X~~	—	H	O	L	D	—				
4	BH7-20-SS5	S		2	↓		X	X										
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): N. Sullivan	Received By Driver/Depot: M. Jeouse	Received at Lab: [illegible]	Verified By: [illegible]
Relinquished By (Print): Nick Sullivan	Date/Time: 20/10/20 3.25 PM	Date/Time: Oct 20, 2020 04.50	Date/Time: Oct 20, 2020 940
Date/Time: Oct. 20. 2020	Temperature: °C	Temperature: 10.1 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 31385
Project: PE5061
Custody: 55008

Report Date: 23-Oct-2020
Order Date: 20-Oct-2020

Order #: 2043273

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

Paracel ID	Client ID
2043273-01	BH1-20-GW1
2043273-02	BH2-20-GW1
2043273-03	BH3-20-GW1
2043273-04	BH6-20-GW1
2043273-05	Dup 1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 23-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 20-Oct-2020

Client PO: 31385

Project Description: PE5061

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	23-Oct-20	23-Oct-20
PHC F1	CWS Tier 1 - P&T GC-FID	22-Oct-20	23-Oct-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	20-Oct-20	22-Oct-20
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	22-Oct-20	23-Oct-20

Certificate of Analysis

Report Date: 23-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 20-Oct-2020

Client PO: 31385

Project Description: PE5061

	Client ID:	BH1-20-GW1	BH2-20-GW1	BH3-20-GW1	BH6-20-GW1
	Sample Date:	19-Oct-20 09:00	19-Oct-20 09:00	19-Oct-20 09:00	19-Oct-20 09:00
	Sample ID:	2043273-01	2043273-02	2043273-03	2043273-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Acetone	5.0 ug/L	-	-	-	<5.0
Benzene	0.5 ug/L	-	-	-	<0.5
Bromodichloromethane	0.5 ug/L	-	-	-	<0.5
Bromoform	0.5 ug/L	-	-	-	<0.5
Bromomethane	0.5 ug/L	-	-	-	<0.5
Carbon Tetrachloride	0.2 ug/L	-	-	-	<0.2
Chlorobenzene	0.5 ug/L	-	-	-	<0.5
Chloroform	0.5 ug/L	-	-	-	2.5
Dibromochloromethane	0.5 ug/L	-	-	-	<0.5
Dichlorodifluoromethane	1.0 ug/L	-	-	-	<1.0
1,2-Dichlorobenzene	0.5 ug/L	-	-	-	<0.5
1,3-Dichlorobenzene	0.5 ug/L	-	-	-	<0.5
1,4-Dichlorobenzene	0.5 ug/L	-	-	-	<0.5
1,1-Dichloroethane	0.5 ug/L	-	-	-	<0.5
1,2-Dichloroethane	0.5 ug/L	-	-	-	<0.5
1,1-Dichloroethylene	0.5 ug/L	-	-	-	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	-	-	-	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	-	-	-	<0.5
1,2-Dichloropropane	0.5 ug/L	-	-	-	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	-	-	-	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	-	-	-	<0.5
1,3-Dichloropropene, total	0.5 ug/L	-	-	-	<0.5
Ethylbenzene	0.5 ug/L	-	-	-	<0.5
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	-	-	-	<0.2
Hexane	1.0 ug/L	-	-	-	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	-	-	-	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	-	-	-	<5.0
Methyl tert-butyl ether	2.0 ug/L	-	-	-	<2.0
Methylene Chloride	5.0 ug/L	-	-	-	<5.0
Styrene	0.5 ug/L	-	-	-	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	-	-	-	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	-	-	-	<0.5
Tetrachloroethylene	0.5 ug/L	-	-	-	<0.5
Toluene	0.5 ug/L	-	-	-	<0.5
1,1,1-Trichloroethane	0.5 ug/L	-	-	-	<0.5

Certificate of Analysis

Report Date: 23-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 20-Oct-2020

Client PO: 31385

Project Description: PE5061

	Client ID:	BH1-20-GW1	BH2-20-GW1	BH3-20-GW1	BH6-20-GW1
	Sample Date:	19-Oct-20 09:00	19-Oct-20 09:00	19-Oct-20 09:00	19-Oct-20 09:00
	Sample ID:	2043273-01	2043273-02	2043273-03	2043273-04
	MDL/Units	Water	Water	Water	Water
1,1,2-Trichloroethane	0.5 ug/L	-	-	-	<0.5
Trichloroethylene	0.5 ug/L	-	-	-	<0.5
Trichlorofluoromethane	1.0 ug/L	-	-	-	<1.0
Vinyl chloride	0.5 ug/L	-	-	-	<0.5
m,p-Xylenes	0.5 ug/L	-	-	-	<0.5
o-Xylene	0.5 ug/L	-	-	-	<0.5
Xylenes, total	0.5 ug/L	-	-	-	<0.5
4-Bromofluorobenzene	Surrogate	-	-	-	102%
Dibromofluoromethane	Surrogate	-	-	-	100%
Toluene-d8	Surrogate	-	-	-	112%
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	15.9	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	51.3	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	51.3	<0.5	<0.5	-
Toluene-d8	Surrogate	112%	113%	113%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	219	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100

	Client ID:	Dup 1	-	-	-
	Sample Date:	19-Oct-20 09:00	-	-	-
	Sample ID:	2043273-05	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
Benzene	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
Toluene-d8	Surrogate	113%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*80.7*		*ug/L*		*101*	*50-140*			
Surrogate: Dibromofluoromethane	*81.8*		*ug/L*		*102*	*50-140*			
Surrogate: Toluene-d8	*89.9*		*ug/L*		*112*	*50-140*			
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	*89.9*		*ug/L*		*112*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*82.3*		*ug/L*		*103*	*50-140*			
Surrogate: Dibromofluoromethane	*79.8*		*ug/L*		*99.8*	*50-140*			
Surrogate: Toluene-d8	*90.5*		*ug/L*		*113*	*50-140*			
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*90.5*		*ug/L*		*113*	*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)	1940	25	ug/L	ND	96.8	68-117			
F2 PHCs (C10-C16)	1180	100	ug/L	ND	73.5	60-140			
F3 PHCs (C16-C34)	2920	100	ug/L	ND	74.4	60-140			
F4 PHCs (C34-C50)	2070	100	ug/L	ND	83.6	60-140			
Volatiles									
Acetone	126	5.0	ug/L	ND	126	50-140			
Benzene	40.2	0.5	ug/L	ND	101	60-130			
Bromodichloromethane	43.2	0.5	ug/L	ND	108	60-130			
Bromoform	49.8	0.5	ug/L	ND	124	60-130			
Bromomethane	44.9	0.5	ug/L	ND	112	50-140			
Carbon Tetrachloride	41.6	0.2	ug/L	ND	104	60-130			
Chlorobenzene	42.5	0.5	ug/L	ND	106	60-130			
Chloroform	39.9	0.5	ug/L	ND	99.8	60-130			
Dibromochloromethane	46.0	0.5	ug/L	ND	115	60-130			
Dichlorodifluoromethane	49.8	1.0	ug/L	ND	124	50-140			
1,2-Dichlorobenzene	47.3	0.5	ug/L	ND	118	60-130			
1,3-Dichlorobenzene	46.9	0.5	ug/L	ND	117	60-130			
1,4-Dichlorobenzene	44.6	0.5	ug/L	ND	111	60-130			
1,1-Dichloroethane	38.1	0.5	ug/L	ND	95.2	60-130			
1,2-Dichloroethane	41.0	0.5	ug/L	ND	102	60-130			
1,1-Dichloroethylene	38.8	0.5	ug/L	ND	97.1	60-130			
cis-1,2-Dichloroethylene	41.1	0.5	ug/L	ND	103	60-130			
trans-1,2-Dichloroethylene	41.4	0.5	ug/L	ND	104	60-130			
1,2-Dichloropropane	39.7	0.5	ug/L	ND	99.2	60-130			
cis-1,3-Dichloropropylene	43.0	0.5	ug/L	ND	108	60-130			
trans-1,3-Dichloropropylene	42.6	0.5	ug/L	ND	107	60-130			
Ethylbenzene	43.2	0.5	ug/L	ND	108	60-130			
Ethylene dibromide (dibromoethane, 1,2-	43.8	0.2	ug/L	ND	110	60-130			
Hexane	46.7	1.0	ug/L	ND	117	60-130			
Methyl Ethyl Ketone (2-Butanone)	103	5.0	ug/L	ND	103	50-140			
Methyl Isobutyl Ketone	109	5.0	ug/L	ND	109	50-140			
Methyl tert-butyl ether	96.0	2.0	ug/L	ND	96.0	50-140			
Methylene Chloride	47.0	5.0	ug/L	ND	118	60-130			
Styrene	43.4	0.5	ug/L	ND	109	60-130			
1,1,1,2-Tetrachloroethane	43.4	0.5	ug/L	ND	109	60-130			
1,1,2,2-Tetrachloroethane	49.2	0.5	ug/L	ND	123	60-130			
Tetrachloroethylene	47.1	0.5	ug/L	ND	118	60-130			
Toluene	44.8	0.5	ug/L	ND	112	60-130			
1,1,1-Trichloroethane	42.4	0.5	ug/L	ND	106	60-130			
1,1,2-Trichloroethane	43.5	0.5	ug/L	ND	109	60-130			
Trichloroethylene	47.2	0.5	ug/L	ND	118	60-130			
Trichlorofluoromethane	39.9	1.0	ug/L	ND	99.6	60-130			
Vinyl chloride	42.5	0.5	ug/L	ND	106	50-140			
m,p-Xylenes	87.4	0.5	ug/L	ND	109	60-130			
o-Xylene	43.0	0.5	ug/L	ND	107	60-130			
Surrogate: 4-Bromofluorobenzene	*83.7*		*ug/L*		*105*	*50-140*			
Surrogate: Dibromofluoromethane	*74.5*		*ug/L*		*93.1*	*50-140*			
Surrogate: Toluene-d8	*78.4*		*ug/L*		*98.1*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	40.2	0.5	ug/L	ND	101	60-130			
Ethylbenzene	43.2	0.5	ug/L	ND	108	60-130			
Toluene	44.8	0.5	ug/L	ND	112	60-130			
m,p-Xylenes	87.4	0.5	ug/L	ND	109	60-130			
o-Xylene	43.0	0.5	ug/L	ND	107	60-130			
Surrogate: Toluene-d8	*78.4*		*ug/L*		*98.1*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PARACE LABORATORIES l

Paracel ID: 2043273

Blvd. 4J8

bs.com m

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2043273	№ 55008

Client Name: PATERSON

Project Ref: YE5061

Page 1 of 1

Contact Name: Mark D'Arcy ; Nick Sullivan

Quote #:

Address: 154 Colonnade Road

PO #: 31385

E-mail: mdarcy@patersongroup.ca
nsullivan@patersongroup.ca

Telephone: 613-226-7381

Turnaround Time

☐ 1 day ☑ 3 day

☐ 2 day ☐ Regular

Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analysis: BTEX / PHCs	Required Analysis: BTEX / F1
1	BH1-20-GW1	GW		3	Oct 19/2020		X	
2	BH2-20-GW1	GW		3			X	
3	BH3-20-GW1	GW		3			X	
4	BH6-20-GW1	GW		3			X	
5	DUP1	GW		2	〃			X
6								
7								
8								
9								
10								

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: M. LOUISE	Received at Lab: Jumeepam Dhimal	Verified By:
Relinquished By (Print): Joshua Dempsey	Date/Time: 20/10/20 3:25	Date/Time: Oct 20, 2020 04:50	Date/Time: Oct 21 20 9:34
Date/Time: Oct 20/2020	Temperature: °C PM	Temperature: 10.1 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Nick Sullivan

Client PO: 31423
Project: PE5061
Custody: 55027

Report Date: 23-Oct-2020
Order Date: 21-Oct-2020

Order #: 2043411

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

Paracel ID	Client ID
2043411-01	BH7-20-GW1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 23-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 21-Oct-2020

Client PO: 31423

Project Description: PE5061

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	23-Oct-20	23-Oct-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	22-Oct-20	22-Oct-20
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	23-Oct-20	23-Oct-20

Certificate of Analysis

Report Date: 23-Oct-2020

Client: **Paterson Group Consulting Engineers**

Order Date: 21-Oct-2020

Client PO: **31423**

Project Description: **PE5061**

	Client ID:	BH7-20-GW1	-	-	-
	Sample Date:	21-Oct-20 09:00	-	-	-
	Sample ID:	2043411-01	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	-	-	-
Benzene	0.5 ug/L	<0.5	-	-	-
Bromodichloromethane	0.5 ug/L	<0.5	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-
Bromomethane	0.5 ug/L	<0.5	-	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	-	-	-
Chlorobenzene	0.5 ug/L	<0.5	-	-	-
Chloroform	0.5 ug/L	2.0	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	-	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	-	-	-
Hexane	1.0 ug/L	<1.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	-	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	-	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	-	-	-
Methylene Chloride	5.0 ug/L	<5.0	-	-	-
Styrene	0.5 ug/L	<0.5	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	-	-	-

Certificate of Analysis

Report Date: 23-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 21-Oct-2020

Client PO: 31423

Project Description: PE5061

	Client ID:	BH7-20-GW1	-	-	-
	Sample Date:	21-Oct-20 09:00	-	-	-
	Sample ID:	2043411-01	-	-	-
	MDL/Units	Water	-	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	-	-	-
Trichloroethylene	0.5 ug/L	<0.5	-	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
4-Bromofluorobenzene	Surrogate	105%	-	-	-
Dibromofluoromethane	Surrogate	99.4%	-	-	-
Toluene-d8	Surrogate	113%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*80.7*		*ug/L*		*101*	*50-140*			
Surrogate: Dibromofluoromethane	*81.8*		*ug/L*		*102*	*50-140*			
Surrogate: Toluene-d8	*89.9*		*ug/L*		*112*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*82.3*		*ug/L*		*103*	*50-140*			
Surrogate: Dibromofluoromethane	*79.8*		*ug/L*		*99.8*	*50-140*			
Surrogate: Toluene-d8	*90.5*		*ug/L*		*113*	*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)	1940	25	ug/L	ND	96.8	68-117			
F2 PHCs (C10-C16)	1540	100	ug/L	ND	96.0	60-140			
F3 PHCs (C16-C34)	3650	100	ug/L	ND	93.0	60-140			
F4 PHCs (C34-C50)	2310	100	ug/L	ND	93.3	60-140			
Volatiles									
Acetone	126	5.0	ug/L	ND	126	50-140			
Benzene	40.2	0.5	ug/L	ND	101	60-130			
Bromodichloromethane	43.2	0.5	ug/L	ND	108	60-130			
Bromoform	49.8	0.5	ug/L	ND	124	60-130			
Bromomethane	44.9	0.5	ug/L	ND	112	50-140			
Carbon Tetrachloride	41.6	0.2	ug/L	ND	104	60-130			
Chlorobenzene	42.5	0.5	ug/L	ND	106	60-130			
Chloroform	39.9	0.5	ug/L	ND	99.8	60-130			
Dibromochloromethane	46.0	0.5	ug/L	ND	115	60-130			
Dichlorodifluoromethane	49.8	1.0	ug/L	ND	124	50-140			
1,2-Dichlorobenzene	47.3	0.5	ug/L	ND	118	60-130			
1,3-Dichlorobenzene	46.9	0.5	ug/L	ND	117	60-130			
1,4-Dichlorobenzene	44.6	0.5	ug/L	ND	111	60-130			
1,1-Dichloroethane	38.1	0.5	ug/L	ND	95.2	60-130			
1,2-Dichloroethane	41.0	0.5	ug/L	ND	102	60-130			
1,1-Dichloroethylene	38.8	0.5	ug/L	ND	97.1	60-130			
cis-1,2-Dichloroethylene	41.1	0.5	ug/L	ND	103	60-130			
trans-1,2-Dichloroethylene	41.4	0.5	ug/L	ND	104	60-130			
1,2-Dichloropropane	39.7	0.5	ug/L	ND	99.2	60-130			
cis-1,3-Dichloropropylene	43.0	0.5	ug/L	ND	108	60-130			
trans-1,3-Dichloropropylene	42.6	0.5	ug/L	ND	107	60-130			
Ethylbenzene	43.2	0.5	ug/L	ND	108	60-130			
Ethylene dibromide (dibromoethane, 1,2-	43.8	0.2	ug/L	ND	110	60-130			
Hexane	46.7	1.0	ug/L	ND	117	60-130			
Methyl Ethyl Ketone (2-Butanone)	103	5.0	ug/L	ND	103	50-140			
Methyl Isobutyl Ketone	109	5.0	ug/L	ND	109	50-140			
Methyl tert-butyl ether	96.0	2.0	ug/L	ND	96.0	50-140			
Methylene Chloride	47.0	5.0	ug/L	ND	118	60-130			
Styrene	43.4	0.5	ug/L	ND	109	60-130			
1,1,1,2-Tetrachloroethane	43.4	0.5	ug/L	ND	109	60-130			
1,1,2,2-Tetrachloroethane	49.2	0.5	ug/L	ND	123	60-130			
Tetrachloroethylene	47.1	0.5	ug/L	ND	118	60-130			
Toluene	44.8	0.5	ug/L	ND	112	60-130			
1,1,1-Trichloroethane	42.4	0.5	ug/L	ND	106	60-130			
1,1,2-Trichloroethane	43.5	0.5	ug/L	ND	109	60-130			
Trichloroethylene	47.2	0.5	ug/L	ND	118	60-130			
Trichlorofluoromethane	39.9	1.0	ug/L	ND	99.6	60-130			
Vinyl chloride	42.5	0.5	ug/L	ND	106	50-140			
m,p-Xylenes	87.4	0.5	ug/L	ND	109	60-130			
o-Xylene	43.0	0.5	ug/L	ND	107	60-130			
Surrogate: 4-Bromofluorobenzene	*83.7*		*ug/L*		*105*	*50-140*			
Surrogate: Dibromofluoromethane	*74.5*		*ug/L*		*93.1*	*50-140*			
Surrogate: Toluene-d8	*78.4*		*ug/L*		*98.1*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PARACE LABORATORIES LT

Paracel ID: 2043411

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2043411	Nº 55027

Client Name: Paterson Group	Project Ref: PE5061	Page 1 of 1
Contact Name: Nick Sullivan	Quote #:	Turnaround Time
Address: 154 Colonnade Rd. S.	PO #: 31423	☐ 1 day ☐ 3 day ☒ 2 day ☐ Regular
Telephone: 613-226-7381	E-mail: nsullivan@patersongroup.ca	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: VOCs	Required Analysis: PHCs F1-F4
1	BH7-20-GW1	GW		3	Oct. 21. 20	AM	X	X
2								
3								
4								
5								
6								
7								
8								
9								
10								

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): N. Sullivan	Received By Driver/Depot: T. Devine	Received at Lab: Jinseepam	Verified By:
Relinquished By (Print): Nick Sullivan	Date/Time: 21/10/20 4:11	Date/Time: Oct 21, 2020 04.55	Date/Time: 10-24-20 17:43
Date/Time: October 21, 2020	Temperature: °C PH.	Temperature: 11.5 °C	pH Verified: ☐ By: