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Phase II Environmental Site Assessment

1081 Carling Avenue
Ottawa, Ontario

Prepared For

1081 Carling Avenue 2019 Co-tenancy c/o
Taggart Realty Management

July 7, 2021

Report: PE5302-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for 1081 Carling Avenue, in the City of Ottawa, Ontario.

The purpose of the Phase II ESA was to address two potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II - Property. The subsurface investigation consisted of drilling five boreholes, four of which were completed as groundwater monitoring wells.

Soil samples were obtained from the boreholes and screened using visual observations and organic vapour measurements. Seven soil samples including one duplicate, were submitted for laboratory analysis of petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs) and/or metals. All BTEX, PHC, PAH and metals concentrations identified in the soil samples were in compliance with the applicable MECP Table 3 standards.

Four groundwater samples, including one duplicate sample, were obtained from the monitoring wells installed in BH1, BH2 and BH3 and were analyzed for PHCs and VOCs. The majority of the analyzed parameter concentrations in the groundwater samples were identified as being non-detect, with the identified concentrations being in compliance with the MECP 3 Table 3 standards.

Based on the findings of the Phase II ESA, the soils and groundwater on the Phase II – Property are in compliance with MECP Table 3 Standards.

Recommendations

Monitoring Wells

It is expected that the groundwater monitoring wells will be abandoned in accordance with O.Reg.903, at the time of construction excavation. It is recommended that the integrity of the monitoring wells be maintained, prior to future construction, for possible further groundwater monitoring purposes.

1.0 INTRODUCTION

At the request of Taggart Realty Management, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment for 1081 Carling Avenue in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address two areas of potential environmental concern (APECs) identified on the Phase II Property, during the Phase I ESA conducted by Paterson in June of 2021.

1.1 Site Description

Address:	1081 Carling Avenue, Ottawa, Ontario.
Legal Description:	Part of Lot 35, Concession 1; Nepean Township, in the City of Ottawa.
Location:	The subject property is located on the north side of Carling Avenue, in the north-western quadrant of the Carling Avenue and Parkdale Avenue intersection in the City of Ottawa, Ontario.
Latitude and Longitude:	45° 23' 36.1" N, 75° 45' 15.5" W
Site Description:	
Configuration:	Rectangular
Site Area:	0.43 ha (approximate)

1.2 Property Ownership

Paterson was engaged to conduct this Phase I – ESA by Mr. Braden Walker of Taggart Realty Management. Mr. Walker can be contacted via his mailing address at 225 Metcalfe Street, Suite 708, Ottawa, Ontario, K2P 1P9.

1.3 Current and Proposed Future Uses

The Phase II – Property is occupied by an eight-storey commercial office building. The study area consists of a mixture of commercial and residential properties. It is our understanding that the subject site is to be developed for residential purposes.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 3 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 3 Standards are based on the following considerations:

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

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 Phase II - Property is located in a mixed residential and commercial area and is situated in the north-western quadrant of the Carling Avenue and Parkdale Avenue intersection in the City of Ottawa, Ontario. Carling Avenue followed by the Experimental Farms are located to the south, and Parkdale Avenue followed by the Ottawa Civic Hospital Campus are located to the east. Hamilton Avenue and residential dwellings are located immediately west and north of the Phase II - Property, respectively.

The general area of the Phase II – Property slopes significantly down towards the west/northwest in the general direction of the Ottawa River. Site drainage consists primarily of surface runoff towards manholes located along Carling Avenue and Parkdale Avenue as well as a catch basin located in the parking lot in the northern portion of the property.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted through the interim of May 30 to June 2, 2021.

The field program consisted of drilling five boreholes, four of which were instrumented with groundwater monitoring wells. The monitoring well installed in BH3-21 was solely implemented to assess groundwater conditions from a geotechnical perspective. The boreholes were drilled to a maximum depth of 15.06 m below the existing grade.

3.2 Media Investigated

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

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

The Geological Survey of Canada website on the Urban Geology of the National Capital Area was consulted as part of this assessment. Based on the information from NRCAN, bedrock in the area of the site consists of interbedded limestone and dolomite of the Gull River Formation. Based on the maps, the surficial geology consists of plain till with an overburden thickness ranging from 3 to 5 m.

Contaminants of Potential Concern

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

- Petroleum Hydrocarbons (PHCs (F_1-F_4))
- Benzene, toluene, ethylbenzene, and xylene (BTEX)
- Polycyclic aromatic hydrocarbons (PAHs)
- Metals

Existing Buildings and Structures

The Phase I - Property is currently occupied by an eight-storey commercial office building with an underground parking garage located in the southeastern portion of the property and a parade structure occupying the central portion of the site.

Water Bodies

There are no water bodies on the subject property or within the Phase I ESA study area.

Areas of Natural Significance

There are no areas of natural and scientific interest on the subject property or within the Phase I ESA study area.

Water Well Records

A search of the MECPs website for all drilled well records within 250 m of the subject site was conducted as part of this assessment. The search identified three monitoring well records on the Phase I – Property and two additional records pertaining to an abandonment and a domestic well drilled in 1958 in the Phase I study area.

Based on the well records, the stratigraphy on the subject site consists primarily of sandy fill overlaying silty clay and/or sand till. Bedrock was encountered at an average depth of 6m. The depth of the water table was not recorded in the reviewed monitoring well records.

Neighbouring Land Use

Neighbouring land use in the Phase I study area consists primarily of residential and commercial properties with the Ottawa Civic Hospital campus located to east, across Parkdale Avenue.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Five PCAs were identified within the Phase I study area. Based on their separation distances and cross or down gradient orientation with respect to the subject site, the above noted PCAs, except for the historical on-site gasoline service station and fill material of unknown quality, are not considered to result in APECs on the Phase I – Property.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I ESA is considered to be sufficient to conclude that there are two PCAs that result in APECs on the subject site.

The presence of two APECs was confirmed by a variety of independent sources, and as such, the conclusions of this report are not affected by uncertainty which may be present with respect to the individual sources.

3.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan for this project is included in Appendix 1 of this report. No deviations from the sampling and analysis plan were identified during the Phase II ESA.

3.5 Impediments

No physical impediments were encountered during the Phase II ESA program.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation was conducted throughout the interim of May 30 to June 2, 2021. The field program consisted of the drilling of five boreholes on the Phase II Property, four of which were completed with monitoring well installations.

The boreholes were placed to address the aforementioned areas of potential environmental concern (APECs) and general coverage for geotechnical purposes.

The boreholes were drilled with a low clearance track-mounted drill rig, operated by George Downing Estate Drilling of Hawkesbury, Ontario, under the full-time supervision of Paterson personnel. Borehole locations are shown on Drawing PE5302-3 – Test Hole Location Plan appended to this report.

4.2 Soil Sampling

A total of 38 soil samples were obtained from the boreholes by means of sampling from shallow auger flights and split spoon sampling.

The depths at which auger samples and split spoon samples were obtained from the boreholes are shown as "**AU**" and "**SS**" on the Soil Profile and Test Data Sheets, appended to this report.

Site soils generally consist of between 1.20 and 3.10 m of fill, consisting of brown silty sand with some gravel and crushed stone. Native brown silty clay followed by glacial till extended to depths ranging from 4.65 to 6.45 m underlain by interbedded grey limestone bedrock extending to depths ranging from 9.04 to 15.06 m. All boreholes were terminated within the bedrock.

4.3 Field Screening Measurements

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

To measure the soil vapours, the analyser probe is inserted into the nominal headspace above the soil sample. A photo ionization detector (PID) was used to measure the volatile organic vapour concentrations. The sample is agitated/manipulated gently as the measurement is taken. The peak reading registered within the first 15 seconds is recorded as the vapour measurement.

The PID readings were found to range from 0 to 10.4 ppm in the soil samples obtained. These results do not indicate the potential for significant contamination from volatile contaminants. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

4.4 Groundwater Monitoring Well Installation

Four groundwater monitoring wells were installed on the Phase II Property as part of the subsurface investigation including one deep monitoring well solely used for geotechnical purposes (BH3-21). The monitoring wells consisted of 25 mm diameter Schedule 40 threaded PVC risers and screens. Monitoring well construction details are listed below in Table 1 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Table 1: Monitoring Well Construction Details

Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1-21	82.14	9.63	6.63-9.63	6.4-9.63	4.2-6.64	Flush Mount
BH3-21	82.28	15.06	8.90-15.06	8.4-15.06	4.6-8.4	Flush Mount
BH4-21	80.64	9.07	6.07-9.07	5.5-9.07	1.5-5.5	Flush Mount
BH5-21	80.98	9.04	6.04-9.04	5.4-9.04	4.3-5.4	Flush Mount

4.5 Field Measurement of Water Quality Parameters

Groundwater sampling was conducted on June 10, 2021, and water quality parameters were collected at that time. The averaged water quality parameters collected during the sampling program are provided below.

Table 2: Groundwater Quality Parameters

Well ID	Temperature (ºC)	Conductivity (µs)	pH
BH1-21	7.89	11.64	7.02
BH4-21	7.67	5.53	7.18
BH5-21	7.78	1093	7.34

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

Based on the guidelines outlined in the Sampling and Analysis Plan, appended to this report, the following soil samples were submitted for analysis:

Table 2: Soil Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameter Analyzed			Rationale
		PHCs and BTEX	Metals	PAHs	
BH1-21-SS3	1.5-2.1 m Brown silty sand fill		X	X	Assess APEC 2 (Fill material of unknown quality)
BH1-21-SS6	3.81-4.41 m Native glacial till	X			Assess APEC 1 (Historical gasoline service station with two USTs)
BH3-21-SS2	1.5-2.1 m Brown silty sand fill/native fine silty sand		X	X	Assess APEC 2 (Fill material of unknown quality)
BH4-21-SS3	1.5-2.1 m Brown silty sand fill		X		Assess APEC 2 (Fill material of unknown quality)
BH5-21-SS4	1.5-2.1 m Brown silty sand fill		X	X	Assess APEC 2 (Fill material of unknown quality)
BH5-21-SS6	3.0-3.60m Native brown silty clay/glacial till	X			Assess APEC 1 (Historical gasoline service station with two USTs)
BH7-21-SS6 (Duplicate of BH5-21-SS6)	3.0-3.60m Native brown silty clay/glacial till	X			Assess APEC 1 (Historical gasoline service station with two USTs)

Based on the guidelines outlined in the Sampling and Analysis Plan, appended to this report, the following groundwater samples were submitted for analysis:

Table 3: Groundwater Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameters Analyzed		Rationale
		PHCs ($F_1 – F_4$)	VOCs	
BH1-21-GW1	6.63-9.63 Bedrock (grey limestone interbedded with dolostone)	X	X	Assess APEC 1 (Historical gasoline service station with two USTs)
BH4-21–GW1	9.07-6.07 Bedrock (grey limestone interbedded with dolostone)	X	X	Down gradient of APEC 1
BH5-21-GW1	6.04-9.04 Bedrock (grey limestone interbedded with dolostone)	X	X	Assess APEC 1 (Historical gasoline service station with two USTs)
DUP*	6.63-9.63 Bedrock (grey limestone interbedded with dolostone)		X	QA/QC

- * - Duplicate of BH1-GW1

Paracel Laboratories (Paracel) of Ottawa, Ontario, performed the laboratory analysis on the samples submitted for analytical testing.

Paracel is a member of the Standards Council of Canada/Canadian Association for Laboratory Accreditation (SCC/CALA). Paracel is accredited and certified by SCC/CALA for specific tests registered with the association.

4.8 Residue Management

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

4.9 Elevation Surveying

Boreholes were surveyed to geodetic elevations by Paterson personnel.

4.10 Quality Assurance and Quality Control Measures

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

5.0 REVIEW AND EVALUATION

5.1 Geology

The soil profile generally consists of between 1.20 to 3.10 m of fill, consisting of brown silty sand with some gravel and crushed stone underlain by brown silty clay followed by glacial till extending to depths ranging from 4.65 to 6.45 m. All of the boreholes were terminated in interbedded grey limestone and dolostone bedrock that extended to depths ranging from 9.04 to 15.06 m

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling event on June 10, 2021, using an electronic water level meter. Groundwater levels are summarized below in Table 4. All elevations were acquired through a GPS survey completed at the time of the subsurface investigation.

Table 4: Groundwater Level Measurements				
Borehole Location	**Ground Surface Elevation (m)**	**Water Level Depth (m below grade)**	**Water Level Elevation (Asl)**	**Date of Measurement**
BH1-21	82.14	6.41	75.73	June 10, 2021
BH3-21	82.28	7.80	74.48	
BH4-21	80.64	5.77	74.87	
BH5-21	80.98	4.69	76.29	

Based on the groundwater levels recorded, the groundwater appears to flow to the west.

5.3 Fine-Coarse Soil Texture

No grain size analysis was completed for the subject site. Coarse-grained standards were selected based on the observed stratigraphy.

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in vapour readings ranging from 0.1 to 23.1 ppm.

No visual or olfactory indications of potential contamination were identified in the soil samples at the time of the field program. 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

Six soil samples including one duplicate were submitted for analysis of metals, PAHs, PHCs (F_1-F_4) and BTEX. The results of the analytical testing are presented below in Tables 5, 6 and 7. The laboratory certificates of analysis are provided in Appendix 1. Analytical test results are shown on Drawing PE5302- 4 – Analytical Testing Plan.

Table 5: Analytical Test Results – Soil – PAHs

Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 3 Residential Standards (µg/g)
		May 31, 2021	June1, 2021	June 2, 2021	
		BH1-21-SS3	BH3-21-SS2	BH5-21-SS4	
Acenaphthene	0.02	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	0.67
Benzo(a)anthracene	0.02	nd	nd	nd	0.5
Benzo(a)pyrene	0.02	nd	nd	nd	0.3
Benzo(b)fluoranthene	0.02	nd	nd	nd	0.78
Benzo(g,h,i)perylene	0.02	nd	nd	nd	6.6
Benzo(k)fluoranthene	0.02	nd	nd	nd	0.78
Chrysene	0.02	nd	nd	nd	7
Dibenzo(a,h)anthracene	0.02	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	nd	0.69
Fluorene	0.02	nd	nd	nd	62
Indeno(1,2,3-cd) pyrene	0.02	nd	nd	nd	0.38
1-Methylnaphthalene	0.02	nd	nd	nd	0.99
2-Methylnaphthalene	0.02	nd	nd	nd	0.99
Methylnaphthalene (1 & 2)	0.04	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	nd	6.2
Pyrene	0.02	nd	nd	nd	78

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – Parameter not analysed
- **Bold and Underlined** – Results exceed the selected MECP standard

All PAH parameters were identified as being non-detect and therefore in compliance with the MECP Table 3 standards.

Table 6: Analytical Test Results – Soil – Metals

Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Residential Standards (µg/g)
		May 31/2021	June 1/2021	June 2/2021		
		BH1-21-SS3	BH3-21-SS2	BH4-21-SS3	BH5-21-SS4	
Antimony	1.0	nd	nd	nd	nd	7.5
Arsenic	1.0	1.7	3.1	3.7	1.4	18
Barium	1.0	27.0	79.1	158	13.5	390
Beryllium	0.5	nd	nd	nd	nd	4
Boron	5.0	nd	nd	6.2	nd	120
Cadmium	0.5	nd	nd	nd	nd	1.2
Chromium	5.0	9.3	16.7	21.3	10.6	160
Cobalt	1.0	4.1	7.9	4.9	2.5	22
Copper	5.0	8.9	17.3	12.8	nd	140
Lead	1.0	3.3	7.1	55.4	1.6	120
Molybdenum	1.0	nd	1.2	nd	nd	6.9
Nickel	5.0	7.0	17.5	10.8	nd	100
Selenium	1.0	nd	nd	nd	nd	2.4
Silver	0.3	nd	nd	nd	nd	20
Thallium	1.0	nd	nd	nd	nd	1
Uranium	1.0	nd	nd	nd	nd	23
Vanadium	10.0	23.2	28.1	25.0	31.9	86
Zinc	20.0	nd	24.7	136	nd	340

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

Bold and Underlined – Results exceed the selected MECP standards

All metal parameters were in compliance with the applicable MECP Table 3 standards.

Table 7: Analytical Test Results – Soil – PHCs (F_1-F_4) and BTEX					
Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 3 Residential Standards (µg/g)
		May 31/2021	June 2/2021	June 2/2021	
		BH1-21-SS6	BH5-21-SS6	*BH7-21-SS6	
Benzene	0.02	nd	nd	nd	0.21
Ethylbenzene	0.05	nd	nd	nd	2
Toluene	0.05	nd	nd	nd	2.3
Xylenes, total	0.05	nd	nd	nd	3.1
F1 PHCs (C6-C10)	7	nd	nd	nd	55
F2 PHCs (C10-C16)	4	nd	nd	nd	98
F3 PHCs (C16-C34)	8	nd	nd	18	300
F4 PHCs (C34-C50)	6	nd	nd	18	2800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – Parameter not analysed
- * - Duplicate of BH5-21-SS6
- **Bold and Underlined** – Results exceed the selected MECP standards

All of the analyzed PHC and BTEX parameters were non-detect with the exception of PHC fractions F_3 and F_4 in the duplicate sample labelled BH7-21, which are in compliance with the applicable MECP Table 3 standards.

TABLE 7: Maximum Concentrations – Soil			
Parameter	Maximum Concentration (µg/g)	Soil Sample	Depth Interval (m BGS)
Arsenic	3.7	BH4-21-SS3	1.50 – 2.10, Fill
Barium	158	BH4-21-SS3	1.50 – 2.10, Fill
Boron	6.2	BH4-21-SS3	1.50 – 2.10, Fill
Chromium	21.3	BH4-21-SS3	1.50 – 2.10, Fill
Cobalt	7.9	BH3-21-SS2	1.50-2.10, Fill
Copper	17.3	BH3-21-SS2	1.50-2.10, Fill
Lead	55.4	BH4-21-SS3	1.50 – 2.10, Fill
Molybdenum	1.2	BH3-21-SS2	1.50-2.10, Fill
Nickel	17.5	BH3-21-SS2	1.50-2.10, Fill
Vanadium	31.9	BH5-21-SS4	1.50-2.10, Fill
Zinc	136	BH4-21-SS3	1.50 – 2.10, Fill
F3 PHCs (C16-C34)	18	*BH7-21-SS6	3.0-3.60, Native
F4 PHCs (C34-C50)	18	*BH7-21-SS6	3.0-3.60, Native

Notes:
- **Bold and Underlined** – Results exceed the selected MECP standards
- * - Duplicate Sample of BH5-21-SS6

All other analyzed parameters were non-detect.

5.6 Groundwater Quality

Groundwater samples from monitoring wells installed in BH1-21, BH4-21 and BH5-21 were submitted for laboratory analysis of PHCs (F_1-F_4) and VOCs.

The groundwater samples were obtained from the screened intervals noted in Table 4. The results of the analytical testing are presented below in Tables 8 and Table 9. The laboratory certificate of analysis is provided in Appendix 1. Analytical test results are shown on Drawing PE5302- 5 – Analytical Testing Plan – Groundwater.

Table 8: Analytical Test Results – Groundwater – PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			MECP Table 3 Residential Standards (µg/L)
		June 10, 2021			
		BH1-21-GW1	BH4-21-GW1	BH5-21-GW1	
F1 PHCs (C6-C10)	25	nd	nd	nd	750
F2 PHCs (C10-C16)	100	nd	nd	nd	150
F3 PHCs (C16-C34)	100	nd	nd	nd	500
F4 PHCs (C34-C50)	100	nd	nd	nd	500

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

The PHC concentrations were identified as being non-detect and therefore in compliance with the MECP Table 3 Standards.

Table 9: Analytical Test Results – Groundwater – VOCs

Parameter	*MDL* (µg/L)	Water Samples (µg/L)				MECP Table 3 Residential Standards (µg/L)
		June 10, 2021				
		BH1-21-GW1	BH4-21-GW1	BH5-21-GW1	*DUP-1-21	
Acetone	5	nd	nd	nd	nd	130000
Benzene	0.5	1	nd	nd	1	44
Bromodichloromethane	0.5	nd	nd	nd	nd	85000
Bromoform	0.5	nd	nd	nd	nd	380
Bromomethane	0.5	nd	nd	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	nd	nd	630
Chloroform	0.5	nd	nd	nd	nd	2.4
Dibromochloromethane	0.5	nd	nd	nd	nd	82000
Dichlorodifluoromethane	1.0	nd	nd	nd	nd	4400
1,2-Dichlorobenzene	0.5	nd	nd	nd	nd	4600
1,3-Dichlorobenzene	0.5	nd	nd	nd	nd	9600
1,4-Dichlorobenzene	0.5	nd	nd	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	nd	16
cis-1,3-Dichloropropylene	0.5	nd	nd	nd	nd	
trans-1,3-Dichloropropylene	0.5	nd	nd	nd	nd	
1,3-Dichloropropene, total	0.5	nd	nd	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	nd	nd	2300
Ethylene dibromide (dibromoethane, 1,2-)	0.2	nd	nd	nd	nd	0.25
Hexane	1.0	nd	nd	nd	nd	51
Methyl Ethyl Ketone (2-Butanone)	5.0	nd	nd	nd	nd	470000
Methyl Isobutyl Ketone	5.0	nd	nd	nd	nd	140000
Methyl tert-butyl ether	2.0	nd	nd	nd	nd	190 ug/L
Methylene Chloride	5.0	nd	nd	nd	nd	610
Styrene	0.5	nd	nd	nd	nd	1300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	nd	nd	1.6
Toluene	0.5	nd	nd	nd	nd	18000
1,1,1-Trichloroethane	0.5	nd	nd	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	nd	nd	1.6
Trichlorofluoromethane	1.0	nd	nd	nd	nd	2500
Vinyl Chloride	0.5	nd	nd	nd	nd	0.5
m/p-Xylene	0.5	nd	nd	nd	nd	
o-Xylene	0.5	nd	nd	nd	nd	
Xylenes, total	0.5	nd	nd	nd	nd	4200 ug/L

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (< MDL)
- *Duplicate Sample of BH1-21

All VOC parameters were identified as being non-detect except for benzene concentrations identified in BH1-21-GW1 and the corresponding duplicate sample both of which are in compliance with the applicable MECP Table 3 standards.

5.7 Quality Assurance and Quality Control Results

All soil and groundwater samples were handled in accordance with the Analytical Protocol with respect to holding time, preservation method, storage requirement, and container type.

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

As per the Sampling and Analysis Plan, a duplicate soil sample was obtained from sample BH5-21-SS6 and submitted for laboratory analysis of BTEX and PHC (F_1-F_4) parameters. Low concentrations of PHC fractions F_3 and F_4 were identified in the duplicate sample with no detections in the original sample. Based on the very low concentrations, the results are considered to be acceptable.

A duplicate groundwater sample was obtained from the monitoring well installed in BH1-21 and submitted for laboratory analysis of VOC parameters. No PHC (F_1-F_4) or VOC concentrations were detected except for benzene concentrations that had an RPD value of zero.

The quality of the field data collected during the Phase II ESA is considered to be sufficient to meet the overall objectives of the 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 an eight-storey commercial office building located in the south-eastern portion of the Phase II - Property with a parking garage located in the central portion. The western and northeastern portions of the Phase II – Property consist of asphaltic concrete parking lots.

Potentially Contaminating Activity and Areas of Potential Environmental Concern

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

- Historical gasoline service station with two USTs.
- Fill material of unknown quality.

Contaminants of Potential Concern and Impacted Media

Contaminants of potential concern associated with the PCAs include metals and PAHs in the soil and PHCs(F_1-F_4) and BTEX in the soil and groundwater.

Subsurface Structures and Utilities

Underground service locates were completed prior to the subsurface investigation. Underground utilities on the Phase II - Property include private electrical and sewer services as well as hydro and gas lines and a tunnel that extends from the subject building to the garage.

Physical Setting

Site Stratigraphy

The site stratigraphy, from the ground surface to the deepest aquifer or aquitard investigated consists of:

- Asphaltic concrete from 0 to 0.08 m overlaying fill material consisting of brown silty sand with gravel and crushed stone extending to depths ranging from 1.22 to 3.10 m.
- Native brown silty clay extending to depths ranging from 3.50 to 4.11 m
- Glacial till extending to depths ranging from 4.65 to 6.45 m.
- Interbedded grey limestone bedrock extending to depths ranging from 9.04 to 15.06 m.

Hydrogeological Characteristics

Groundwater at the Phase II - Property was encountered within the native glacial till layer and bedrock.

Water levels were measured at the subject site on June 10, 2021, at depths ranging from 4.69 to 7.80 m below grade.

Based on the groundwater levels recorded, the groundwater appears to flow in a westerly direction.

Approximate Depth to Bedrock

Bedrock was encountered at an average depth of 5.69 m below the existing grade.

Approximate Depth to Water Table

Depth to the water table at the subject site varies between approximately 4.69 to 7.80 m below the existing grade.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) does not apply to the subject site.

Section 43.1 of the Regulation does not apply to the subject site in that the subject site is not a Shallow Soil Property.

Fill Placement

A surficial covering of asphaltic concrete overlying fill material ranging from 1.22 to 3.10 m and consisting of brown silty sand with gravel and crushed stone was identified in all of the boreholes.

Proposed Buildings and Other Structures

It is our understanding that the subject site is to be redeveloped for residential purposes.

Areas of Natural Significance and Water Bodies

No areas of natural significance are present on or within the vicinity of the Phase II - Property.

There are no water bodies on the subject property, or within the Phase I ESA study area.

Environmental Condition

Areas Where Contaminants are Present

No contaminants were identified on the Phase II Property.

Types of Contaminants

No contaminants were identified on the Phase II Property.

Contaminated Media

Based on the findings of this Phase II ESA, the soil and groundwater on the subject site are in compliance with the MECP Table 3 residential standards.

What Is Known About Areas Where Contaminants Are Present

No areas of contaminants were identified on the Phase II - Property.

Distribution and Migration of Contaminants

No contaminants were identified on the Phase II - Property.

Discharge of Contaminants

No contaminants were identified on the Phase II - Property.

Climatic and Meteorological Conditions

In general, climatic, and meteorological conditions have the potential to affect contaminant distribution.

Two ways by which climatic and meteorological conditions may affect contaminant distribution include the downward leaching of contaminants by means of the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally. It is our opinion that climatic and meteorological conditions have not influenced contaminant transport in the past.

Potential for Vapour Intrusion

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

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for 1081 Carling Avenue, in the City of Ottawa, Ontario.

The purpose of the Phase II ESA was to address two potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II - Property. The subsurface investigation consisted of drilling five boreholes, four of which were completed as groundwater monitoring wells.

Soil samples were obtained from the boreholes and screened using visual observations and organic vapour measurements. Seven soil samples including one duplicate, were submitted for laboratory analysis of petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs) and/or metals. All BTEX, PHC, PAH and metals concentrations identified in the soil samples were in compliance with the applicable MECP Table 3 standards.

Four groundwater samples, including one duplicate sample, were obtained from the monitoring wells installed in BH1, BH2 and BH3 and were analyzed for PHCs and VOCs. The majority of the analyzed parameter concentrations in the groundwater samples were identified as being non-detect, with the identified concentrations being in compliance with the MECP 3 Table 3 standards.

Based on the findings of the Phase II ESA, the soils and groundwater on the Phase II – Property are in compliance with MECP Table 3 Standards.

Recommendations

Monitoring Wells

It is expected that the groundwater monitoring wells will be abandoned in accordance with O.Reg.903, at the time of construction excavation. It is recommended that the integrity of the monitoring wells be maintained, prior to future construction, for possible further groundwater monitoring purposes.

7.0 STATEMENT OF LIMITATIONS

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

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

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

This report was prepared for the sole use of 1081 Carling Avenue 2019 Co-tenancy Taggart Realty Management. Notification from 1081 Carling Avenue 2019 Co-tenancy Taggart Realty Management and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

Samuel Berube, B.Eng.

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

Report Distribution:

- Taggart Realty
- Paterson Group

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE5302-3 – TEST HOLE LOCATION PLAN

DRAWING PE5302-4 ANAYTICAL TESTING PLAN - SOIL (BTEX, PHCs, METALS, PAHs)

DRAWING PE5302-4A – CROSS SECTION A-A' SOIL (BTEX, PHCs, METALS, PAHs)

DRAWING PE5302-4B – CROSS SECTION B-B' SOIL (BTEX, PHCs, METALS, PAHs)

DRAWING PE5302-5 – ANALTICAL TESTING PLAN - GROUNDWATER (PHCs VOCs)

DRAWING PE5302-5A – CROSS SECTION A-A' GROUNDWATER (PHCs VOCs)

DRAWING PE5302-5B – CROSS SECTION B-B' GROUNDWATER (PHCs VOCs)

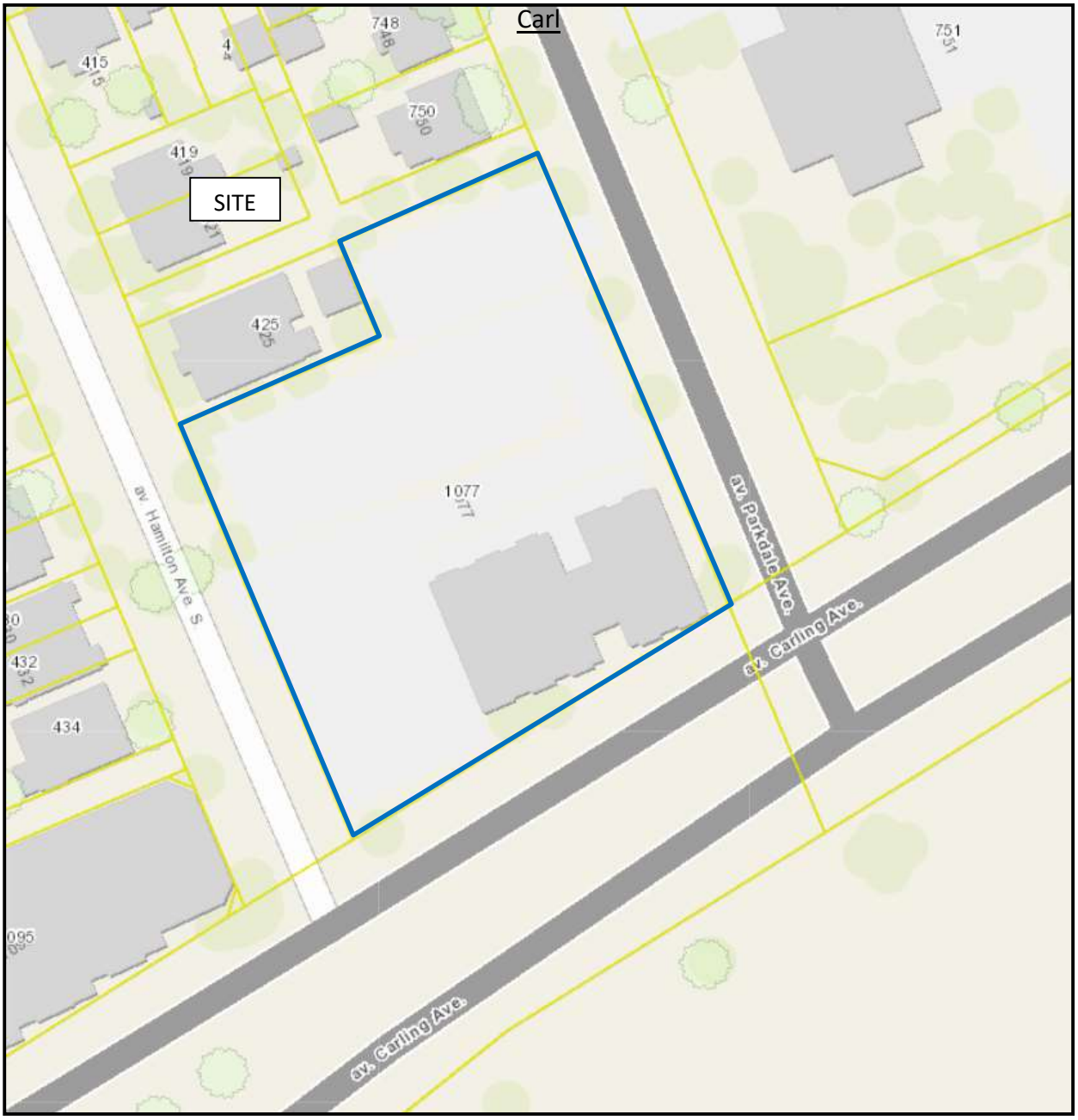
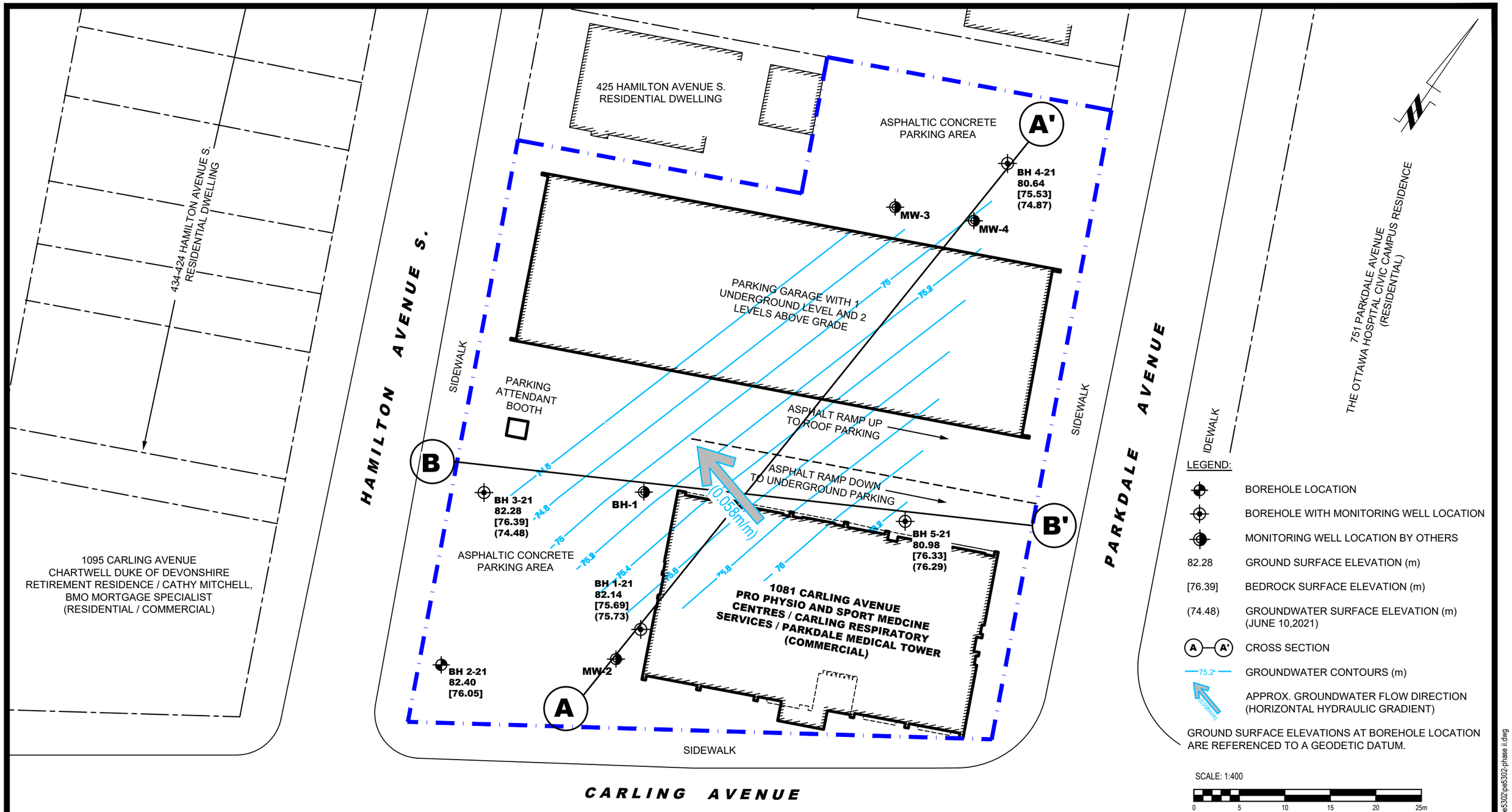


FIGURE 1

KEY PLAN



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TAGGART REALTY

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1081 CARLING AVENUE

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:400	Date: 07/2021
Drawn by: YA	Report No.: PE5302-2
Checked by: SB	Dwg. No.: PE5302-3
Approved by: MSD	Revision No.:

11x17

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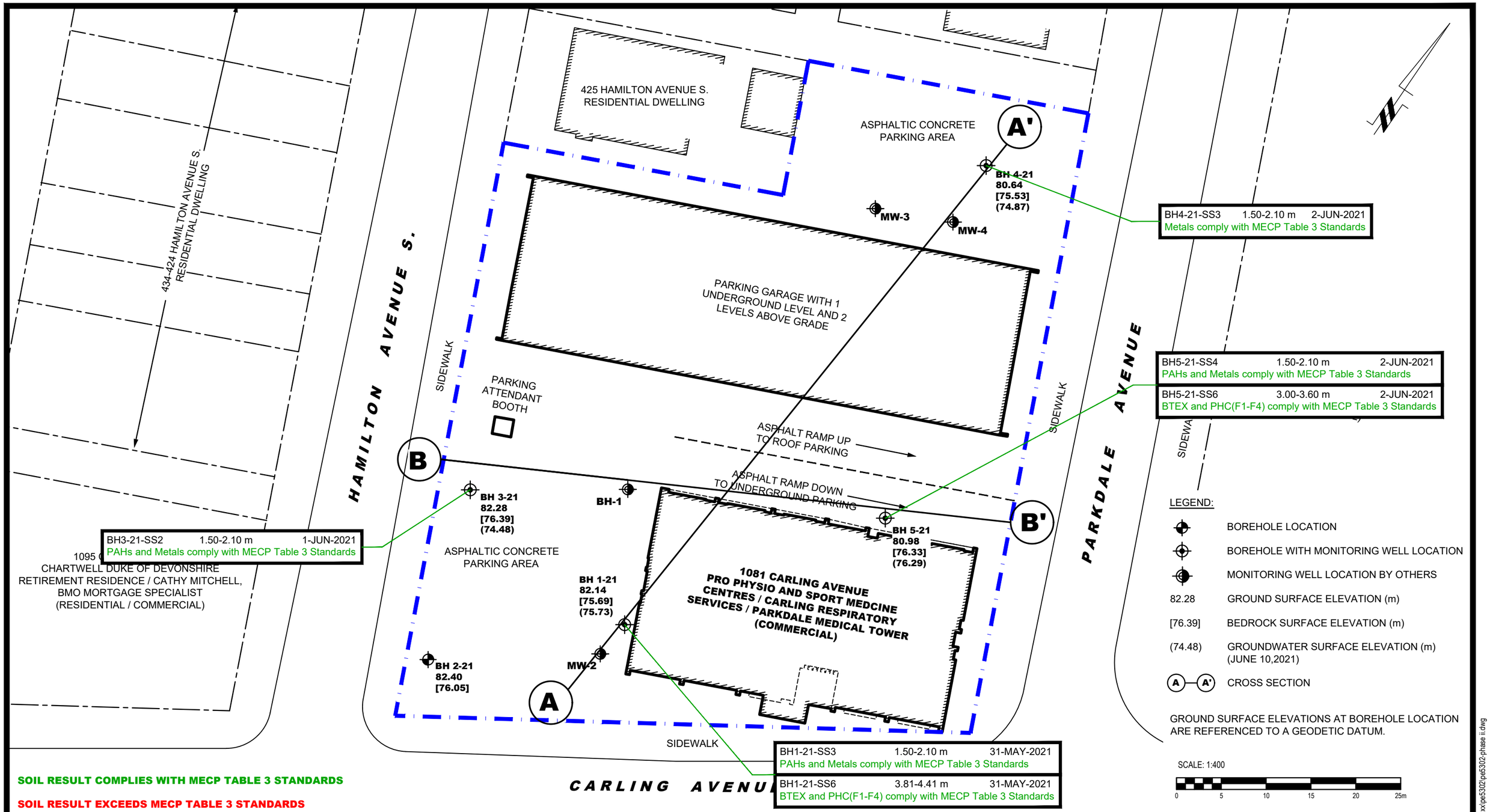

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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TAGGART REALTY

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1081 CARLING AVENUE

OTTAWA, ONTARIO

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

Scale: 1:400	Date: 07/2021
Drawn by: YA	Report No.: PE5302-2
Checked by: SB	Dwg. No.: PE5302-4
Approved by: MSD	Revision No.:

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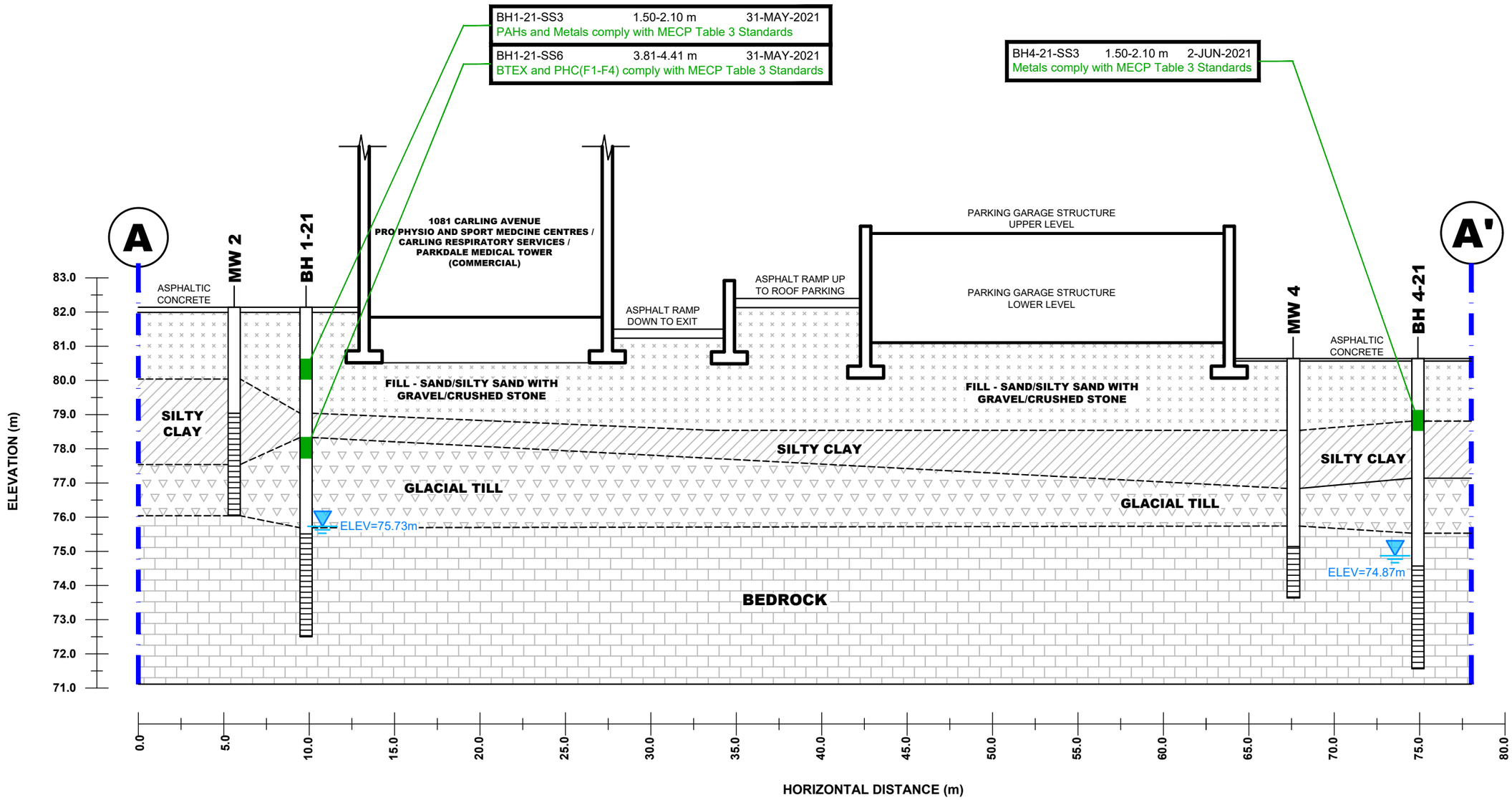

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1081 CARLING AVENUE

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 06/2021
Drawn by: YA	Report No.: PE5302-1
Checked by: SB	Dwg. No.: PE5302-4A
Approved by: MSD	Revision No.:

11x17

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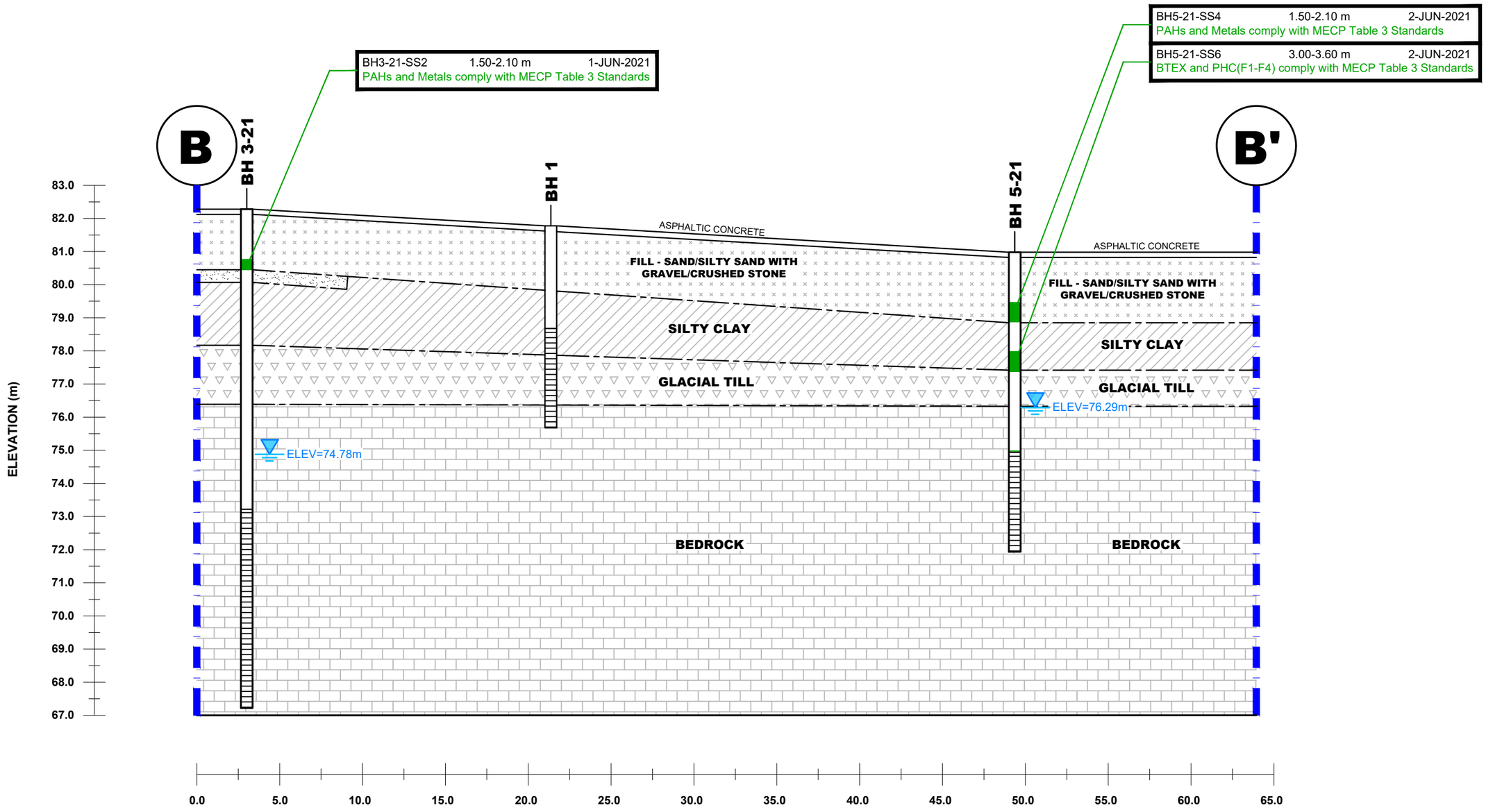

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1081 CARLING AVENUE

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE5302-2
Checked by: SB	Dwg. No.: PE5302-4B
Approved by: MSD	Revision No.:

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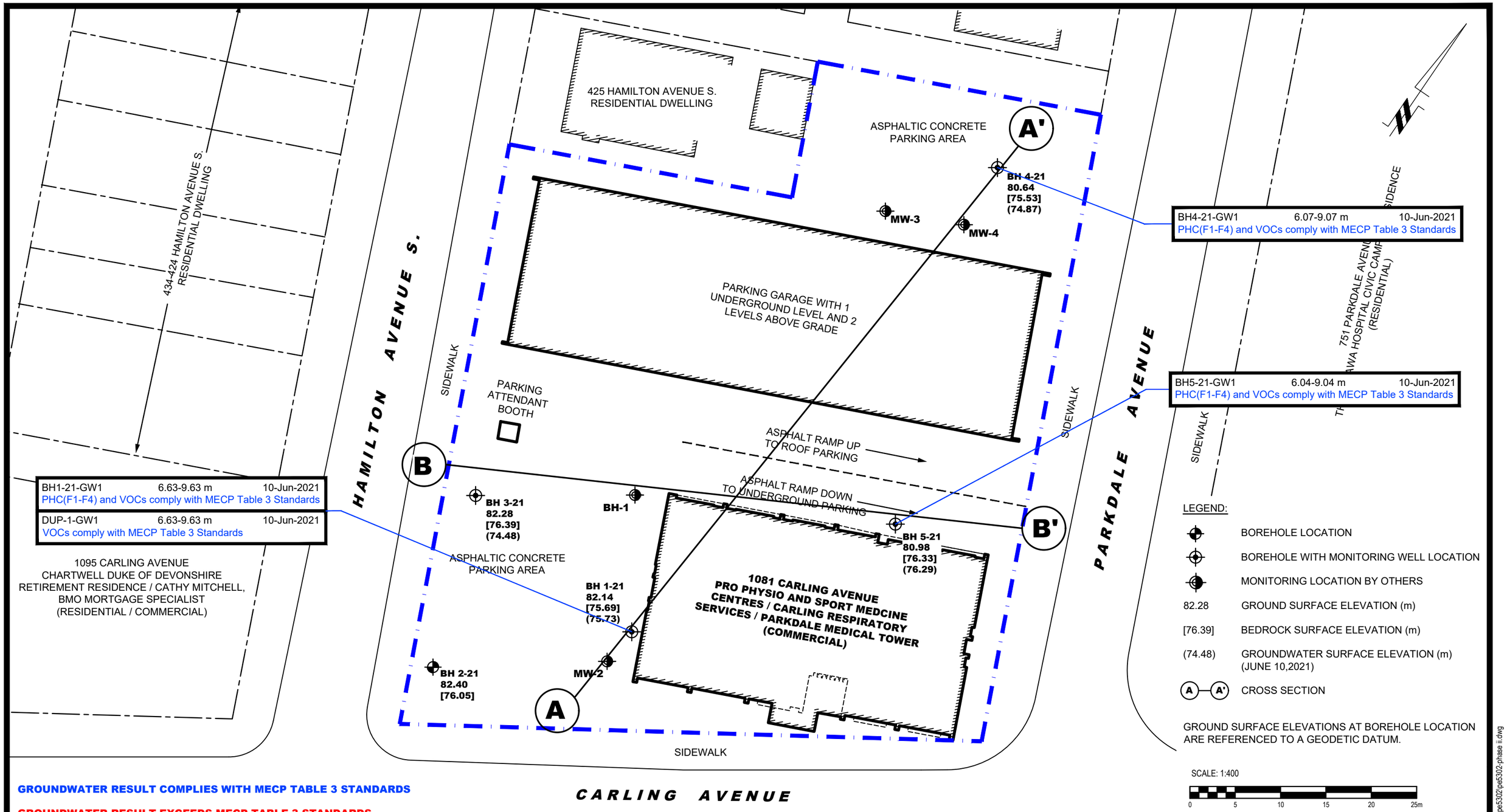

BH1-21-GW1	6.63-9.63 m	10-Jun-2021
PHC(F1-F4) and VOCs comply with MECP Table 3 Standards		
DUP-1-GW1	6.63-9.63 m	10-Jun-2021
VOCs comply with MECP Table 3 Standards		

1095 CARLING AVENUE
CHARTWELL DUKE OF DEVONSHIRE
RETIREMENT RESIDENCE / CATHY MITCHELL,
BMO MORTGAGE SPECIALIST
(RESIDENTIAL / COMMERCIAL)

BH4-21-GW1	6.07-9.07 m	10-Jun-2021
PHC(F1-F4) and VOCs comply with MECP Table 3 Standards		

BH5-21-GW1	6.04-9.04 m	10-Jun-2021
PHC(F1-F4) and VOCs comply with MECP Table 3 Standards		

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- MONITORING LOCATION BY OTHERS
- 82.28 GROUND SURFACE ELEVATION (m)
- [76.39] BEDROCK SURFACE ELEVATION (m)
- (74.48) GROUNDWATER SURFACE ELEVATION (m) (JUNE 10,2021)
- A — A' CROSS SECTION

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

SCALE: 1:400

0 5 10 15 20 25m

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1081 CARLING AVENUE

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN- GROUNDWATER (VOCs, PHCs)

Scale: 1:400	Date: 07/2021
Drawn by: YA	Report No.: PE5302-2
Checked by: SB	Dwg. No.: PE5302-5
Approved by: MSD	Revision No.:

11x17

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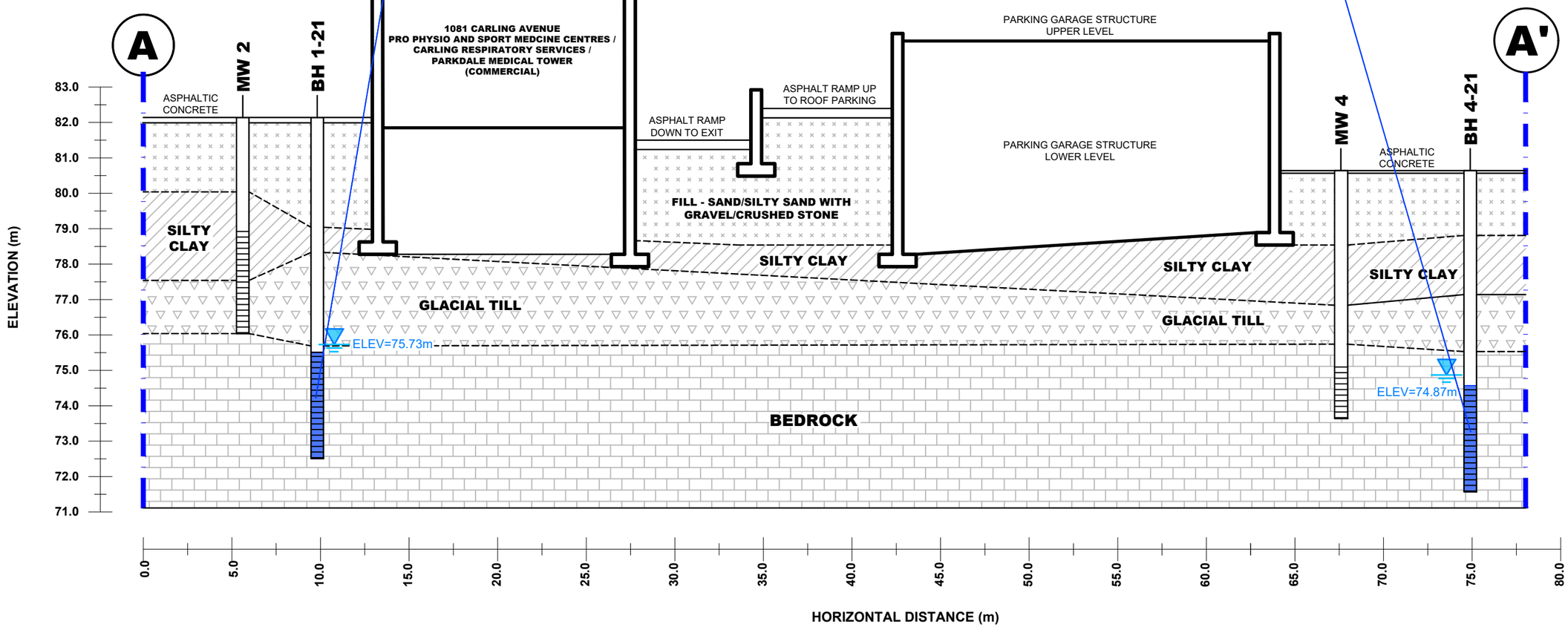
BH1-21-GW1 6.63-9.63 m 10-Jun-2021
PHC(F1-F4) and VOCs comply with MECP Table 3 Standards

DUP-1-GW1 6.63-9.63 m 10-Jun-2021
VOCs comply with MECP Table 3 Standards

BH4-21-GW1 6.07-9.07 m 10-Jun-2021
PHC(F1-F4) and VOCs comply with MECP Table 3 Standards



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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1081 CARLING AVENUE

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE5302-2
Checked by: SB	Dwg. No.: PE5302-5A
Approved by: MSD	Revision No.:

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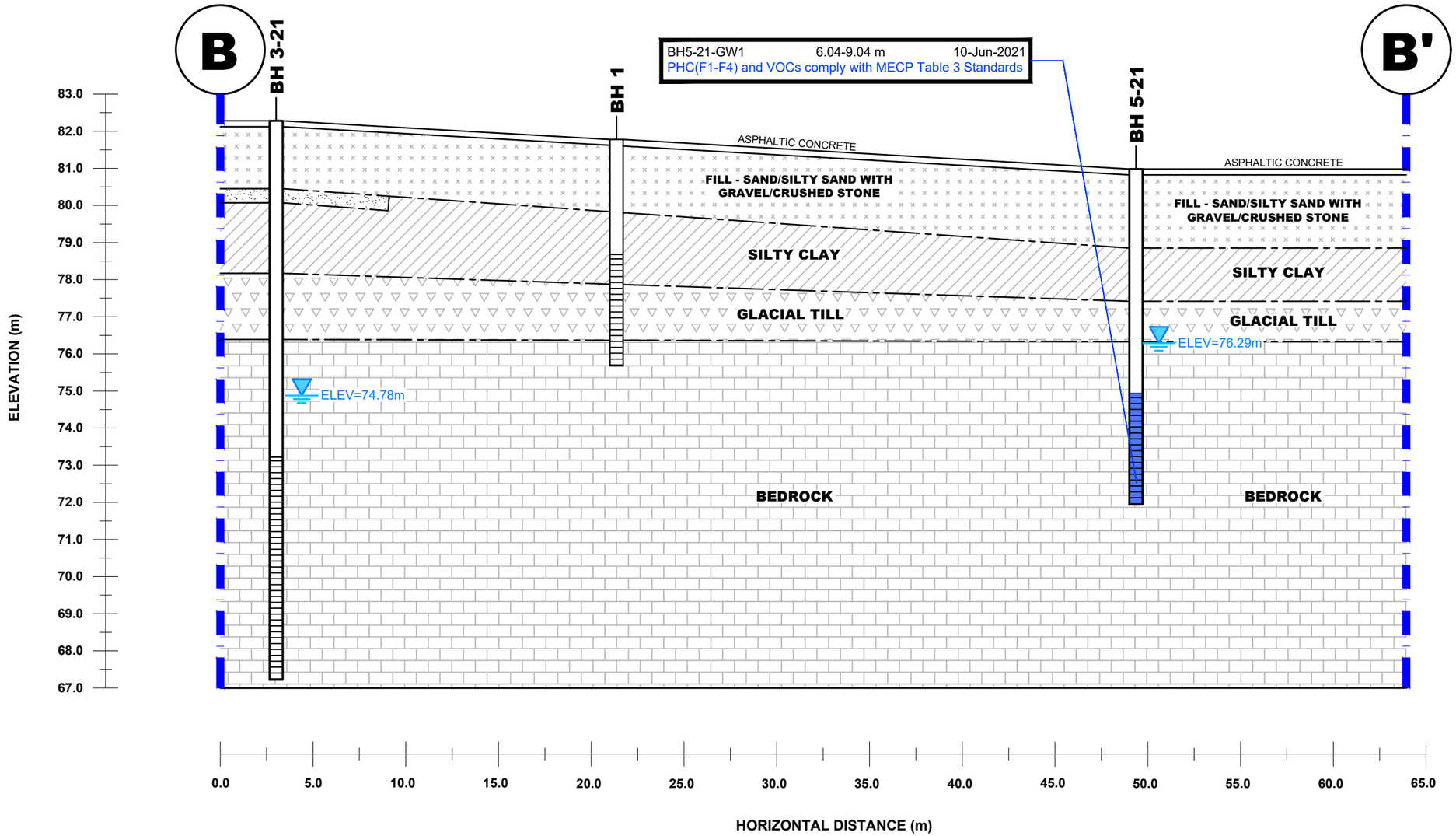

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1081 CARLING AVENUE

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE5302-2
Checked by: SB	Dwg. No.: PE5302-5B
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 CERTIFICATE OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

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patersongroup

Sampling & Analysis Plan

Phase II Environmental Site Assessment
1081 Carling Avenue
Ottawa, Ontario

Prepared For
Taggart Realty

June 2021
Report: PE5302-SAP

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Taggart Realty to conduct a Phase II Environmental Site Assessment (ESA) of 1081 Carling Avenue, Ottawa, Ontario. Based on our 2021 Phase I ESA completed for the subject property, a subsurface investigation program, consisting of borehole drilling, was developed.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-21	Assess APEC 1 (Historical gasoline service station with two USTs)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH2-21	General Coverage	Through the fill material into the native soil, and intercept the groundwater table, as applicable
BH3-21	Assess APEC 2 (Fill material of unknown quality)	Through the fill material into the native soil, and intercept the groundwater table, as applicable
BH4-21	Assess APEC 2 (Fill material of unknown quality)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH5-21	Assess APEC 1 (Historical gasoline service station with two USTs)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.

At each borehole, split-spoon samples of 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.

Upon refusal, rock coring shall be undertaken to the required depth. Approximately every metre the well shall be purged by inertial pumping and the water level recorded to determine if groundwater water is entering the borehole.

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

2.0 ANALYTICAL TESTING PROGRAM

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

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

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

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

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

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

Equipment

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

- ❒ glass soil sample jars
- ❒ two buckets
- ❒ cleaning brush (toilet brush works well)
- ❒ dish detergent
- ❒ methyl hydrate
- ❒ water (if not available on site - water jugs available in the 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 catch basin of known geodetic elevation.

Drilling Procedure

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

- ❒ Continuous split spoon samples (every 0.6 m or 2') or semi-continuous (every 0.76 m or 2'6") are required.
- ❒ Make sure samples are well sealed in plastic bags with no holes prior to screening and are kept cool but unfrozen.
- ❒ If sampling for VOCs, BTEX, or PHCs F1, a soil core from each soil sample which may be analysed 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 the 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 an RKI Eagle, PID, etc. depending on the 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 a brush in soapy water, inside and out, including the 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 the 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 the bag.
- ❒ Insert the probe into soil bag, creating a seal with your hand around the opening.
- ❒ Gently manipulate soil in the 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 the Sampling and Analysis Plan.

3.2 Monitoring Well Installation Procedure

Equipment

- ❒ 5’ x 2” [1.52 m x 50 mm] threaded sections of Schedule 40 PVC slotted well screen (5’ x 1 ¼” [1.52 m x 32 mm] if installing in a cored hole in bedrock)
- ❒ 5’ x 2” [1.52 m x 50 mm] threaded sections of Schedule 40 PVC riser pipe (5’ x 1 ¼” [1.52 m x 32 mm] if installing in a 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 the required depth, using drilling and sampling procedures described above.
- ❒ If the borehole is deeper than required monitoring well, backfill with bentonite chips to the 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 the screen. Thread the second section of the screen if required. Thread risers onto the screen. Lower into the borehole to the required depth. Ensure slip-cap or J-plug is inserted to prevent backfill materials from entering the 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 the 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 the 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 a socket wrench or Allan key to open metal flush mount protector cap. Remove plastic well cap.
- ❒ Measure water level, with respect to the existing ground surface, using water level meter or interface probe. If using an interface probe on suspected NAPL site, measure the thickness of the free product.
- ❒ Measure the total depth of well.
- ❒ Clean water level tape or interface probe using methanol and water. Change gloves between wells.
- ❒ Calculate the volume of standing water within well and record.
- ❒ Insert polyethylene tubing into well and attach to the peristaltic pump. Turn on the peristaltic pump and purge into the 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 the 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 the 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 a 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 the frequency of use.

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

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

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

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. High-Rise Development - 1081 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5836

REMARKS

HOLE NO. BH 1-21

BORINGS BY CME-55 Low Clearance Drill **DATE** May 30, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	82.14
Asphaltic concrete 0.08		AU	1				
FILL: Brown silty sand with crushed stone 0.69		SS	2	17	9	1	81.14
FILL: Crushed stone 1.45		SS	3	33	4	2	80.14
FILL: Brown silty sand, trace crushed stone and gravel		SS	4	42	8		
3.10						3	79.14
Stiff, brown **SILTY CLAY**		SS	5	75	11		
3.81						4	78.14
GLACIAL TILL: Compact to very dense, brown silty sand with clay, gravel, cobbles and boulders		SS	6	50	27		
		SS	7	33	62	5	77.14
- grey by 5.25m depth		SS	8	25	22		
		SS	9	0	50+	6	76.14
6.45							
BEDROCK: Good to poor quality, grey limestone interbedded with silty dolostone		RC	1	100	87	7	75.14
- 150mm thick void / seam from 9.01 to 9.16m depth						8	74.14
		RC	2	90	65		
- 12mm thick mud seam at 9.32m depth						9	73.14
9.63		RC	3	100	42		
End of Borehole							
(GWL @ 6.41m - June 10, 2021)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**
20 40 60 80

Monitoring Well Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. High-Rise Development - 1081 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5836

REMARKS

HOLE NO. BH 2-21

BORINGS BY CME-55 Low Clearance Drill **DATE** May 30, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	82.40
Asphaltic concrete 0.08		AU	1				
FILL: Brown silty sand with crushed stone 0.76						1	81.40
FILL: Brown silty sand, trace topsoil 1.22		SS	2	50	13		
		SS	3	83	17	2	80.40
Very stiff, brown **SILTY CLAY**		SS	4	96	20		
		SS	5	83	15	3	79.40
3.83		SS	6	100	50+		
GLACIAL TILL: Very dense, brown silty sand with clay, gravel, cobbles and boulders		SS	7	91	50+	4	78.40
		SS	8	13	50+	5	77.40
- grey by 4.9m depth							
6.35						6	76.40
		RC	1	100	38	7	75.40
BEDROCK: Poor to good quality, grey limestone interbedded with silty dolostone		RC	2	100	77	8	74.40
						9	73.40
		RC	3	100	87	10	72.40
10.59							
End of Borehole							
(GWL @ 6.47m - June 10, 2021)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. High-Rise Development - 1081 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

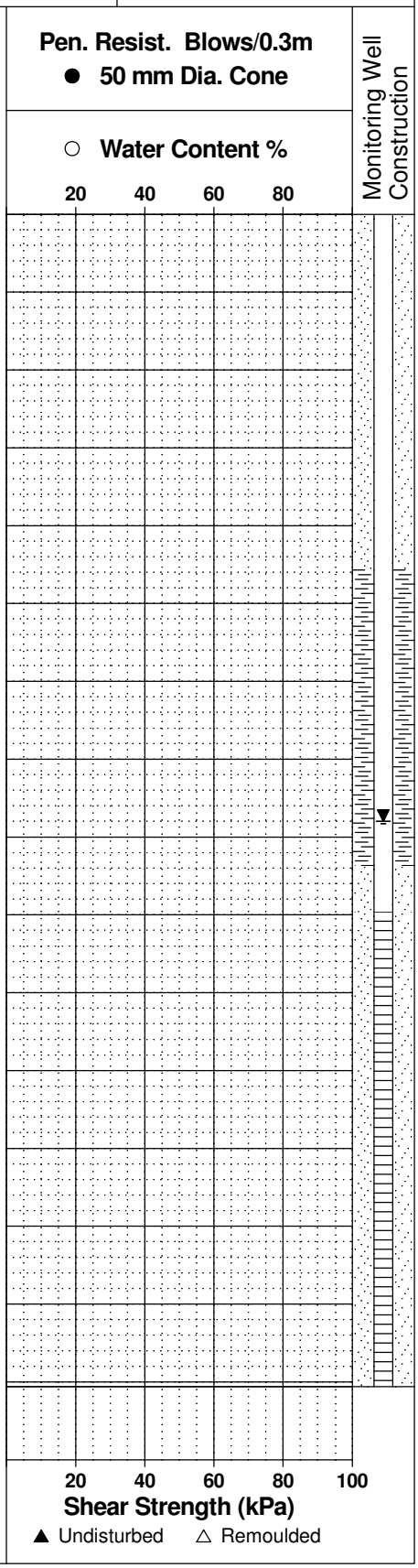
FILE NO. PG5836

REMARKS

HOLE NO. BH 3-21

BORINGS BY CME-55 Low Clearance Drill **DATE** June 1, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	82.28
Asphaltic concrete 0.08							
FILL: Brown silty sand with crushed stone 0.46		SS	1	58	7	1	81.28
FILL: Brown silty sand, trace gravel 1.83		SS	2	58	5	2	80.28
Loose, brown **SILTY FINE SAND to SANDY SILT** 2.21		SS	3	67	5		
Firm to very stiff, brown **SILTY CLAY**		SS	4	67	13	3	79.28
4.11		SS	5	100	17	4	78.28
GLACIAL TILL: Compact to very dense, brown silty sand with clay, gravel, cobbles and boulders		SS	6	75	52	5	77.28
- grey by 4.6m depth		SS	7	73	50+		
5.89						6	76.28
		RC	1	100	68	7	75.28
		RC	2	100	78	8	74.28
		RC	3	100	75	9	73.28
BEDROCK: Fair to excellent quality, grey limestone interbedded with silty dolostone		RC	4	100	100	10	72.28
		RC	5	100	100	11	71.28
		RC	6	100	98	12	70.28
15.06						13	69.28
End of Borehole (GWL @ 7.80m - June 10, 2021)						14	68.28
						15	67.28



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. High-Rise Development - 1081 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5836

REMARKS

HOLE NO. BH 4-21

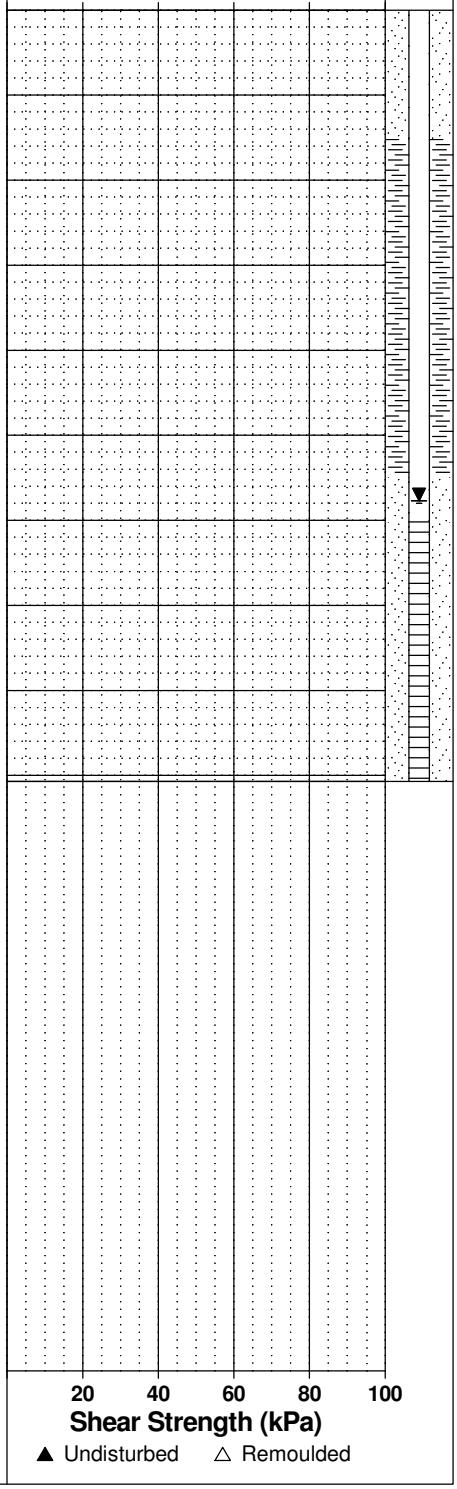
BORINGS BY CME-55 Low Clearance Drill **DATE** June 1, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	80.64
Asphaltic concrete 0.05		AU	1				
FILL: Brown silty sand with crushed stone 0.70		SS	2	25	6	1	79.64
- some gravel by 0.5m depth							
FILL: Brown silty sand with asphaltic concrete 1.83		SS	3	25	20	2	78.64
Firm, brown **SILTY CLAY**		SS	4	83	6	3	77.64
3.50		SS	5	100	4		
GLACIAL TILL: Loose, brown silty clay with sand, gravel and cobbles		SS	6	92	7	4	76.64
4.50							
GLACIAL TILL: Dense, grey silty sand with gravel and rock fragments 5.11		SS	7	60	44	5	75.64
		RC	1	100	64	6	74.64
BEDROCK: Fair to good quality, grey limestone interbedded with silty dolostone		RC	2	100	83	7	73.64
		RC	3	95	62	8	72.64
9.07						9	71.64
End of Borehole							
(GWL @ 5.77m - June 10, 2021)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**

20 40 60 80

Monitoring Well Construction



20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. High-Rise Development - 1081 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

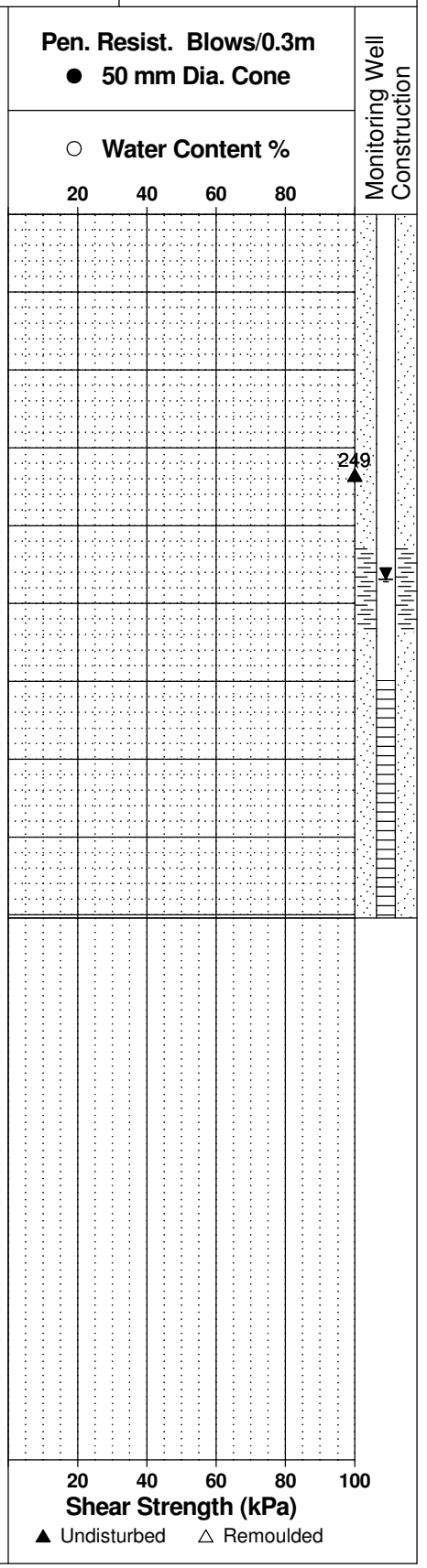
FILE NO. PG5836

REMARKS

HOLE NO. BH 5-21

BORINGS BY CME-55 Low Clearance Drill **DATE** June 2, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	80.98
Asphaltic concrete 0.05		AU	1				
Concrete 0.13		AU	2				
		SS	3	50	6	1	79.98
FILL: Brown silty sand		SS	4	50	2	2	78.98
2.13							
Hard to very stiff, brown **SILTY CLAY**		SS	5	92	15	3	77.98
3.56		SS	6	92	P		
GLACIAL TILL: Dense, grey silty clay with sand, gravel, cobbles and boulders		SS	7	0	50+	4	76.98
- decreasing clay content with depth 4.65		SS	8	100	50+		
		RC	1	100	60	5	75.98
						6	74.98
BEDROCK: Fair to good quality, grey limestone interbedded with silty dolostone		RC	2	100	88	7	73.98
		RC	3	100	82	8	72.98
9.04						9	71.98
End of Borehole							
(GWL @ 4.69m - June 10, 2021)							



SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

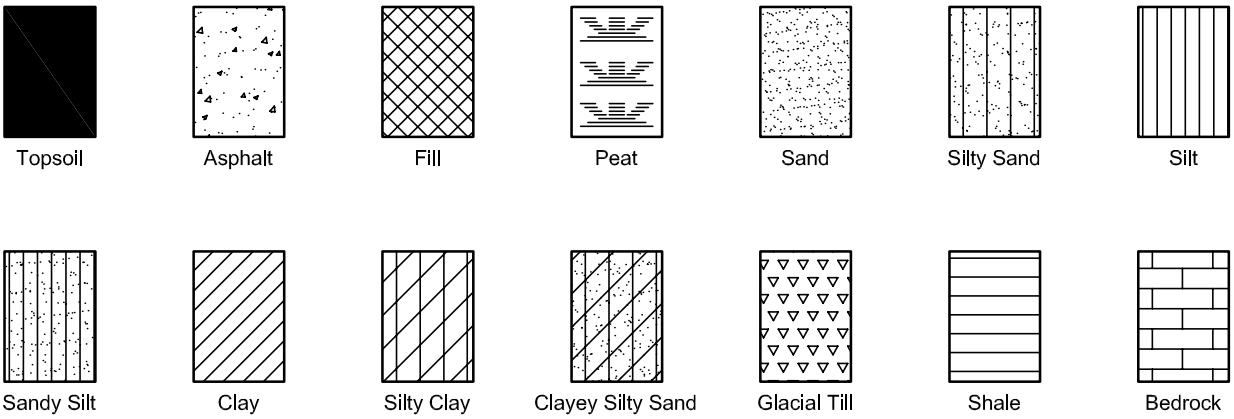
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

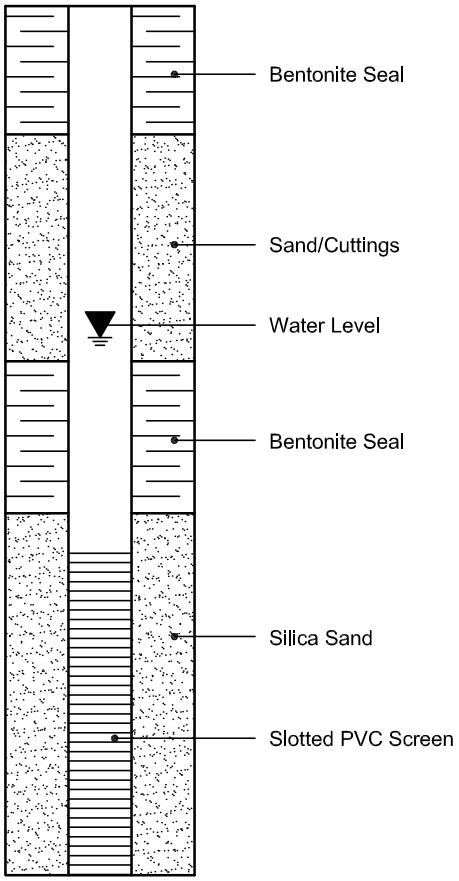
SYMBOLS AND TERMS (continued)

STRATA PLOT

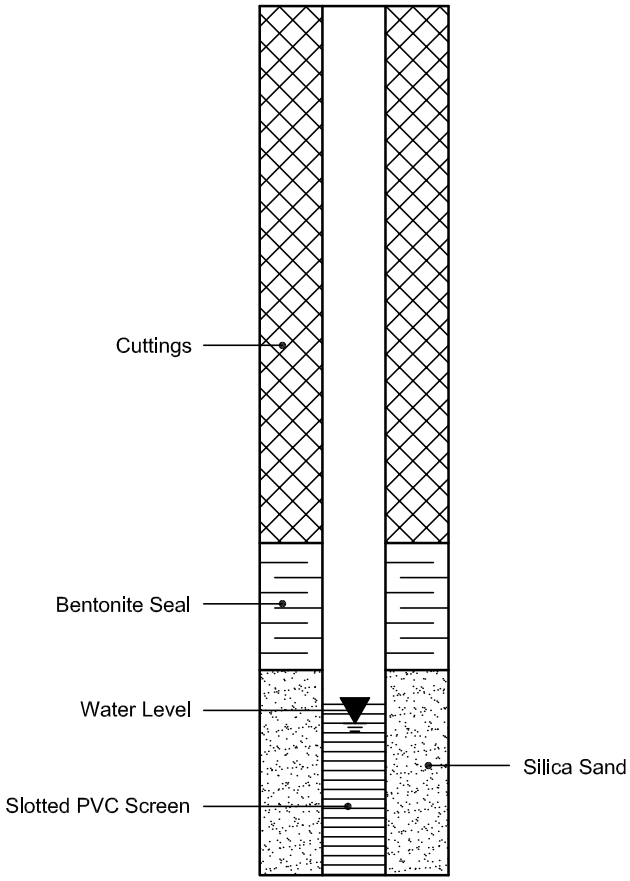


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 32217
Project: PE5302
Custody: 131374

Report Date: 9-Jun-2021
Order Date: 3-Jun-2021

Order #: 2123461

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

Paracel ID	Client ID
2123461-01	BH1-21-SS3
2123461-02	BH1-21-SS6
2123461-03	BH3-21-SS2
2123461-04	BH4-21-SS3
2123461-05	BH5-21-SS4
2123461-06	BH5-21-SS6

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 09-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 3-Jun-2021

Client PO: 32217

Project Description: PE5302

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	7-Jun-21	7-Jun-21
PHC F1	CWS Tier 1 - P&T GC-FID	7-Jun-21	7-Jun-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	7-Jun-21	8-Jun-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	8-Jun-21	9-Jun-21
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	7-Jun-21	9-Jun-21
Solids, %	Gravimetric, calculation	7-Jun-21	8-Jun-21

Certificate of Analysis

Report Date: 09-Jun-2021

Client: **Paterson Group Consulting Engineers**

Order Date: 3-Jun-2021

Client PO: **32217**

Project Description: PE5302

	Client ID:	BH1-21-SS3	BH1-21-SS6	BH3-21-SS2	BH4-21-SS3
	Sample Date:	31-May-21 09:00	31-May-21 09:00	01-Jun-21 09:00	01-Jun-21 09:00
	Sample ID:	2123461-01	2123461-02	2123461-03	2123461-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	91.2	79.0	90.0	90.2
Metals					
Antimony	1.0 ug/g dry	<1.0	-	<1.0	<1.0
Arsenic	1.0 ug/g dry	1.7	-	3.1	3.7
Barium	1.0 ug/g dry	27.0	-	79.1	158
Beryllium	0.5 ug/g dry	<0.5	-	<0.5	<0.5
Boron	5.0 ug/g dry	<5.0	-	<5.0	6.2
Cadmium	0.5 ug/g dry	<0.5	-	<0.5	<0.5
Chromium	5.0 ug/g dry	9.3	-	16.7	21.3
Cobalt	1.0 ug/g dry	4.1	-	7.9	4.9
Copper	5.0 ug/g dry	8.9	-	17.3	12.8
Lead	1.0 ug/g dry	3.3	-	7.1	55.4
Molybdenum	1.0 ug/g dry	<1.0	-	1.2	<1.0
Nickel	5.0 ug/g dry	7.0	-	17.5	10.8
Selenium	1.0 ug/g dry	<1.0	-	<1.0	<1.0
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	<1.0
Vanadium	10.0 ug/g dry	23.2	-	28.1	25.0
Zinc	20.0 ug/g dry	<20.0	-	24.7	136
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	-	58.2%	-	-
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	-	<8	-	-
F4 PHCs (C34-C50)	6 ug/g dry	-	<6	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	<0.02	-

Certificate of Analysis

Report Date: 09-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 3-Jun-2021

Client PO: 32217

Project Description: PE5302

	Client ID:	BH1-21-SS3	BH1-21-SS6	BH3-21-SS2	BH4-21-SS3
	Sample Date:	31-May-21 09:00	31-May-21 09:00	01-Jun-21 09:00	01-Jun-21 09:00
	Sample ID:	2123461-01	2123461-02	2123461-03	2123461-04
	MDL/Units	Soil	Soil	Soil	Soil
Acenaphthylene	0.02 ug/g dry	<0.02	-	<0.02	-
Anthracene	0.02 ug/g dry	<0.02	-	<0.02	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	-	<0.02	-
Benzo [a] pyrene	0.02 ug/g dry	<0.02	-	<0.02	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	-	<0.02	-
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	-	<0.02	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	-	<0.02	-
Chrysene	0.02 ug/g dry	<0.02	-	<0.02	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	-	<0.02	-
Fluoranthene	0.02 ug/g dry	<0.02	-	<0.02	-
Fluorene	0.02 ug/g dry	<0.02	-	<0.02	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	-	<0.02	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	<0.02	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	<0.02	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	<0.04	-
Naphthalene	0.01 ug/g dry	<0.01	-	<0.01	-
Phenanthrene	0.02 ug/g dry	<0.02	-	<0.02	-
Pyrene	0.02 ug/g dry	<0.02	-	<0.02	-
2-Fluorobiphenyl	Surrogate	106%	-	86.5%	-
Terphenyl-d14	Surrogate	122%	-	113%	-

Certificate of Analysis

Report Date: 09-Jun-2021

Client: **Paterson Group Consulting Engineers**

Order Date: 3-Jun-2021

Client PO: **32217**

Project Description: PE5302

	Client ID:	BH5-21-SS4	BH5-21-SS6	-	-
	Sample Date:	02-Jun-21 09:00	02-Jun-21 09:00	-	-
	Sample ID:	2123461-05	2123461-06	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	94.3	87.6	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	1.4	-	-	-
Barium	1.0 ug/g dry	13.5	-	-	-
Beryllium	0.5 ug/g dry	<0.5	-	-	-
Boron	5.0 ug/g dry	<5.0	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	10.6	-	-	-
Cobalt	1.0 ug/g dry	2.5	-	-	-
Copper	5.0 ug/g dry	<5.0	-	-	-
Lead	1.0 ug/g dry	1.6	-	-	-
Molybdenum	1.0 ug/g dry	<1.0	-	-	-
Nickel	5.0 ug/g dry	<5.0	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	<1.0	-	-	-
Vanadium	10.0 ug/g dry	31.9	-	-	-
Zinc	20.0 ug/g dry	<20.0	-	-	-
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	-	58.7%	-	-
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	-	<8	-	-
F4 PHCs (C34-C50)	6 ug/g dry	-	<6	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	-	-

Certificate of Analysis

Report Date: 09-Jun-2021

Client: **Paterson Group Consulting Engineers**

Order Date: 3-Jun-2021

Client PO: **32217**

Project Description: PE5302

	Client ID:	BH5-21-SS4	BH5-21-SS6	-	-
	Sample Date:	02-Jun-21 09:00	02-Jun-21 09:00	-	-
	Sample ID:	2123461-05	2123461-06	-	-
	MDL/Units	Soil	Soil	-	-
Acenaphthylene	0.02 ug/g dry	<0.02	-	-	-
Anthracene	0.02 ug/g dry	<0.02	-	-	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	-	-	-
Benzo [a] pyrene	0.02 ug/g dry	<0.02	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	-	-	-
Chrysene	0.02 ug/g dry	<0.02	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	-	-	-
Fluoranthene	0.02 ug/g dry	<0.02	-	-	-
Fluorene	0.02 ug/g dry	<0.02	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	-	-	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	-	-
Naphthalene	0.01 ug/g dry	<0.01	-	-	-
Phenanthrene	0.02 ug/g dry	<0.02	-	-	-
Pyrene	0.02 ug/g dry	<0.02	-	-	-
2-Fluorobiphenyl	Surrogate	90.1%	-	-	-
Terphenyl-d14	Surrogate	111%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	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	*1.44*		*ug/g*		*108*	*50-140*			
Surrogate: Terphenyl-d14	*1.61*		*ug/g*		*120*	*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	*9.52*		*ug/g*		*119*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g wet	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	1.2	1.0	ug/g dry	ND			NC	30	
Arsenic	4.4	1.0	ug/g dry	4.3			2.1	30	
Barium	82.6	1.0	ug/g dry	80.8			2.2	30	
Beryllium	0.7	0.5	ug/g dry	0.7			1.8	30	
Boron	8.9	5.0	ug/g dry	7.5			17.0	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium	22.4	5.0	ug/g dry	22.5			0.3	30	
Cobalt	8.4	1.0	ug/g dry	8.4			0.1	30	
Copper	21.5	5.0	ug/g dry	21.8			1.1	30	
Lead	19.0	1.0	ug/g dry	17.7			7.0	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	19.4	5.0	ug/g dry	19.7			1.7	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	30.8	10.0	ug/g dry	30.5			1.2	30	
Zinc	66.8	20.0	ug/g dry	66.5			0.5	30	
Physical Characteristics									
% Solids	87.1	0.1	% by Wt.	88.4			1.4	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g dry	ND			NC	40	
Anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Chrysene	ND	0.02	ug/g dry	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Fluorene	ND	0.02	ug/g dry	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
Naphthalene	ND	0.01	ug/g dry	ND			NC	40	
Phenanthrene	ND	0.02	ug/g dry	ND			NC	40	
Pyrene	ND	0.02	ug/g dry	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	*1.63*		*ug/g dry*		*112*	*50-140*			
Surrogate: Terphenyl-d14	*1.89*		*ug/g dry*		*129*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g wet	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g wet	ND			NC	50	
Toluene	ND	0.05	ug/g wet	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g wet	ND			NC	50	
o-Xylene	ND	0.05	ug/g wet	ND			NC	50	
Surrogate: Toluene-d8	*9.18*		*ug/g wet*		*115*	*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)	194	7	ug/g	ND	97.0	80-120			
F2 PHCs (C10-C16)	95	4	ug/g	ND	95.7	60-140			
F3 PHCs (C16-C34)	251	8	ug/g	ND	103	60-140			
F4 PHCs (C34-C50)	157	6	ug/g	ND	102	60-140			
Metals									
Antimony	44.0	1.0	ug/g	ND	87.9	70-130			
Arsenic	50.8	1.0	ug/g	1.7	98.1	70-130			
Barium	76.2	1.0	ug/g	32.3	87.7	70-130			
Beryllium	46.0	0.5	ug/g	ND	91.4	70-130			
Boron	43.9	5.0	ug/g	ND	81.7	70-130			
Cadmium	44.1	0.5	ug/g	ND	88.0	70-130			
Chromium	57.5	5.0	ug/g	9.0	96.9	70-130			
Cobalt	50.4	1.0	ug/g	3.4	94.1	70-130			
Copper	53.7	5.0	ug/g	8.7	89.9	70-130			
Lead	51.7	1.0	ug/g	7.1	89.1	70-130			
Molybdenum	47.0	1.0	ug/g	ND	93.6	70-130			
Nickel	53.4	5.0	ug/g	7.9	91.1	70-130			
Selenium	45.2	1.0	ug/g	ND	90.2	70-130			
Silver	42.7	0.3	ug/g	ND	85.4	70-130			
Thallium	44.5	1.0	ug/g	ND	89.0	70-130			
Uranium	47.8	1.0	ug/g	ND	95.2	70-130			
Vanadium	61.1	10.0	ug/g	12.2	97.8	70-130			
Zinc	68.6	20.0	ug/g	26.6	83.9	70-130			
Semi-Volatiles									
Acenaphthene	0.172	0.02	ug/g	ND	94.2	50-140			
Acenaphthylene	0.133	0.02	ug/g	ND	72.9	50-140			
Anthracene	0.145	0.02	ug/g	ND	79.5	50-140			
Benzo [a] anthracene	0.139	0.02	ug/g	ND	76.0	50-140			
Benzo [a] pyrene	0.158	0.02	ug/g	ND	86.4	50-140			
Benzo [b] fluoranthene	0.168	0.02	ug/g	ND	92.2	50-140			
Benzo [g,h,i] perylene	0.135	0.02	ug/g	ND	74.1	50-140			
Benzo [k] fluoranthene	0.134	0.02	ug/g	ND	73.2	50-140			
Chrysene	0.170	0.02	ug/g	ND	92.9	50-140			
Dibenzo [a,h] anthracene	0.139	0.02	ug/g	ND	75.8	50-140			
Fluoranthene	0.134	0.02	ug/g	ND	73.4	50-140			
Fluorene	0.141	0.02	ug/g	ND	77.2	50-140			
Indeno [1,2,3-cd] pyrene	0.133	0.02	ug/g	ND	72.9	50-140			
1-Methylnaphthalene	0.147	0.02	ug/g	ND	80.4	50-140			
2-Methylnaphthalene	0.156	0.02	ug/g	ND	85.2	50-140			
Naphthalene	0.166	0.01	ug/g	ND	91.1	50-140			
Phenanthrene	0.151	0.02	ug/g	ND	82.6	50-140			
Pyrene	0.126	0.02	ug/g	ND	69.2	50-140			
Surrogate: 2-Fluorobiphenyl	*1.16*		*ug/g*		*79.3*	*50-140*			
Surrogate: Terphenyl-d14	*1.69*		*ug/g*		*116*	*50-140*			
Volatiles									
Benzene	3.84	0.02	ug/g	ND	96.0	60-130			
Ethylbenzene	4.97	0.05	ug/g	ND	124	60-130			
Toluene	4.27	0.05	ug/g	ND	107	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
m,p-Xylenes	9.69	0.05	ug/g	ND	121	60-130			
o-Xylene	4.25	0.05	ug/g	ND	106	60-130			
Surrogate: Toluene-d8	*9.20*		*ug/g*		*115*	*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

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: 2123461

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2123461	№ 132347

Client Name: Paterson Group Inc.	Project Ref: PE5302
Contact Name: Mark D'Arcy, Samuel Bérubé	Quote #:
Address: 154 Colonnade Rd South	PO #: 32217
Telephone:	E-mail: mdarcy@patersongroup.ca sberube@patersongroup.ca

Page 1 of 1

Turnaround Time

☐ 1 day ☐ 3 day ☐ 2 day ☑ Regular

Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH1-21-SS3	S		1	May 31/21				✓	✓			
2	BH1-21-SS6	↓		2	↓		✓						
3	BH3-21-SS2			1	June 1/21				✓	✓			
4	BH4-21-SS3			1	↓					✓			
5	BH5-21-SS4			1	June 2/21				✓	✓			
6	BH5-21-SS6	↓		2	↓		✓	✓					
7													
8													
9													
10													

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign): S. Bérubé	Received By Driver/Depot: A. Touse	Received at Lab:	Verified By:
Relinquished By (Print): Samuel Bérubé	Date/Time: 03/06/21 3:30	Date/Time: June 3/21 4:15	Date/Time: June 3rd, 2021 17:06
Date/Time:	Temperature: °C	Temperature: 10.0 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 32265
Project: PE5302
Custody: 132380

Report Date: 14-Jun-2021
Order Date: 10-Jun-2021

Order #: 2124555

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

Paracel ID	Client ID
2124555-01	BH7-SS6

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 32265

Report Date: 14-Jun-2021

Order Date: 10-Jun-2021

Project Description: PE5302

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	11-Jun-21	11-Jun-21
PHC F1	CWS Tier 1 - P&T GC-FID	11-Jun-21	11-Jun-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	11-Jun-21	11-Jun-21
Solids, %	Gravimetric, calculation	11-Jun-21	14-Jun-21

Certificate of Analysis

Report Date: 14-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 10-Jun-2021

Client PO: 32265

Project Description: PE5302

	Client ID:	BH7-SS6	-	-	-
	Sample Date:	02-Jun-21 09:00	-	-	-
	Sample ID:	2124555-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	68.9	-	-	-
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	107%	-	-	-
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	18	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	18	-	-	-

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						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.53*		*ug/g*		*110*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	76	8	ug/g dry	127			50.4	30	QR-04
F4 PHCs (C34-C50)	ND	6	ug/g dry	8			NC	30	
Physical Characteristics									
% Solids	87.9	0.1	% by Wt.	89.1			1.3	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	*3.41*		*ug/g dry*		*101*	*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)	206	7	ug/g	ND	103	80-120			
F2 PHCs (C10-C16)	98	4	ug/g	ND	87.5	60-140			
F3 PHCs (C16-C34)	299	8	ug/g	127	62.3	60-140			
F4 PHCs (C34-C50)	155	6	ug/g	8	84.4	60-140			
Volatiles									
Benzene	3.69	0.02	ug/g	ND	92.2	60-130			
Ethylbenzene	3.14	0.05	ug/g	ND	78.4	60-130			
Toluene	3.34	0.05	ug/g	ND	83.6	60-130			
m,p-Xylenes	6.26	0.05	ug/g	ND	78.3	60-130			
o-Xylene	3.39	0.05	ug/g	ND	84.9	60-130			
Surrogate: Toluene-d8	*2.58*		*ug/g*		*80.7*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QR-04 : Duplicate results exceeds RPD limits due to non-homogeneous matrix.

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: 2124555

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2124555	№ 132380

Client Name: Paterson Group Inc.
Contact Name: Samuel Berube, Mark D'Arcy
Address: 154 Colonnade Rd South
Telephone: 613-226-7381

Project Ref: PE5302
Quote #:
PO #: 32265
E-mail: sberube@patersongroup.ca
mdarcy@patersongroup.ca

Page 1 of 1

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☑ Regular
Date Required:

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

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

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH7-SS6	S		2	June 2/21		✓						
2													
3													
4													
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: M. Louise	Received at Lab: Juneyoung Do	Verified By:
Relinquished By (Print): Samuel Bérubé	Date/Time: 10/06/21 2:35	Date/Time: June 10, 2021 03:29	Date/Time: June 10, 2021 17:58
Date/Time:	Temperature: °C	Temperature: 9.8 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 32267
Project: PE5302
Custody: 131423

Report Date: 17-Jun-2021
Order Date: 11-Jun-2021

Order #: 2124688

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

Paracel ID	Client ID
2124688-01	BH1-21-GW1
2124688-02	BH4-21-GW1
2124688-03	BH5-21-GW1
2124688-04	DUP-1-GW1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 32267

Report Date: 17-Jun-2021

Order Date: 11-Jun-2021

Project Description: PE5302

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	14-Jun-21	14-Jun-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	16-Jun-21	17-Jun-21
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	14-Jun-21	14-Jun-21

Certificate of Analysis

Report Date: 17-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 11-Jun-2021

Client PO: 32267

Project Description: PE5302

	Client ID:	BH1-21-GW1	BH4-21-GW1	BH5-21-GW1	DUP-1-GW1
	Sample Date:	10-Jun-21 09:00	10-Jun-21 09:00	10-Jun-21 09:00	10-Jun-21 09:00
	Sample ID:	2124688-01	2124688-02	2124688-03	2124688-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	1.0	<0.5	<0.5	1.0
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	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
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	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
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Report Date: 17-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 11-Jun-2021

Client PO: 32267

Project Description: PE5302

	Client ID:	BH1-21-GW1	BH4-21-GW1	BH5-21-GW1	DUP-1-GW1
	Sample Date:	10-Jun-21 09:00	10-Jun-21 09:00	10-Jun-21 09:00	10-Jun-21 09:00
	Sample ID:	2124688-01	2124688-02	2124688-03	2124688-04
	MDL/Units	Water	Water	Water	Water
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	103%	109%	107%	105%
Dibromofluoromethane	Surrogate	91.1%	93.2%	91.4%	91.4%
Toluene-d8	Surrogate	102%	103%	105%	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	-

Certificate of Analysis

Report Date: 17-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 11-Jun-2021

Client PO: 32267

Project Description: PE5302

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*84.0*		*ug/L*		*105*	*50-140*			
Surrogate: Dibromofluoromethane	*67.8*		*ug/L*		*84.7*	*50-140*			
Surrogate: Toluene-d8	*83.9*		*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									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*83.8*		*ug/L*		*105*	*50-140*			
Surrogate: Dibromofluoromethane	*73.7*		*ug/L*		*92.1*	*50-140*			
Surrogate: Toluene-d8	*81.4*		*ug/L*		*102*	*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)	2290	25	ug/L	ND	114	68-117			
F2 PHCs (C10-C16)	1180	100	ug/L	ND	73.8	60-140			
F3 PHCs (C16-C34)	3160	100	ug/L	ND	80.5	60-140			
F4 PHCs (C34-C50)	1700	100	ug/L	ND	68.7	60-140			
Volatiles									
Acetone	99.0	5.0	ug/L	ND	99.0	50-140			
Benzene	39.1	0.5	ug/L	ND	97.8	60-130			
Bromodichloromethane	37.0	0.5	ug/L	ND	92.6	60-130			
Bromoform	39.0	0.5	ug/L	ND	97.6	60-130			
Bromomethane	27.9	0.5	ug/L	ND	69.8	50-140			
Carbon Tetrachloride	32.7	0.2	ug/L	ND	81.7	60-130			
Chlorobenzene	42.5	0.5	ug/L	ND	106	60-130			
Chloroform	37.7	0.5	ug/L	ND	94.2	60-130			
Dibromochloromethane	35.5	0.5	ug/L	ND	88.8	60-130			
Dichlorodifluoromethane	33.5	1.0	ug/L	ND	83.8	50-140			
1,2-Dichlorobenzene	37.6	0.5	ug/L	ND	94.1	60-130			
1,3-Dichlorobenzene	37.7	0.5	ug/L	ND	94.2	60-130			
1,4-Dichlorobenzene	38.2	0.5	ug/L	ND	95.4	60-130			
1,1-Dichloroethane	36.5	0.5	ug/L	ND	91.2	60-130			
1,2-Dichloroethane	40.8	0.5	ug/L	ND	102	60-130			
1,1-Dichloroethylene	31.7	0.5	ug/L	ND	79.3	60-130			
cis-1,2-Dichloroethylene	40.7	0.5	ug/L	ND	102	60-130			
trans-1,2-Dichloroethylene	39.3	0.5	ug/L	ND	98.3	60-130			
1,2-Dichloropropane	45.3	0.5	ug/L	ND	113	60-130			
cis-1,3-Dichloropropylene	37.9	0.5	ug/L	ND	94.8	60-130			
trans-1,3-Dichloropropylene	40.2	0.5	ug/L	ND	100	60-130			
Ethylbenzene	43.2	0.5	ug/L	ND	108	60-130			
Ethylene dibromide (dibromoethane, 1,2-	38.3	0.2	ug/L	ND	95.7	60-130			
Hexane	40.0	1.0	ug/L	ND	100	60-130			
Methyl Ethyl Ketone (2-Butanone)	103	5.0	ug/L	ND	103	50-140			
Methyl Isobutyl Ketone	109	5.0	ug/L	ND	109	50-140			
Methyl tert-butyl ether	112	2.0	ug/L	ND	112	50-140			
Methylene Chloride	29.6	5.0	ug/L	ND	74.0	60-130			
Styrene	37.0	0.5	ug/L	ND	92.5	60-130			
1,1,1,2-Tetrachloroethane	32.6	0.5	ug/L	ND	81.5	60-130			
1,1,2,2-Tetrachloroethane	42.4	0.5	ug/L	ND	106	60-130			
Tetrachloroethylene	36.5	0.5	ug/L	ND	91.2	60-130			
Toluene	38.6	0.5	ug/L	ND	96.4	60-130			
1,1,1-Trichloroethane	41.3	0.5	ug/L	ND	103	60-130			
1,1,2-Trichloroethane	44.1	0.5	ug/L	ND	110	60-130			
Trichloroethylene	39.1	0.5	ug/L	ND	97.7	60-130			
Trichlorofluoromethane	28.8	1.0	ug/L	ND	71.9	60-130			
Vinyl chloride	32.9	0.5	ug/L	ND	82.2	50-140			
m,p-Xylenes	75.9	0.5	ug/L	ND	94.9	60-130			
o-Xylene	43.3	0.5	ug/L	ND	108	60-130			
Surrogate: 4-Bromofluorobenzene	*85.7*		*ug/L*		*107*	*50-140*			
Surrogate: Dibromofluoromethane	*79.6*		*ug/L*		*99.5*	*50-140*			
Surrogate: Toluene-d8	*80.4*		*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: 2124688

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2124688	№ 132423

Client Name: Paterson Group Inc.	Project Ref: PE5302
Contact Name: Mark D'Arcy, Samuel Bérubé	Quote #:
Address: 154 Colonnade Rd South	PO #: 32267
Telephone: 613-226-7381	E-mail: mdarcy@patersongroup.ca Sberube@patersongroup.ca

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Turnaround Time

☐ 1 day ☐ 3 day
☐ 2 day ☑ Regular
Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH1-21-GW1	GW		3	June 10/21		✓	✓					
2	BH4-21-GW1			3			✓	✓					
3	BH5-21-GW1			3			✓	✓					
4	DUP-1-GW1			2				✓					
5													
6													
7													
8													
9													
10													

Required Analysis

Comments: * VOC and PHC(F1-F4) analysis

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: A. Louise	Received at Lab: Suneepam Dhaliwal	Verified By: BG
Relinquished By (Print): Samuel Bérubé	Date/Time: 11/06/21 2:41	Date/Time: JUN 11, 2021 07:15	Date/Time: June 11, 2021 16:16
Date/Time:	Temperature: °C	Temperature: 18.0 °C	pH Verified: ☐ By: