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Phase II Environmental Site Assessment

15, 17 and 19 Larch Street
City of Ottawa, Ontario

Prepared For

Avenyn Capital Partners LP
c/o 15-19 Larch St. Inc.

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Report: PE5506-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the properties addressed 15, 17 and 19 Larch Street, in the Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) that were identified during the Phase I ESA and considered to result in areas of potential environmental concern (APECs) on the Phase II ESA Property.

The subsurface investigations were conducted in between August and September of 2020 and later, in January of 2022, which consisted of drilling four (4) boreholes, all which were instrumented with groundwater monitoring wells. The general soil profile encountered during the field program consisted of granular material, underlain by silty clay, followed by silty sand or sandy silt, overlying limestone bedrock. The boreholes were terminated in bedrock at depths of approximately 7.24 to 10.44 m below the ground surface (mbgs). No signs of contamination or olfactory evidence was noted at the time of the field program. Soil samples were obtained from the boreholes and screened based on visual observation and sample intervals (depths).

Six (6) soil samples, including two (2) duplicate samples, were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F_1-F_4) and metals (including hydride forming compounds: arsenic (As), Antimony (Sb), Selenium (Se)), mercury and hexavalent chromium (CrVI). No BTEX concentrations were identified in any of the soil samples analyzed. With the exception of some metal parameters (barium, lead, molybdenum and zinc), all other parameters analyzed in the soil samples complied with MECP Table 3 Residential Standards. Exceedances for metals parameters were identified in fill material below APEC1.

Groundwater samples from monitoring wells BH2, BH3 and BH4 were collected during the September 2020 and January 2022 sampling events. No free product or petroleum hydrocarbon sheen was noted on the purge water during the groundwater sampling events. Groundwater samples were analyzed for BTEX, PHCs and VOCs. Groundwater samples were analyzed for BTEX, PHCs and/or VOCs. With the exception of chloroform, all analyzed parameter concentrations from the most recent sampling events complied with the MECP Table 3 Standards. The presence of chloroform in the groundwater samples is considered to be a result of the use of municipally treated water in the rock coring process, and is not considered to exceed site standards.

Recommendations

It is our understanding that the Phase II ESA Property will be redeveloped for residential purposes. Due to the change in land use to a more sensitive land use (mixed-use to residential), a record of site condition (RSC) will be required as per O.Reg 154/03.

Soil

Based on the findings of the Phase II ESA, it is recommended that the fill material impacted with metals be remediated and be carried out in conjunction with the construction excavation. A representative sample of impacted soil must be submitted for a leachate analysis in accordance with O.Reg. 347/558 prior to disposal at an approved landfill site.

Excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19 – On-site and Excess Soil Management.

Monitoring Wells

If the monitoring wells installed on the Phase II ESA Property are not going to be used in the future, or will be destroyed during site redevelopment, they should be abandoned according to Ontario Regulation 903. The wells will be registered with the MECP under this regulation.

1.0 INTRODUCTION

At the request of Avenyn Capital Partners LP, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment at 15, 17 and 19 Larch Street (the Phase II ESA Property), in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address areas of potential environmental concern (APECs) identified on the Phase II ESA Property, during the Phase I ESA conducted by Paterson in November of 2021.

1.1 Site Description

Address:	15, 17 and 19 Larch Street, Ottawa, Ontario
Legal Description:	Part of Block 122, Registered Plan 13, Lots 35 and 36 and Part of Lot 34, Registered Plan 82974, in the City of Ottawa, Ontario.
Location:	The Phase I ESA Property is located on the north side of Larch Street, approximately 85 m west of Preston Street. Refer to Figure 1 - Key Plan in Appendix 1 for the site location.
Latitude and Longitude:	45° 24’ 19.8” N, 75° 42’ 49.6” W

Site Description:

Configuration:	Irregular
Area:	926 m^2 (approximately)
Zoning:	R4H – Residential Zone

1.2 Property Ownership

Paterson was engaged to conduct this Phase I-ESA by Mr. Domenic Idone, with Avenyn Capital Partners LP. The head office of Avenyn Capital Partners LP is located at 503-359 Kent Street, Ottawa, Ontario.

1.3 Current and Proposed Future Uses

The Phase II ESA Property is currently occupied by a two-storey multi-residential apartment building with a finished basement and a slab-on-grade commercial building formerly used as a steel fabrication workshop.

It is our understanding that the Phase II ESA Property will be redeveloped for residential purposes. Due to the change in land use to a more sensitive land use (mixed-sue to residential), a record of site condition (RSC) will be required as per O.Reg 154/03.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 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 Ontario Ministry of Environment, Conservation and Parks (MECP), April 2011. The MECP selected Table 3 Standards are based on the following considerations:

- ❒ Coarse-grained soil conditions
- ❒ Full depth generic site conditions
- ❒ Non-potable groundwater conditions
- ❒ Residential land use

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

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

Section 43.1 of O.Reg. 153/04 does not apply to the Phase II ESA Property in that the property is not a Shallow Soil property.

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

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The western portion of the Phase II ESA Property is occupied by a two (2) storey multi-tenant apartment building with a finished basement. The residence was constructed circa 1956 with a concrete block foundation and finished exterior in red brick with a sloped shingled style roof.

The commercial building, presently vacant, is situated on the eastern portion of the site was initially used a private parking garage that was constructed circa 1948 with a slab-on-grade foundation and concrete block walls with a sloped shingled style roof. The northern extension was constructed in 1972 with a flat tar-and-gravel style roof. The entire building was used as a steel fabrication workshop.

The Phase II ESA Property is relatively flat and slightly above the grade of Larch Street. The majority of the site is landscaped with a pavement structure fronting Larch Street, which is used for parking. Site drainage consists of infiltration on the landscaped areas and sheet flow to drains located along Larch Street.

2.2 Past Investigations

Paterson completed a Phase I ESA in November of 2021 for the Phase II ESA Property. Based on the findings of the Phase I ESA, two (2) potentially contaminating activities (PCAs) were determined to result in areas of potential environmental concern (APECs) on the Phase II ESA Property:

As per Column A of Table 2 of the O.Reg. 153/04, as amended, the following on-site PCAs that generated APECs on the Phase I ESA Property are:

- PCA 34 – “Metal Fabrication,” associated with the former on-site metal welding and fabrication shop (APEC 1).
- PCA 27 – “Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles” associated with the ordnance building used to store wartime equipment, located off-site to the west. (APEC 2).
- Application of salt to parking surfaces during conditions of snow or ice or both (APEC3)

The APECs are shown on Drawing PE5506-1 – Site Plan, while the corresponding PCAs are shown in red on Drawing PE5506-2 – Surrounding Land Use Plan of the Phase I ESA report.

The rationale for identifying the above APECs is based on a review of fire insurance plans, aerial photographs, field observations, and personal interviews. A Phase II ESA was recommended to address the aforementioned APECs.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigations were conducted on August 31, 2020 and January 12, 2022. The field programs consisted of drilling four (4) boreholes to address the APECs identified on the Phase II ESA Property. All of the boreholes completed with monitoring well installations. Boreholes were drilled to a maximum depth of 10. 44 m below the ground surface (mbgs).

3.2 Media Investigated

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

Contaminants of potential concern (CPCs) on the Phase II ESA Property include benzene, toluene, ethylbenzene, and xylenes (BTEX), volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs, F1-F4) and Metals including arsenic, antimony and selenium, mercury (Hg) and hexavalent chromium (CrVI).

3.3 Phase I Conceptual Site Model

According to the Geological Survey of Canada website, the bedrock in the area of the Phase I ESA Property is reported to consist of interbedded limestone and shale, of the Verulam Formation. Overburden consists of plain till, with a drift thickness on the order of 3 to 5 m. Based on the regional topography, groundwater is expected to flow in a northwesterly direction.

Existing Buildings and Structures

The western portion of the Phase I ESA Property is occupied by a two (2) storey multi-tenant apartment building with a finished basement. The residence was

constructed circa 1956 with a concrete block foundation and finished exterior in red brick with a sloped shingled style roof.

The commercial building, presently vacant, is situated on the eastern portion of the site was initially used a private parking garage that was constructed circa 1948 with a slab-on-grade foundation and concrete block walls with a sloped shingled style roof. The northern extension was constructed in 1972 with a flat tar-and-gravel style roof. The entire building was used as a steel fabrication workshop.

Subsurface Structures and Utilities

The Phase I ESA Property is situated in a municipally serviced area. Underground utilities and/or structures enter the Phase I ESA Property from Larch Street.

Areas of Natural Significance

No areas of natural significance were identified in the Phase I Study Area.

Water Bodies

No natural water bodies were identified in the Phase I Study Area.

Drinking Water Wells

There are no potable water wells on the Phase I ESA Property, nor are they expected to be present as the subject land is situated in a municipally serviced area.

Neighbouring Land Use

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

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 7.1 of the Phase I ESA report, two (2) PCAs and the resultant APECs are summarized in Table 1, along with their respective locations and contaminants of potential concern (CPCs).

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

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1: Resulting from the metal / welding shop	Eastern portion of the Phase I ESA Property	PCA 34 – Metal Fabrication	On-site	BTEX VOCs PHCs (F_1-F_4) Metals (Hg, CrVI)	Soil and/or Groundwater
APEC 2: Resulting from the historical presence of an ordnance depot (warehouse)	Western portion of the Phase I ESA Property	PCA 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	Off-site	VOCs PHCs (F_1-F_4) Metals (Hg, CrVI)	Groundwater
APEC3: Application of salt to parking surfaces during conditions of snow or ice or both	South portion of the Phase I ESA property	Application of salt to parking surfaces during conditions of snow or ice or both	On-Site	EC/SAR	Soil

Contaminants of Potential Concern

As per Section 7.1, the contaminants of potential concern (CPCs) in soil and/or groundwater include benzene, toluene, ethylbenzene, and xylenes (BTEX), volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs, F1-F4) and Metals including arsenic, antimony and selenium, mercury (Hg) and hexavalent chromium (CrVI).

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 PCAs that have resulted in APECs on the Phase I ESA Property.

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

3.4 Deviations from Sampling and Analysis Plan

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

3.5 Impediments

Groundwater samples from the monitoring wells in BH2 and BH3 were submitted for PHCs (F_1 - F_4) and VOCs analysis during the 2020 sampling event. A groundwater sample was not recovered from BH1, due to a blocked well screen.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation conducted for this Phase II ESA consisted of drilling three (3) boreholes (BH1 through BH3) across the Phase II ESA Property in 2020 and one (1) in the interior of the metal fabrication shop (BH4) in 2022. The boreholes were drilled to a maximum depth of 10.44 m below ground surface (bgs) to intercept groundwater. The borehole locations are indicated on the attached Drawing PE5506-3 - Test Hole Location Plan.

4.2 Soil Sampling

A total of 35 soil samples and seven (7) rock core samples were obtained from the boreholes by means of grab sampling from auger flights/auger samples and split spoon sampling, as well as rock cores. Split spoon samples were taken at approximate 0.76 m intervals.

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

The borehole profiles generally consist of topsoil and/or fill consisting of granular material, underlain by silty clay, followed by silty sand or sandy silt, overlying limestone 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.

Vapours were negligible in the soil samples. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1. No obvious visual or olfactory indications of potential environmental contaminants were identified in the soil samples.

4.4 Groundwater Monitoring Well Installation

Four (4) groundwater monitoring wells were installed on the Phase II ESA Property as part of the subsurface investigation. The monitoring wells consisted of 32 mm diameter, Schedule 40 threaded PVC risers and screens. Monitoring well construction details are listed below in Table 2 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Borehole locations and elevations were surveyed geodetically by Paterson personnel.

TABLE 2. Monitoring Well Construction Details

Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1	60.05	10.44	8.94-10.44	8.60-10.44	0.15-10.44	Flushmount
BH2	60.08	9.17	7.65-9.17	7.0-9.17	0.15-7.0	Flushmount
BH3	59.17	8.56	7.06-8.56	6.80-8.56	0.15-6.80	Flushmount
BH4	59.27	7.24	4.24-7.24	3.75-7.24	0.15-3.75	Flushmount

4.5 Groundwater Sampling

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

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

4.6 Analytical Testing

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

TABLE 3: Soil Samples Submitted and Analyzed Parameters

Sample ID	Sample Depth / Stratigraphic Unit	Parameters Analyzed					Rationale
		BTEX	PHCs (F1-F4)	Metals	Hg	CrVI	
August 31, 2020							
BH1-AU1	0-0.05m Topsoil			X	X	X	Assess the quality of the fill material.
BH1-SS7	4.57-5.18m Silty sand-gravel	X	X				Assess the potential soil impact due to former use of the site (PCA 34).
BH2-AU1	0-0.05m Topsoil			X	X	X	Assess the potential soil impact due to former ordnance depot (PCA 27).
BH3-SS8	5.33-5.94m Silty sand	X	X				Assess the potential soil impact due to former use of the site (PCA 34)
DUP	5.33-5.94m Silty sand	X					Duplicate soil sample (BH3-SS8) for QA/QC purposes.
January 12, 2022							
BH4-22-SS1	0.25-0.64m Fill	X	X	X	X	X	Assess the potential soil impact due to former use of the site (PCA 34).
BH4-22-SS6	3.66-4.27m Fill	X	X				Assess the potential soil impact due to former use of the site (PCA 34).
DUP	3.66-4.27m Fill	X	X				Duplicate soil sample (BH4-22-SS6) for QA/QC purposes

TABLE 4: Groundwater Samples Submitted and Analyzed Parameters

Sample ID	Screened Interval	Parameters Analyzed			Rationale
		BTEX	PHCs (F1-F4)	VOCs	
September 4, 2020					
BH2-GW1	7.65-9.17m	X	X	X	Assess potential groundwater impacts from the former ordnance depot off-site (PCA27).
BH3-GW1	7.06-8.56m	X	X	X	Assess the potential groundwater impact due to former use of the site (PCA 34)

TABLE 4: Groundwater Samples Submitted and Analyzed Parameters					
Sample ID	Screened Interval	Parameters Analyzed			Rationale
		BTEX	PHCs (F1-F4)	VOCs	
September 15, 2020					
BH2-GW2	7.65-9.17m		X	X	Assess potential groundwater impacts from the former ordnance depot off-site (PCA27).
BH3-GW2	7.06-8.56m			X	Assess the potential groundwater impact due to former use of the site (PCA 34)
January 17, 2022					
BH4-GW	4.24-7.24m	X	X	X	Assess the potential groundwater impact due to former use of the site (PCA 34)
DUP	4.24-7.24m	X	X	X	Duplicate groundwater sample (BH4-GW) for QA/QC purposes

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

4.7 Residue Management

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

4.8 Elevation Surveying

Boreholes were surveyed at geodetic elevations by Paterson personnel.

4.9 Quality Assurance and Quality Control Measures

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

5.0 REVIEW AND EVALUATION

5.1 Geology

Site soils generally consisted of topsoil and/or fill consisting of granular material, underlain by silty clay, followed by silty sand or sandy silt, overlying limestone bedrock. The boreholes were terminated in bedrock at depths of approximately 7.24 to 10.44 m below the ground surface (mbgs).

Bedrock was encountered at depths ranging from approximately 6.17 to 7.47 m below grade. Bedrock was cored to a maximum depth of 10.44 m below grade.

Groundwater was encountered within the overburden at depths ranging from approximately 5.07 to 6.08 mbgs.

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

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the January 17, 2022 sampling event on using an electronic water level meter. Groundwater levels are summarized below in Table 5.

TABLE 5: Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH2	60.83	6.08	54.75	January 17, 2022
BH3	59.17	5.07	54.10	January 17, 2022
BH4	59.27	5.34	53.93	January 17, 2022

Based on the groundwater elevations measured during the sampling events, groundwater contour mapping was completed. Based on the contour mapping, groundwater flow at the subject site is in a northerly direction. A horizontal hydraulic gradient of approximately 0.06m/m was calculated. Groundwater contours are shown on Drawing PE5506-3.

5.3 Fine-Coarse Soil Texture

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

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in vapour readings ranging from 0 to 1.0 ppm. The field screening results of each individual soil sample are provided on the Soil Profile and Test Data Sheets appended to this report.

5.5 Soil Quality

During the 2020 and 2022 subsurface program, eight (8) soil samples were submitted for analytical testing for benzene, ethylbenzene, toluene and xylenes (BTEX), petroleum hydrocarbons (PHCs, fractions 1 to 4) and/or metals.

TABLE 6: Analytical Test Results – Soil BTEX and/or PHC (F1 to F4)

Parameter	MDL (µg/g)	Soil Samples (ug/g)			MECP Table 3 Residential Standards (µg/g)
		August 31, 2020			
		BH1-SS7	BH3-SS8	DUP (SS8)	
Benzene	0.02	nd	nd	nd	0.32
Ethylbenzene	0.05	nd	nd	nd	1.1
Toluene	0.05	nd	nd	nd	6.4
Xylene, total	0.05	nd	nd	nd	26
PHCs - F1	7	nd	nd	NA	55
PHCs - F2	4	nd	nd	NA	230
PHCs - F3	8	nd	nd	NA	1700
PHCs - F4	6	nd	nd	NA	3300

Notes:
- MDL - Method Detection Limit
- NA – Not Analyzed
- nd - Not Detected (i.e <MDL)

TABLE 6 Continued: Analytical Test Results – Soil BTEX and/or PHC (F1 to F4)

Parameter	MDL (µg/g)	Soil Samples (ug/g)			MECP Table 3 Residential Standards (µg/g)
		January 12, 2022			
		BH4-22-SS1	BH4-22-SS6	DUP (SS6)	
Benzene	0.02	nd	nd	nd	0.32
Ethylbenzene	0.05	nd	nd	nd	1.1
Toluene	0.05	nd	nd	nd	6.4
Xylene, total	0.05	nd	nd	nd	26
PHCs - F1	7	nd	nd	nd	55
PHCs - F2	4	nd	nd	nd	230
PHCs - F3	8	29	nd	nd	1700
PHCs - F4	6	nd	nd	nd	3300

TABLE 6 Continued: Analytical Test Results – Soil BTEX and/or PHC (F1 to F4)					
Parameter	MDL (µg/g)	Soil Samples (ug/g)			MECP Table 3 Residential Standards (µg/g)
		January 12, 2022			
		BH4-22-SS1	BH4-22-SS6	DUP (SS6)	

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (i.e <MDL)

With the exception of BH4-22-SS1, BTEX and PHC concentrations were non-detect in the soil samples analyzed. All of the analytical test results comply with the selected MECP Table 3 Residential Standards.

TABLE 7: Analytical Test Results – Soil – Metals					
Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 3 Residential Standards (µg/g)
		August 31, 2020		January 12, 2022	
		BH1-AU1	BH2-AU1	BH4-22-SS1	
Antimony	1.0	nd	nd	nd	7.5
Arsenic	1.0	4.3	3.9	5.0	18
Barium	1.0	274	234	**498**	390
Beryllium	0.5	0.6	0.6	nd	4
Boron	5.0	5.4	nd	8.2	120
Cadmium	0.5	nd	nd	0.6	1.2
Chromium	5.0	54.7	44.6	116	160
Chromium (VI)	0.2	nd	nd	nd	8
Cobalt	1.0	12.1	12.3	9.4	22
Copper	5.0	32.7	26.6	57.0	140
Lead	1.0	55.1	22.4	**286**	120
Mercury	0.1	nd	nd	0.1	0.27
Molybdenum	1.0	nd	nd	**15.8**	6.9
Nickel	5.0	29.6	26.1	25.4	100
Selenium	1.0	nd	nd	nd	2.4
Silver	0.3	nd	nd	nd	20
Thallium	1.0	nd	nd	nd	1
Uranium	1.0	nd	nd	nd	23
Vanadium	10.0	56.7	55.2	57.8	86
Zinc	20.0	129	111	**392**	340

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (i.e <MDL)
- **Bold and Underlined** – Parameter exceeds the selected standard

Metal concentrations identified in the BH1-AU1 and BH2-AU1 analyzed comply with the MECP Table 3 Residential Standards. The concentrations of barium,

lead, molybdenum and zinc in soil sample BH4-22-SS1 are in excess of the selected MECP standards.

The analytical results in soil are shown on Drawing PE5506-4 – Analytical Testing Plan – Soil, as well as on cross-sections Drawings PE5506-4A and 4B.

The maximum concentrations of analyzed parameters in the soil at the site are summarized below in Table 8.

TABLE 8: Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Borehole	Depth Interval (m BGS)
PHCs - F3	29	BH4-22-SS1	0.25-0.64m, Fill
Arsenic	5.0		
Barium	**498**		
Beryllium	0.6	BH1-AU1; BH2-AU1	0.0-0.05m, Fill
Boron	8.2	BH4-22-SS1	0.25-0.64m, Fill
Cadmium	0.6		
Chromium	116		
Cobalt	12.3	BH2-AU1	0.0-0.05m, Fill
Copper	57.0	BH4-22-SS1	0.25-0.64m, Fill
Lead	**286**		
Mercury	29.6	BH1-AU1	0.0-0.05m, Fill
Molybdenum	**15.8**	BH4-22-SS1	0.25-0.64m, Fill
Nickel	29.6	BH1-AU1	0.0-0.05m, Fill
Vanadium	57.8	BH4-22-SS1	0.25-0.64m, Fill
Zinc	**392**		

Notes:
- **Bold and Underlined** – Parameter exceeds the selected standard

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

5.6 Groundwater Quality

Groundwater samples from BH2 and BH3 were collected and analyzed for BTEX, PHCs and/or VOCs during on September 4 and 12, 2020. Groundwater samples from BH4 were collected and analyzed during the most recent program on January 17, 2022. The results of the analytical testing are presented in Tables 9 and 10 along with the MECP Table 3 Standards. The laboratory certificates of analysis are included in Appendix 2 of this report.

TABLE 9: Analytical Test Results – Groundwater (PHCs)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)						MECP Table 3 Standards (µg/L)
		September 4, 2020		September 15, 2020		January 17, 2022		
		BH2-GW1	BH3-GW1	BH2-GW2	BH3-GW2	BH4-GW	DUP (BH4)	
Benzene	0.5	0.8	nd	nd	nd	nd	nd	44
Toluene	0.5	3.1	3.6	nd	2.6	1.9	1.9	18,000
Ethylbenzene	0.5	4.4	4.0	nd	nd	nd	nd	2,300
Xylenes	0.5	6.9	6.0	nd	4.0	2.2	2.2	4,200
PHC F1	25	99	nd	nd	NA	nd	NA	750
PHC F2	100	nd	nd	nd	NA	nd	NA	150
PHC F3	100	**669**	nd	nd	NA	nd	NA	500
PHC F4	100	**630**	nd	nd	NA	nd	NA	500

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (i.e <MDL)
- NA – Parameter not analyzed
- Bold and Underline – parameter exceeds the selected standards

BTEX and PHC concentrations were identified in the first groundwater sampling event, in both BH2 and BH3 shortly after the drilling program. PHC, fractions F3 and F4 were in excess of the selected standard.

It is expected that these wells were not fully established, and that sediment may have been present in the well, and as such, a second groundwater sample from BH2 and BH3 was analyzed for the same parameters on September 15 2020. BTEX parameters were detected in both groundwater samples. All of the groundwater samples collected as part of the re-sampling complied to the MECP Table 3 Residential Standards.

In January, 2022, a third groundwater sample was collected from Borehole BH4, and submitted for analysis of PHC and BTEX. All parameters were found to be in compliance with the MECP site standards.

No unusual visual or olfactory observations were noted from the groundwater recovered from the wells.

TABLE 10A: Analytical Test Results – Groundwater (VOCs)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)		MECP Table 3 Standards (µg/L)
		September 4, 2020		
		BH2-GW1	BH3-GW1	
Acetone	5	nd	nd	130,000
Benzene	0.5	0.8	nd	44
Bromodichloromethane	0.5	nd	nd	85,000
Bromoform	0.5	nd	nd	380
Bromomethane	0.5	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	630
Chloroform	0.5	**22.1**	**27.5**	2.4
Dibromochloromethane	0.5	nd	nd	82,000
Dichlorodifluoromethane	1	nd	nd	4,400
1,2-Dichlorobenzene	0.5	nd	nd	4,600
1,3-Dichlorobenzene	0.5	nd	nd	9,600
1,4-Dichlorobenzene	0.5	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	16
1,3-Dichloropropene, total	0.5	nd	nd	5.2
Ethylbenzene	0.5	4.4	4.0	2,300
Ethylene dibromide	0.2	nd	nd	0.25
Hexane	1	**296**	**78.2**	51
Methyl Ethyl Ketone	5	nd	nd	470,000
Methyl Isobutyl Ketone	5	nd	nd	140,000
Methyl tert-butyl ether	2	nd	nd	190
Methylene Chloride	5	nd	nd	610
Styrene	0.5	nd	nd	1,300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	1.6
Toluene	0.5	3.1	3.6	18,000
1,1,1-Trichloroethane	0.5	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	1.6
Trichlorofluoromethane	1	nd	nd	2,500
Vinyl Chloride	0.5	nd	nd	0.5
Xylenes, total	0.5	6.9	6.0	4,200

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (i.e <MDL)
- **Bold and Underlined –** parameter exceed the selected MECP standards.

Chloroform and hexane concentrations in the groundwater samples collected from the first sampling event were in excess of selected standards due to

unestablished groundwater wells. A second sampling event was carried out on September 15, 2021.

TABLE 10B: Analytical Test Results – Groundwater (VOCs)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)		MECP Table 3 Standards (µg/L)
		September 15, 2020		
		BH2-GW2	BH3-GW2	
Acetone	5	nd	162	130,000
Benzene	0.5	nd	nd	44
Bromodichloromethane	0.5	nd	nd	85,000
Bromoform	0.5	nd	nd	380
Bromomethane	0.5	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	630
Chloroform	0.5	**8.4**	**10.7**	2.4
Dibromochloromethane	0.5	nd	nd	82,000
Dichlorodifluoromethane	1	nd	nd	4,400
1,2-Dichlorobenzene	0.5	nd	nd	4,600
1,3-Dichlorobenzene	0.5	nd	nd	9,600
1,4-Dichlorobenzene	0.5	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	16
1,3-Dichloropropene, total	0.5	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	2,300
Ethylene dibromide	0.2	nd	nd	0.25
Hexane	1	nd	23	51
Methyl Ethyl Ketone	5	nd	nd	470,000
Methyl Isobutyl Ketone	5	nd	nd	140,000
Methyl tert-butyl ether	2	nd	nd	190
Methylene Chloride	5	nd	nd	610
Styrene	0.5	nd	nd	1,300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	1.6
Toluene	0.5	nd	2.6	18,000
1,1,1-Trichloroethane	0.5	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	1.6
Trichlorofluoromethane	1	nd	nd	2,500
Vinyl Chloride	0.5	nd	nd	0.5
Xylenes, total	0.5	nd	4.0	4,200

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (i.e <MDL)

With the exception of chloroform and BTEX parameters, no VOC concentrations were detected in the groundwater samples analyzed. No unusual visual or olfactory observations were noted from the groundwater recovered from the wells. Chloroform exceeded the selected MECP standards at BH2 and BH3. Chloroform is a result of the municipal drinking water which was utilized during the rock coring and is not considered an environmental concern. All groundwater samples analyzed comply with the selected MECP Standards.

TABLE 10C: Analytical Test Results – Groundwater (VOCs)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)		MECP Table 3 Standards (µg/L)
		January 17, 2022		
		BH4-GW	DUP	
Acetone	5	nd	nd	130,000
Benzene	0.5	nd	nd	44
Bromodichloromethane	0.5	nd	nd	85,000
Bromoform	0.5	nd	nd	380
Bromomethane	0.5	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	630
Chloroform	0.5	**5.3**	**6.2**	2.4
Dibromochloromethane	0.5	nd	nd	82,000
Dichlorodifluoromethane	1	nd	nd	4,400
1,2-Dichlorobenzene	0.5	nd	nd	4,600
1,3-Dichlorobenzene	0.5	nd	nd	9,600
1,4-Dichlorobenzene	0.5	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	16
1,3-Dichloropropene, total	0.5	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	2,300
Ethylene dibromide	0.2	nd	nd	0.25
Hexane	1	nd	nd	51
Methyl Ethyl Ketone	5	nd	nd	470,000
Methyl Isobutyl Ketone	5	nd	nd	140,000
Methyl tert-butyl ether	2	nd	nd	190
Methylene Chloride	5	nd	nd	610
Styrene	0.5	nd	nd	1,300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	1.6
Toluene	0.5	1.9	1.9	18,000
1,1,1-Trichloroethane	0.5	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	1.6
Trichlorofluoromethane	1	nd	nd	2,500

TABLE 10C: Analytical Test Results – Groundwater (VOCs)				
Parameter	MDL (µg/L)	Groundwater Samples (µg/L)		MECP Table 3 Standards (µg/L)
		January 17, 2022		
		BH4-GW	DUP	
Vinyl Chloride	0.5	nd	nd	0.5
Xylenes, total	0.5	2.2	2.2	4,200

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (i.e <MDL)
- **Bold and Underlined –** parameter exceed the selected MECP standards.

Chloroform concentrations from the most recently drilled well at BH4 (interior of commercial building) was in excess of the selected standards.

The presence of chloroform is considered to be a result of the use of municipally treated water during the rock coring process. Chloroform concentrations detected in sample BH4-GW are not considered to represent exceedances of the site standards.

All groundwater samples analyzed are considered to comply with the selected MECP Standards.

The analytical results for BTEX and PHCs tested in groundwater are shown on Drawing PE5506-5–Analytical Testing Plan – Groundwater.

The maximum concentrations of analyzed parameters within the most recent samples from the groundwater monitoring wells at the site are summarized below in Table 11.

TABLE 11: Maximum Concentrations – Groundwater			
Parameter	Maximum Concentration (µg/g)	Borehole	Screened Interval (m BGS)
Hexane	23	BH3-GW2	7.06-8.56m
Toluene	2.6		
Xylenes	4.0		
*Elevated chloroform concentrations were detected in BH2, BH3 and BH4, however its presence is considered to be due to the use of Municipal water in the rock coring process, and not considered to represent an exceedance of site standards.			

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

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of the September 2020 and January 2022 sampling events were handled in accordance with the Analytical Protocol with respect to preservation method, storage requirement, and container type.

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

Two (2) duplicate soil and groundwater samples (DUP) were obtained from BH3-SS8, BH4-22-SS6 and BH3-GW1 and analyzed for BTEX, PHCs or VOCs.

The results of the parameters analyzed for the soil duplicate samples were not detected above the laboratory limit. Test results for the duplicate groundwater sample and RPD calculations are provided below in Table 12.

TABLE 12: QA/QC Results –Groundwater (BTEX, PHCs, VOCs))

Parameter	BH4-GW	DUP	RDP (%)	QA/QC Results
Chloroform	5.3	6.2	15.6	Within the acceptable range
Toluene	1.9	1.9	0	Within the acceptable range
Xylenes	2.2	2.2	0	Within the acceptable range

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

5.8 Phase II Conceptual Site Model

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

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

Based on the results of the Phase I ESA completed for the Phase I ESA Property, three (3) PCAs and the resultant APECs on the subject site are

summarized in Table1 in Section 3.3, along with their respective locations and contaminants of potential concern (CPCs).

Contaminants of Potential Concern

As per Section 3.3, the contaminants of potential concern (CPCs) in soil and/or groundwater include benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), volatile organic compounds (VOCs) and metals (including arsenic (As), antimony (Sb) and selenium (Se)), mercury (Hg) and hexavalent chromium (CrVI).

Although EC/SAR is considered to be a contaminant of potential concern, analysis was not carried out, as the EC/SAR concentrations would be deemed to meet site standards, under section 49.1 of the regulation. Salt or brine may have been applied under conditions or snow or ice or both, for the purposes of vehicle or pedestrian safety.

Subsurface Structures and Utilities

The Phase II ESA Property is situated in a municipally serviced area. Underground utilities and/or structures enter the Phase II ESA Property from Larch Street.

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

Physical Setting

Site Stratigraphy

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is illustrated on Drawings PE5506-4A, 4B, 5A and 5B. The stratigraphy consists of:

- An asphaltic concrete structure of approximately 0.13 thick, overlies the fill material consisting of silty sand with crushed stone and some concrete. The fill material was identified in BH3 and BH4. The fill material extended to a depth of approximately 0.6 mbgs. Groundwater was not encountered in this layer.
- Topsoil extending 0.25 to 0.3 mbgs was identified in BH1 and BH2.

- Silty clay was encountered in all of the boreholes, extending to depths of approximately 1.83 to 3.05 mbgs. Groundwater was not encountered in this layer.
- Silty sand to silty sand-gravel was encountered in all of the boreholes, extending to depths of approximately 6.17 to 7.47 mbgs. Groundwater was not encountered in this layer.
- Limestone bedrock was encountered in all of the boreholes and terminated in this layer at depths ranging from approximately 7.24 to 10.44 mbgs. Groundwater was encountered in this layer.

Hydrogeological Characteristics

Groundwater at the Phase II ESA Property was encountered in the bedrock. During the most recent groundwater monitoring event, groundwater flow was measured in a northerly direction, with a hydraulic gradient of 0.06 m/m. Groundwater contours are shown on Drawing PE5506-3 – Test Hole Location Plan.

Approximate Depth to Bedrock

Bedrock was encountered during the drilling program at depths ranging from approximately 6.17 to 7.44 mbgs.

Approximate Depth to Water Table

The depth to the water table at the subject site varies between approximately 5.07 to 6.08 m below existing grade.

Sections 41 and 43.1 of the Regulation

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

Section 43.1 of the Regulation does not apply to the Phase II ESA Property as bedrock is located more than 2 m below ground surface.

Existing Buildings and Structures

The western portion of the Phase I ESA Property is occupied by a two (2) storey multi-tenant apartment building with a finished basement. The residence was constructed with a concrete block foundation and finished exterior in red brick with a sloped shingled style roof.

The commercial building, presently vacant, is situated on the eastern portion of the site with a slab-on-grade foundation and concrete block walls with a sloped shingled style roof. The northern extension was constructed in 1972 with a flat tar-and-gravel style roof.

Areas of Natural Significance

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

Water Bodies

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

Environmental Condition

Areas Where Contaminants are Present

Based on the analytical results for soil, the fill material in beneath the garage (15 Larch Street) is impacted with metals.

Based on the analytical results for groundwater, there are no contaminants present beneath the Phase II ESA Property.

It should be noted that chloroform concentrations were in excess of the selected standards, however, these exceedances are a result of the municipal water used for coring bedrock and as such, chloroform is not considered a contaminant. The chloroform is a result of municipally treated water, and concentrations during both events were in compliance with the chloroform standards presented in Table A: Soil and Ground Water Values for Chloroform found in “Guidance for Addressing Chloroform at a Record of Site Condition Property”, therefore, the chloroform is not considered to exceed the RSC property standards.

Types of Contaminants

Based on the analytical results for soil, the types of contaminants present in the fill material include barium, lead, molybdenum and zinc. No other contaminants were identified on or beneath the Phase II ESA Property.

Contaminated Media

Based on the analytical results, the fill material on the Phase II ESA Property is impacted with metals.

What Is Known About Areas Where Contaminants Are Present

Based on the findings of the Phase II ESA, the metal impact is isolated in the fill material only. There are no contaminants in the groundwater at the Phase II ESA Property.

Distribution and Migration of Contaminants

The distribution of metals-impacted fill material appears to be limited to the area of the fabrication shop (APEC1).

Groundwater was not impacted.

Discharge of Contaminants

Based on the findings of the Phase II ESA, discharge of metals on-site may be a result of imported fill material during development of the site.

The groundwater beneath the Phase II ESA complies with the MECP Table 3 Standards.

Climatic and Meteorological Conditions

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

Based on the analytical results contaminant distribution is not considered to have occurred on the Phase II ESA Property.

Potential for Vapour Intrusion

Based on the findings of the Phase II ESA, metal impacted fill material is not volatile and therefore, there is no potential for vapour intrusion on the Phase II ESA Property.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the properties addressed 15, 17 and 19 Larch Street, in the Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) that were identified during the Phase I ESA and considered to result in areas of potential environmental concern (APECs) on the Phase II ESA Property.

The subsurface investigations were conducted in between August and September of 2020 and later, in January of 2022, which consisted of drilling four (4) boreholes, all which were instrumented with groundwater monitoring wells. The general soil profile encountered during the field program consisted of granular material, underlain by silty clay, followed by silty sand or sandy silt, overlying limestone bedrock. The boreholes were terminated in bedrock at depths of approximately 7.24 to 10.44 m below the ground surface (mbgs). No signs of contamination or olfactory evidence was noted at the time of the field program. Soil samples were obtained from the boreholes and screened based on visual observation and sample intervals (depths).

Six (6) soil samples, including two (2) duplicate samples, were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F_1-F_4) and metals (including hydride forming compounds: arsenic (As), Antimony (Sb), Selenium (Se)), mercury and hexavalent chromium (CrVI). No BTEX concentrations were identified in any of the soil samples analyzed. With the exception of some metal parameters (barium, lead, molybdenum and zinc), all other parameters analyzed in the soil samples complied with MECP Table 3 Residential Standards. Exceedances for metals parameters were identified in fill material below APEC1.

Groundwater samples from monitoring wells BH2, BH3 and BH4 were collected during the September 2020 and January 2022 sampling events. No free product or petroleum hydrocarbon sheen was noted on the purge water during the groundwater sampling events. Groundwater samples were analyzed for BTEX, PHCs and VOCs. Groundwater samples were analyzed for BTEX, PHCs and/or VOCs. With the exception of chloroform, all analyzed parameter concentrations from the most recent sampling events complied with the MECP Table 3 Standards. The presence of chloroform in the groundwater samples is considered to be a result of the use of municipally treated water in the rock coring process, and is not considered to exceed site standards.

Recommendations

It is our understanding that the Phase II ESA Property will be redeveloped for residential purposes. Due to the change in land use to a more sensitive land use (mixed-use to residential), a record of site condition (RSC) will be required as per O.Reg 154/03.

Soil

Based on the findings of the Phase II ESA, it is recommended that the fill material impacted with metals be remediated and be carried out in conjunction with the construction excavation. A representative sample of impacted soil must be submitted for a leachate analysis in accordance with O.Reg. 347/558 prior to disposal at an approved landfill site.

Excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19 – On-site and Excess Soil Management.

Monitoring Wells

If the monitoring wells installed on the Phase II ESA Property are not going to be used in the future, or will be destroyed during site redevelopment, they should be abandoned according to Ontario Regulation 903. The wells will be registered with the MECP under this regulation.

7.0 STATEMENT OF LIMITATIONS

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

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

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

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

Paterson Group Inc.

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

Adrian Menyhart, P.Eng., QP_{ESA}

Report Distribution:

- Avenyn Capital Partners LP
- Paterson Group

FIGURES

Figure 1 - Key Plan

Drawing PE5506-3 – Test Hole Location Plan & Groundwater Contour Plan

Drawing PE5506-4 – Analytical Testing Plan – Soil

Drawing PE5506-4A – Cross-section A – A' – Soil

Drawing PE5506-4B – Cross-section B – B' – Soil

Drawing PE5506-5 – Analytical Testing Plan – Groundwater

Drawing PE5506-5A – Cross-section A – A' – Groundwater

Drawing PE5506-5B – Cross-section B – B' – Groundwater

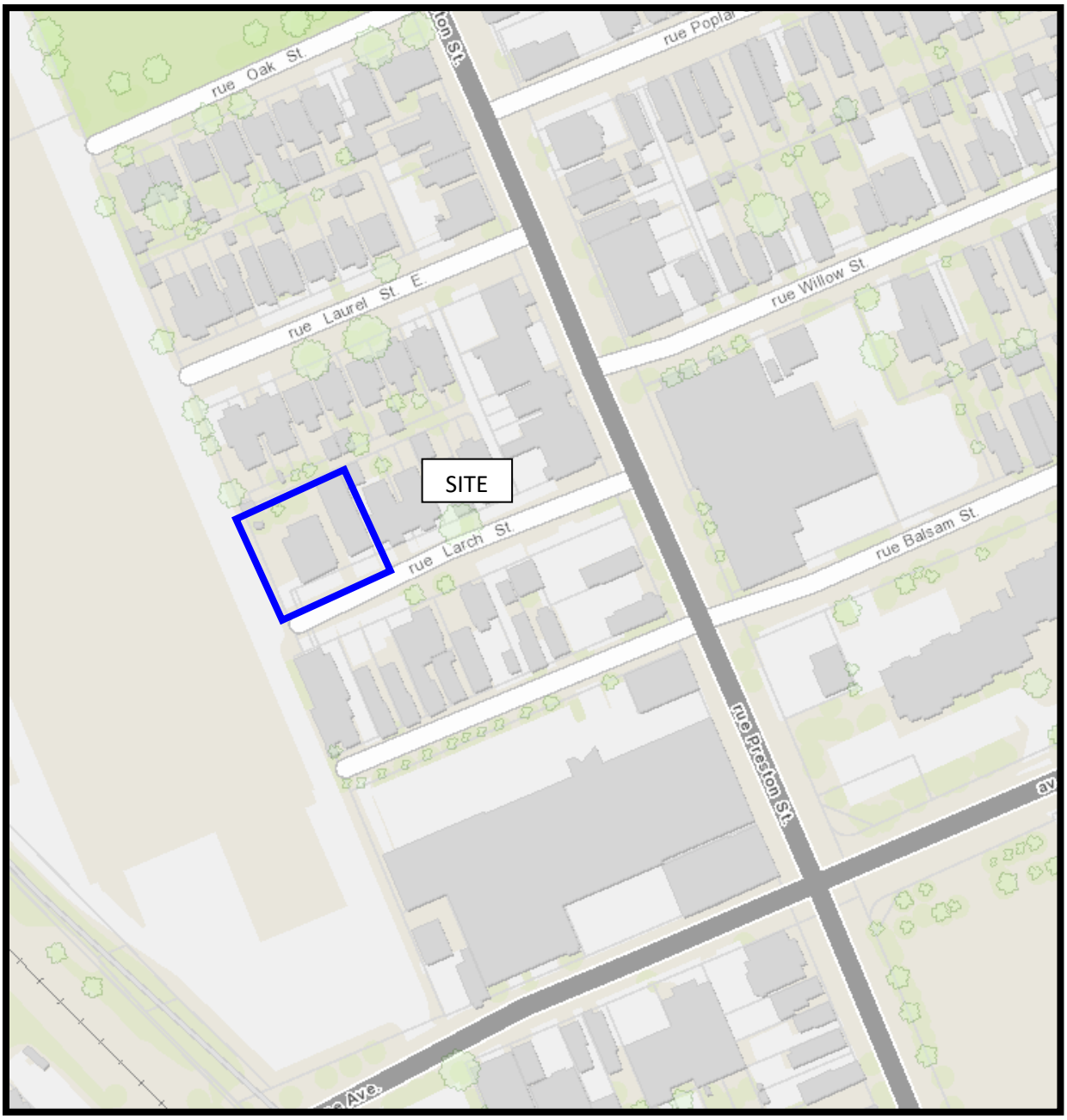
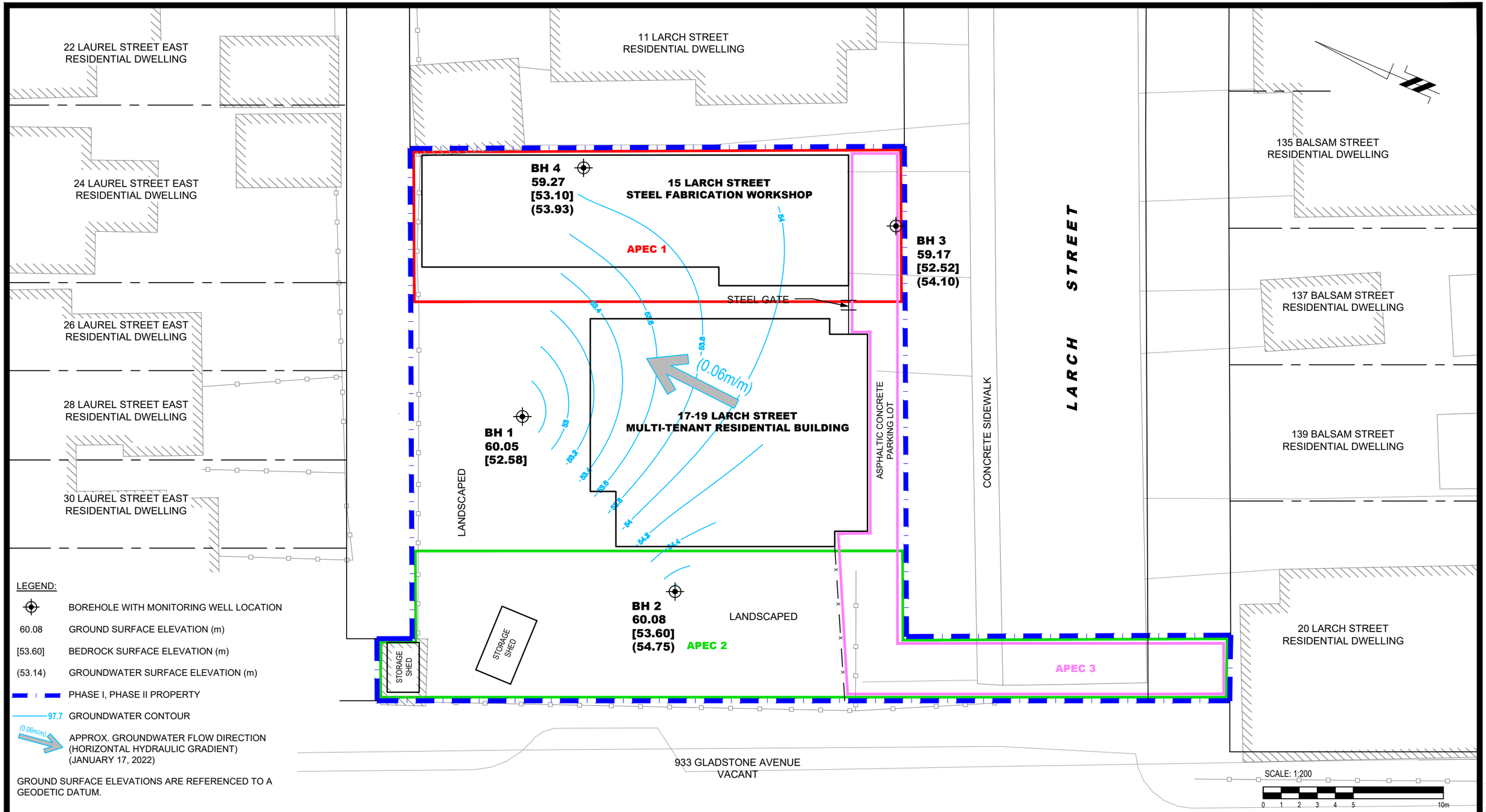


FIGURE 1

KEY PLAN



LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- 60.08 GROUND SURFACE ELEVATION (m)
- [53.60] BEDROCK SURFACE ELEVATION (m)
- (53.14) GROUNDWATER SURFACE ELEVATION (m)
- PHASE I, PHASE II PROPERTY
- 97.7 GROUNDWATER CONTOUR
- (0.06m/m) APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT) (JANUARY 17, 2022)

GROUND SURFACE ELEVATIONS ARE REFERENCED TO A GEODETIC DATUM.

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NO.	REVISIONS	DATE	INITIAL

AVENYN CAPITAL PARTNERS LP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
15, 17 AND 19 LARCH STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:200	Date: 01/2022
Drawn by: MPG	Report No.: PE5506-2
Checked by: MW	Dwg. No.: PE5506-3
Approved by: AM	Revision No.:

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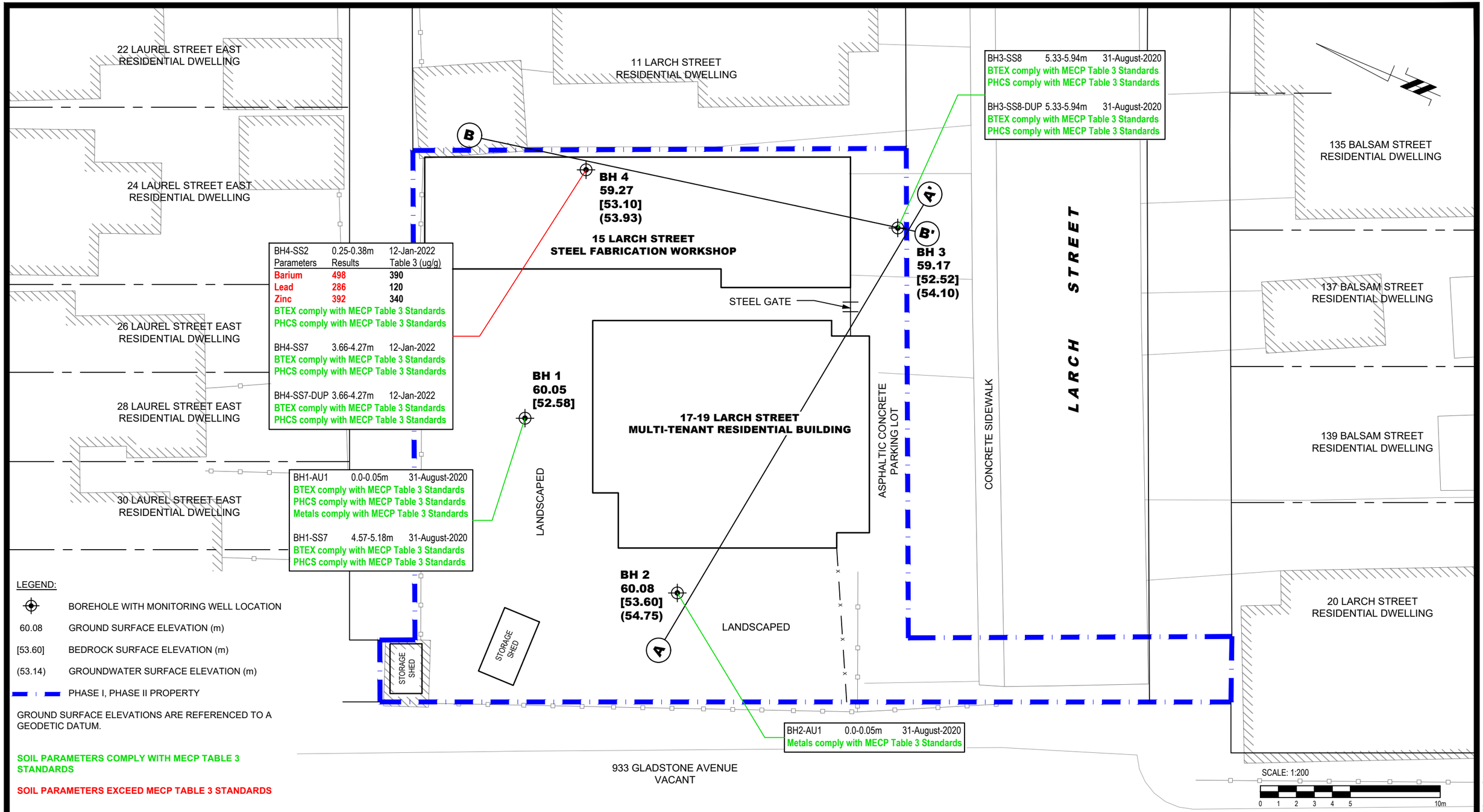

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NO.	REVISIONS	DATE	INITIAL

AVENYN CAPITAL PARTNERS LP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
15, 17 AND 19 LARCH STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:200	Date: 01/2022
Drawn by: MPG	Report No.: PE5506-2
Checked by: MW	Dwg. No.: PE5506-4
Approved by: AM	Revision No.:

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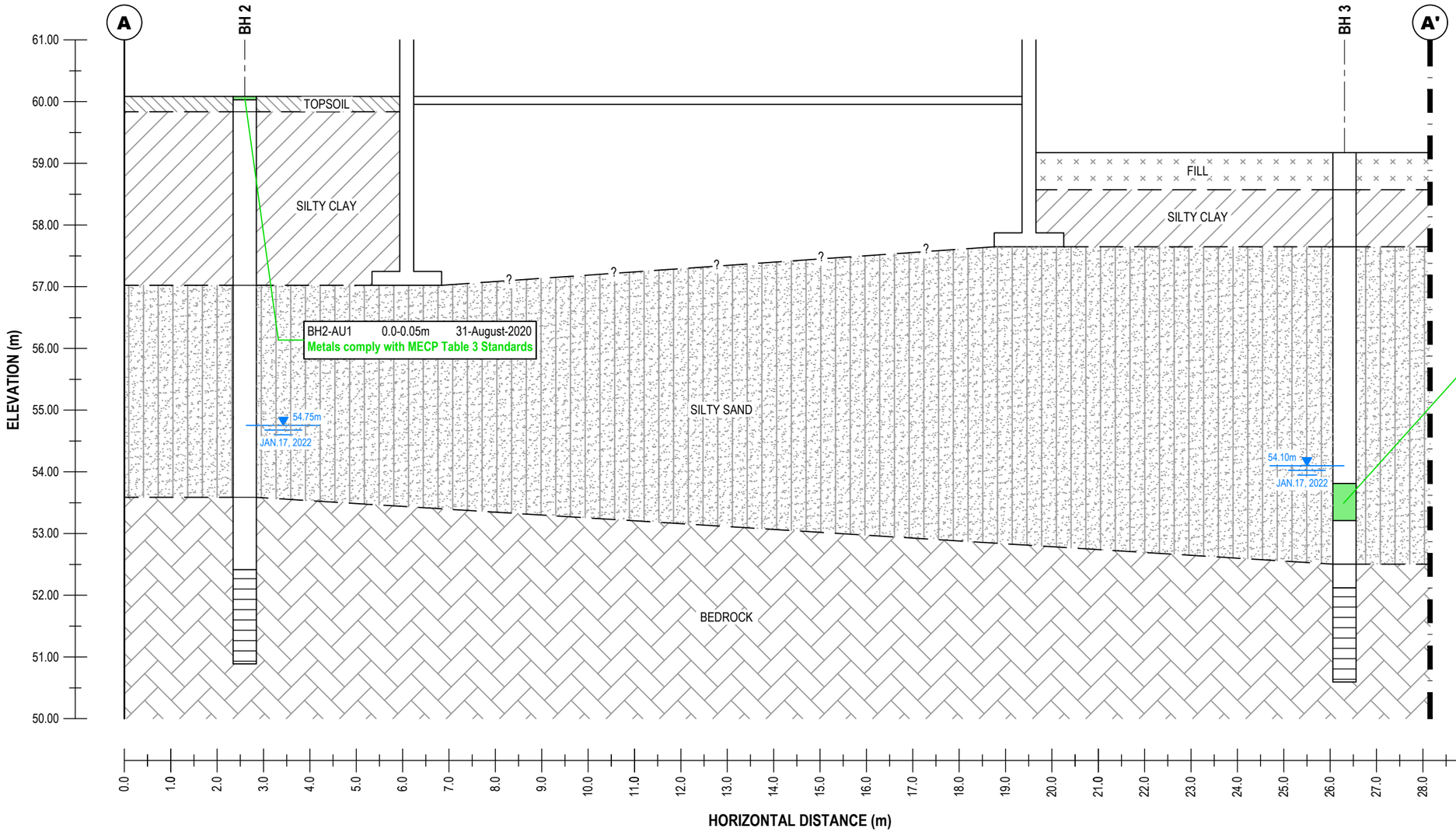

SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

PHASE I, PHASE II PROPERTY

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NO.	REVISIONS	DATE	INITIAL
0			

AVENYN CAPITAL PARTNERS LP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
15, 17 AND 19 LARCH STREET

OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - SOIL

Scale: AS SHOWN	Date: 01/2022
Drawn by: MPG	Report No.: PE5506-2
Checked by: MW	Dwg. No.: PE5506-4A
Approved by: MSD	Revision No.:

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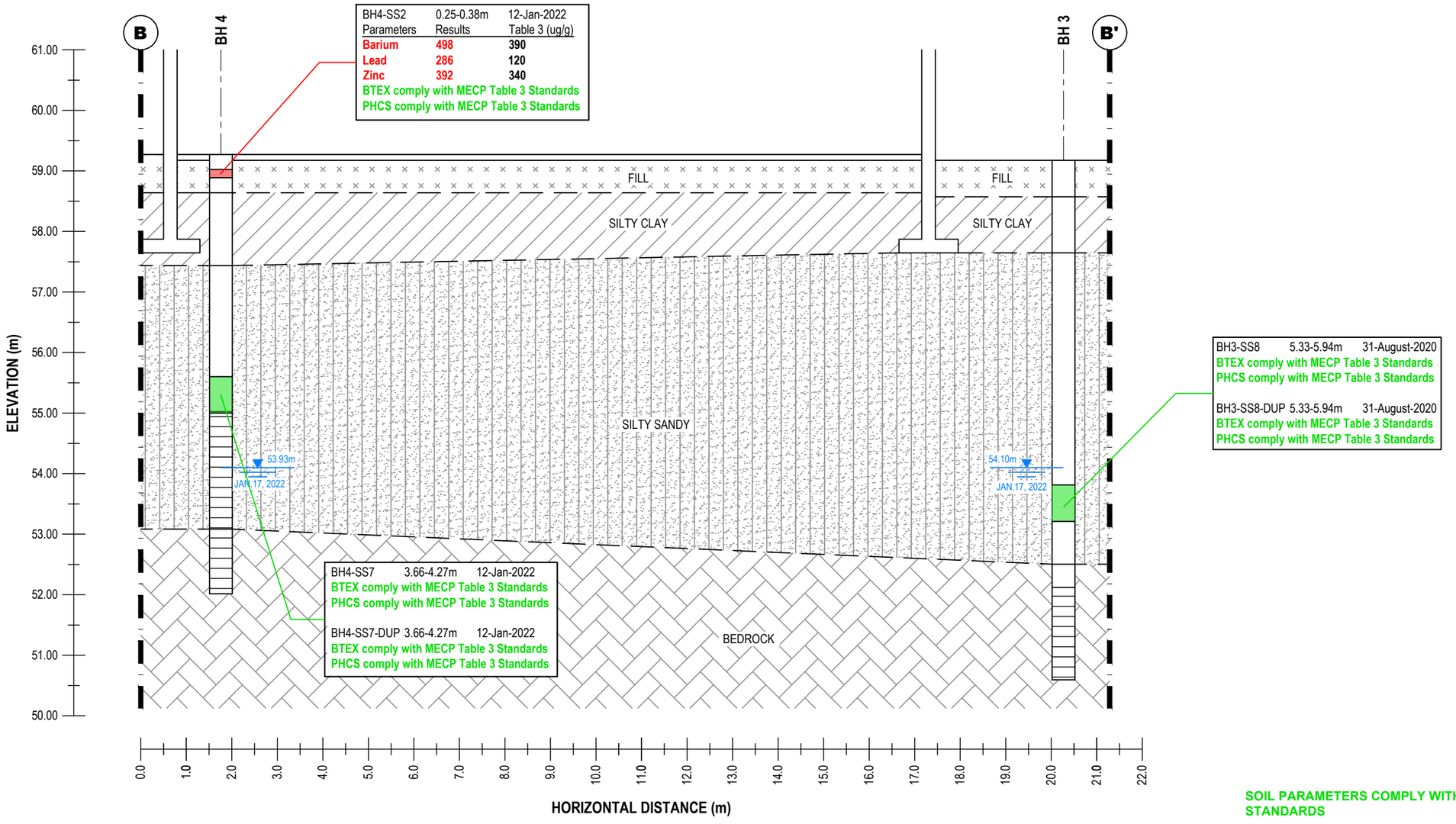

SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

PHASE I, PHASE II PROPERTY

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NO.	REVISIONS	DATE	INITIAL
0			

AVENYN CAPITAL PARTNERS LP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
15, 17 AND 19 LARCH STREET

OTTAWA, ONTARIO

Title:

CROSS-SECTION B-B' - SOIL

Scale: AS SHOWN	Date: 01/2022
Drawn by: MPG	Report No.: PE5506-2
Checked by: MW	Dwg. No.: PE5506-4B
Approved by: MSD	Revision No.:

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22 LAUREL STREET EAST
RESIDENTIAL DWELLING

24 LAUREL STREET EAST
RESIDENTIAL DWELLING

26 LAUREL STREET EAST
RESIDENTIAL DWELLING

28 LAUREL STREET EAST
RESIDENTIAL DWELLING

30 LAUREL STREET EAST
RESIDENTIAL DWELLING

11 LARCH STREET
RESIDENTIAL DWELLING

135 BALSAM STREET
RESIDENTIAL DWELLING

137 BALSAM STREET
RESIDENTIAL DWELLING

139 BALSAM STREET
RESIDENTIAL DWELLING

20 LARCH STREET
RESIDENTIAL DWELLING

933 GLADSTONE AVENUE
VACANT

LARCH STREET

B

A

B'

A'

BH 4
59.27
[53.10]
(53.93)

15 LARCH STREET
STEEL FABRICATION WORKSHOP

BH 3
59.17
[52.52]
(54.10)

STEEL GATE

17-19 LARCH STREET
MULTI-TENANT RESIDENTIAL BUILDING

BH 1
60.05
[52.58]

BH 2
60.08
[53.60]
(54.75)

LANDSCAPED

ASPHALTIC CONCRETE
PARKING LOT

CONCRETE SIDEWALK

LANDSCAPED

STORAGE SHED

STORAGE SHED

BH4-GW	4.24-7.24m	17-Jan-2022
Parameters	Results	Table 3 (ug/L)
Chloroform	**5.3**	**2.4**
BTEX comply with MECP Table 3 Standards		
PHCs comply with MECP Table 3 Standards		

DUP	4.27-7.24m	17-Jan-2022
Parameters	Results	Table 3 (ug/L)
Chloroform	**6.2**	**2.4**
BTEX comply with MECP Table 3 Standards		

BH3-GW1	7.06-8.56m	4-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**22.1**	**2.4**
Hexane	296	51
BTEX comply with MECP Table 3 Standards		
PHCs comply with MECP Table 3 Standards		

BH3-GW2	7.06-8.56m	15-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**10.7**	**2.4**
BTEX comply with MECP Table 3 Standards		

BH2-GW1	7.65-9.17m	4-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**22.1**	**2.4**
Hexane	296	51
PHC-F3	**669**	**500**
PHC-F4	**630**	**500**
BTEX comply with MECP Table 3 Standards		

BH2-GW2	7.65-9.17m	15-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**8.4**	**2.4**
BTEX comply with MECP Table 3 Standards		
PHCs comply with MECP Table 3 Standards		

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- 60.08 GROUND SURFACE ELEVATION (m)
- [53.60] BEDROCK SURFACE ELEVATION (m)
- (53.14) GROUNDWATER SURFACE ELEVATION (m)
- PHASE I, PHASE II PROPERTY

GROUND SURFACE ELEVATIONS ARE REFERENCED TO A GEODETIC DATUM.

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

GROUNDWATER PARAMETERS EXCEED MECP TABLE 3 STANDARDS

NOTE: CHLOROFORM NOT CONSIDERED TO REPRESENT AN EXCEEDANCE OF SITE STANDARDS, DUE TO THE INTRODUCTION OF MUNICIPALLY TREATED GROUNDWATER DURING THE BEDROCK CORING PROGRAM

SCALE: 1:200

0 1 2 3 4 5 10m

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NO.	REVISIONS	DATE	INITIAL

AVENYN CAPITAL PARTNERS LP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
15, 17 AND 19 LARCH STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - GROUNDWATER

Scale: 1:200	Date: 01/2022
Drawn by: MPG	Report No.: PE5506-2
Checked by: MW	Dwg. No.: PE5506-5
Approved by: MSD	Revision No.:

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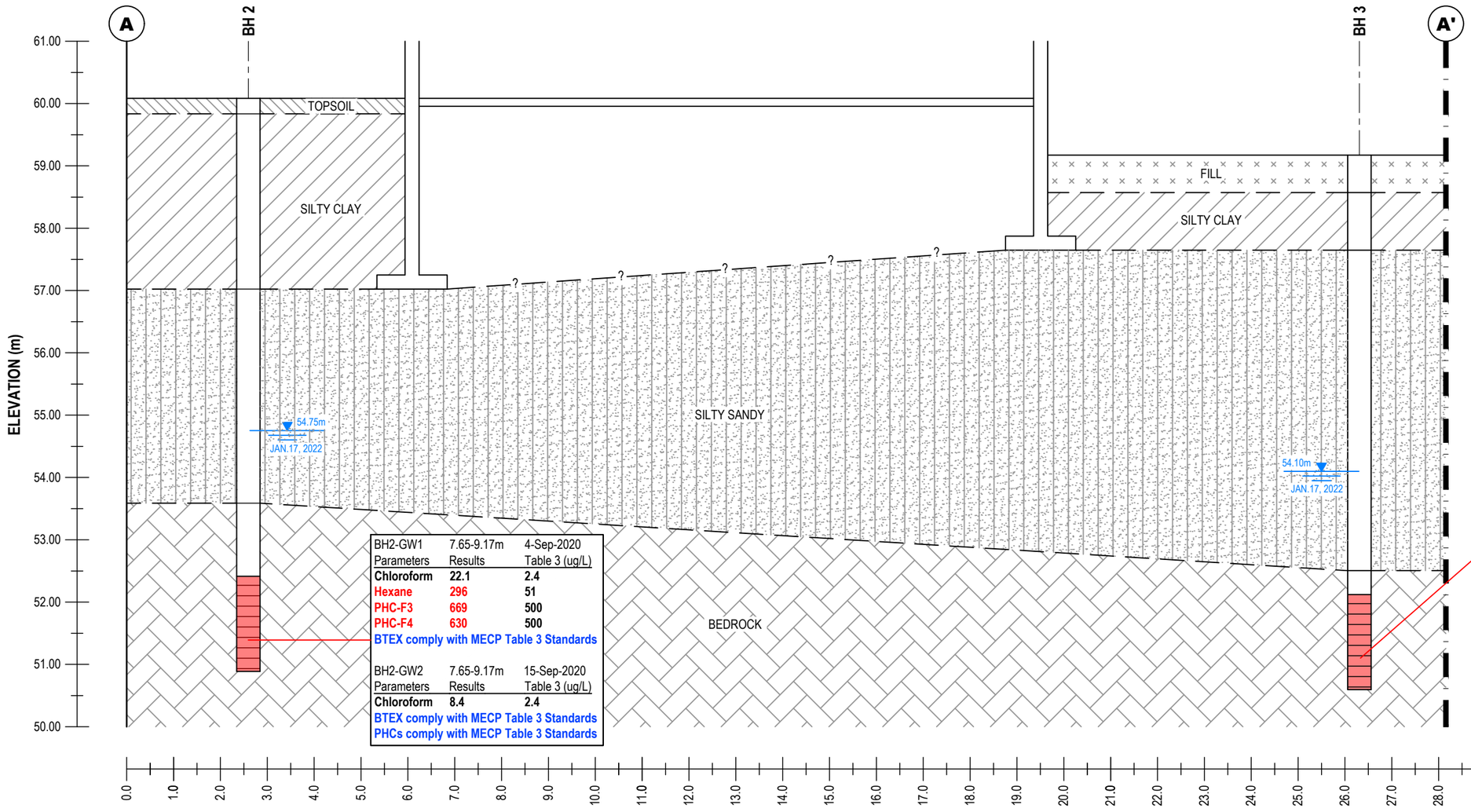

BH2-GW1	7.65-9.17m	4-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**22.1**	**2.4**
Hexane	**296**	**51**
PHC-F3	**669**	**500**
PHC-F4	**630**	**500**
BTEX comply with MECP Table 3 Standards		

BH2-GW2	7.65-9.17m	15-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**8.4**	**2.4**
BTEX comply with MECP Table 3 Standards		
PHCs comply with MECP Table 3 Standards		

BH3-GW1	7.06-8.56m	4-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**22.1**	**2.4**
Hexane	**296**	**51**
BTEX comply with MECP Table 3 Standards		
PHCs comply with MECP Table 3 Standards		

BH3-GW2	7.06-8.56m	15-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**10.7**	**2.4**
BTEX comply with MECP Table 3 Standards		

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

GROUNDWATER PARAMETERS EXCEED MECP TABLE 3 STANDARDS

NOTE:CHLOROFORM NOT CONSIDERED TO REPRESENT AN EXCEEDANCE OF SITE STANDARDS, DUE TO THE INTRODUCTION OF MUNICIPALLY TREATED GROUNDWATER DURING THE BEDROCK CORING PROGRAM

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AVENYN CAPITAL PARTNERS LP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
15, 17 AND 19 LARCH STREET

OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - GROUNDWATER

Scale: AS SHOWN	**Date:** 01/2022
Drawn by: MPG	**Report No.:** PE5506-2
Checked by: MW	**Dwg. No.:** PE5506-5A
Approved by: MSD	**Revision No.:**

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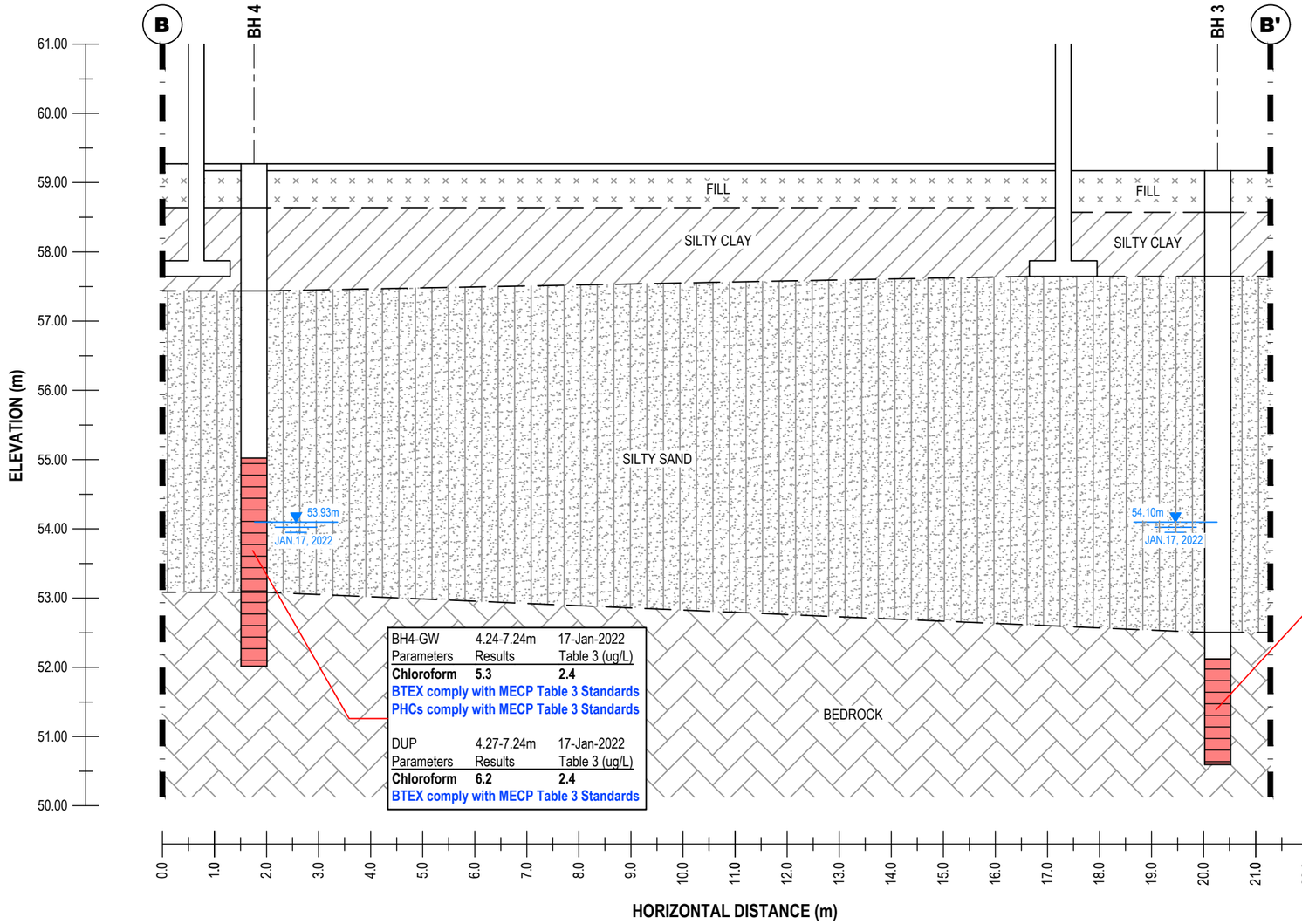

BH4-GW	4.24-7.24m	17-Jan-2022
Parameters	Results	Table 3 (ug/L)
Chloroform	**5.3**	**2.4**
BTEX comply with MECP Table 3 Standards		
PHCs comply with MECP Table 3 Standards		
DUP	4.27-7.24m	17-Jan-2022
Parameters	Results	Table 3 (ug/L)
Chloroform	**6.2**	**2.4**
BTEX comply with MECP Table 3 Standards		

BH3-GW1	7.06-8.56m	4-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**22.1**	**2.4**
Hexane	**296**	**51**
BTEX comply with MECP Table 3 Standards		
PHCs comply with MECP Table 3 Standards		
BH3-GW2	7.06-8.56m	15-Sep-2020
Parameters	Results	Table 3 (ug/L)
Chloroform	**10.7**	**2.4**
BTEX comply with MECP Table 3 Standards		

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

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NOTE:CHLOROFORM NOT CONSIDERED TO REPRESENT AN EXCEEDANCE OF SITE STANDARDS, DUE TO THE INTRODUCTION OF MUNICIPALLY TREATED GROUNDWATER DURING THE BEDROCK CORING PROGRAM

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AVENYN CAPITAL PARTNERS LP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
15, 17 AND 19 LARCH STREET

OTTAWA, ONTARIO

Title:

CROSS-SECTION B-B' - GROUNDWATER

Scale: AS SHOWN	**Date:** 01/2022
Drawn by: MPG	**Report No.:** PE5506-2
Checked by: MW	**Dwg. No.:** PE5506-5B
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 CERTIFICATES OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

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patersongroup

Sampling & Analysis Plan

Phase II Environmental Site Assessment
15, 17 and 19 Larch Street
Ottawa, Ontario

Prepared For

Avenyn Capital Partners

August 2020
Revised January 2021

Report: PE5506-SAP

Table of Contents

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Avenyn Capital Partners to conduct a Phase II Environmental Site Assessment (ESA) for the properties addressed 15, 17 and 19 Larch Street, in the City of Ottawa, Ontario. A subsurface investigation program consisting of borehole drilling, was developed for the property based on the findings of the 2020 Phase I ESA. It should be noted that the Phase II ESA was carried out in conjunction with a Geotechnical Investigation.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1	Place borehole on the central north side of the site for coverage.	Drill borehole to approximately 10.5 mbgs to intercept the groundwater table.
BH2	Place borehole on the west side of the site to assess the potential impact due to a former ordnance depot immediately west of the site.	Drill borehole to approximately 9. mbgs to intercept the groundwater table.
BH3	Place borehole along the southeast side of the site to assess the potential impact due to an on-site steel welding shop.	Drill borehole to approximately 8.5 mbgs to intercept the groundwater table.
BH4	Place borehole in the interior of the garage to the site to assess the potential impact due to an on-site steel welding shop.	Drill borehole to approximately 7 mbgs to intercept the groundwater table.

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

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

2.0 ANALYTICAL TESTING PROGRAM

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

- ❒ At least one sample from each borehole should be submitted, in order to delineate the horizontal extent of contamination across the site.
- ❒ At least one sample from each stratigraphic unit should be submitted, in order to delineate the vertical extent of contamination at the site.
- ❒ In boreholes where there is visual or olfactory evidence of contamination, or where organic vapour meter or photoionization detector readings indicate the presence of contamination, the 'worst-case' sample from each borehole should be submitted for comparison with MECP 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 drilling 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
- ❒ trowel
- ❒ cleaning brush (toilet brush works well)
- ❒ dish detergent
- ❒ methyl hydrate
- ❒ water (if not available on site - water jugs available in trailer)
- ❒ latex or nitrile gloves (depending on suspected contaminant)
- ❒ RKI Eagle organic vapour meter or MiniRae photoionization detector (depending on contamination suspected)

Determining Borehole Locations

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

After drilling is completed a plan with the borehole locations must be provided. Distances and orientations of boreholes with respect to site features (buildings, roadways, etc.) must be provided. Distances should be measured using a measuring tape or wheel rather than paced off. Ground surface elevations at each borehole should be surveyed relative to geodetic benchmark.

Drilling Procedure

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

- ❒ Continuous split spoon samples (every 0.6 m or 2') or semi-continuous (every 0.76 m or 2'6") are required.
- ❒ Make sure samples are well sealed in plastic bags with no holes prior to screening and are kept cool but unfrozen.
- ❒ If sampling for VOCs, BTEX, or PHCs F_1, a soil core from each soil sample which may be analyzed must be taken and placed in the laboratory-provided methanol vial.
- ❒ Note all and any odours or discolouration of samples.
- ❒ Split spoon samplers or hand held sampling equipment (shovel or trowel) must be washed between samples.
- ❒ If obvious contamination is encountered, continue sampling until vertical extent of contamination is delineated.
- ❒ As a general rule, environmental boreholes should be deep enough to intercept the groundwater table (unless this is impossible/impractical - call project manager to discuss).
- ❒ If at all possible, soil samples should be submitted to a preliminary screening procedure on site, either using a RKI Eagle, PID, etc. depending on type of suspected contamination.

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

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

3.2 Monitoring Well Installation Procedure

Equipment

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

Procedure

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

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

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

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

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

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

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
15, 17 and 19 Larch Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5506

REMARKS

HOLE NO. BH 1

BORINGS BY CME-55 Low Clearance Drill **DATE** August 31, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	60.05
TOPSOIL 0.30		AU	1				
		SS	2	75	11	1	59.05
Very stiff, brown **SILTY CLAY**		SS	3	100	11	2	58.05
3.05		SS	4	100	7	3	57.05
		SS	5	92	10		
Compact, grey **SILTY SAND-GRAVEL,** some clay		SS	6	29	21	4	56.05
5.33		SS	7	50	16	5	55.05
		SS	8	58	39		
Dense to compact, grey **SILTY SAND-GRAVEL**		SS	9	71	25	6	54.05
7.47		SS	10	83	10	7	53.05
		RC	1	95	73	8	52.05
BEDROCK: Fair to excellent quality, grey limestone						9	51.05
		RC	2	100	100	10	50.05
10.44							
End of Borehole							
(Monitoring well blocked - Sept. 4, 2020)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
15, 17 and 19 Larch Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5506

REMARKS

HOLE NO. BH 2

BORINGS BY CME-55 Low Clearance Drill **DATE** August 31, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	60.08
TOPSOIL 0.25		AU	1				
Very stiff, brown **SILTY CLAY**		SS	2	100	6	1	59.08
		SS	3	100	5	2	58.08
		SS	4	100	6		
3.05						3	57.08
Compact, brown **SANDY SILT**		SS	5	62	23		
3.80							
Dense, grey **SILTY SAND-GRAVEL**		SS	6	54	49	4	56.08
4.50							
		SS	7	50	49	5	55.08
Dense, grey **SILTY SAND**		SS	8	71	31		
6.48		SS	9	80	50+	6	54.08
		RC	1	100	100	7	53.08
BEDROCK: Excellent quality, grey limestone						8	52.08
		RC	2	100	76		
9.17						9	51.08
End of Borehole							
(GWL @ 6.08m - Jan. 17, 2022)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
15, 17 and 19 Larch Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5506

REMARKS

HOLE NO. BH 3

BORINGS BY CME-55 Low Clearance Drill **DATE** September 1, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	59.17
FILL: Brown silty sand with concrete and crushed stone		AU	1				
0.60							
Very stiff, brown **SILTY CLAY**		SS	2	100	13	1	58.17
1.52							
Compact, brown **SANDY SILT**		SS	3	100	17	2	57.17
2.29							
		SS	4	58	41	3	56.17
		SS	5	88	30		
		SS	6	83	22	4	55.17
Dense, brown **SILTY SAND,** trace clay and gravel		SS	6	82	50+	5	54.17
		SS	8	71	13		
		SS	9	63	50+	6	53.17
6.65							
		RC	1	100	93	7	52.17
BEDROCK: Excellent quality, grey limestone							
		RC	3	100	94	8	51.17
8.56							
End of Borehole							
(GWL @ 5.07m - Jan. 17, 2022)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
15, 17 and 19 Larch Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5506

REMARKS

HOLE NO. BH 4

BORINGS BY Portable Drill **DATE** January 12, 2022

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							0	59.27
Concrete slab	0.13		AU	1				
FILL: Crushed stone	0.25		SS	2	93			
FILL: Brown silty clay, trace grave	0.63		SS	3	95		1	58.27
Stiff, brown **SILTY CLAY to CLAYEY SILT,** trace gravel	1.83		SS	4	96			
Compact, brown **SILTY SAND-GRAVEL**	2.44		SS	5	100		2	57.27
			SS	6	45			
Compact, brown **SANDY SILT**	6.17		SS	7	50		3	56.27
							4	55.27
							5	54.27
							6	53.27
BEDROCK: Grey limestone	7.24		RC	1			7	52.27
End of Borehole								
(GWL @ 5.34m - Jan. 17, 2022)								

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

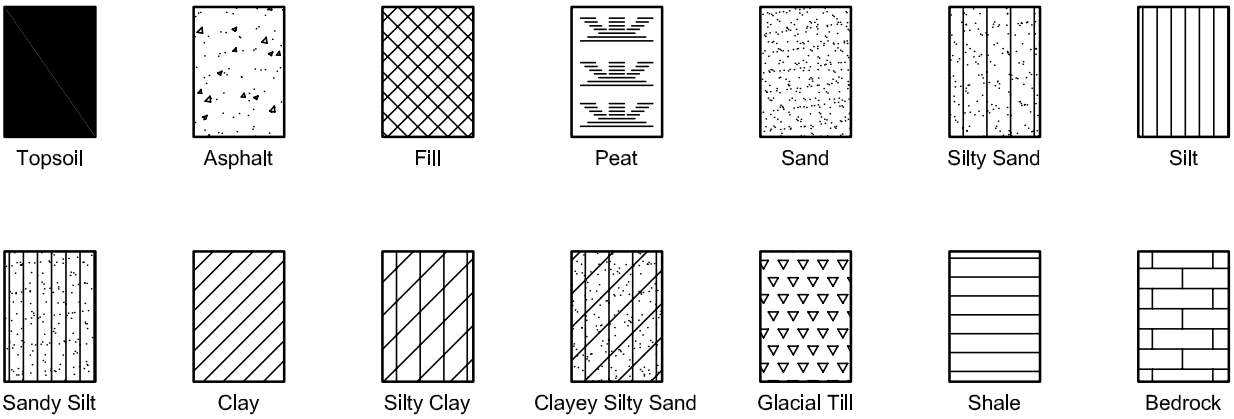
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

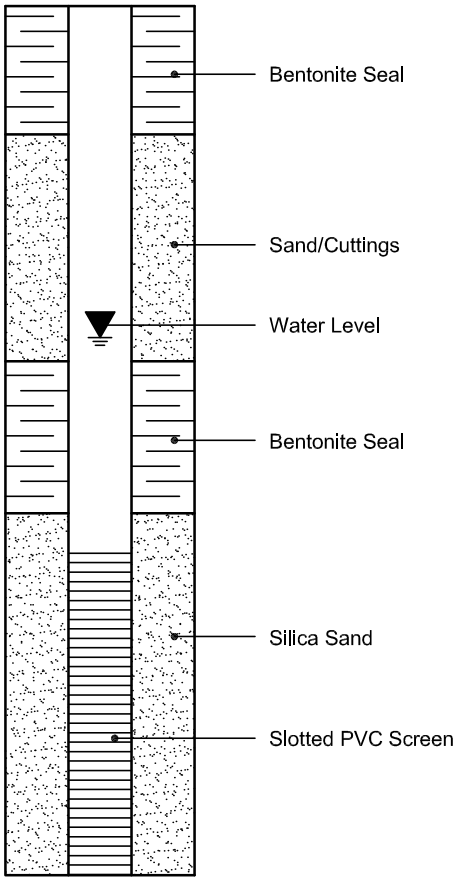
SYMBOLS AND TERMS (continued)

STRATA PLOT

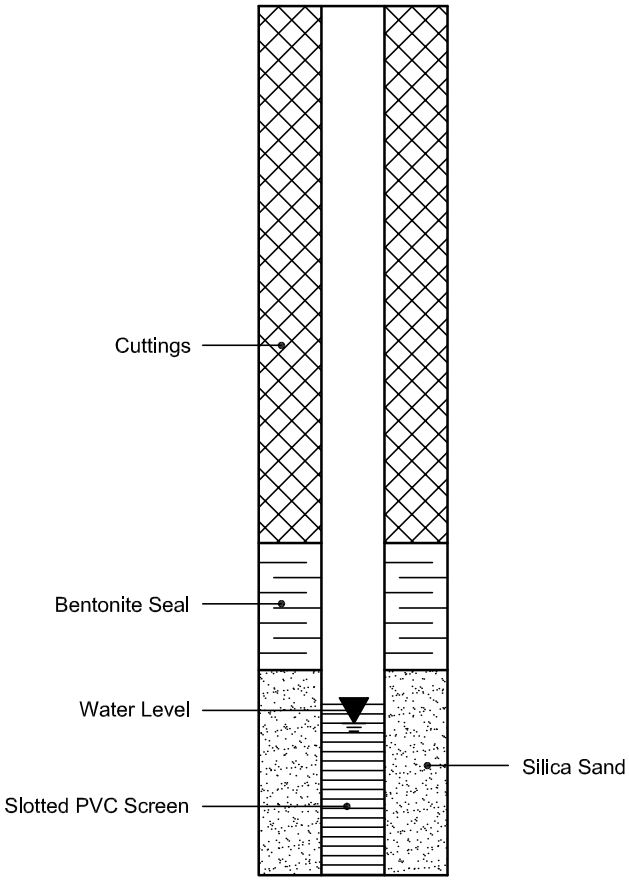


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 30723
Project: PE4945
Custody: 128137

Report Date: 8-Sep-2020
Order Date: 3-Sep-2020

Order #: 2036477

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

Paracel ID	Client ID
2036477-01	BH1-AU1
2036477-02	BH1-SS7
2036477-03	BH2-AU1
2036477-04	BH3-SS8
2036477-05	Dup

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 08-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 3-Sep-2020

Client PO: 30723

Project Description: PE4945

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	4-Sep-20	5-Sep-20
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	5-Sep-20	5-Sep-20
Mercury by CVAA	EPA 7471B - CVAA, digestion	4-Sep-20	8-Sep-20
PHC F1	CWS Tier 1 - P&T GC-FID	4-Sep-20	5-Sep-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	4-Sep-20	8-Sep-20
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	8-Sep-20	8-Sep-20
Solids, %	Gravimetric, calculation	8-Sep-20	8-Sep-20

Certificate of Analysis

Report Date: 08-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 3-Sep-2020

Client PO: 30723

Project Description: PE4945

	Client ID:	BH1-AU1	BH1-SS7	BH2-AU1	BH3-SS8
	Sample Date:	31-Aug-20 09:00	31-Aug-20 10:00	31-Aug-20 12:00	01-Sep-20 09:00
	Sample ID:	2036477-01	2036477-02	2036477-03	2036477-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	81.6	95.8	78.7	82.0
Metals					
Antimony	1.0 ug/g dry	<1.0	-	<1.0	-
Arsenic	1.0 ug/g dry	4.3	-	3.9	-
Barium	1.0 ug/g dry	274	-	234	-
Beryllium	0.5 ug/g dry	0.6	-	0.6	-
Boron	5.0 ug/g dry	5.4	-	<5.0	-
Cadmium	0.5 ug/g dry	<0.5	-	<0.5	-
Chromium	5.0 ug/g dry	54.7	-	44.6	-
Chromium (VI)	0.2 ug/g dry	<0.2	-	<0.2	-
Cobalt	1.0 ug/g dry	12.1	-	12.3	-
Copper	5.0 ug/g dry	32.7	-	26.6	-
Lead	1.0 ug/g dry	55.1	-	22.4	-
Mercury	0.1 ug/g dry	<0.1	-	<0.1	-
Molybdenum	1.0 ug/g dry	<1.0	-	<1.0	-
Nickel	5.0 ug/g dry	29.6	-	26.1	-
Selenium	1.0 ug/g dry	<1.0	-	<1.0	-
Silver	0.3 ug/g dry	<0.3	-	<0.3	-
Thallium	1.0 ug/g dry	<1.0	-	<1.0	-
Uranium	1.0 ug/g dry	<1.0	-	<1.0	-
Vanadium	10.0 ug/g dry	56.7	-	55.2	-
Zinc	20.0 ug/g dry	129	-	111	-
Volatiles					
Benzene	0.02 ug/g dry	-	<0.02	-	<0.02
Ethylbenzene	0.05 ug/g dry	-	<0.05	-	<0.05
Toluene	0.05 ug/g dry	-	<0.05	-	<0.05
m,p-Xylenes	0.05 ug/g dry	-	<0.05	-	<0.05
o-Xylene	0.05 ug/g dry	-	<0.05	-	<0.05
Xylenes, total	0.05 ug/g dry	-	<0.05	-	<0.05
Toluene-d8	Surrogate	-	117%	-	115%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	-	<7
F2 PHCs (C10-C16)	4 ug/g dry	-	<4	-	<4
F3 PHCs (C16-C34)	8 ug/g dry	-	<8	-	<8
F4 PHCs (C34-C50)	6 ug/g dry	-	<6	-	<6

Certificate of Analysis

Report Date: 08-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 3-Sep-2020

Client PO: 30723

Project Description: PE4945

	Client ID:	Dup	-	-	-
	Sample Date:	31-Aug-20 00:00	-	-	-
	Sample ID:	2036477-05	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	82.0	-	-	-
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	113%	-	-	-

Certificate of Analysis

Report Date: 08-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 3-Sep-2020

Client PO: 30723

Project Description: PE4945

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.53*		*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)	42	7	ug/g dry	38			9.4	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	17	8	ug/g dry	36			70.3	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	10			NC	30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			NC	30	
Arsenic	1.7	1.0	ug/g dry	1.6			10.3	30	
Barium	15.3	1.0	ug/g dry	14.8			3.3	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	ND	5.0	ug/g dry	ND			NC	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	6.8	5.0	ug/g dry	6.9			2.5	30	
Cobalt	2.0	1.0	ug/g dry	2.0			4.1	30	
Copper	ND	5.0	ug/g dry	ND			NC	30	
Lead	2.4	1.0	ug/g dry	2.2			7.6	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	ND	5.0	ug/g dry	ND			NC	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	16.4	10.0	ug/g dry	16.7			2.3	30	
Zinc	ND	20.0	ug/g dry	ND			NC	30	
Physical Characteristics									
% Solids	80.8	0.1	% by Wt.	81.6			1.1	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	0.078	0.05	ug/g dry	0.069			11.8	50	
m,p-Xylenes	0.068	0.05	ug/g dry	0.076			11.1	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	*3.14*		*ug/g dry*		*93.2*	*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)	195	7	ug/g	ND	97.6	80-120			
F2 PHCs (C10-C16)	99	4	ug/g	ND	97.2	60-140			
F3 PHCs (C16-C34)	285	8	ug/g	36	99.9	60-140			
F4 PHCs (C34-C50)	152	6	ug/g	10	90.3	60-140			
Metals									
Antimony	45.0	1.0	ug/g	ND	90.0	70-130			
Arsenic	54.1	1.0	ug/g	ND	107	70-130			
Barium	55.2	1.0	ug/g	5.9	98.5	70-130			
Beryllium	51.1	0.5	ug/g	ND	102	70-130			
Boron	46.8	5.0	ug/g	ND	92.3	70-130			
Cadmium	48.6	0.5	ug/g	ND	97.3	70-130			
Chromium (VI)	0.1	0.2	ug/g	ND	60.5	70-130			QM-05
Chromium	57.2	5.0	ug/g	ND	109	70-130			
Cobalt	54.3	1.0	ug/g	ND	107	70-130			
Copper	52.0	5.0	ug/g	ND	101	70-130			
Lead	50.2	1.0	ug/g	ND	98.6	70-130			
Mercury	1.34	0.1	ug/g	ND	89.1	70-130			
Molybdenum	51.4	1.0	ug/g	ND	103	70-130			
Nickel	53.5	5.0	ug/g	ND	104	70-130			
Selenium	49.8	1.0	ug/g	ND	99.5	70-130			
Silver	41.7	0.3	ug/g	ND	83.4	70-130			
Thallium	49.7	1.0	ug/g	ND	99.4	70-130			
Uranium	53.2	1.0	ug/g	ND	106	70-130			
Vanadium	61.2	10.0	ug/g	ND	109	70-130			
Zinc	53.1	20.0	ug/g	ND	97.3	70-130			
Volatiles									
Benzene	3.17	0.02	ug/g	ND	79.3	60-130			
Ethylbenzene	3.85	0.05	ug/g	ND	96.1	60-130			
Toluene	4.01	0.05	ug/g	ND	100	60-130			
m,p-Xylenes	7.90	0.05	ug/g	ND	98.7	60-130			
o-Xylene	4.25	0.05	ug/g	ND	106	60-130			
Surrogate: Toluene-d8	*2.85*		*ug/g*		*88.9*	*50-140*			

Qualifier Notes:

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES L

Paracel ID: 2036477

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2036477	Nº 128137

Page 1 of 1

Client Name: Paterson
Project Ref: PE 4945
Contact Name: Mark D'Arcy
Quote #:
Address: 154 Colonnade
PO #: 30723
E-mail: mdarcy@patersongroup.ca
Telephone: 613 226 7381

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

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

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

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

	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)	BTEX						
1	BH1-AU1	S		1	Aug 31 2020	9 am				✓	✓	✓								✓
2	BH1-SS7	S		2	Aug 31 2020	10am	✓													✓
3	BH2-AU1	S		1	Aug 31 2020	12 pm				✓	✓	✓								✓
4	BH3-SS8	S		2	Sep 1 2020	9 am	✓													✓
5	DUP	S		1										✓						
6																				
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: PACAREL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
GPat	A Squire	Jumeeporn Dornai	
Relinquished By (Print): Grant Paterson	Date/Time: 03/09/20 8:00	Date/Time: Sep 03 2020 04.16	Date/Time: 9-3-20 16:47
Date/Time: Sept. 3 / 2020	Temperature: °C 2 pk	Temperature: 10.2 °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: 33617
Project: PE5506
Custody: 64435

Report Date: 19-Jan-2022
Order Date: 13-Jan-2022

Order #: 2203387

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

Paracel ID	Client ID
2203387-01	BH4-22-SS1
2203387-03	BH4-22-SS6
2203387-04	DUP

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 19-Jan-2022

Client: Paterson Group Consulting Engineers

Order Date: 13-Jan-2022

Client PO: 33617

Project Description: PE5506

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	17-Jan-22	17-Jan-22
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	13-Jan-22	17-Jan-22
Mercury by CVAA	EPA 7471B - CVAA, digestion	17-Jan-22	17-Jan-22
PHC F1	CWS Tier 1 - P&T GC-FID	17-Jan-22	17-Jan-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	13-Jan-22	15-Jan-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	17-Jan-22	17-Jan-22
Solids, %	Gravimetric, calculation	19-Jan-22	19-Jan-22

Certificate of Analysis

Report Date: 19-Jan-2022

Client: Paterson Group Consulting Engineers

Order Date: 13-Jan-2022

Client PO: 33617

Project Description: PE5506

	Client ID:	BH4-22-SS1	BH4-22-SS6	DUP	-
	Sample Date:	12-Jan-22 09:00	12-Jan-22 09:00	12-Jan-22 09:00	-
	Sample ID:	2203387-01	2203387-03	2203387-04	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	88.0	85.9	87.0	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	5.0	-	-	-
Barium	1.0 ug/g dry	498	-	-	-
Beryllium	0.5 ug/g dry	<0.5	-	-	-
Boron	5.0 ug/g dry	8.2	-	-	-
Cadmium	0.5 ug/g dry	0.6	-	-	-
Chromium	5.0 ug/g dry	116	-	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	-	-	-
Cobalt	1.0 ug/g dry	9.4	-	-	-
Copper	5.0 ug/g dry	57.0	-	-	-
Lead	1.0 ug/g dry	286	-	-	-
Mercury	0.1 ug/g dry	0.1	-	-	-
Molybdenum	1.0 ug/g dry	15.8	-	-	-
Nickel	5.0 ug/g dry	25.4	-	-	-
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	57.8	-	-	-
Zinc	20.0 ug/g dry	392	-	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Toluene-d8	Surrogate	97.4%	98.5%	97.8%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	29	<8	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	-

Certificate of Analysis

Report Date: 19-Jan-2022

Client: Paterson Group Consulting Engineers

Order Date: 13-Jan-2022

Client PO: 33617

Project Description: PE5506

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*2.89*		*ug/g*		*90.2*	*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)	1450	4	ug/g dry	1480			2.5	30	
F3 PHCs (C16-C34)	794	8	ug/g dry	812			2.2	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			NC	30	
Arsenic	1.2	1.0	ug/g dry	1.2			1.1	30	
Barium	25.5	1.0	ug/g dry	25.7			0.6	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	ND	5.0	ug/g dry	ND			NC	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	9.1	5.0	ug/g dry	9.3			1.9	30	
Cobalt	2.4	1.0	ug/g dry	2.4			1.3	30	
Copper	ND	5.0	ug/g dry	ND			NC	30	
Lead	4.9	1.0	ug/g dry	4.8			0.3	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	ND	5.0	ug/g dry	ND			NC	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	19.1	10.0	ug/g dry	19.3			1.0	30	
Zinc	26.3	20.0	ug/g dry	25.7			2.4	30	
Physical Characteristics									
% Solids	76.5	0.1	% by Wt.	76.1			0.5	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	*4.41*		*ug/g dry*		*104*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	176	7	ug/g	ND	88.2	80-120			
F2 PHCs (C10-C16)	1680	4	ug/g	1480	197	60-140			QM-06
F3 PHCs (C16-C34)	1100	8	ug/g	812	119	60-140			
F4 PHCs (C34-C50)	145	6	ug/g	ND	95.2	60-140			
Metals									
Antimony	39.4	1.0	ug/g	ND	78.8	70-130			
Arsenic	45.6	1.0	ug/g	ND	90.2	70-130			
Barium	53.0	1.0	ug/g	10.3	85.4	70-130			
Beryllium	48.1	0.5	ug/g	ND	95.9	70-130			
Boron	45.4	5.0	ug/g	ND	89.4	70-130			
Cadmium	42.9	0.5	ug/g	ND	85.7	70-130			
Chromium (VI)	0.2	0.2	ug/g	ND	78.0	70-130			
Chromium	50.7	5.0	ug/g	ND	94.0	70-130			
Cobalt	47.0	1.0	ug/g	1.0	92.1	70-130			
Copper	46.4	5.0	ug/g	ND	90.3	70-130			
Lead	45.6	1.0	ug/g	1.9	87.2	70-130			
Mercury	1.49	0.1	ug/g	ND	99.3	70-130			
Molybdenum	43.8	1.0	ug/g	ND	87.5	70-130			
Nickel	47.0	5.0	ug/g	ND	90.8	70-130			
Selenium	44.6	1.0	ug/g	ND	89.1	70-130			
Silver	43.3	0.3	ug/g	ND	86.6	70-130			
Thallium	45.7	1.0	ug/g	ND	91.3	70-130			
Uranium	47.6	1.0	ug/g	ND	94.8	70-130			
Vanadium	55.3	10.0	ug/g	ND	95.2	70-130			
Zinc	53.6	20.0	ug/g	ND	86.6	70-130			
Volatiles									
Benzene	4.43	0.02	ug/g	ND	111	60-130			
Ethylbenzene	4.45	0.05	ug/g	ND	111	60-130			
Toluene	4.38	0.05	ug/g	ND	110	60-130			
m,p-Xylenes	8.95	0.05	ug/g	ND	112	60-130			
o-Xylene	4.61	0.05	ug/g	ND	115	60-130			
Surrogate: Toluene-d8	*2.95*		*ug/g*		*92.2*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QM-06 : Due to noted non-homogeneity of the QC sample matrix, the spike recoveries were out side the accepted range. Batch data accepted based on other QC.

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: 2203387

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2203387	№ 64435

Client Name: Paterson Group	Project Ref: PE5506
Contact Name: Mark D'Arcy	Quote #:
Address: 154 Colonnade Rd	PO #: 33617
Telephone:	E-mail: mdarcy@patersongroup.ca

Page __ of __

Turnaround Time

☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular

Date Required:

☐ REG 153/04 ☐ REG 406/19

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

Other Regulation

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

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHC F1-F4 + BTEX	Metals (inc. Hg, CrVI)	HOLD										
1	BH4-22-SS1	S		3	Jan 12/2022	/	X	X											
2	BH4-22-SS3	↓		2	↓	↓			X										
3	BH4-22-SS6	↓		2	↓	↓	X												
4	DUP	S		2	Jan 12/2022	/	X												
5																			
6																			
7																			
8																			
9																			
10																			

Comments: HOLD BH4-22-SS3

Method of Delivery: Paracel Courier

Relinquished By (Sign): [signature]	Received By Driver/Depot: M. Dlouse	Received at Lab: Sunegpam Dokmai	Verified By: [signature]
Relinquished By (Print): Kat Chrcek	Date/Time: 13/01/22 3 40	Date/Time: Jan 13, 2022 04.30	Date/Time: Jan 14, 2022 10:31
Date/Time: Jan 13/2022	Temperature: °C PH	Temperature: 18.3 °C	pH Verified: ☐ By:

Chain of Custody (Blank).xlsx

Revision 4.0

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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: 30733
Project: PE4945
Custody: 128123

Report Date: 8-Sep-2020
Order Date: 4-Sep-2020

Order #: 2036649

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

Paracel ID	Client ID
2036649-01	BH2-GW1
2036649-02	BH3-GW1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 30733

Report Date: 08-Sep-2020

Order Date: 4-Sep-2020

Project Description: PE4945

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	8-Sep-20	8-Sep-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	8-Sep-20	8-Sep-20
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	8-Sep-20	8-Sep-20

Certificate of Analysis

Report Date: 08-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 4-Sep-2020

Client PO: 30733

Project Description: PE4945

	Client ID:	BH2-GW1	BH3-GW1	-	-
	Sample Date:	04-Sep-20 09:00	04-Sep-20 09:00	-	-
	Sample ID:	2036649-01	2036649-02	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	-	-
Benzene	0.5 ug/L	0.8	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroform	0.5 ug/L	22.1	27.5	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	4.4	4.0	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	-	-
Hexane	1.0 ug/L	296	78.2	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	3.1	3.6	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-

Certificate of Analysis

Report Date: 08-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 4-Sep-2020

Client PO: 30733

Project Description: PE4945

	Client ID:	BH2-GW1	BH3-GW1	-	-
	Sample Date:	04-Sep-20 09:00	04-Sep-20 09:00	-	-
	Sample ID:	2036649-01	2036649-02	-	-
	MDL/Units	Water	Water	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	5.3	4.8	-	-
o-Xylene	0.5 ug/L	1.6	1.3	-	-
Xylenes, total	0.5 ug/L	6.9	6.0	-	-
4-Bromofluorobenzene	Surrogate	114%	114%	-	-
Dibromofluoromethane	Surrogate	93.0%	94.2%	-	-
Toluene-d8	Surrogate	107%	106%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	99	<25	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	-	-
F3 PHCs (C16-C34)	100 ug/L	669	<100	-	-
F4 PHCs (C34-C50)	100 ug/L	630	<100	-	-

Certificate of Analysis

Report Date: 08-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 4-Sep-2020

Client PO: 30733

Project Description: PE4945

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	*89.9*		*ug/L*		*112*	*50-140*			
Surrogate: Dibromofluoromethane	*81.5*		*ug/L*		*102*	*50-140*			
Surrogate: Toluene-d8	*95.2*		*ug/L*		*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	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	*89.8*		*ug/L*		*112*	*50-140*			
Surrogate: Dibromofluoromethane	*82.5*		*ug/L*		*103*	*50-140*			
Surrogate: Toluene-d8	*94.5*		*ug/L*		*118*	*50-140*			

Certificate of Analysis

Report Date: 08-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 4-Sep-2020

Client PO: 30733

Project Description: PE4945

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1670	25	ug/L	ND	83.3	68-117			
F2 PHCs (C10-C16)	1680	100	ug/L	ND	105	60-140			
F3 PHCs (C16-C34)	4250	100	ug/L	ND	108	60-140			
F4 PHCs (C34-C50)	2940	100	ug/L	ND	119	60-140			
Volatiles									
Acetone	87.1	5.0	ug/L	ND	87.1	50-140			
Benzene	36.2	0.5	ug/L	ND	90.4	60-130			
Bromodichloromethane	38.7	0.5	ug/L	ND	96.8	60-130			
Bromoform	40.6	0.5	ug/L	ND	101	60-130			
Bromomethane	35.4	0.5	ug/L	ND	88.4	50-140			
Carbon Tetrachloride	41.3	0.2	ug/L	ND	103	60-130			
Chlorobenzene	35.4	0.5	ug/L	ND	88.4	60-130			
Chloroform	35.9	0.5	ug/L	ND	89.7	60-130			
Dibromochloromethane	38.3	0.5	ug/L	ND	95.7	60-130			
Dichlorodifluoromethane	36.4	1.0	ug/L	ND	91.0	50-140			
1,2-Dichlorobenzene	40.4	0.5	ug/L	ND	101	60-130			
1,3-Dichlorobenzene	42.4	0.5	ug/L	ND	106	60-130			
1,4-Dichlorobenzene	42.1	0.5	ug/L	ND	105	60-130			
1,1-Dichloroethane	37.9	0.5	ug/L	ND	94.8	60-130			
1,2-Dichloroethane	34.4	0.5	ug/L	ND	86.0	60-130			
1,1-Dichloroethylene	37.6	0.5	ug/L	ND	93.9	60-130			
cis-1,2-Dichloroethylene	37.2	0.5	ug/L	ND	93.0	60-130			
trans-1,2-Dichloroethylene	38.8	0.5	ug/L	ND	97.0	60-130			
1,2-Dichloropropane	36.4	0.5	ug/L	ND	91.0	60-130			
cis-1,3-Dichloropropylene	38.9	0.5	ug/L	ND	97.2	60-130			
trans-1,3-Dichloropropylene	36.8	0.5	ug/L	ND	91.9	60-130			
Ethylbenzene	36.3	0.5	ug/L	ND	90.8	60-130			
Ethylene dibromide (dibromoethane, 1,2-	33.7	0.2	ug/L	ND	84.2	60-130			
Hexane	38.0	1.0	ug/L	ND	95.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	81.4	5.0	ug/L	ND	81.4	50-140			
Methyl Isobutyl Ketone	93.1	5.0	ug/L	ND	93.1	50-140			
Methyl tert-butyl ether	93.5	2.0	ug/L	ND	93.5	50-140			
Methylene Chloride	36.3	5.0	ug/L	ND	90.6	60-130			
Styrene	32.9	0.5	ug/L	ND	82.2	60-130			
1,1,1,2-Tetrachloroethane	37.9	0.5	ug/L	ND	94.7	60-130			
1,1,2,2-Tetrachloroethane	42.5	0.5	ug/L	ND	106	60-130			
Tetrachloroethylene	36.1	0.5	ug/L	ND	90.4	60-130			
Toluene	36.8	0.5	ug/L	ND	92.0	60-130			
1,1,1-Trichloroethane	38.6	0.5	ug/L	ND	96.6	60-130			
1,1,2-Trichloroethane	35.4	0.5	ug/L	ND	88.5	60-130			
Trichloroethylene	35.4	0.5	ug/L	ND	88.6	60-130			
Trichlorofluoromethane	40.8	1.0	ug/L	ND	102	60-130			
Vinyl chloride	34.8	0.5	ug/L	ND	87.0	50-140			
m,p-Xylenes	73.5	0.5	ug/L	ND	91.8	60-130			
o-Xylene	35.6	0.5	ug/L	ND	89.0	60-130			
Surrogate: 4-Bromofluorobenzene	*91.0*		*ug/L*		*114*	*50-140*			
Surrogate: Dibromofluoromethane	*86.2*		*ug/L*		*108*	*50-140*			
Surrogate: Toluene-d8	*80.5*		*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.

PARACEL LABORATORIES LTD.

Paracel ID: 2036649

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2036649	Nº 128123

Client Name: PATERSON	Project Ref: PE4945	Page 1 of 1
Contact Name: MARK D'ARCY	Quote #:	Turnaround Time: ☒ 1 day ☐ 3 day ☐ 2 day ☐ Regular
Address: 154 COLONNADE Rd. S OTTAWA, ONT.	PO #: 30733	
Telephone: (613) 226-7381	E-mail: mdarcy@PATERSONGroup.ca	Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+~~BTEX~~	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH2-GW1	GW		3	SEPT 04/20		✓	✓					
2	BH3-GW1	GW		3	SEPT 04/20		✓	✓					
3													
4													
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: Drop Box

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: Jumeepam Dhuma	Verified By:
Relinquished By (Print): DOMINIC LANDRY	Date/Time:	Date/Time: Sep04, 2020 04:45	Date/Time: SEPT 4, 2020 18:00
Date/Time: SEPT. 04/2020	Temperature: °C	Temperature: 14.9°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: 30840
Project: PE4945
Custody: 128177

Report Date: 17-Sep-2020
Order Date: 15-Sep-2020

Order #: 2038291

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

Paracel ID	Client ID
2038291-01	BH2-GW2
2038291-02	BH3-GW2

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 17-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 15-Sep-2020

Client PO: 30840

Project Description: PE4945

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	16-Sep-20	16-Sep-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	16-Sep-20	16-Sep-20
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	16-Sep-20	16-Sep-20

Certificate of Analysis

Report Date: 17-Sep-2020

Client: **Paterson Group Consulting Engineers**

Order Date: 15-Sep-2020

Client PO: **30840**

Project Description: PE4945

	Client ID:	BH2-GW2	BH3-GW2	-	-
	Sample Date:	15-Sep-20 14:45	15-Sep-20 15:00	-	-
	Sample ID:	2038291-01	2038291-02	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	162	-	-
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroform	0.5 ug/L	8.4	10.7	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	-	-
Hexane	1.0 ug/L	<1.0	23.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	2.6	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-

Certificate of Analysis

Report Date: 17-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 15-Sep-2020

Client PO: 30840

Project Description: PE4945

	Client ID:	BH2-GW2	BH3-GW2	-	-
	Sample Date:	15-Sep-20 14:45	15-Sep-20 15:00	-	-
	Sample ID:	2038291-01	2038291-02	-	-
	MDL/Units	Water	Water	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	3.0	-	-
o-Xylene	0.5 ug/L	<0.5	1.0	-	-
Xylenes, total	0.5 ug/L	<0.5	4.0	-	-
4-Bromofluorobenzene	Surrogate	124%	114%	-	-
Dibromofluoromethane	Surrogate	112%	115%	-	-
Toluene-d8	Surrogate	111%	115%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-

Certificate of Analysis

Report Date: 17-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 15-Sep-2020

Client PO: 30840

Project Description: PE4945

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	*96.9*		*ug/L*		*121*	*50-140*			
Surrogate: Dibromofluoromethane	*91.0*		*ug/L*		*114*	*50-140*			
Surrogate: Toluene-d8	*88.9*		*ug/L*		*111*	*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	*91.7*		*ug/L*		*115*	*50-140*			
Surrogate: Dibromofluoromethane	*89.8*		*ug/L*		*112*	*50-140*			
Surrogate: Toluene-d8	*88.1*		*ug/L*		*110*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1820	25	ug/L	ND	91.2	68-117			
F2 PHCs (C10-C16)	1660	100	ug/L	ND	104	60-140			
F3 PHCs (C16-C34)	4620	100	ug/L	ND	118	60-140			
F4 PHCs (C34-C50)	2880	100	ug/L	ND	116	60-140			
Volatiles									
Acetone	81.5	5.0	ug/L	ND	81.5	50-140			
Benzene	42.2	0.5	ug/L	ND	106	60-130			
Bromodichloromethane	43.9	0.5	ug/L	ND	110	60-130			
Bromoform	40.4	0.5	ug/L	ND	101	60-130			
Bromomethane	33.0	0.5	ug/L	ND	82.5	50-140			
Carbon Tetrachloride	42.5	0.2	ug/L	ND	106	60-130			
Chlorobenzene	38.8	0.5	ug/L	ND	97.0	60-130			
Chloroform	42.6	0.5	ug/L	ND	107	60-130			
Dibromochloromethane	40.6	0.5	ug/L	ND	101	60-130			
Dichlorodifluoromethane	44.0	1.0	ug/L	ND	110	50-140			
1,2-Dichlorobenzene	42.2	0.5	ug/L	ND	106	60-130			
1,3-Dichlorobenzene	43.4	0.5	ug/L	ND	108	60-130			
1,4-Dichlorobenzene	42.8	0.5	ug/L	ND	107	60-130			
1,1-Dichloroethane	42.3	0.5	ug/L	ND	106	60-130			
1,2-Dichloroethane	38.2	0.5	ug/L	ND	95.5	60-130			
1,1-Dichloroethylene	43.8	0.5	ug/L	ND	109	60-130			
cis-1,2-Dichloroethylene	42.8	0.5	ug/L	ND	107	60-130			
trans-1,2-Dichloroethylene	44.4	0.5	ug/L	ND	111	60-130			
1,2-Dichloropropane	40.4	0.5	ug/L	ND	101	60-130			
cis-1,3-Dichloropropylene	41.7	0.5	ug/L	ND	104	60-130			
trans-1,3-Dichloropropylene	35.8	0.5	ug/L	ND	89.6	60-130			
Ethylbenzene	38.6	0.5	ug/L	ND	96.6	60-130			
Ethylene dibromide (dibromoethane, 1,2-	35.8	0.2	ug/L	ND	89.6	60-130			
Hexane	43.5	1.0	ug/L	ND	109	60-130			
Methyl Ethyl Ketone (2-Butanone)	90.7	5.0	ug/L	ND	90.7	50-140			
Methyl Isobutyl Ketone	105	5.0	ug/L	ND	105	50-140			
Methyl tert-butyl ether	101	2.0	ug/L	ND	101	50-140			
Methylene Chloride	41.5	5.0	ug/L	ND	104	60-130			
Styrene	35.1	0.5	ug/L	ND	87.8	60-130			
1,1,1,2-Tetrachloroethane	39.0	0.5	ug/L	ND	97.4	60-130			
1,1,2,2-Tetrachloroethane	50.0	0.5	ug/L	ND	125	60-130			
Tetrachloroethylene	36.9	0.5	ug/L	ND	92.2	60-130			
Toluene	39.3	0.5	ug/L	ND	98.4	60-130			
1,1,1-Trichloroethane	43.1	0.5	ug/L	ND	108	60-130			
1,1,2-Trichloroethane	42.2	0.5	ug/L	ND	106	60-130			
Trichloroethylene	40.2	0.5	ug/L	ND	101	60-130			
Trichlorofluoromethane	45.2	1.0	ug/L	ND	113	60-130			
Vinyl chloride	39.3	0.5	ug/L	ND	98.3	50-140			
m,p-Xylenes	79.8	0.5	ug/L	ND	99.7	60-130			
o-Xylene	40.4	0.5	ug/L	ND	101	60-130			
Surrogate: 4-Bromofluorobenzene	*89.7*		*ug/L*		*112*	*50-140*			
Surrogate: Dibromofluoromethane	*90.6*		*ug/L*		*113*	*50-140*			
Surrogate: Toluene-d8	*78.2*		*ug/L*		*97.8*	*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.

PARA LABORATORI

Paracel ID: 2038291

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2038291	Nº 128177

Client Name: PATERSON
Project Ref: PE4945
Page 1 of 1

Contact Name: MARK D'ARCY
Quote #:

Address: 154 COLONNADE Rd. S. OTTAWA, ONT.
PO #: 30840

E-mail: md'arcy@PATERSONGROUP.ca

Telephone: (613) 226-7381

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

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH2-GW2	GW	\	3	SEPT. 15/20	2:45p	✓	✓					
2	BH3-GW2	GW	\	2	SEPT. 15/20	3:00p		✓					
3													
4													
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: Drop Box

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: BRam	Verified By:
Relinquished By (Print): Dominic Landry	Date/Time:	Date/Time: Sept 15/20 18:50	Date/Time: 16 Sep 2020 8:27
Date/Time: SEPT. 15/2020	Temperature: °C	Temperature: 9.8 °C	pH Verified: ☐ By: NA

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Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 33661
Project: PE5506
Custody: 64451

Report Date: 20-Jan-2022
Order Date: 18-Jan-2022

Order #: 2204049

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

Paracel ID	Client ID
2204049-01	BH4-GW
2204049-02	DUP

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 33661

Report Date: 20-Jan-2022

Order Date: 18-Jan-2022

Project Description: PE5506

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	19-Jan-22	19-Jan-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	19-Jan-22	19-Jan-22
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	19-Jan-22	19-Jan-22

Certificate of Analysis

Report Date: 20-Jan-2022

Client: Paterson Group Consulting Engineers

Order Date: 18-Jan-2022

Client PO: 33661

Project Description: PE5506

	Client ID:	BH4-GW	DUP	-	-
	Sample Date:	17-Jan-22 09:00	17-Jan-22 09:00	-	-
	Sample ID:	2204049-01	2204049-02	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	-	-
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroform	0.5 ug/L	5.3	6.2	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	-	-
Hexane	1.0 ug/L	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	1.9	1.9	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-

Certificate of Analysis

Report Date: 20-Jan-2022

Client: Paterson Group Consulting Engineers

Order Date: 18-Jan-2022

Client PO: 33661

Project Description: PE5506

	Client ID:	BH4-GW	DUP	-	-
	Sample Date:	17-Jan-22 09:00	17-Jan-22 09:00	-	-
	Sample ID:	2204049-01	2204049-02	-	-
	MDL/Units	Water	Water	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	1.6	1.7	-	-
o-Xylene	0.5 ug/L	0.5	0.5	-	-
Xylenes, total	0.5 ug/L	2.2	2.2	-	-
4-Bromofluorobenzene	Surrogate	102%	102%	-	-
Dibromofluoromethane	Surrogate	104%	115%	-	-
Toluene-d8	Surrogate	106%	106%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-

Certificate of Analysis

Report Date: 20-Jan-2022

Client: Paterson Group Consulting Engineers

Order Date: 18-Jan-2022

Client PO: 33661

Project Description: PE5506

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	*81.9*		*ug/L*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*57.3*		*ug/L*		*71.7*	*50-140*			
Surrogate: Toluene-d8	*88.1*		*ug/L*		*110*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	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	0.99	0.5	ug/L	0.93			6.3	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	*81.6*		*ug/L*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*63.5*		*ug/L*		*79.4*	*50-140*			
Surrogate: Toluene-d8	*84.8*		*ug/L*		*106*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1610	25	ug/L	ND	80.3	68-117			
F2 PHCs (C10-C16)	1410	100	ug/L	ND	88.1	60-140			
F3 PHCs (C16-C34)	4040	100	ug/L	ND	103	60-140			
F4 PHCs (C34-C50)	3100	100	ug/L	ND	125	60-140			
Volatiles									
Acetone	107	5.0	ug/L	ND	107	50-140			
Benzene	51.8	0.5	ug/L	ND	129	60-130			
Bromodichloromethane	46.4	0.5	ug/L	ND	116	60-130			
Bromoform	39.1	0.5	ug/L	ND	97.7	60-130			
Bromomethane	42.0	0.5	ug/L	ND	105	50-140			
Carbon Tetrachloride	44.1	0.2	ug/L	ND	110	60-130			
Chlorobenzene	42.1	0.5	ug/L	ND	105	60-130			
Chloroform	43.2	0.5	ug/L	ND	108	60-130			
Dibromochloromethane	34.8	0.5	ug/L	ND	86.9	60-130			
Dichlorodifluoromethane	48.8	1.0	ug/L	ND	122	50-140			
1,2-Dichlorobenzene	37.5	0.5	ug/L	ND	93.6	60-130			
1,3-Dichlorobenzene	38.0	0.5	ug/L	ND	95.0	60-130			
1,4-Dichlorobenzene	41.1	0.5	ug/L	ND	103	60-130			
1,1-Dichloroethane	50.2	0.5	ug/L	ND	125	60-130			
1,2-Dichloroethane	43.2	0.5	ug/L	ND	108	60-130			
1,1-Dichloroethylene	49.8	0.5	ug/L	ND	124	60-130			
cis-1,2-Dichloroethylene	47.2	0.5	ug/L	ND	118	60-130			
trans-1,2-Dichloroethylene	46.7	0.5	ug/L	ND	117	60-130			
1,2-Dichloropropane	49.4	0.5	ug/L	ND	123	60-130			
cis-1,3-Dichloropropylene	43.9	0.5	ug/L	ND	110	60-130			
trans-1,3-Dichloropropylene	38.8	0.5	ug/L	ND	97.1	60-130			
Ethylbenzene	42.6	0.5	ug/L	ND	106	60-130			
Ethylene dibromide (dibromoethane, 1,2-	43.1	0.2	ug/L	ND	108	60-130			
Hexane	42.6	1.0	ug/L	ND	107	60-130			
Methyl Ethyl Ketone (2-Butanone)	113	5.0	ug/L	ND	113	50-140			
Methyl Isobutyl Ketone	105	5.0	ug/L	ND	105	50-140			
Methyl tert-butyl ether	99.4	2.0	ug/L	ND	99.4	50-140			
Methylene Chloride	46.1	5.0	ug/L	ND	115	60-130			
Styrene	41.4	0.5	ug/L	ND	104	60-130			
1,1,1,2-Tetrachloroethane	40.5	0.5	ug/L	ND	101	60-130			
1,1,2,2-Tetrachloroethane	46.5	0.5	ug/L	ND	116	60-130			
Tetrachloroethylene	39.1	0.5	ug/L	ND	97.7	60-130			
Toluene	42.9	0.5	ug/L	ND	107	60-130			
1,1,1-Trichloroethane	42.7	0.5	ug/L	ND	107	60-130			
1,1,2-Trichloroethane	46.8	0.5	ug/L	ND	117	60-130			
Trichloroethylene	46.4	0.5	ug/L	ND	116	60-130			
Trichlorofluoromethane	44.7	1.0	ug/L	ND	112	60-130			
Vinyl chloride	47.4	0.5	ug/L	ND	119	50-140			
m,p-Xylenes	84.6	0.5	ug/L	ND	106	60-130			
o-Xylene	43.3	0.5	ug/L	ND	108	60-130			
Surrogate: 4-Bromofluorobenzene	*83.9*		*ug/L*		*105*	*50-140*			
Surrogate: Dibromofluoromethane	*83.3*		*ug/L*		*104*	*50-140*			
Surrogate: Toluene-d8	*82.1*		*ug/L*		*103*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PARACEL LABORATORIES LT

Paracel ID: 2204049

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2204049	Nº 64451

Client Name: PATERSON
Contact Name: Mark D'Arcy
Address: 154 Colonnade Rd S
Telephone: 613 866 4875

Project Ref: PE5506
Quote #:
PO #: 33662
E-mail: Mdarcy@patersongroup.ca
Bdrieschner@patersongroup.ca

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

☒ REG 153/04 ☐ REG 406/19

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

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analysis: PAHs	VOCs	PHCs (F1-F4)
1	BH4-GW	GW		4	JAN 17, 2022			X	X
2	DUP	GW		3	JAN 17, 2022			X	
3									
4									
5									
6									
7									
8									
9									
10									

Comments:

Method of Delivery: PACAREL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Beau Drieschner	A. Rouse		
Relinquished By (Print): Beau Drieschner	Date/Time: 18/01/22 11:20	Date/Time: Jan 18th 2022 11:35	Date/Time: Jan 18th 2022 12:12
Date/Time: JAN 17, 2022	Temperature: °C AR	Temperature: 5.7 °C	pH Verified: ☐ By: