PATERSON GROUP

Phase II Environmental Site Assessment

357, 361 and 363 Preston Street
Ottawa, Ontario

Prepared for 1503839 Ontario Inc.

Report: PE5699-2
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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the property addressed 357, 361 and 363 Preston Street, 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 considered to result in areas of potential environmental concern (APECs) on the subject property. The subsurface investigation consisted of drilling four boreholes, three of which were instrumented with groundwater monitoring wells.

Soil samples were obtained from the boreholes and screened using visual observations and olfactory observations. Three soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs F_1-F_4), polycyclic aromatic hydrocarbons (PAHs) and/or metals. Based on the analytical test results, the concentration of arsenic, lead and several PAHs detected within the soil at BH1-22 and BH3-22 are in excess of the selected MECP Table 7 standards. All remaining parameters were in compliance with the MECP Table 7 and Table 1 standards.

Groundwater samples were recovered from the monitoring wells installed in BH1-22, BH2-22, and BH3-22. Three groundwater samples (including one duplicate) were submitted for laboratory analysis of BTEX and PHCs (F_1-F_4). Based on the analytical test results, the groundwater results are in compliance with the MECP Table 7 standards. As a result, the groundwater beneath the subject site is not considered to be contaminated.

Recommendations

Based on the findings of this assessment, metals and PAH impacted soil/fill was identified within the north-western and central portion of the subject site, requiring some remedial work. It is our understanding that the subject site is to be redeveloped for mixed commercial and residential purposes.

Soil

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

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 the 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.

Monitoring Wells

If the monitoring wells installed on the subject site are not going to be used in the future or will be destroyed during site redevelopment, they should be abandoned according to Ontario Regulation 903. The 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 Mr. Joseph Peloso with 1503839 Ontario Inc., Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment of 357, 361 and 363 Preston Street, in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address areas of potential environmental concern (APECs) identified on the Phase II Property, during the Phase I ESA conducted by Paterson in April 2022.

1.1 Site Description

Address:	357 Preston Street, Ottawa, Ontario; 361 Preston Street, Ottawa, Ontario; 363 Preston Street, Ottawa, Ontario.
Location:	The subject site is located on the east side of Preston Street, between Aberdeen Street and Beech Street, in the City of Ottawa, Ontario. For the purpose of this report, Preston Street runs in a north-south orientation. Refer to Figure 1- Key Plan, appended to this report.
Latitude and Longitude:	45° 24’ 04.10” N, 75°42’ 34.55” W
Configuration:	Rectangular
Site Area:	0.09 hectares (approximate)
Zoning:	TM – Traditional Mainstreet Zone
Current Use:	The subject site is currently occupied by a 1-storey residential building and a 2-storey residential building. One of the buildings (363 Preston Street) has a restaurant business on the ground floor level.
Services:	The subject site is located in a municipally serviced area.

1.2 Property Ownership

The current owner of the site is 1503839 Ontario Inc. Paterson was retained to complete this Phase II ESA by Mr. Joseph Peloso of 1503839 Ontario Inc. The offices of 1503839 Ontario Inc. are located at 489 Preston Street, in Ottawa, Ontario.

1.3 Current and Proposed Future Uses

The subject site is currently occupied by two residential dwellings and a vacant lot used for parking. The study area consists of a mixture of commercial and residential properties. It is our understanding that the property is to be redeveloped with a multi-storey mixed-use building, with commercial units on the ground floor and the remaining with residential units. The building is anticipated to have several underground parking levels. It is expected that the proposed development will be municipally serviced.

1.4 Applicable Site Condition Standard

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

- ❒ Coarse-grained soil conditions
- ❒ Shallow bedrock conditions
- ❒ Full Depth site conditions
- ❒ Non-potable groundwater conditions
- ❒ Residential land use.

Table 1 background site condition standards were also selected for the purpose of off-site soil disposal classification.

Section 35 of the Regulation does apply to the Phase II property in that the property relies upon municipal drinking water.

Section 41 of the Regulation does not apply to the Phase II property, as the property is not within 30 m of an environmentally sensitive area.

Section 43.1 of the Regulation does apply to the Phase II property in that the property is a shallow soil property or the property is within 30 m of a water body.

The residential standards were selected based on the proposed future use of the subject site. Coarse-grained soil standards were chosen as a conservative approach. Grain size analysis was not completed.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The subject property is situated in a mixed commercial/residential area. The surface of the site generally consists of asphaltic concrete with a small area covered in gravel along the northwestern property limits.

The site is slightly above the grade of Preston Street and is relatively flat, while the regional topography slopes gently down in a southerly direction. Site drainage consists of both infiltration and sheet drainage in the limited paved areas which drain to catch basins along Preston Street.

2.2 Past Investigations

Paterson completed a Phase I ESA for the subject site in April 2022. The Phase I ESA identified four Potentially Contaminating Activities (PCAs) resulting in Areas of Potential Environmental Concern (APECs) with respect to the subject property. Historically, a restaurant was present at 357 Preston Street, however, as of late 2000s, the building burnt down and was never rebuilt. Based on the presence of fill of unknown quality from the demolition of the former building, an APEC was identified on site. During the site visit, an aboveground storage tank (AST) was identified at the rear of 361 Preston Street. Additionally, a former retail fuel outlet with several underground storage tanks (USTs) and current automotive service garage were identified on the neighbouring property to the west of the subject site. The presence of the former retail fuel outlet and underground storage tanks are considered to represent APECs on the subject site.

PCAs that represent APECs on the subject property, as well as the Contaminants of Potential Concern (CPCs) are presented below in Table 1.

Table 1
Areas of Potential Environmental Concern (APECs)

Area of Potential Environmental Concern	Location of APEC	Potentially Contaminating Activity	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC1 Fill material of unknown quality	Northern portion of the subject site	Item 30 – Importation of fill material of unknown quality.	On-Site	Metals PAHs	Soil and/or Groundwater

Table 1 - Continued
Areas of Potential Environmental Concern (APECs)

Area of Potential Environmental Concern	Location of APEC	Potentially Contaminating Activity	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC 2 Aboveground Storage Tank (AST)	Center of the subject site	Item 28 – Gasoline and Associated Products Stored in Fixed Tanks.	On-Site	PHCs BTEX	Soil and/or Groundwater
APEC 3 Automotive service garage	Northwestern corner of the subject site	Item 52 – Storage, maintenance, fuelling and repair of equipment, vehicles and material used to maintain transportation systems.	Off-Site	PHCs BTEX	Groundwater
APEC 4 Former Retail Fuel Outlet	Northwestern corner of the subject site	Item 28 – Gasoline and Associated Products Stored in Fixed Tanks.	Off-Site	PHCs BTEX	Groundwater

A Phase II ESA was recommended to address the aforementioned APECs.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted on May 31, 2022. The field program consisted of drilling four boreholes, three of which were instrumented with groundwater monitoring wells. Boreholes were drilled to depths ranging from 6.07 to 6.15 m below the existing grade.

3.2 Media Investigated

During the subsurface investigation, soil samples and groundwater samples were obtained and submitted for laboratory analysis. The rationale for sampling and analyzing this media is based on the Contaminants of Potential Concern identified in the Phase I ESA. Contaminants of concern for soil and groundwater include petroleum hydrocarbons (PHCs, Fractions F_1 - F_4), benzene, toluene, ethylbenzene, and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), and metals.

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

According to mapping provided on the Geological Survey of Canada website, the bedrock within the area of the subject site consists of interbedded limestone and shale of the Verulam Formation, whereas the surficial geology generally consists of till, with an overburden thickness ranging from 2 m to 5 m.

Water Bodies and Areas of Natural and Scientific Interest

No water bodies were identified within the Phase I study area. The nearest named water body with respect to the subject site is Dow's Lake, located approximately 530 m to the south.

Drinking Water Wells

According to a search of available MECP water well records, no drinking water wells are expected to be present within the Phase I study area.

Existing Buildings and Structures

Two (2) of the three (3) parcels that make up the Phase I property are occupied by two residential buildings. The exact years of the construction of these buildings are unknown. It is estimated that the buildings were constructed in the late to early 1930s to 1940s.

357 Preston Steet is a vacant lot, currently used for vehicular parking.

361 Preston Street is occupied with a one-storey residential building with a half basement. The building exterior is finished in stucco and concrete stones/blocks with a sloped style shingle roof.

363 Preston Street is occupied by a two-storey building with a half basement, that is currently used for residential purposes with a restaurant on the first floor. The building exterior is finished in stucco and concrete stones/blocks with a sloped style shingle roof.

Neighbouring Land Use

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

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 7.1 of this report, two (2) on-site and two (2) off-site PCAs were identified to result in APECs on the Phase I property, as summarized below:

- PCA 30: *"Importation of fill material of unknown quality"* – this PCA was identified on the northern portion of the Phase I property (357 Preston Street) from the demolition of the former two-storey building which occupied the site (APEC 1).
- PCA 28: *"Gasoline and Associated Products Storage in Fixed Tanks"* – this PCA was identified on the central portion of the Phase I property (361 Preston Street) from the presence of an aboveground storage tank on-site (APEC 2).
- PCA 52: *"Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems"* – this PCA was identified as an existing automotive service garage located off-site at 402 Preston Street (APEC 3).
- PCA 28: *"Gasoline and Associated Products Storage in Fixed Tanks"* – this PCA was identified as former underground storage tanks located off-site at 402 Preston Street (APEC 4).

Additional existing and historical off-site PCAs were identified within the Phase I study area, however, based on their separation distances, down-gradient or cross-gradient orientation, as well as information contained within our files, these sites are not considered to pose an environmental concern to the subject site.

Contaminants of Potential Concern

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

- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX);
- Petroleum hydrocarbons; fractions 1 through 4 (PHCs F_1-F_4);
- Polycyclic aromatic hydrocarbons (PAHs)
- Metals (including Mercury and Hexavalent Chromium).

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 that are considered to result in APECs on the Phase I Property. The 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.

3.4 Deviations from Sampling and Analysis Plan

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

3.5 Impediments

No physical impediments aside from existing buildings and underground services were encountered during the Phase II ESA field program.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation was conducted on May 31, 2022. The field program consisted of drilling four boreholes, three of which were instrumented with groundwater monitoring wells. Boreholes were drilled to depths ranging from 6.07 m to 6.15 m below the existing grade.

The boreholes were placed to address the aforementioned APECs. The boreholes were drilled with a low clearance track-mounted drill rig provided by George Downing Estate Drilling. Borehole locations are shown on Drawing PE5699-3 – Test Hole Location Plan, appended to this report.

4.2 Soil Sampling

A total of 13 soil samples were obtained from the boreholes by means of split spoon sampling and auger samples. The depths at which auger samples, and split spoon samples were obtained from the boreholes are shown as "**AU**", and "**SS**" respectively on the Soil Profile and Test Data Sheets, appended to this report.

Site soils generally consist of fill material comprised of brown to black silty sand, with gravel, underlain by glacial till. The fill material was encountered in all boreholes during the drilling program and extended to depths ranging from 0.05 m

to 1.83 m. Bedrock was encountered at each borehole location, ranging in depth between 1.50 m to 2.16 m below the existing ground surface.

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 deleterious fill, as well as screening with a photo ionization detector (PID).

The soil vapours were measured by inserting the analyzer probe into the nominal headspace above the soil sample. Samples were then agitated/manipulated gently as the measurements were taken. The peak reading registered within the first 15 seconds was recorded as the vapour measurement.

The vapour readings were recorded from 1.0 to 13.2 ppm for all soil samples. The vapour readings were not considered to be indicative of volatile compounds. Vapour readings are noted on the Soil Profile and Test Data Sheets provided in Appendix 1.

4.4 Groundwater Monitoring Well Installation

Three groundwater monitoring wells were installed on the subject site as part of the current Phase II investigation. The monitoring wells consisted of 32 mm diameter Schedule 40 threaded PVC risers and screens. A summary of the monitoring well construction details are listed below in Table 2 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Table 2
Monitoring Well Construction Details

Well ID	Ground Surface Elevation (m ASL)	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1-22	61.20	6.10	3.05-6.10	2.44-6.10	0.30-3.04	Flushmount
BH2-22	61.09	6.15	3.10-6.15	2.49-6.15	0.30-2.49	Flushmount
BH3-22	61.45	6.02	2.97-6.02	2.29-6.02	0.30-2.29	Flushmount

4.5 Field Measurement of Water Quality Parameters

Groundwater sampling was conducted for the three monitoring wells installed on May 31, 2022. Following their development and stabilization, the water quality parameters were measured at each monitoring well location using a multi-reader probe, the results of which are summarized below in Table 3.

Table 3
Measurement of Water Quality Parameters

Well ID	Temperature (°C)	Conductivity (µS)	pH (Units)	Date of Measurement
BH1-22	12.7	2037	5.00	June 3, 2022
BH2-22	13.1	1373	5.15	
BH3-22	16.0	1167	3.01	

4.6 Groundwater Sampling

Groundwater sampling protocols were followed using the MECP document entitled "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", dated May 1996. Groundwater samples were obtained from each monitoring well, using dedicated sampling equipment. Standing water was purged from each well prior to sampling. Samples were stored in coolers to reduce analyte volatilization during transportation.

Details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan in Appendix 1.

4.7 Analytical Testing

The following soil and groundwater samples were submitted for analysis:

Table 4
Soil Samples Submitted

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed				Rationale
		PHCs (F_1-F_4)	BTEX	Metals	PAHs	
BH1-22-SS3	1.52-2.13m Fill Material			x	x	Assess soil for potential impacts within the fill material.
BH2-22-SS2	0.76-1.37m Fill Material			x	x	Assess soil for potential impacts within the fill material.
BH3-22-SS2	0.76-1.37m Fill Material	x	x	x	x	Assess soil for potential impacts within proximity to the above ground storage tank and fill material.

Table 5
Groundwater Samples Submitted

Sample ID	Screened Interval & Stratigraphic Unit	Parameters Analyzed			Rationale
		PHCs (F_1-F_4)	BTEX	PAHs	
BH1-22-GW1	3.05-6.10m Bedrock	X	X	X	Assess groundwater for potential impacts related to the identified potentially contaminating activities on-site.
BH2-22-GW1	3.10-6.15m Bedrock	X	X		
BH3-22-GW1	2.97-6.02m Bedrock	X	X	X	
DUP (BH2-22)	3.10-6.15m Bedrock		X		QA/QC

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

4.8 Residue Management

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

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

In general, the subsurface soil profile encountered at the borehole locations consisted of fill material, underlain by glacial till, followed by limestone bedrock.

Bedrock was encountered at depths ranging from 1.50 m to 2.16 m below ground surface (mbgs).

The groundwater was encountered in the bedrock at depths ranging from approximately 2.54 m to 3.97 m below existing grade.

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 during the groundwater sampling event on June 3, 2022 using an electronic water level meter. Groundwater levels are summarized below in Table 6.

Table 6
Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1-22	61.20	3.97	57.23	June 3, 2022
BH2-22	61.09	2.54	58.55	June 3, 2022
BH3-22	61.45	2.75	58.70	June 3, 2022

Based on the water levels and configuration of the borehole locations, the groundwater appears to flow in a westerly direction.

5.3 Fine-Coarse Soil Texture

No grain size analysis was completed for the subject site. Coarse grained soil standards were chosen as a conservative approach.

5.4 Soil: Field Screening

Fill material was identified across the Phase II property beneath the pavement structure. The fill material generally consisted of brown silty sand with gravel and crushed stone. Within the former building footprint of 357 Preston Street, some of the fill material contained trace amounts of asphalt, clay tile and wood chips. Fill material within the area of the above ground storage tank was observed to be darker in colour.

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

5.5 Soil Quality

Based on the findings of the field screening, in combination with sample depth and location, a total of three (3) soil samples were submitted for analysis of a combination of BTEX, PHC (F1-F4), PAHs and/or metals. The results of the analytical testing are presented below in Tables 7 through 10. The laboratory certificates of analysis are provided in Appendix 1.

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

Parameter	MDL (µg/g)	Soil Samples (µg/g)	MECP Table 7 Residential Standards (µg/g)	MECP Table 1 Residential Standards (µg/g)
		May 31, 2022		
		BH3-22-SS2		
Benzene	0.02	nd	0.21	0.02
Ethylbenzene	0.05	nd	2	0.05
Toluene	0.05	nd	2.3	0.2
Xylenes, total	0.05	nd	3.1	0.05
F1 PHC (C6-C10)	7	nd	55	25
F2 PHCs (C10-C16)	4	nd	98	10
F3 PHCs (C16-C34)	8	217	300	240
F4 PHCs (C34-C50)	6	(267)	2800	120
F4 PHCs (gravimetric)	50	(270)	2800	120

Notes:
- MDL – Method Detection Limit
- NA – not analyzed
- nd – not detected above the MDL
- ( ) – Value in brackets exceeds Table 1 standards

Detected BTEX and PHC parameter concentrations in the soil samples analysed comply with the selected MECP Table 7 standards. With regards to MECP Table 1 background site condition standards, PHC F4 does not comply with the standards.

Table 8
Analytical Test Results – Soil – PAHs

Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 7 Residential Standards (µg/g)	MECP Table 1 Residential Standards (µg/g)
		May 31, 2022				
		BH1-22-SS3	BH2-22-SS3	BH3-22-SS2		
Acenaphthene	0.02	0.03	nd	(0.04)	7.9	0.072
Acenaphthylene	0.02	0.04	nd	**(0.24)**	0.15	0.093
Anthracene	0.02	0.10	nd	(0.23)	0.67	0.16
Benzo[a]anthracene	0.02	0.21	nd	**(0.74)**	0.5	0.36
Benzo[a]pyrene	0.02	0.21	nd	**(0.80)**	0.3	0.3
Benzo[b]fluoranthene	0.02	0.18	nd	**(0.85)**	0.78	0.47
Benzo[ghi]perylene	0.02	0.11	nd	0.46	6.6	0.68
Benzo[k]fluoranthene	0.02	0.09	nd	(0.48)	0.78	0.48
Chrysene	0.02	0.22	nd	0.72	7	2.8
Dibenzo[a,h]anthracene	0.02	0.02	nd	**(0.13)**	0.1	0.1
Fluoranthene	0.02	0.43	nd	**(1.21)**	0.69	0.56
Fluorene	0.02	0.03	nd	0.05	62	0.12
Indeno[1,2,3-cd]pyrene	0.02	0.09	nd	**(0.43)**	0.38	0.23
1-Methylnaphthalene	0.02	nd	nd	0.02	0.99	0.59
2-Methylnaphthalene	0.02	nd	nd	0.03	0.99	0.59
Methylnaphthalene (1&2)	0.04	nd	nd	0.05	0.99	0.59
Naphthalene	0.01	0.01	nd	0.02	0.6	0.09
Phenanthrene	0.02	0.40	nd	0.66	6.2	0.69
Pyrene	0.02	0.41	nd	(1.05)	78	1

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined –** Results exceed selected MECP standard
- ( ) – Value in brackets exceeds Table 1 standards

Detectable PAH concentrations identified in Samples BH1-22-SS3 and BH3-22-SS2 comply with the MECP Table 7 standards, with the exception of acenaphthylene, benzo[a]anthracene, benzo[a]pyrene, benzo[a]fluoranthene, dibenzo[a,h]anthracene, fluoranthene and ideno[1,2,3-cd]pyrene in Sample BH3-22-SS2. No PAH parameters were identified in the remaining soil samples submitted for analytical testing. Various PAH concentrations also exceeded Table 1 standards.

TABLE 9
Analytical Test Results – Soil - Metals

Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 7 Residential Standards (µg/g)	MECP Table 1 Residential Standards (µg/g)
		May 31, 2022				
		BH1-22-SS3	BH2-22-SS2	BH3-22-SS2		
Antimony	1.0	nd	nd	(1.7)	7.5	1.3
Arsenic	1.0	4.3	2.8	**(27.4)**	18	18
Barium	1.0	135	43.6	(253)	390	220
Beryllium	0.5	nd	nd	0.9	4	2.5
Boron	5.0	12.9	6.6	14.4	120	36
Cadmium	0.5	nd	nd	0.8	1.2	1.2
Chromium (VI)	5.0	nd	nd	nd	8	0.66
Chromium	0.2	22.8	13.1	31.5	160	70
Cobalt	1.0	7.5	4.2	10.8	22	21
Copper	5.0	13.0	11.9	59.6	140	92
Lead	1.0	**(326)**	4.8	111	120	120
Mercury	0.1	nd	nd	0.1	0.27	0.27
Molybdenum	1.0	nd	nd	1.8	6.9	2
Nickel	5.0	14.4	10.4	28.2	100	82
Selenium	1.0	nd	nd	1.3	2.4	1.5
Silver	0.3	nd	nd	nd	20	0.5
Thallium	1.0	nd	nd	nd	1	1
Uranium	1.0	nd	nd	1.5	23	2.5
Vanadium	10.0	47.1	22.9	46.7	86	86
Zinc	20.0	82.0	nd	166	340	290

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined –** Results exceed selected MECP standard
- ( ) – Value in brackets exceeds Table 1 standards

Detected metal parameter concentrations in the soil samples analysed comply with the MECP Table 7 standards, with the exception of lead in Sample BH1-22-SS3, and arsenic in Sample BH3-22-SS2. Antimony and barium concentrations in Sample BH3-22-SS2 exceeds the MECP Table 1 background site condition standards.

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

TABLE 10
Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Sample ID	Depth Interval (m BGS)
Antimony	1.7	BH3-22-SS2	0.76-1.37 m; Fill material
Arsenic	**27.4**	BH3-22-SS2	0.76-1.37 m; Fill material
Barium	253	BH3-22-SS2	0.76-1.37 m; Fill material
Beryllium	0.9	BH3-22-SS2	0.76-1.37 m; Fill material
Boron	14.4	BH3-22-SS2	0.76-1.37 m; Fill material
Cadmium	0.8	BH3-22-SS2	0.76-1.37 m; Fill material
Chromium	31.5	BH3-22-SS2	0.76-1.37 m; Fill material
Cobalt	10.8	BH3-22-SS2	0.76-1.37 m; Fill material
Copper	59.6	BH3-22-SS2	0.76-1.37 m; Fill material
Lead	**326**	BH1-22-SS3	1.52-2.13 m; Fill material
Molybdenum	1.8	BH3-22-SS2	0.76-1.37 m; Fill material
Nickel	28.2	BH3-22-SS2	0.76-1.37 m; Fill material
Selenium	1.3	BH3-22-SS2	0.76-1.37 m; Fill material
Uranium	1.5	BH3-22-SS2	0.76-1.37 m; Fill material
Vanadium	47.1	BH1-22-SS3	1.52-2.13 m; Fill material
Zinc	166	BH3-22-SS2	0.76-1.37 m; Fill material
F3 PHCs (C16-C34)	217	BH3-22-SS2	0.76-1.37 m; Fill material
F4 PHCs (C34-C50)	267	BH3-22-SS2	0.76-1.37 m; Fill material
F4G PHCs (gravimetric)	270	BH3-22-SS2	0.76-1.37 m; Fill material
Acenaphthene	0.04	BH3-22-SS2	0.76-1.37 m; Fill material
Acenaphthylene	**0.24**	BH3-22-SS2	0.76-1.37 m; Fill material
Anthracene	0.23	BH3-22-SS2	0.76-1.37 m; Fill material
Benzo[a]anthracene	**0.74**	BH3-22-SS2	0.76-1.37 m; Fill material
Benzo[a]pyrene	**0.80**	BH3-22-SS2	0.76-1.37 m; Fill material
Benzo[b]fluoranthene	**0.85**	BH3-22-SS2	0.76-1.37 m; Fill material
Benzo[g,h,i]perylene	0.46	BH3-22-SS2	0.76-1.37 m; Fill material
Benzo[k]fluoranthene	0.48	BH3-22-SS2	0.76-1.37 m; Fill material
Chrysene	0.72	BH3-22-SS2	0.76-1.37 m; Fill material
Dibenzo[a,h]anthracene	**0.13**	BH3-22-SS2	0.76-1.37 m; Fill material
Fluoranthene	**1.21**	BH3-22-SS2	0.76-1.37 m; Fill material
Fluorene	0.05	BH3-22-SS2	0.76-1.37 m; Fill material
Indeno[1,2,3-cd]pyrene	**0.43**	BH3-22-SS2	0.76-1.37 m; Fill material
1-Methylnaphthalene	0.02	BH3-22-SS2	0.76-1.37 m; Fill material
2-Methylnaphthalene	0.03	BH3-22-SS2	0.76-1.37 m; Fill material
Methylnaphthalene (1&2)	0.05	BH3-22-SS2	0.76-1.37 m; Fill material
Naphthalene	0.02	BH3-22-SS2	0.76-1.37 m; Fill material
Phenanthrene	0.66	BH3-22-SS2	0.76-1.37 m; Fill material
Pyrene	1.05	BH3-22-SS2	0.76-1.37 m; Fill material

All other parameter concentrations were below the laboratory detection limits.

5.6 Groundwater Quality

Groundwater samples from the monitoring wells installed on the Phase II property were submitted for laboratory analysis of BTEX, PHCs (F_1-F_4) and PAHs. The

groundwater samples were obtained from the screened intervals noted on Table 2. The results of the analytical testing are presented below in Tables 11 through 13. The laboratory certificates of analysis are provided in Appendix 1.

Table 11
Analytical Test Results – Groundwater – BTEX and PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)				MECP Table 7 Non-Potable Standards (µg/g)
		June 3, 2022				
		BH1-22-GW1	BH2-22-GW1	BH3-22-GW1	DUP (Duplicate of BH2-22)	
Benzene	0.5	nd	nd	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	nd	nd	54
Toluene	0.5	nd	nd	nd	nd	320
Xylenes	0.5	nd	nd	0.8	nd	72
PHC F1	25	nd	nd	nd	NA	420
PHC F2	100	nd	nd	nd	NA	150
PHC F3	100	nd	nd	nd	NA	500
PHC F4	100	nd	nd	nd	NA	500

Notes:
- MDL – Method Detection Limit
- NA – not analyzed
- nd – not detected above the MDL
- **Bold and Underlined** – Value exceeds selected MECP Standards

Detected BTEX/PHC parameter concentrations in the groundwater samples analysed comply with the MECP Table 7 standards.

Table 12
Analytical Test Results – Groundwater – PAHs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)		MECP Table 7 Non-Potable Standards (µg/g)
		June 3, 2022		
		BH1-22-GW1	BH3-22-GW1	
Acenaphthene	0.05	nd	nd	17
Acenaphthylene	0.05	nd	nd	1
Anthracene	0.01	nd	nd	1
Benzo[a]anthracene	0.01	nd	nd	1.8
Benzo[a]pyrene	0.01	nd	nd	0.81
Benzo[b]fluoranthene	0.05	nd	nd	0.75
Benzo[g,h,i]perylene	0.05	nd	nd	0.2
Benzo[k]fluoranthene	0.05	nd	nd	0.4
Chrysene	0.05	nd	nd	0.7
Dibenzo[a,h]anthracene	0.05	nd	nd	0.4

Table 12 - Continued
Analytical Test Results – Groundwater – PAHs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)		MECP Table 7 Non-Potable Standards (µg/g)
		June 3, 2022		
		BH1-22-GW1	BH3-22-GW1	
Fluoranthene	0.01	nd	nd	44
Fluorene	0.05	nd	nd	290
Indeno[1,2,3-cd]pyrene	0.05	nd	nd	0.2
1-Methylnaphthalene	0.05	nd	nd	1500
2-Methylnaphthalene	0.05	nd	nd	1500
Methylnaphthalene (1&2)	0.05	nd	nd	1500
Naphthalene	0.10	nd	nd	7
Phenanthrene	0.05	nd	nd	380
Pyrene	0.01	nd	nd	5.7

Notes:
- MDL – Method Detection Limit
- NA – not analyzed
- nd – not detected above the MDL
- **Bold and Underlined** – Value exceeds selected MECP Standards

No PAH concentrations were identified above the laboratory detection limits. All groundwater samples are in compliance with the MECP Table 7 standards.

Table 13
Maximum Concentrations – Groundwater

Parameter	Maximum Concentration (µg/L)	Sample ID	Screened Interval (m BGS)
Xylenes	0.8	BH3-22-GW1	2.97-6.02 m

Remaining parameters analysed were not identified above the laboratory method detection limits.

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 Protocol 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, a Certificate of Analysis has been received for each sample submitted for analysis and all Certificates of Analysis are appended to this report.

A duplicate groundwater sample was obtained from BH2-22-GW1 and analysed for BTEX. Test results for the duplicate groundwater sample were non-detect.

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

5.8 Phase II Conceptual Site Model

The following section has been prepared in accordance with the requirements of O.Reg. 269/11 amended by the Environmental Protection Act. Conclusions and recommendations are discussed in a subsequent section.

Site Description

The Phase II property is currently occupied by two residential dwellings. The two residential dwellings are landscaped with asphaltic concrete paved driveways, with a paved asphaltic concrete parking lot adjacent to the north, with a small portion at the northwest corner gravel covered.

Potentially Contaminating Activity and Areas of Potential Environmental Concern

As indicated in the Phase I ESA, the following PCAs were considered to result in APECs on the Phase I/Phase II property:

Table 14
Areas of Potential Environmental Concern (APECs)

Area of Potential Environmental Concern	Location of APEC	Potentially Contaminating Activity	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC1 Fill material of unknown quality	Northern portion of the subject site	Item 30 – Importation of fill material of unknown quality.	On-Site	Metals PAHs	Soil and/or Groundwater
APEC 2 Aboveground Storage Tank (AST)	Center of the subject site	Item 28 – Gasoline and Associated Products Stored in Fixed Tanks.	On-Site	PHCs BTEX	Soil and/or Groundwater
APEC 3 Automotive service garage	Northwestern corner of the subject site	Item 52 – Storage, maintenance, fuelling and repair of equipment, vehicles and material used to maintain transportation systems.	Off-Site	PHCs BTEX	Groundwater

Table 14 - Continued
Areas of Potential Environmental Concern (APECs)

Area of Potential Environmental Concern	Location of APEC	Potentially Contaminating Activity	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC 4 Former Retail Fuel Outlet	Northwestern corner of the subject site	Item 28 – Gasoline and Associated Products Stored in Fixed Tanks.	Off-Site	PHCs BTEX	Groundwater

No other PCAs are considered to have the potential to pose an environmental concern to the subject site.

Contaminants of Potential Concern

The contaminants of potential concern resulting from the identified APECs are as follows:

- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX);
- Petroleum hydrocarbons; fractions 1 through 4 (PHCs F_1-F_4);
- Polycyclic aromatic hydrocarbons (PAHs)
- Metals (including Mercury and Hexavalent Chromium).

Subsurface Structures and Utilities

The Phase II property is situated in a municipally serviced area. Utilities on the Phase II property include water, sewer, electrical, and natural gas connections. Based on standard practice for subsurface utility installation, service trenches are expected to be present approximately 1 to 2 m below existing grade, above the water level of the subject site, therefore it is not likely to effect groundwater within the site.

Physical Setting

Site Stratigraphy

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. The stratigraphy of the subject site generally consists of:

- A pavement structure consisting of asphaltic concrete above a granular layer (engineered fill), was encountered at BH2-22, BH3-22 and BH4-22 with an approximate thickness of 0.05 m. Crushed stone was encountered at BH1-22 with an approximate 0.13 m thick layer.

- Fill material generally consisting of brown silty sand with gravel and crushed stone. Fill was encountered in all of the boreholes and extended to depths ranging approximately 0.13 to 1.83 m below grade.
- Glacial till was encountered in all boreholes beneath the fill material at depths ranging approximately 0.69 to 2.16 m below grade.
- All Boreholes were terminated in limestone bedrock at an average depth of 6.10 m below grade, with the exception of BH4-22. Groundwater was encountered in this stratigraphic unit.

Hydrogeological Characteristics

Groundwater at the Phase II property was encountered within the bedrock layer. Groundwater levels were measured at the subject site on June 3, 2022. Groundwater levels ranged in depths from approximately 2.54 to 3.97 m below grade.

Groundwater contour mapping was conducted for groundwater elevations identified during the June 2022 sampling event. Groundwater flow at the Phase II property was in a westerly direction, with an average hydraulic gradient of approximately 0.1 m/m.

Approximate Depth to Bedrock

Bedrock was encountered at depths of approximately 1.50 to 2.16 m below ground surface.

Approximate Depth to Water Table

Depth to water table at the Phase II property varies between approximately 2.54 to 3.97 m below existing grade.

Sections 35, 41 and 43.1 of the Regulation

Section 35 of the Regulation does apply to the subject site, in that the property, and the properties within the 250 m study area do not rely upon potable groundwater.

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

Section 43.1 of the Regulation does apply to the subject site in that the site is a shallow soil property and/or the property is within 30 m of a water body.

Fill Placement

Fill material was identified across the Phase II property beneath the pavement structure and extended to depths ranging between 0.13 to 1.83 m below ground surface. The fill material generally consisted of brown silty sand with gravel and crushed stone. Within the former building footprint of 357 Preston Street, the lowest layer of the fill material contained trace amounts of asphalt, clay tile and wood chips. Fill material within the area of the above ground storage tank was observed to be darker in colour.

Existing Buildings and Structures

Two (2) of the three (3) parcels that make up the Phase II property are occupied by two residential buildings. The exact years of the construction of these buildings are unknown. It is estimated that the buildings were constructed in the late to early 1930s to 1940s.

357 Preston Steet is a vacant lot, currently used for vehicular parking.

361 Preston Street is occupied with a one-storey residential building with a half basement. The building exterior is finished in stucco and concrete stones/blocks with a sloped style shingle roof.

363 Preston Street is occupied by a two-storey building with a half basement, that is currently used for residential purposes with a restaurant on the first floor. The building exterior is finished in stucco and concrete stones/blocks with a sloped style shingle roof.

Proposed Buildings and Other Structures

It is our understanding that the subject site is to be redeveloped with a mixed-use building, used for commercial purposes on the main floor and residential units for the remaining.

Areas of Natural Significance and Water Bodies

No water bodies were identified within the Phase I study area. The nearest named water body with respect to the subject site is Dow's Lake, located approximately 530 m to the south.

Environmental Condition

Areas Where Contaminants are Present

Based on the findings of the Phase II ESA, the fill material in BH1-22 and BH3-22 is shown to be impacted with some metals (i.e arsenic and lead) and several PAHs, specifically in BH3-22.

Types of Contaminants

The soil/fill within BH1-22 contains the following contaminants of concern at concentrations exceeding the selected MECP Table 7 standards:

- *Metals:*
    - *Lead*

The soil/fill within BH3-22 contains the following contaminants of concern at concentrations exceeding the selected MECP Table 7 standards:

- *Polycyclic Aromatic Hydrocarbons:*
    - *Acenaphthylene*
    - *Benzo[a]anthracene*
    - *Benzo[a]pyrene*
    - *Benzo[a]fluoranthene*
    - *Dibenzo[a,h]anthracene*
    - Fluoranthene
    - Ideno[1,2,3-cd]pyrene
- *Metals:*
    - *Arsenic*

Contaminated Media

The fill material extending from 0.69 to 1.22 m in BH3-22 is impacted with arsenic and several PAH concentrations in excess of the selected MECP Table 7 residential standards. The fill material extending from 1.45 to 1.83 m in BH1-22 is

impacted with lead concentrations in excess of the selected MECP Table 7 residential standards.

What Is Known About Areas Where Contaminants Are Present

Based on the findings of this Phase II ESA, metals (lead) impacted soil/fill was identified within the northwestern portion of the site (BH1-22). This contaminant is associated with the fill material of unknown quality.

Metals (arsenic) and PAH impacted soil/fill was identified within the central portion of the subject site (BH3-22). These contaminants are generally associated with the presence fill material of unknown quality and historical use of coal in this location.

Distribution and Migration of Contaminants

As previously noted, PAH impacted soil/fill was identified within the central portion of the subject site (BH3-22). Based on the low concentration of PAHs detected in the groundwater, this contamination is anticipated to be limited to the soil/fill in this location. Groundwater tested on the property was found to be clean.

Discharge of Contaminants

The PAH impacted soil/fill identified within the central portion of the subject site (BH3-22) is suspected to have resulted from the presence of imported fill

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 standards. Fluctuations in the groundwater level and groundwater flow are also not considered to have affected the contaminant based on the depth of the water table within the bedrock, well below the shallow soil/fill material.

Potential for Vapour Intrusion

Given the low volatility of the soil contaminants, the potential for vapours to be present within the subject buildings is considered to be negligible.

During redevelopment of the subject site, all soils exceeding the selected MECP Table 7 standards will be removed and disposed of 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 property addressed 357, 361 and 363 Preston Street, 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 considered to result in areas of potential environmental concern (APECs) on the subject property. The subsurface investigation consisted of drilling four boreholes, three of which were instrumented with groundwater monitoring wells.

Soil samples were obtained from the boreholes and screened using visual observations and olfactory observations. Three soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs F_1-F_4), polycyclic aromatic hydrocarbons (PAHs) and/or metals. Based on the analytical test results, the concentration of arsenic, lead and several PAHs detected within the soil at BH1-22 and BH3-22 are in excess of the selected MECP Table 7 standards. All remaining parameters were in compliance with the MECP Table 7 and Table 1 standards.

Groundwater samples were recovered from the monitoring wells installed in BH1-22, BH2-22, and BH3-22. Three groundwater samples (plus one duplicate) were submitted for laboratory analysis of BTEX and PHCs (F_1-F_4) and PAHs. Based on the analytical test results, the groundwater results are in compliance with the MECP Table 7 standards. As a result, the groundwater beneath the subject site is not considered to be contaminated.

Recommendations

Based on the findings of this assessment, metals and PAH impacted soil/fill was identified within the north-western and central portion of the subject site, requiring some remedial work. It is our understanding that the subject site is to be redeveloped for mixed commercial and residential purposes.

Soil

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

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 the 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.

Monitoring Wells

If the monitoring wells installed on the subject site are not going to be used in the future or will be destroyed during site redevelopment, they should be abandoned according to Ontario Regulation 903, however, it is our recommendation that the wells be maintained for future monitoring purposes. The 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 (reaffirmed 2022). 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 1503839 Ontario Inc. Notification from 1503839 Ontario Inc. and Paterson Group will be required prior to the release of this report to any other party.

Paterson Group Inc.

Joshua Dempsey, B.Sc.

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

Report Distribution:

- 1503839 Ontario Inc.
- Paterson Group Inc.

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE5699-1 – SITE PLAN

DRAWING PE5699-2 – SURROUNDING LAND USE PLAN

DRAWING PE5699-3 – TEST HOLE LOCATION PLAN

DRAWING PE5699-4 – ANALYTICAL TESTING PLAN – SOIL – BTEX/PHCS

DRAWING PE5699-4A – CROSS SECTION A-A' – SOIL – BTEX/PHCS

DRAWING PE5699-5 – ANALYTICAL TESTING PLAN – SOIL – METALS

DRAWING PE5699-5A – CROSS SECTION A-A' – SOIL – METALS

DRAWING PE5699-6 – ANALYTICAL TESTING PLAN – SOIL – PAHS

DRAWING PE5699-6A – CROSS SECTION A-A' – SOIL – PAHS

DRAWING PE5699-7 – ANALYTICAL TESTING PLAN – GROUNDWATER – BTEX/PHCS

DRAWING PE5699-7A – CROSS SECTION A-A' – GROUNDWATER – BTEX/PHCS

DRAWING PE5699-8 – ANALYTICAL TESTING PLAN – GROUNDWATER – PAHS

DRAWING PE5699-8A – CROSS SECTION A-A'- GROUNDWATER – PAHS

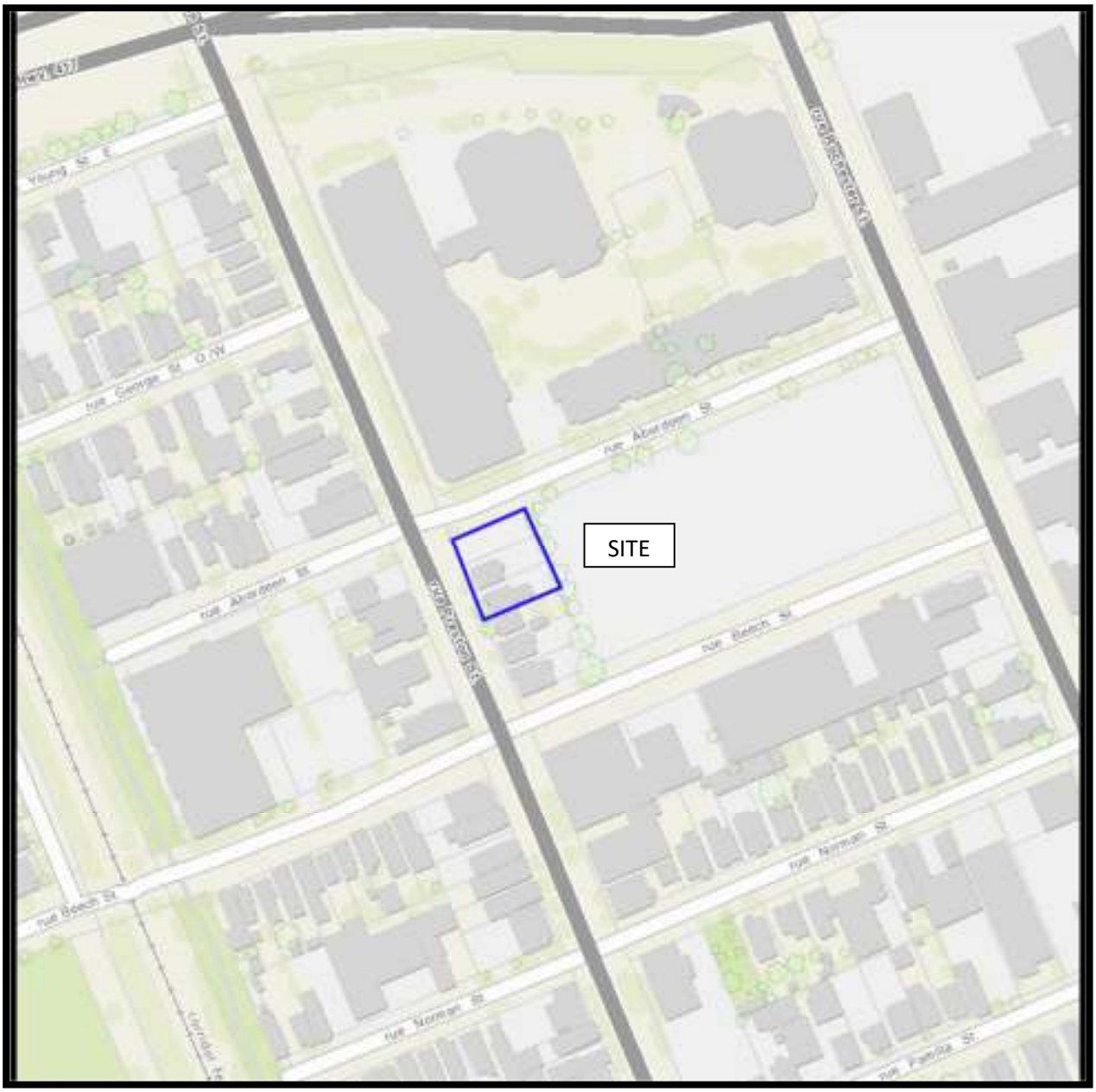
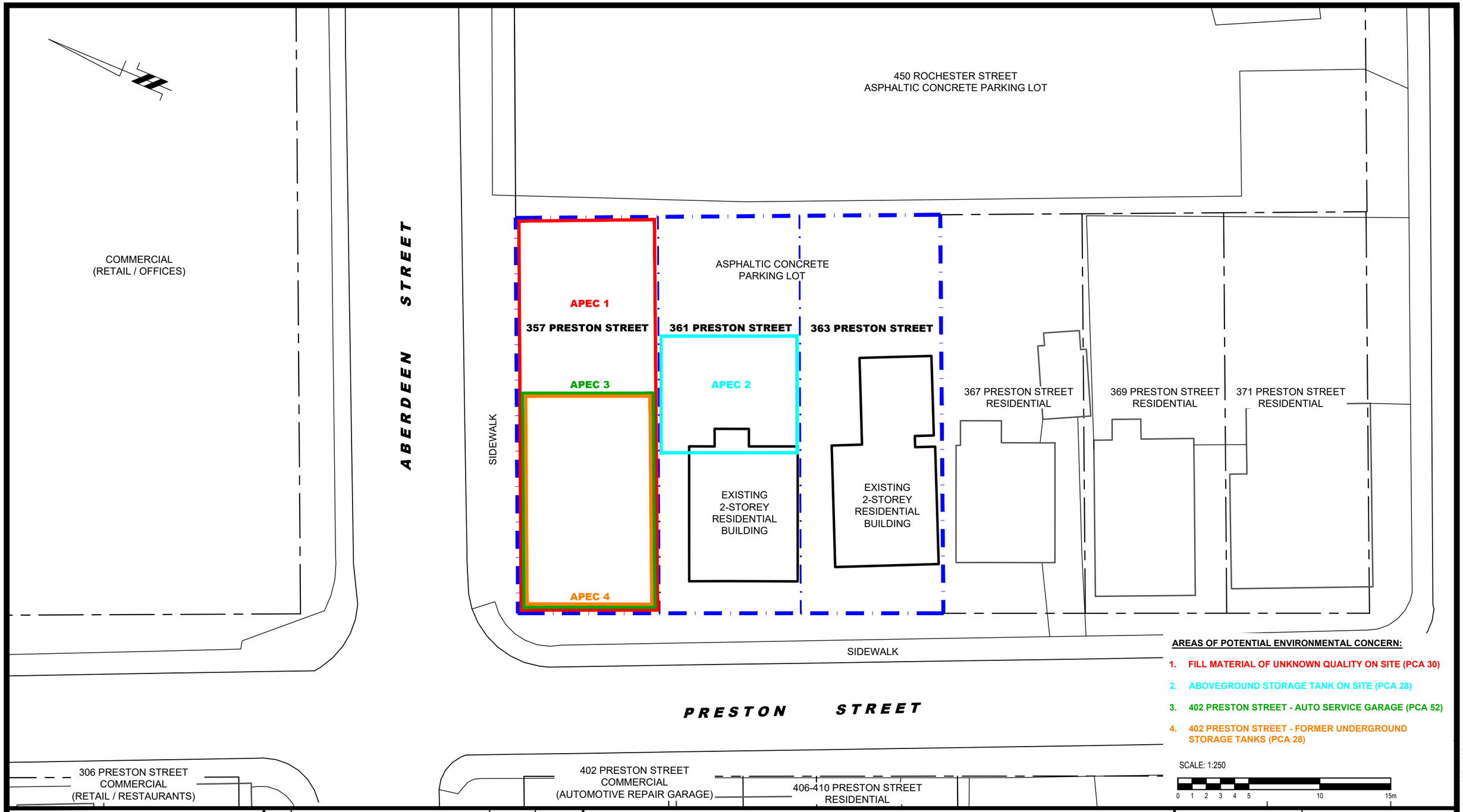


FIGURE 1

KEY PLAN



AREAS OF POTENTIAL ENVIRONMENTAL CONCERN:

1. **FILL MATERIAL OF UNKNOWN QUALITY ON SITE (PCA 30)**
2. **ABOVEGROUND STORAGE TANK ON SITE (PCA 28)**
3. **402 PRESTON STREET - AUTO SERVICE GARAGE (PCA 52)**
4. **402 PRESTON STREET - FORMER UNDERGROUND STORAGE TANKS (PCA 28)**

SCALE: 1:250

0 1 2 3 4 5 10 15m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
357, 361 AND 363 PRESTON STREET

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:250	**Date:** 06/2022
Drawn by: YA	**Report No.:** PE5699-1
Checked by: JD	**Dwg. No.:** PE5699-1
Approved by: MSD	**Revision No.:**

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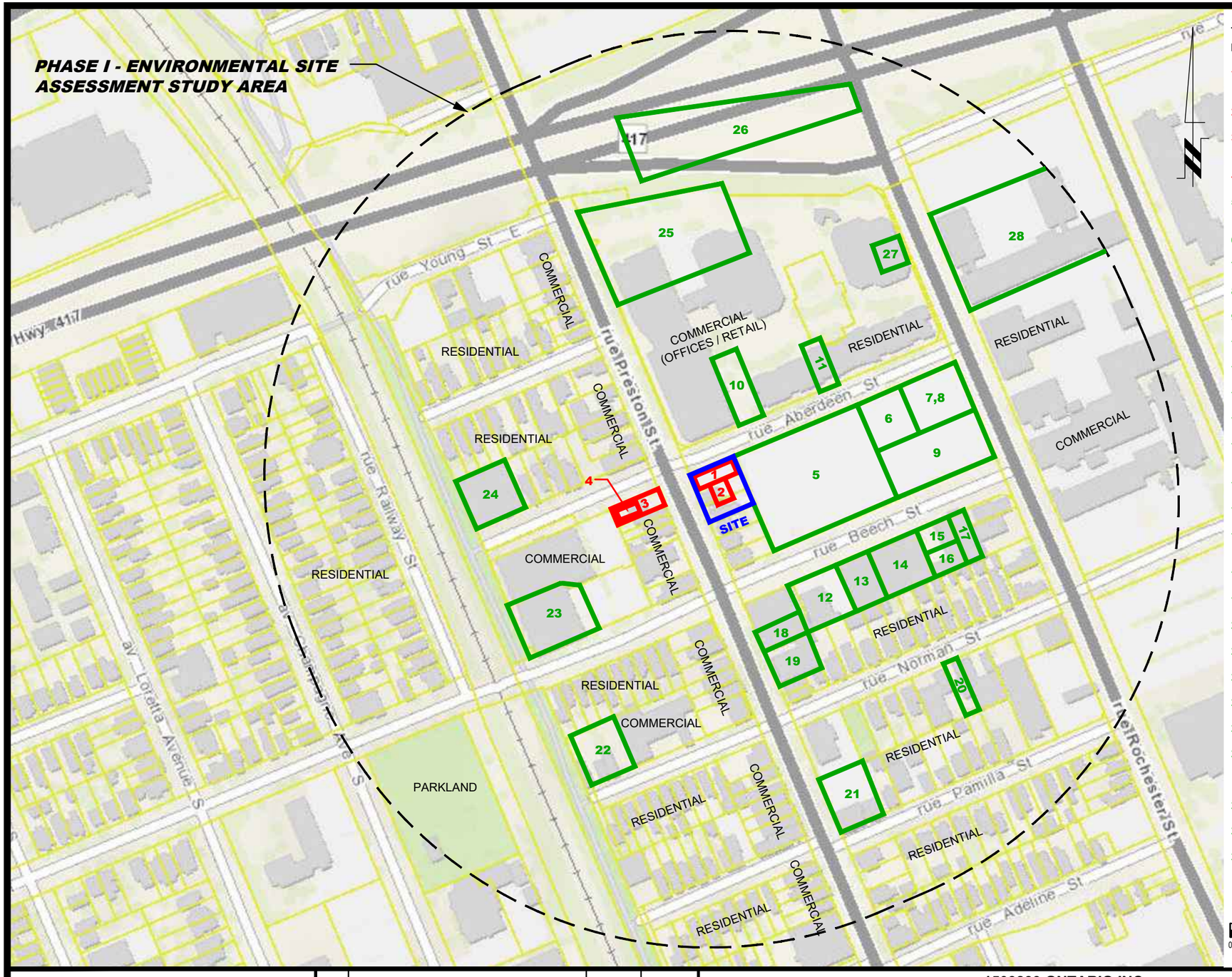

POTENTIALLY CONTAMINATING ACTIVITIES:

ID:	PCA ID:	ADDRESS:	DESCRIPTION:
1)	PCA#30	ON-SITE	FILL MATERIAL OF UNKNOWN QUALITY
2)	PCA #28	ON-SITE	ABOVEGROUND STORAGE TANK
3)	PCA#28,52	402 PRESTON STREET	FORMER RETAIL FUEL OUTLET & UNDERGROUND STORAGE TANKS
4)	PCA#52	402 PRESTON STREET	AUTOMOTIVE SERVICE GARAGE
5)	PCA#30	405 ROCHESTER STREET	IMPORTED FILL MATERIAL OF UNKNOWN QUALITY
6)	PCA#52	10 ABERDEEN STREET	FORMER DRIVE SHED
7)	PCA#52	550 ROCHESTER STREET	FORMER TRUCK REPAIR GARAGE
8)	PCA#28	405 ROCHESTER STREET	FORMER RETAIL FUEL OUTLET
9)	PCA#11	552 ROCHESTER STREET	FORMER COMMERCIAL TRUCKING
10)	PCA#33	25 ABERDEEN STREET	FORMER ACETYL WELDING SHOP
11)	PCA #52	5 ABERDEEN STREET	FORMER AUTOMOTIVE REPAIR GARAGE
12)	PCA#33	70 BEECH STREET	FORMER WELDING SHOP
13)	PCA#34	60 BEECH STREET	FORMER MACHINE SHOP
14)	PCA#52	40 BEECH STREET	FORMER AUTOMOTIVE PAINT & BODY SHOP
15)	PCA#52	34 BEECH STREET	FORMER AUTOMOTIVE REPAIR GARAGE
16)	PCA#52	44 BEECH STREET	FORMER PAINT AND BODY SHOP
17)	PCA#52	20 BEECH STREET	FORMER ELMERS AUTOMOTIVE REPAIR GARAGE
18)	PCA#31	401 PRESTON STREET	FORMER NATIONAL PRINTERS
19)	PCA#31	399 PRESTON STREET	FORMER PRINTING FACILITY
20)	PCA#34	66 NORMAN STREET	FORMER MACHINE SHOP
21)	PCA#52	427 PRESTON STREET	FORMER AUTOMOTIVE DEALERSHIP
22)	PCA#52	95 NORMAN STREET	FORMER AUTOMOTIVE REPAIR GARAGE
23)	PCA#31	95 BEECH STREET	FORMER PRINTERS AND LITHOGRAPHERS
24)	PCA#52	75 ABERDEEN STREET	FORMER AUTOMOTIVE REPAIR GARAGE
25)	PCA#52	339 PRESTON STREET	FORMER TRUCK REPAIR GARAGE , PRIVATE FUEL PUMPS AND TWO UNDERGROUND STORAGE TANKS
26)		HIGHWAY 417	FORMER COAL SHED
27)	PCA#34	374 ROCHESTER STREET	FORMER MACHINE SHOP
28)	PCA#41	552 BOOTH STREET	FORMER FUEL TESTING FACILITY

SCALE: 1:2500

0 25 50 75 100 125 150 175m

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NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
357, 361 AND 363 PRESTON STREET

OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

Scale: 1:2500	Date: 06/2022
Drawn by: YA	Report No.: PE5699-1
Checked by: JD	Dwg. No.: PE5699-2
Approved by: MSD	Revision No.:

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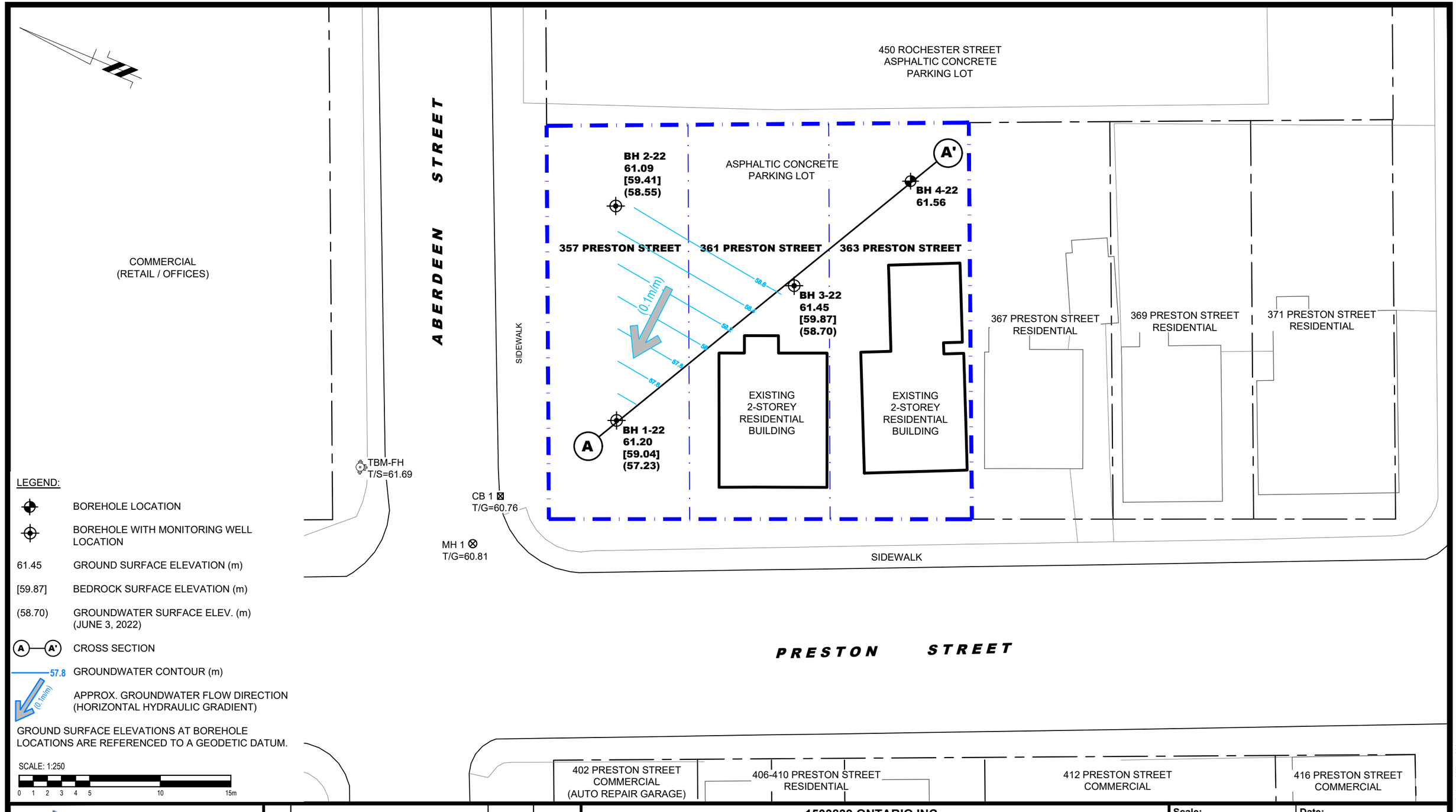

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- 61.45 GROUND SURFACE ELEVATION (m)
- [59.87] BEDROCK SURFACE ELEVATION (m)
- (58.70) GROUNDWATER SURFACE ELEV. (m) (JUNE 3, 2022)
- A — A' CROSS SECTION
- 57.8 GROUNDWATER CONTOUR (m)
- APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

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

SCALE: 1:250

0 1 2 3 4 5 10 15m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
357, 361 & 363 PRESTON STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:250	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
Checked by: JD	Dwg. No.: PE5699-3
Approved by: MSD	Revision No.:

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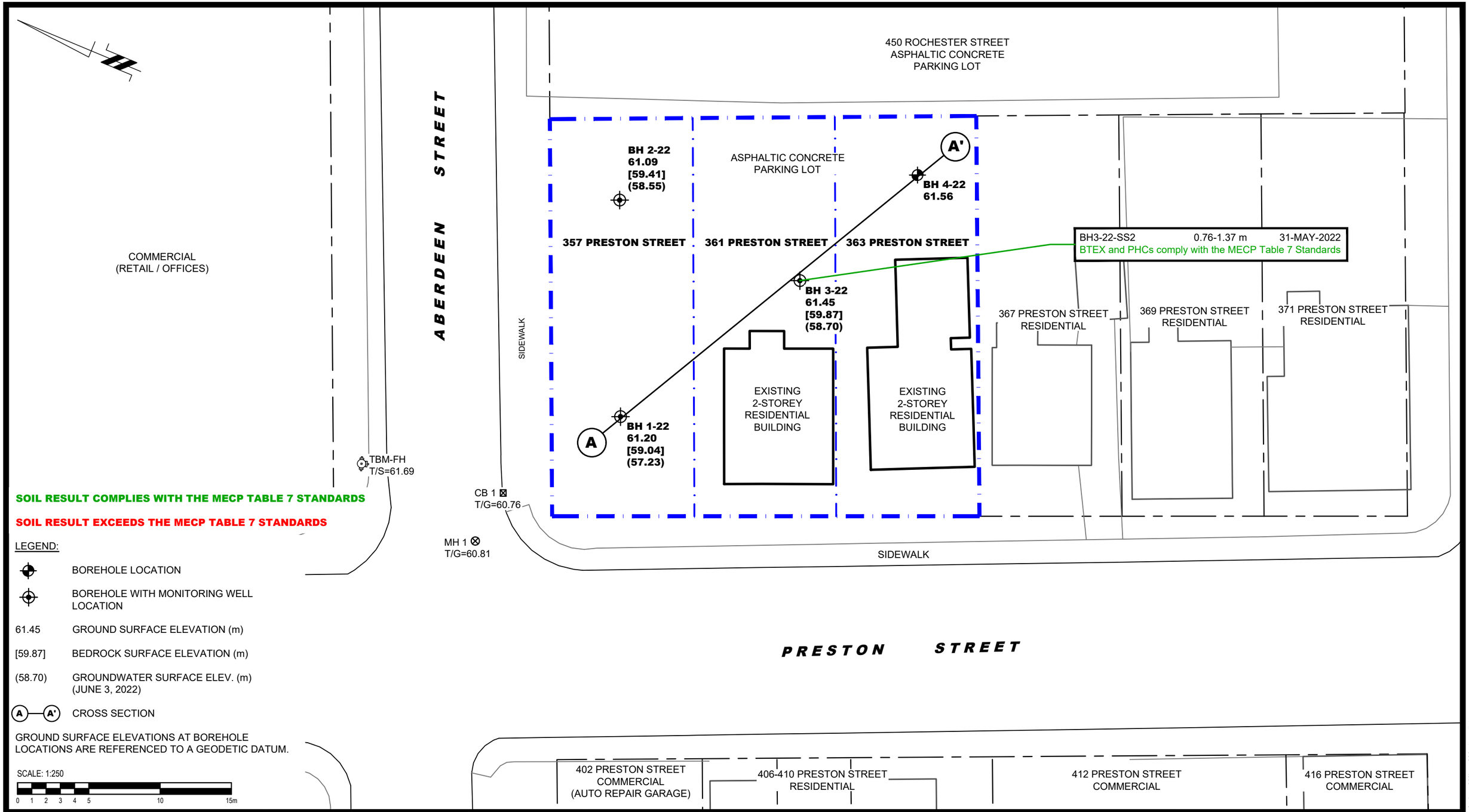

SOIL RESULT COMPLIES WITH THE MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 7 STANDARDS

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- 61.45 GROUND SURFACE ELEVATION (m)
- [59.87] BEDROCK SURFACE ELEVATION (m)
- (58.70) GROUNDWATER SURFACE ELEV. (m) (JUNE 3, 2022)
- A — A' CROSS SECTION

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

SCALE: 1:250

0 1 2 3 4 5 10 15m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
357, 361 & 363 PRESTON STREET
OTTAWA, ONTARIO

Title:
ANALYTICAL TESTING PLAN - SOIL (BTEX, PHCs)

Scale: 1:250	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
Checked by: JD	Dwg. No.: PE5699-4
Approved by: MSD	Revision No.:

11x17

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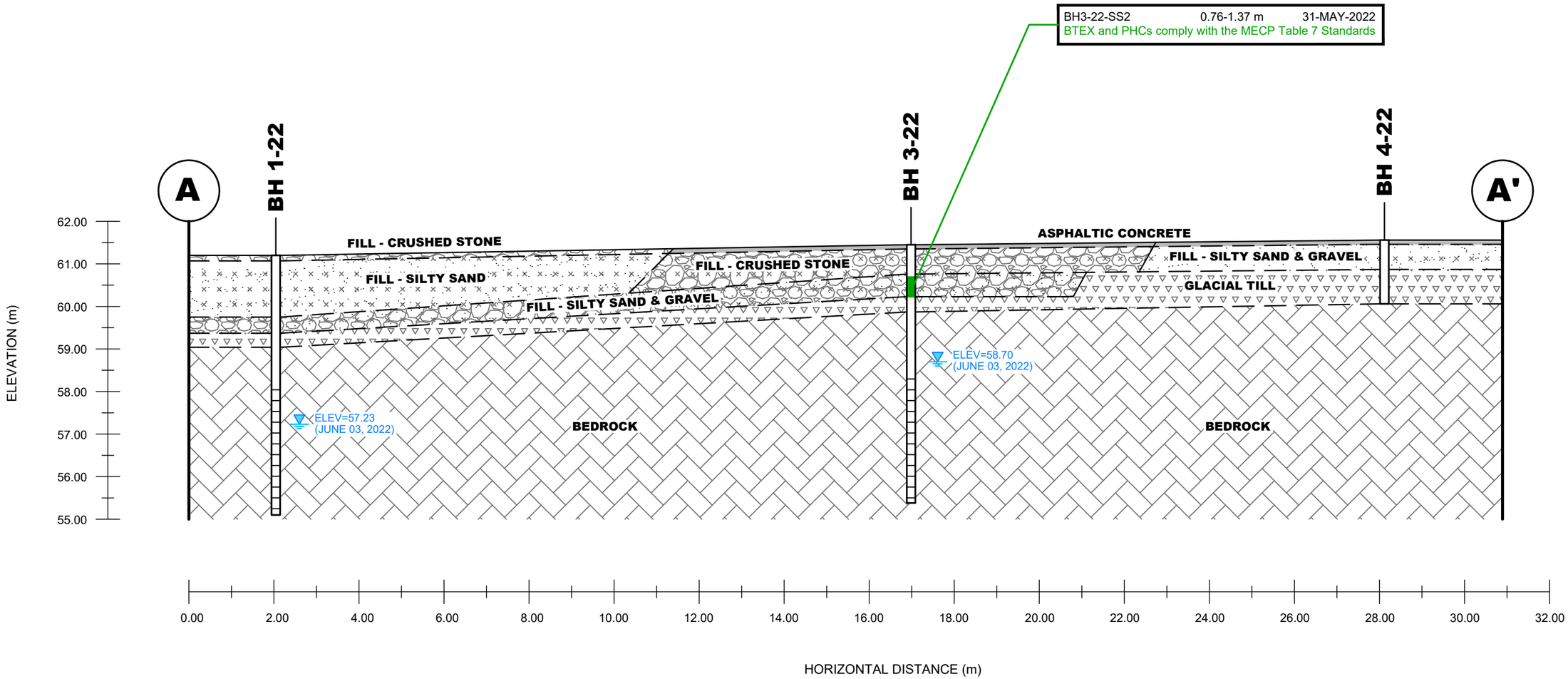

SOIL RESULT COMPLIES WITH THE MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 7 STANDARDS

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
357, 361 & 363 PRESTON STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (BTEX, PHCs)

Scale: AS SHOWN	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
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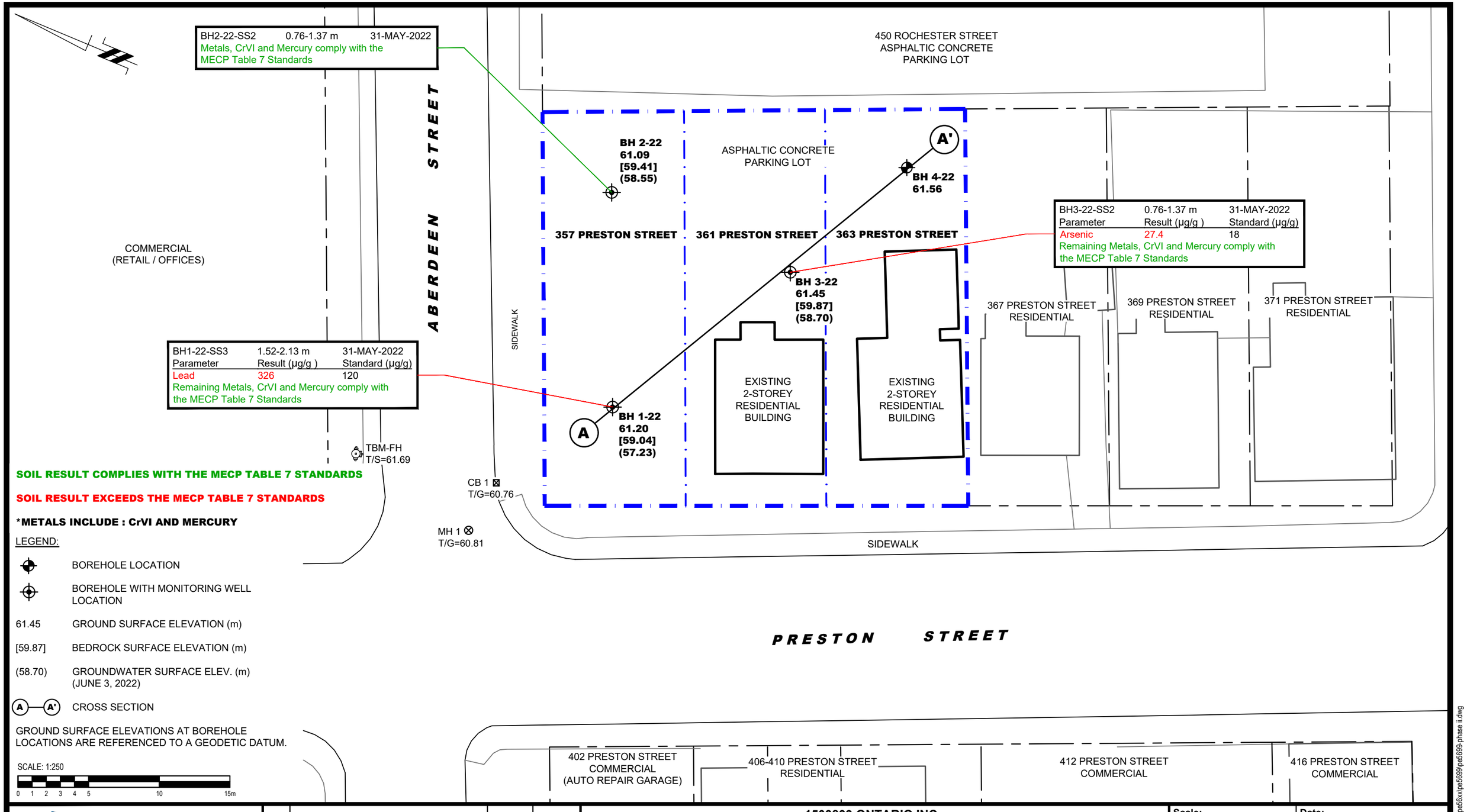

SOIL RESULT COMPLIES WITH THE MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 7 STANDARDS

***METALS INCLUDE : CrVI AND MERCURY**

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- 61.45 GROUND SURFACE ELEVATION (m)
- [59.87] BEDROCK SURFACE ELEVATION (m)
- (58.70) GROUNDWATER SURFACE ELEV. (m) (JUNE 3, 2022)
- A — A' CROSS SECTION

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

SCALE: 1:250

0 1 2 3 4 5 10 15m

PATERSON GROUP
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NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
357, 361 & 363 PRESTON STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (METALS)

Scale: 1:250	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
Checked by: JD	Dwg. No.: PE5699-5
Approved by: MSD	Revision No.:

11x17

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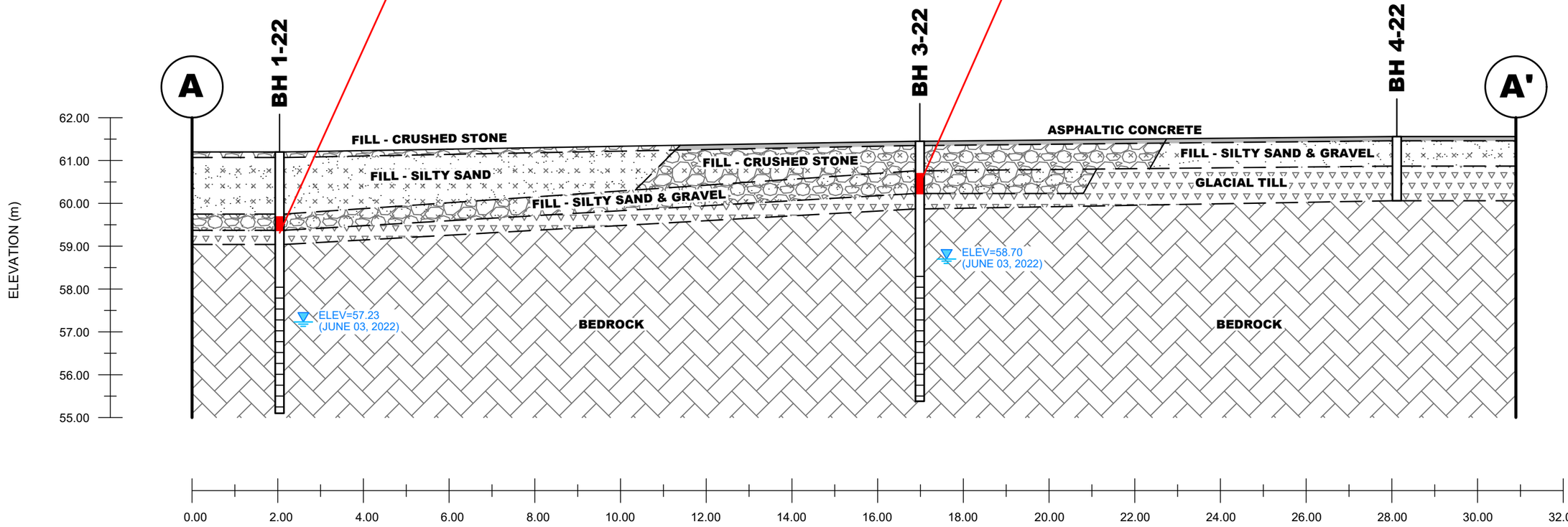
BH1-22-SS3	1.52-2.13 m	31-MAY-2022
Parameter	Result (µg/g)	Standard (µg/g)
Lead	326	120

Remaining Metals, CrVI and Mercury comply with the MECP Table 7 Standards

BH3-22-SS2	0.76-1.37 m	31-MAY-2022
Parameter	Result (µg/g)	Standard (µg/g)
Arsenic	27.4	18

Remaining Metals, CrVI and Mercury comply with the MECP Table 7 Standards



SOIL RESULT COMPLIES WITH THE MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 7 STANDARDS

***METALS INCLUDE : CrVI AND MERCURY**

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

357, 361 & 363 PRESTON STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (METALS)

Scale: AS SHOWN	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
Checked by: JD	Dwg. No.: PE5699-5A
Approved by: MSD	Revision No.:

11x17

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BH2-22-SS2 0.76-1.37 m 31-MAY-2022
PAHs comply with the MECP Table 7 Standards

BH1-22-SS3 1.52-2.13 m 31-MAY-2022
PAHs comply with the MECP Table 7 Standards

450 ROCHESTER STREET
ASPHALTIC CONCRETE
PARKING LOT

ABERDEEN STREET

SIDEWALK

COMMERCIAL
(RETAIL / OFFICES)

BH 2-22
61.09
[59.41]
(58.55)

ASPHALTIC CONCRETE
PARKING LOT

A'

BH 4-22
61.56

357 PRESTON STREET | 361 PRESTON STREET | 363 PRESTON STREET

BH 3-22
61.45
[59.87]
(58.70)

BH 1-22
61.20
[59.04]
(57.23)

A

EXISTING
2-STOREY
RESIDENTIAL
BUILDING

EXISTING
2-STOREY
RESIDENTIAL
BUILDING

BH3-22-SS2	0.76-1.37 m	31-MAY-2022
Parameter	Result (µg/g)	Standard (µg/g)
Acenaphthylene	0.24	0.15
Benzo[a]anthracene	0.74	0.5
Benzo[a]pyrene	0.80	0.3
Benzo[b]fluoranthene	0.85	0.78
Dibenzo[a,h]anthracene	0.13	0.1
Fluoranthene	1.21	0.69
Indeno[1,2,3-cd]pyrene	0.43	0.38

Remaining PAHs comply with the MECP Table 7 Standards

367 PRESTON STREET
RESIDENTIAL

369 PRESTON STREET
RESIDENTIAL

371 PRESTON STREET
RESIDENTIAL

TBM-FH
T/S=61.69

CB 1
T/G=60.76

MH 1
T/G=60.81

SIDEWALK

PRESTON STREET

402 PRESTON STREET
COMMERCIAL
(AUTO REPAIR GARAGE)

406-410 PRESTON STREET
RESIDENTIAL

412 PRESTON STREET
COMMERCIAL

416 PRESTON STREET
COMMERCIAL

SOIL RESULT COMPLIES WITH THE MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 7 STANDARDS

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- 61.45 GROUND SURFACE ELEVATION (m)
- [59.87] BEDROCK SURFACE ELEVATION (m)
- (58.70) GROUNDWATER SURFACE ELEV. (m) (JUNE 3, 2022)
- A—A' CROSS SECTION

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

SCALE: 1:250

0 1 2 3 4 5 10 15m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
357, 361 & 363 PRESTON STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (PAHs)

Scale: 1:250	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
Checked by: JD	Dwg. No.: PE5699-6
Approved by: MSD	Revision No.:

11x17

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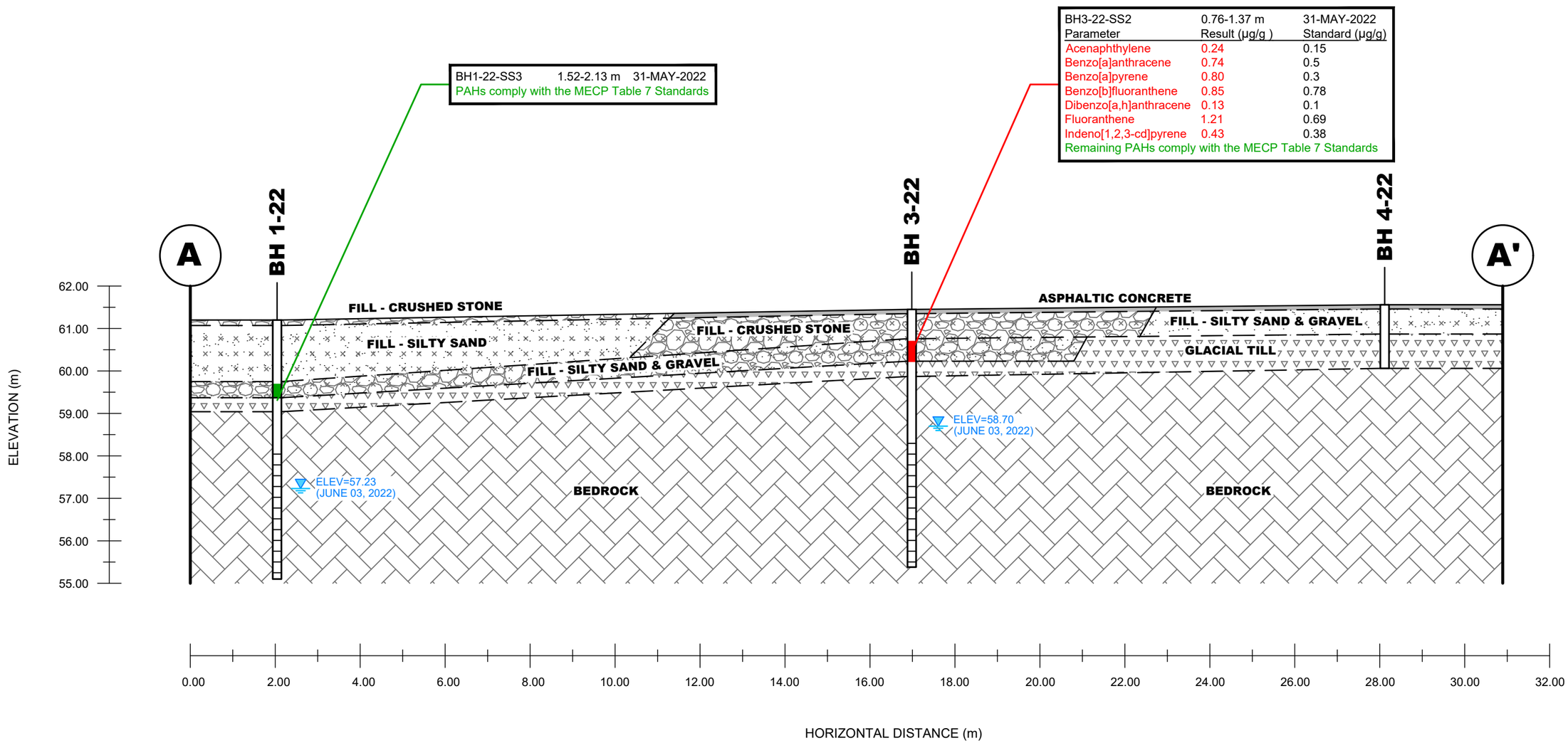

SOIL RESULT COMPLIES WITH THE MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 7 STANDARDS

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
357, 361 & 363 PRESTON STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (PAHs)

Scale: AS SHOWN	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
Checked by: JD	Dwg. No.: PE5699-6A
Approved by: MSD	Revision No.:

11x17

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BH2-22-GW1 3.10-6.15 m 3-JUNE-2022
BTEX and PHCs comply with the MECP Table 7 Standards

DUP (BH2-22) 3.10-6.15 m 3-JUNE-2022
BTEX comply with the MECP Table 7 Standards

BH3-22-GW1 2.97-6.02 m 3-JUNE-2022
BTEX and PHCs comply with the MECP Table 7 Standards

BH1-22-GW1 3.05-6.10 m 3-JUNE-2022
BTEX and PHCs comply with the MECP Table 7 Standards

450 ROCHESTER STREET
ASPHALTIC CONCRETE
PARKING LOT

ABERDEEN STREET

SIDEWALK

COMMERCIAL
(RETAIL / OFFICES)

ASPHALTIC CONCRETE
PARKING LOT

BH 2-22
61.09
[59.41]
(58.55)

BH 4-22
61.56

BH 3-22
61.45
[59.87]
(58.70)

BH 1-22
61.20
[59.04]
(57.23)

A

A'

357 PRESTON STREET

361 PRESTON STREET

363 PRESTON STREET

EXISTING
2-STOREY
RESIDENTIAL
BUILDING

EXISTING
2-STOREY
RESIDENTIAL
BUILDING

367 PRESTON STREET
RESIDENTIAL

369 PRESTON STREET
RESIDENTIAL

371 PRESTON STREET
RESIDENTIAL

TBM-FH
T/S=61.69

CB 1
T/G=60.76

MH 1
T/G=60.81

SIDEWALK

PRESTON STREET

402 PRESTON STREET
COMMERCIAL
(AUTO REPAIR GARAGE)

406-410 PRESTON STREET
RESIDENTIAL

412 PRESTON STREET
COMMERCIAL

416 PRESTON STREET
COMMERCIAL

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 7 STANDARDS

GROUNDWATER RESULT EXCEEDS THE MECP TABLE 7 STANDARDS

LEGEND:

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- BOREHOLE WITH MONITORING WELL LOCATION
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- A—A' CROSS SECTION

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SCALE: 1:250

0 1 2 3 4 5 10 15m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
357, 361 & 363 PRESTON STREET
OTTAWA, ONTARIO

Title:
ANALYTICAL TESTING PLAN - GROUNDWATER (BTEX, PHCs)

Scale: 1:250	**Date:** 06/2022
Drawn by: YA	**Report No.:** PE5699-2
Checked by: JD	**Dwg. No.:** PE5699-7
Approved by: MSD	**Revision No.:**

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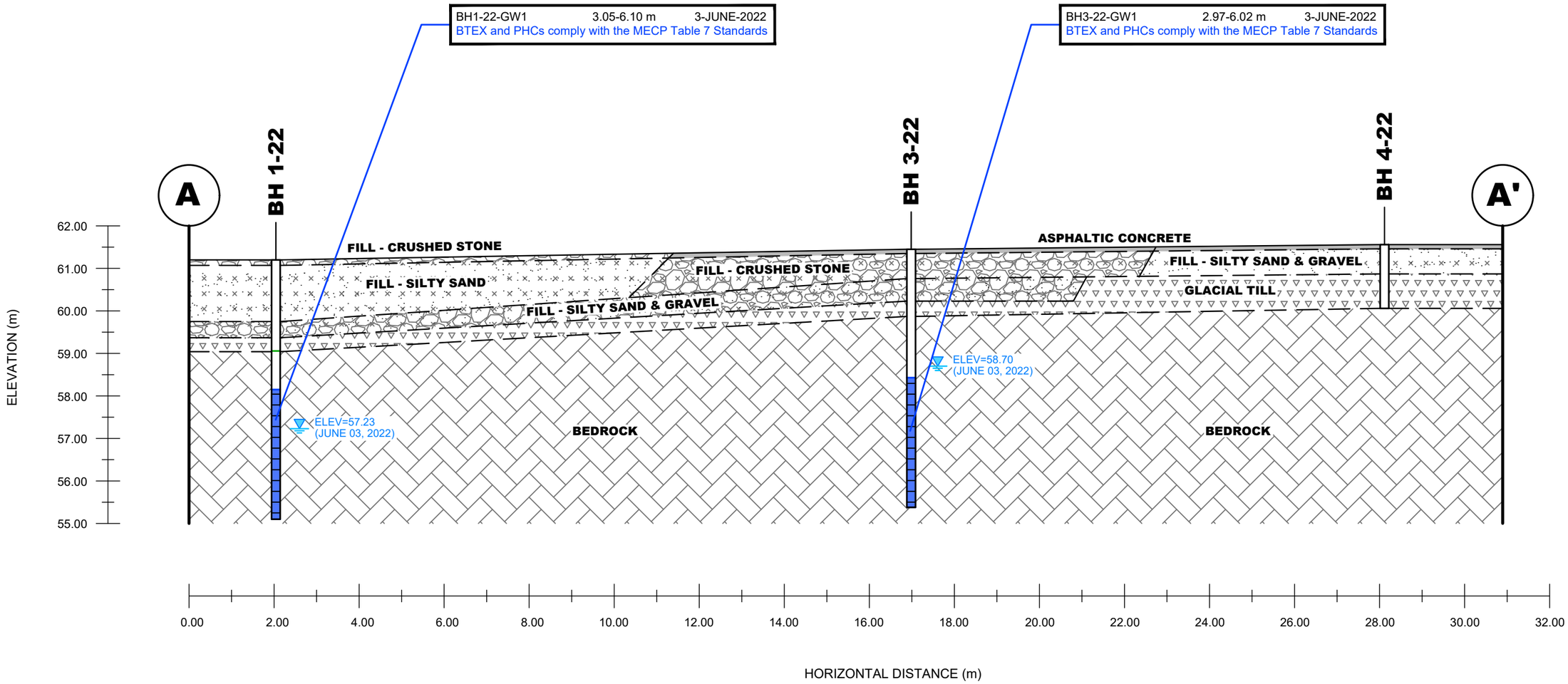

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 7 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
357, 361 & 363 PRESTON STREET

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
Checked by: JD	Dwg. No.: PE5699-7A
Approved by: MSD	Revision No.:

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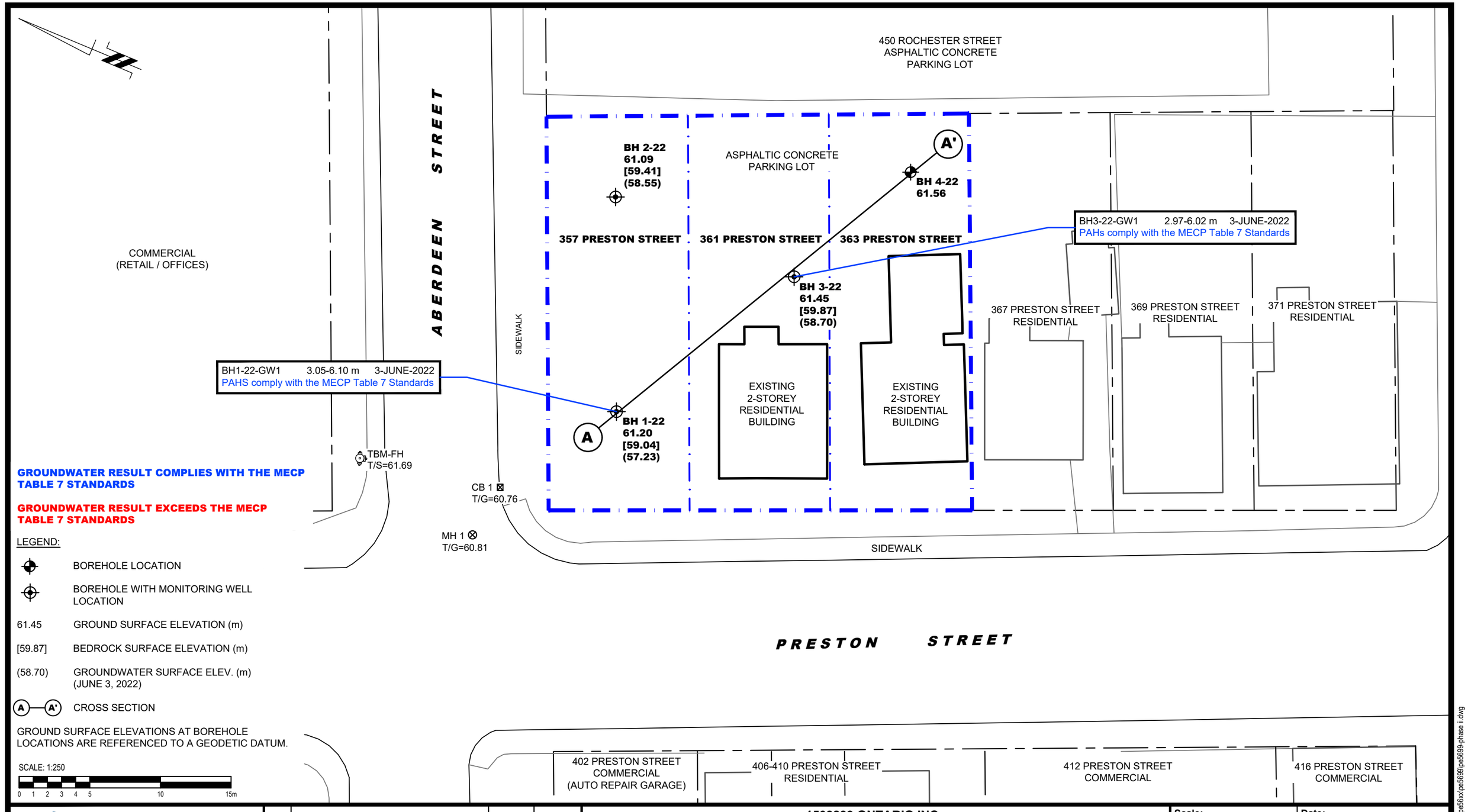

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- A—A' CROSS SECTION

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

SCALE: 1:250

0 1 2 3 4 5 10 15m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

1503839 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
357, 361 & 363 PRESTON STREET
OTTAWA, ONTARIO

Title: ANALYTICAL TESTING PLAN - GROUNDWATER (PAHs)

Scale: 1:250	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
Checked by: JD	Dwg. No.: PE5699-8
Approved by: MSD	Revision No.:

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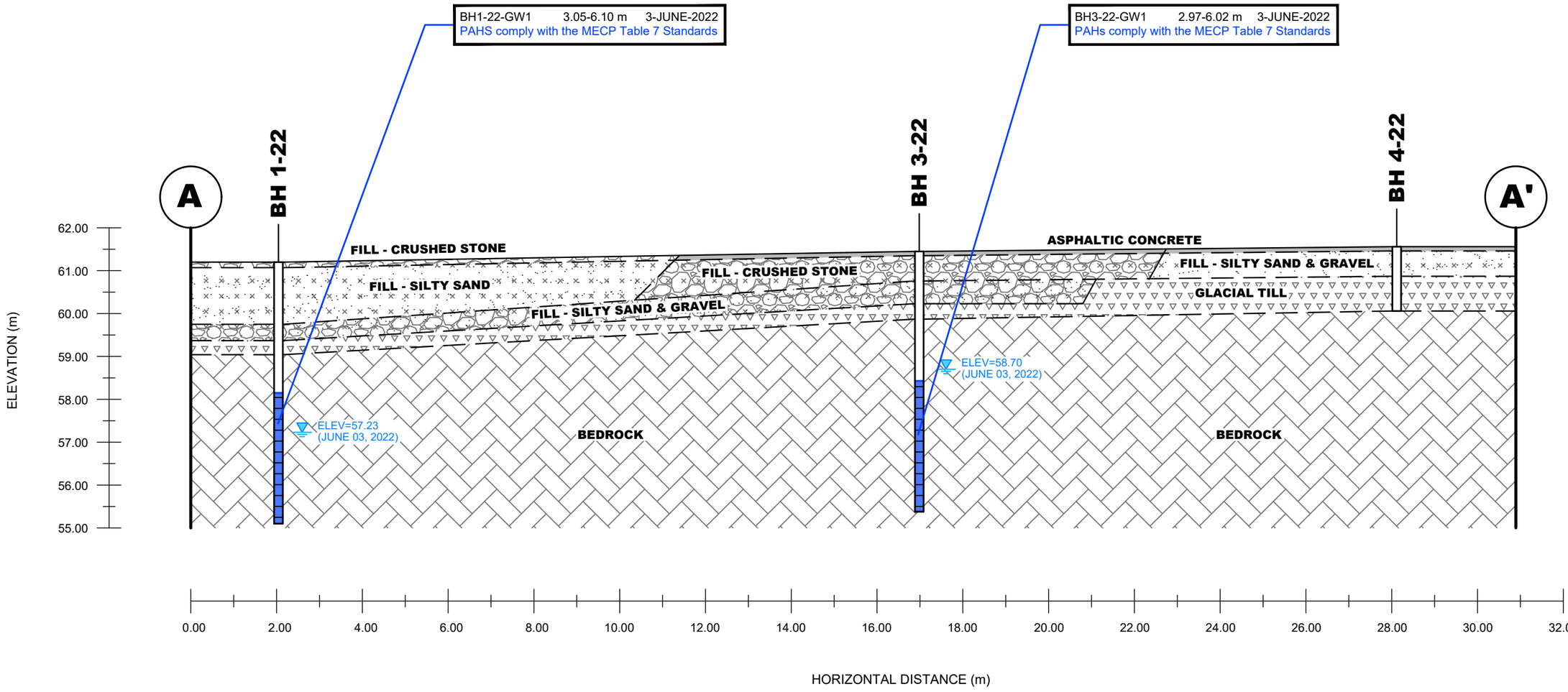

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 7 STANDARDS

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OTTAWA, ONTARIO

Title:
CROSS SECTION A-A' - GROUNDWATER (PAHs)

Scale: AS SHOWN	Date: 06/2022
Drawn by: YA	Report No.: PE5699-2
Checked by: JD	Dwg. No.: PE5699-8A
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

PATERSON GROUP

Sampling and Analysis

357, 361 and 363 Preston Street
Ottawa, Ontario

Prepared for 1503839 Ontario Inc.

Report: PE5699-SAP
May 31, 2022

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by 1503839 Ontario Inc., to conduct a Phase II – Environmental Site Assessment (Phase II ESA) at 357, 361 and 363 Preston Street, 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
BH1-22	Placed on the northwest portion of the Phase II property to assess for potential soil and groundwater impacts resulting from the potential fill material of unknown quality, and current automotive service/former retail fuel outlet on the adjacent property to the west, across Preston.	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH2-22	Placed on the northeast portion of the Phase II property to assess for potential soil impacts from the potential fill material of unknown quality.	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH3-22	Placed on the central portion of the Phase II property, to assess for potential soil and groundwater impacts resulting from the present above ground storage tank (AST)	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH4-22	Placed on the south east portion of the Phase II property for general coverage purposes.	5-7 m; For geotechnical coverage purposes

Borehole locations are shown on Drawing PE5699-3 – 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 boreholes BH1-22, BH2-22 and BH3-22 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 TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

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

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

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9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - 357, 361 & 363 Preston St.
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5699

REMARKS

HOLE NO. BH 1-22

BORINGS BY CME-55 Low Clearance Drill **DATE** May 31, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.20
FILL: Crushed stone and gravel 0.13							
FILL: Brown silty sand		AU	1				
		SS	2	58	16	1	60.20
1.45							
FILL: Brown silty sand with gravel, trace clay tile, asphalt and wood chips 1.83		SS	3	25	22		
GLACIAL TILL: Dense, brown silty sand with gravel, occasional cobbles 2.16						2	59.20
		RC	1	100	89	3	58.20
		RC	2	100	100	4	57.20
BEDROCK: Good to excellent quality, grey limestone						5	56.20
		RC	3	100	95		
6.10						6	55.20
End of Borehole							
(GWL @ 3.97m - June 3, 2022)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - 357, 361 & 363 Preston St.
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5699

REMARKS

HOLE NO. BH 2-22

BORINGS BY CME-55 Low Clearance Drill **DATE** May 31, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.09
Asphaltic concrete 0.05							
FILL: Crushed stone		AU	1				
0.69							
FILL: Brown silty sand with gravel, some crushed stone 1.07		SS	2	42	45	1	60.09
GLACIAL TILL: Dense, brown silty sand with gravel, cobbles and boulders		SS	3	67	50+		
1.68						2	59.09
		RC	1	100	90		
						3	58.09
BEDROCK: Excellent quality, grey limestone		RC	2	100	100	4	57.09
						5	56.09
		RC	3	100	100		
						6	55.09
6.15							
End of Borehole							
(GWL @ 2.54m - June 3, 2022)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - 357, 361 & 363 Preston St.
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5699

REMARKS

HOLE NO. BH 3-22

BORINGS BY CME-55 Low Clearance Drill **DATE** May 31, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.45
Asphaltic concrete 0.05							
FILL: Crushed stone		AU	1				
0.69							
FILL: Black/brown silty sand with gravel, occasional cobbles		SS	2	32	34	1	60.45
1.22							
GLACIAL TILL: Dense, brown silty sand with gravel, cobbles and boulders 1.58						2	59.45
		RC	1	100	54		
						3	58.45
BEDROCK: Fair to excellent quality, grey limestone		RC	2	100	100	4	57.45
						5	56.45
		RC	3	100	100		
6.07						6	55.45
End of Borehole							
(GWL @ 2.75m - June 3, 2022)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - 357, 361 & 363 Preston St.
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5699

REMARKS

HOLE NO. BH 4-22

BORINGS BY CME-55 Low Clearance Drill **DATE** May 31, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
Asphaltic concrete 0.05						0	61.56		
FILL: Brown silty sand with gravel, trace topsoil 0.69		AU	1						
GLACIAL TILL: Loose to compact, brown silty sand with gravel, occasional cobbles 1.50		SS	2	58	8	1	60.56		
End of Borehole									
Practical refusal to augering at 1.50m depth									

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

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

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

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

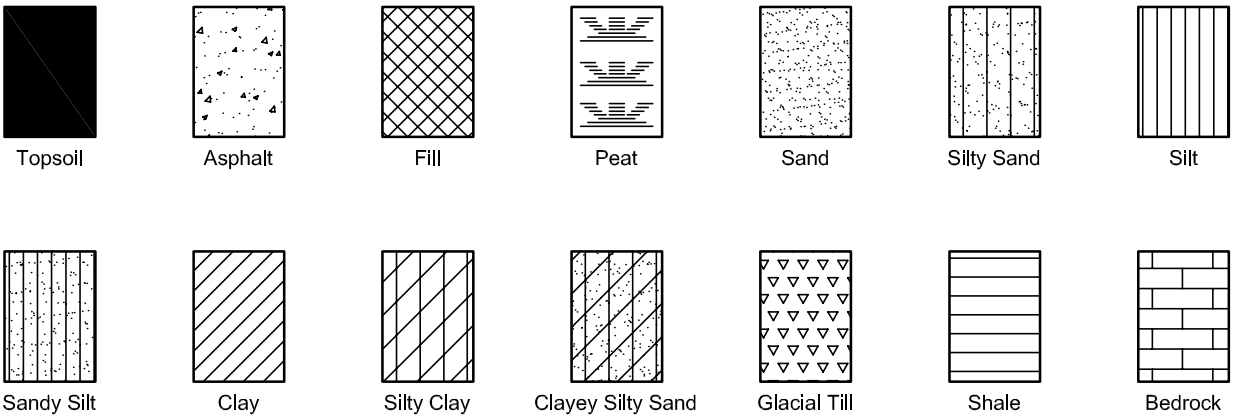
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

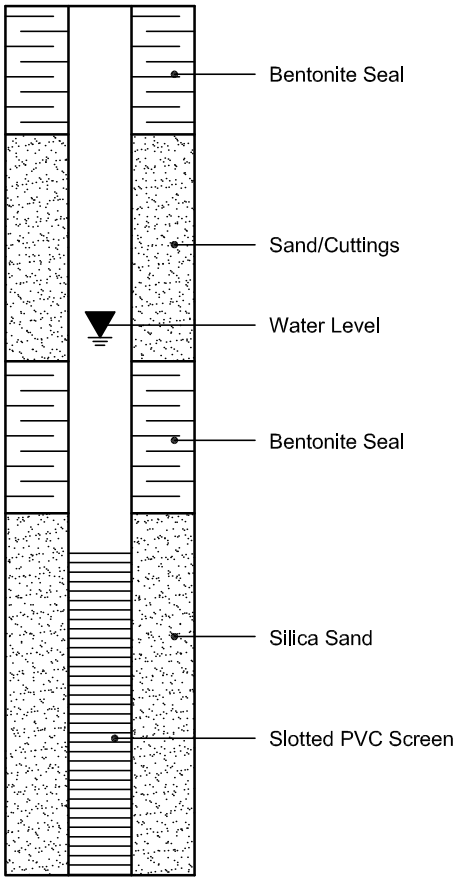
SYMBOLS AND TERMS (continued)

STRATA PLOT

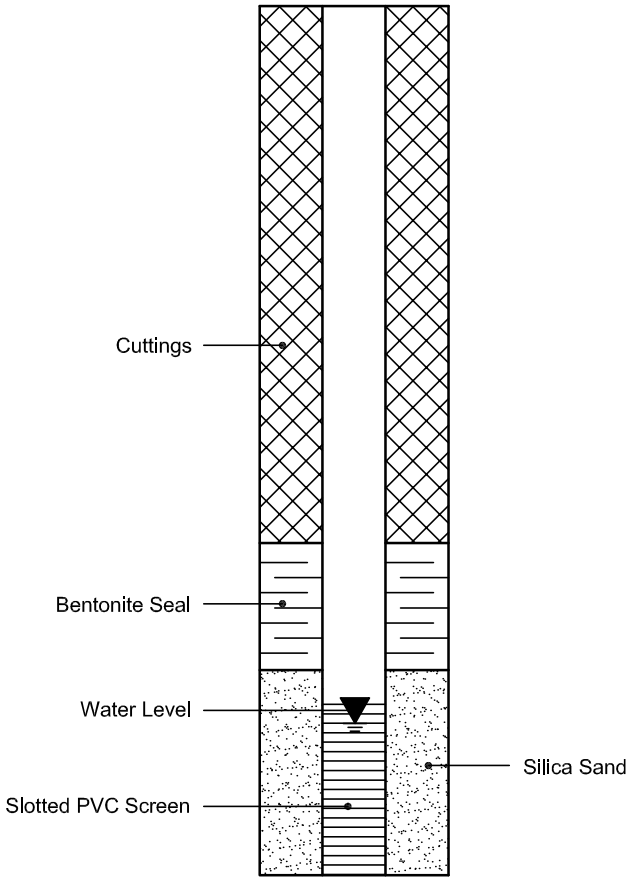


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mark D'Arcy

Client PO: 54850
Project: PE5699
Custody: 136638

Report Date: 7-Jun-2022
Order Date: 1-Jun-2022

Order #: 2223401

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

Paracel ID	Client ID
2223401-01	BH1-22-SS3
2223401-02	BH2-22-SS2
2223401-03	BH3-22-SS2

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 07-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 1-Jun-2022

Client PO: 54850

Project Description: PE5699

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	3-Jun-22	6-Jun-22
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	6-Jun-22	6-Jun-22
Mercury by CVAA	EPA 7471B - CVAA, digestion	6-Jun-22	6-Jun-22
PHC F1	CWS Tier 1 - P&T GC-FID	3-Jun-22	6-Jun-22
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	6-Jun-22	7-Jun-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	2-Jun-22	7-Jun-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	6-Jun-22	6-Jun-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	4-Jun-22	6-Jun-22
Solids, %	Gravimetric, calculation	6-Jun-22	7-Jun-22

Certificate of Analysis

Report Date: 07-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 1-Jun-2022

Client PO: 54850

Project Description: PE5699

	Client ID:	BH1-22-SS3	BH2-22-SS2	BH3-22-SS2	-
	Sample Date:	31-May-22 09:00	31-May-22 09:00	31-May-22 09:00	-
	Sample ID:	2223401-01	2223401-02	2223401-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	84.5	93.1	89.0	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	1.7	-
Arsenic	1.0 ug/g dry	4.3	2.8	27.4	-
Barium	1.0 ug/g dry	135	43.6	253	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	0.9	-
Boron	5.0 ug/g dry	12.9	6.6	14.4	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	0.8	-
Chromium	5.0 ug/g dry	22.8	13.1	31.5	-
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	-
Cobalt	1.0 ug/g dry	7.5	4.2	10.8	-
Copper	5.0 ug/g dry	13.0	11.9	59.6	-
Lead	1.0 ug/g dry	326	4.8	111	-
Mercury	0.1 ug/g dry	<0.1	<0.1	0.1	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	1.8	-
Nickel	5.0 ug/g dry	14.4	10.4	28.2	-
Selenium	1.0 ug/g dry	<1.0	<1.0	1.3	-
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	-
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Uranium	1.0 ug/g dry	<1.0	<1.0	1.5	-
Vanadium	10.0 ug/g dry	47.1	22.9	46.7	-
Zinc	20.0 ug/g dry	82.0	<20.0	166	-
Volatiles					
Benzene	0.02 ug/g dry	-	-	<0.02	-
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	-
Toluene	0.05 ug/g dry	-	-	<0.05	-
m,p-Xylenes	0.05 ug/g dry	-	-	<0.05	-
o-Xylene	0.05 ug/g dry	-	-	<0.05	-
Xylenes, total	0.05 ug/g dry	-	-	<0.05	-
Toluene-d8	Surrogate	-	-	96.8%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	-	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	-	-	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	-	-	217	-
F4 PHCs (C34-C50)	6 ug/g dry	-	-	267 [1]	-

Certificate of Analysis

Report Date: 07-Jun-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 1-Jun-2022

Client PO: **54850**

Project Description: PE5699

	Client ID:	BH1-22-SS3	BH2-22-SS2	BH3-22-SS2	-
	Sample Date:	31-May-22 09:00	31-May-22 09:00	31-May-22 09:00	-
	Sample ID:	2223401-01	2223401-02	2223401-03	-
	MDL/Units	Soil	Soil	Soil	-
F4G PHCs (gravimetric)	50 ug/g dry	-	-	270	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	0.03	<0.02	0.04	-
Acenaphthylene	0.02 ug/g dry	0.04	<0.02	0.24	-
Anthracene	0.02 ug/g dry	0.10	<0.02	0.23	-
Benzo [a] anthracene	0.02 ug/g dry	0.21	<0.02	0.74	-
Benzo [a] pyrene	0.02 ug/g dry	0.21	<0.02	0.80	-
Benzo [b] fluoranthene	0.02 ug/g dry	0.18	<0.02	0.85	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.11	<0.02	0.46	-
Benzo [k] fluoranthene	0.02 ug/g dry	0.09	<0.02	0.48	-
Chrysene	0.02 ug/g dry	0.22	<0.02	0.72	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	0.02	<0.02	0.13	-
Fluoranthene	0.02 ug/g dry	0.43	<0.02	1.21	-
Fluorene	0.02 ug/g dry	0.03	<0.02	0.05	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.09	<0.02	0.43	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	0.02	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	0.03	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	0.05	-
Naphthalene	0.01 ug/g dry	0.01	<0.01	0.02	-
Phenanthrene	0.02 ug/g dry	0.40	<0.02	0.66	-
Pyrene	0.02 ug/g dry	0.41	<0.02	1.05	-
2-Fluorobiphenyl	Surrogate	107%	101%	102%	-
Terphenyl-d14	Surrogate	111%	114%	103%	-

Certificate of Analysis

Report Date: 07-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 1-Jun-2022

Client PO: 54850

Project Description: PE5699

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						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.06*		*ug/g*		*79.7*	*50-140*			
Surrogate: Terphenyl-d14	*1.34*		*ug/g*		*100*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*2.85*		*ug/g*		*89.0*	*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)	35	7	ug/g	24			37.9	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	214	8	ug/g	217			1.4	30	
F4 PHCs (C34-C50)	232	6	ug/g	267			14.1	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	3.2	1.0	ug/g	4.3			NC	30	
Barium	95.6	1.0	ug/g	135			33.8	30	QM-07
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	10.6	5.0	ug/g	12.9			19.3	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	18.6	5.0	ug/g	22.8			20.3	30	
Cobalt	5.9	1.0	ug/g	7.5			23.0	30	
Copper	10.3	5.0	ug/g	13.0			23.1	30	
Lead	176	1.0	ug/g	326			60.0	30	QR-05
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	11.1	5.0	ug/g	14.4			26.2	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	37.7	10.0	ug/g	47.1			22.3	30	
Zinc	64.0	20.0	ug/g	82.0			24.8	30	
Physical Characteristics									
% Solids	88.2	0.1	% by Wt.	78.6			11.5	25	
Semi-Volatiles									
Acenaphthene	0.036	0.02	ug/g	0.033			9.8	40	
Acenaphthylene	0.048	0.02	ug/g	0.044			9.2	40	
Anthracene	0.124	0.02	ug/g	0.102			19.2	40	
Benzo [a] anthracene	0.228	0.02	ug/g	0.212			7.4	40	
Benzo [a] pyrene	0.242	0.02	ug/g	0.214			12.2	40	
Benzo [b] fluoranthene	0.205	0.02	ug/g	0.182			12.2	40	
Benzo [g,h,i] perylene	0.130	0.02	ug/g	0.115			12.6	40	
Benzo [k] fluoranthene	0.101	0.02	ug/g	0.091			11.0	40	
Chrysene	0.240	0.02	ug/g	0.219			9.3	40	
Dibenzo [a,h] anthracene	0.029	0.02	ug/g	0.025			14.9	40	
Fluoranthene	0.477	0.02	ug/g	0.427			11.1	40	
Fluorene	0.032	0.02	ug/g	0.027			17.6	40	
Indeno [1,2,3-cd] pyrene	0.108	0.02	ug/g	0.094			13.0	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	0.014	0.01	ug/g	0.011			27.3	40	
Phenanthrene	0.491	0.02	ug/g	0.395			21.5	40	
Pyrene	0.429	0.02	ug/g	0.405			5.8	40	
Surrogate: 2-Fluorobiphenyl	*1.75*		*ug/g*		*111*	*50-140*			
Surrogate: Terphenyl-d14	*1.73*		*ug/g*		*110*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*3.29*		*ug/g*		*92.0*	*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)	236	7	ug/g	ND	118	80-120			
F2 PHCs (C10-C16)	109	4	ug/g	ND	122	60-140			
F3 PHCs (C16-C34)	485	8	ug/g	217	122	60-140			
F4 PHCs (C34-C50)	408	6	ug/g	267	101	60-140			
F4G PHCs (gravimetric)	930	50	ug/g	ND	93.0	80-120			
Metals									
Antimony	52.7	1.0	ug/g	ND	105	70-130			
Arsenic	63.1	1.0	ug/g	1.7	123	70-130			
Barium	112	1.0	ug/g	53.8	116	70-130			
Beryllium	56.5	0.5	ug/g	ND	113	70-130			
Boron	69.0	5.0	ug/g	5.2	128	70-130			
Cadmium	58.0	0.5	ug/g	ND	116	70-130			
Chromium (VI)	5.3	0.2	ug/g	ND	89.0	70-130			
Chromium	69.4	5.0	ug/g	9.1	120	70-130			
Cobalt	61.6	1.0	ug/g	3.0	117	70-130			
Copper	59.9	5.0	ug/g	5.2	109	70-130			
Lead	47.2	1.0	ug/g	ND	92.7	70-130			
Mercury	1.58	0.1	ug/g	ND	105	70-130			
Molybdenum	60.1	1.0	ug/g	ND	119	70-130			
Nickel	61.8	5.0	ug/g	5.8	112	70-130			
Selenium	55.7	1.0	ug/g	ND	111	70-130			
Silver	48.8	0.3	ug/g	ND	97.6	70-130			
Thallium	58.9	1.0	ug/g	ND	118	70-130			
Uranium	58.6	1.0	ug/g	ND	116	70-130			
Vanadium	81.0	10.0	ug/g	18.9	124	70-130			
Zinc	81.7	20.0	ug/g	32.8	97.7	70-130			
Semi-Volatiles									
Acenaphthene	0.210	0.02	ug/g	0.033	89.9	50-140			
Acenaphthylene	0.207	0.02	ug/g	0.044	82.8	50-140			
Anthracene	0.260	0.02	ug/g	0.102	80.0	50-140			
Benzo [a] anthracene	0.347	0.02	ug/g	0.212	68.6	50-140			
Benzo [a] pyrene	0.376	0.02	ug/g	0.214	82.1	50-140			
Benzo [b] fluoranthene	0.381	0.02	ug/g	0.182	101	50-140			
Benzo [g,h,i] perylene	0.255	0.02	ug/g	0.115	71.1	50-140			
Benzo [k] fluoranthene	0.274	0.02	ug/g	0.091	93.0	50-140			
Chrysene	0.394	0.02	ug/g	0.219	88.6	50-140			
Dibenzo [a,h] anthracene	0.171	0.02	ug/g	0.025	74.2	50-140			
Fluoranthene	0.612	0.02	ug/g	0.427	94.0	50-140			
Fluorene	0.191	0.02	ug/g	0.027	83.5	50-140			
Indeno [1,2,3-cd] pyrene	0.246	0.02	ug/g	0.094	76.8	50-140			
1-Methylnaphthalene	0.187	0.02	ug/g	ND	94.8	50-140			
2-Methylnaphthalene	0.203	0.02	ug/g	ND	103	50-140			
Naphthalene	0.203	0.01	ug/g	0.011	97.6	50-140			
Phenanthrene	0.550	0.02	ug/g	0.395	78.3	50-140			
Pyrene	0.577	0.02	ug/g	0.405	87.3	50-140			
Surrogate: 2-Fluorobiphenyl	*1.55*		*ug/g*		*98.1*	*50-140*			
Surrogate: Terphenyl-d14	*1.54*		*ug/g*		*97.5*	*50-140*			
Volatiles									

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 54850

Report Date: 07-Jun-2022

Order Date: 1-Jun-2022

Project Description: PE5699

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	2.64	0.02	ug/g	ND	66.0	60-130			
Ethylbenzene	4.42	0.05	ug/g	ND	111	60-130			
Toluene	4.85	0.05	ug/g	ND	121	60-130			
m,p-Xylenes	8.89	0.05	ug/g	ND	111	60-130			
o-Xylene	4.86	0.05	ug/g	ND	121	60-130			
Surrogate: Toluene-d8	*3.10*		*ug/g*		*96.9*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

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

QC Qualifiers :

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

QR-05 : Duplicate RPDs higher than normally accepted. Remaining batch QA\QC was acceptable. May be sample effect.

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: 2223401

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2223401	№ 136638

Client Name: PATERSON GROUP	Project Ref: PE5699	Page 1 of 1
Contact Name: Mark D'Arcy	Quote #:	Turnaround Time
Address: 154 Colonnade Road	PO #: 54850	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: mdarcy@patersongroup.ca	Date Required:

☒ REG 153/04 ☐ REG 406/19	Other Regulation
☐ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA
☐ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm
☐ Table	Mun:
For RSC: ☐ Yes ☐ No	☐ Other:

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
	Required Analysis																	
1	BH1-22-SS3	S		2	May 31/22				X	X	X	X						
2	BH2-22-SS2	↓		↓	↓				↓	↓	↓	↓						
3	BH3-22-SS2						X		↓	↓	↓	↓						
4	BH4-22-SS2	↓		↓	↓		HOLD		[redacted]									
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Drop Box

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: Jurnegaon Rahmaj	Verified By:
Relinquished By (Print): Joshua Dempsey	Date/Time:	Date/Time: JUN 01, 2022 04.29	Date/Time: June 2,22 9:47
Date/Time: June 1/2022	Temperature: °C	Temperature: 17.6 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mark D'Arcy

Client PO: 54906
Project: PE5699
Custody: 136651

Report Date: 15-Jun-2022
Order Date: 8-Jun-2022

Order #: 2224338

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

Paracel ID	Client ID
2224338-01	BH1-22-GW1
2224338-02	BH2-22-GW1
2224338-03	BH3-22-GW1
2224338-04	DUP

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 15-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 8-Jun-2022

Client PO: 54906

Project Description: PE5699

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	10-Jun-22	10-Jun-22
PHC F1	CWS Tier 1 - P&T GC-FID	9-Jun-22	10-Jun-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	13-Jun-22	15-Jun-22
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	15-Jun-22	15-Jun-22

Certificate of Analysis

Report Date: 15-Jun-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 8-Jun-2022

Client PO: **54906**

Project Description: **PE5699**

	Client ID:	BH1-22-GW1	BH2-22-GW1	BH3-22-GW1	DUP
	Sample Date:	03-Jun-22 09:00	03-Jun-22 09:00	06-Jun-22 09:00	03-Jun-22 09:00
	Sample ID:	2224338-01	2224338-02	2224338-03	2224338-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	0.8	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	0.8	<0.5
Toluene-d8	Surrogate	102%	102%	102%	104%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-
Semi-Volatiles					
Acenaphthene	0.05 ug/L	<0.05	-	-	-
Acenaphthylene	0.05 ug/L	<0.05	-	-	-
Anthracene	0.01 ug/L	<0.01	-	-	-
Benzo [a] anthracene	0.01 ug/L	<0.01	-	-	-
Benzo [a] pyrene	0.01 ug/L	<0.01	-	-	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	-	-	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	-	-	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	-	-	-
Chrysene	0.05 ug/L	<0.05	-	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	-	-	-
Fluoranthene	0.01 ug/L	<0.01	-	-	-
Fluorene	0.05 ug/L	<0.05	-	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	-	-	-
1-Methylnaphthalene	0.05 ug/L	<0.05	-	-	-
2-Methylnaphthalene	0.05 ug/L	<0.05	-	-	-
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	-	-	-
Naphthalene	0.05 ug/L	<0.05	-	-	-
Phenanthrene	0.05 ug/L	<0.05	-	-	-
Pyrene	0.01 ug/L	<0.01	-	-	-
2-Fluorobiphenyl	Surrogate	88.2%	-	-	-
Terphenyl-d14	Surrogate	112%	-	-	-

Certificate of Analysis

Report Date: 15-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 8-Jun-2022

Client PO: 54906

Project Description: PE5699

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						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						
Benzo [k] fluoranthene	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	*16.1*		*ug/L*		*80.5*	*50-140*			
Surrogate: Terphenyl-d14	*23.4*		*ug/L*		*117*	*50-140*			
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*83.7*		*ug/L*		*105*	*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									
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	*82.9*		*ug/L*		*104*	*50-140*			

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 54906

Report Date: 15-Jun-2022

Order Date: 8-Jun-2022

Project Description: PE5699

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2040	25	ug/L	ND	102	68-117			
Semi-Volatiles									
Acenaphthene	4.26	0.05	ug/L	ND	85.1	50-140			
Acenaphthylene	3.13	0.05	ug/L	ND	62.6	50-140			
Anthracene	4.06	0.01	ug/L	ND	81.3	50-140			
Benzo [a] anthracene	4.19	0.01	ug/L	ND	83.8	50-140			
Benzo [a] pyrene	5.19	0.01	ug/L	ND	104	50-140			
Benzo [b] fluoranthene	5.39	0.05	ug/L	ND	108	50-140			
Benzo [g,h,i] perylene	3.53	0.05	ug/L	ND	70.5	50-140			
Benzo [k] fluoranthene	4.53	0.05	ug/L	ND	90.6	50-140			
Chrysene	4.11	0.05	ug/L	ND	82.1	50-140			
Dibenzo [a,h] anthracene	4.00	0.05	ug/L	ND	80.0	50-140			
Fluoranthene	3.80	0.01	ug/L	ND	76.0	50-140			
Fluorene	5.33	0.05	ug/L	ND	107	50-140			
Indeno [1,2,3-cd] pyrene	4.04	0.05	ug/L	ND	80.9	50-140			
1-Methylnaphthalene	4.02	0.05	ug/L	ND	80.4	50-140			
2-Methylnaphthalene	4.42	0.05	ug/L	ND	88.4	50-140			
Naphthalene	4.27	0.05	ug/L	ND	85.4	50-140			
Phenanthrene	3.90	0.05	ug/L	ND	77.9	50-140			
Pyrene	3.88	0.01	ug/L	ND	77.5	50-140			
Surrogate: 2-Fluorobiphenyl	*16.8*		*ug/L*		*84.0*	*50-140*			
Surrogate: Terphenyl-d14	*23.2*		*ug/L*		*116*	*50-140*			
Volatiles									
Benzene	33.5	0.5	ug/L	ND	83.8	60-130			
Ethylbenzene	35.2	0.5	ug/L	ND	87.9	60-130			
Toluene	35.4	0.5	ug/L	ND	88.4	60-130			
m,p-Xylenes	68.5	0.5	ug/L	ND	85.6	60-130			
o-Xylene	35.0	0.5	ug/L	ND	87.6	60-130			
Surrogate: Toluene-d8	*81.1*		*ug/L*		*101*	*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: 2224338

Blvd. 4J8 ps.com n

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2224338	№ 136651

Client Name: Paterson	Project Ref: PE 5699	Page 1 of 1
Contact Name: Mark Darcy	Quote #:	Turnaround Time
Address: 9 Auriga Drive	PO #: 54906	☐ 1 day ☐ 3 day
	E-mail: mdarcy@patersongroup.ca	☐ 2 day ☒ Regular
Telephone: 613 226 7381	jDempsey@patersongroup.ca	Date Required:

☒ REG 153/04 ☐ REG 406/19

☐ 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	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
1	BH1-22-GW1	GW		4	June 3, 2022		X	X	X									
2	BH2-22-GW1	↓		4	June 3, 2022		↓		H									
3	BH3-22-GW1	↓		3	June 6, 2022		↓											
4	DUP	↓		2	June 3, 2022		↓											
5																		
6																		
7																		
8																		
9																		
10																		

Comments: Hold PAH Test for BH2-22-GW1

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Bryce Lee	Date/Time: 08/06/22 3:20	Date/Time: June 8, 22 17:20	Date/Time: Jun 9 2022
Date/Time: June 7, 2022	Temperature: °C PH.	Temperature: 16.8 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mark D'Arcy

Client PO: 54942
Project: PE5699
Custody: 136656

Report Date: 21-Jun-2022
Order Date: 10-Jun-2022

Order #: 2224545

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

Paracel ID	Client ID
2224545-01	BH3-22-GW1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 54942

Report Date: 21-Jun-2022

Order Date: 10-Jun-2022

Project Description: PE5699

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	16-Jun-22	20-Jun-22

Certificate of Analysis

Report Date: 21-Jun-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 10-Jun-2022

Client PO: **54942**

Project Description: **PE5699**

	Client ID:	BH3-22-GW1	-	-	-
	Sample Date:	03-Jun-22 09:00	-	-	-
	Sample ID:	2224545-01	-	-	-
	MDL/Units	Water	-	-	-
Semi-Volatiles					
Acenaphthene	0.05 ug/L	<0.05	-	-	-
Acenaphthylene	0.05 ug/L	<0.05	-	-	-
Anthracene	0.01 ug/L	<0.01	-	-	-
Benzo [a] anthracene	0.01 ug/L	<0.01	-	-	-
Benzo [a] pyrene	0.01 ug/L	<0.01	-	-	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	-	-	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	-	-	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	-	-	-
Chrysene	0.05 ug/L	<0.05	-	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	-	-	-
Fluoranthene	0.01 ug/L	<0.01	-	-	-
Fluorene	0.05 ug/L	<0.05	-	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	-	-	-
1-Methylnaphthalene	0.05 ug/L	<0.05	-	-	-
2-Methylnaphthalene	0.05 ug/L	<0.05	-	-	-
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	-	-	-
Naphthalene	0.05 ug/L	<0.05	-	-	-
Phenanthrene	0.05 ug/L	<0.05	-	-	-
Pyrene	0.01 ug/L	<0.01	-	-	-
2-Fluorobiphenyl	Surrogate	116%	-	-	-
Terphenyl-d14	Surrogate	85.3%	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 54942

Report Date: 21-Jun-2022

Order Date: 10-Jun-2022

Project Description: PE5699

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						
Benzo [k] fluoranthene	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	*24.1*		*ug/L*		*121*	*50-140*			
Surrogate: Terphenyl-d14	*21.4*		*ug/L*		*107*	*50-140*			

Certificate of Analysis

Report Date: 21-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 10-Jun-2022

Client PO: 54942

Project Description: PE5699

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Semi-Volatiles									
Acenaphthene	4.38	0.05	ug/L	ND	87.7	50-140			
Acenaphthylene	4.44	0.05	ug/L	ND	88.8	50-140			
Anthracene	4.75	0.01	ug/L	ND	95.0	50-140			
Benzo [a] anthracene	4.88	0.01	ug/L	ND	97.6	50-140			
Benzo [a] pyrene	5.26	0.01	ug/L	ND	105	50-140			
Benzo [b] fluoranthene	5.85	0.05	ug/L	ND	117	50-140			
Benzo [g,h,i] perylene	4.20	0.05	ug/L	ND	84.1	50-140			
Benzo [k] fluoranthene	5.85	0.05	ug/L	ND	117	50-140			
Chrysene	4.45	0.05	ug/L	ND	89.0	50-140			
Dibenzo [a,h] anthracene	5.17	0.05	ug/L	ND	103	50-140			
Fluoranthene	4.38	0.01	ug/L	ND	87.6	50-140			
Fluorene	4.57	0.05	ug/L	ND	91.4	50-140			
Indeno [1,2,3-cd] pyrene	5.23	0.05	ug/L	ND	105	50-140			
1-Methylnaphthalene	5.57	0.05	ug/L	ND	111	50-140			
2-Methylnaphthalene	5.53	0.05	ug/L	ND	111	50-140			
Naphthalene	5.15	0.05	ug/L	ND	103	50-140			
Phenanthrene	4.59	0.05	ug/L	ND	91.9	50-140			
Pyrene	4.62	0.01	ug/L	ND	92.4	50-140			
Surrogate: 2-Fluorobiphenyl	*22.7*		*ug/L*		*113*	*50-140*			
Surrogate: Terphenyl-d14	*26.6*		*ug/L*		*133*	*50-140*			

Certificate of Analysis

Report Date: 21-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 10-Jun-2022

Client PO: 54942

Project Description: PE5699

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

PARACEL LABORATORIES LTD.

Paracel ID: 2224545

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2224545	№ 136656

Client Name: Paterson	Project Ref: PE 5699	Page 1 of 1
Contact Name: Mark Darcy	Quote #:	Turnaround Time
Address: 9 Auriga Drive	PO #: 54942	☐ 1 day ☐ 3 day
	E-mail: mdarcy@patersongroup.ca	☐ 2 day ☒ Regular
Telephone: 613 226 7381		Date Required:

☒ REG 153/04 ☐ REG 406/19	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	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
							Required Analysis											
1	BH3-22-GW1	GW		1	June 3, 2022				X									
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: SW. ft

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Bryce Lee	Date/Time:	Date/Time: June 10/22 15:40	Date/Time: June 10/22 15:49
Date/Time: June 10, 2022	Temperature: °C	Temperature: 12.0 °C	pH Verified: ☐ By: