PATERSON GROUP

Phase II-Environmental Site Assessment

258 Durocher Street, Ottawa, Ontario

Prepared for WestUrban Developments Ltd.

Report: PE5641-2
August 31, 2022

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for 258 Durocher Street, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address areas of potential environmental concern (APECs) that were identifed on the Phase II Property during the Phase I ESA.

The subsurface programs were carried out in April and June of 2022, by placing a total of six (6) boreholes across the Phase II Property. All six (6) boreholes were completed as groundwater monitoring wells.

The soil profile encountered generally consisted of an asphalt pavement or topsoil followed by a granular material, underlain by a fill material consisting of sandy silt with some crushed stone, clay and traces of organics, followed by a shaley glacial till, overlying shale bedrock. The boreholes were terminated at a maximum depth of 6.38 m below the ground surface. Soil samples were obtained from the boreholes and screened using vapour measurements along with visual and olfactory observations. A petroleum odour was noted in the field at BH1-22.

Based on the screening results in combination with sample depth and location, ten (10) soil samples and a duplicate were submitted for laboratory analysis of volatile organic compounds (VOCs), which include the BTEX group of parameters, petroleum hydrocarbons (PHCs, F_1-F_4), polycyclic aromatic hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), and/or metals, including mercury and hexavalent chromium.

Concentrations of PHC, fractions F2 and F3, metals (cobalt and molybdenum), and PAHs (benzo[a]anthracene, benzo[a]pyrene and fluoranthene) were identified in soil samples BH1-22-SS4 and BH6-22-AU1/SS2, in excess of the selected MECP Table 3 Residential Standards. However, cobalt and molybdenum are considered to be naturally occurring. All other parameter concentrations in the soil samples analyzed complied with the selected MECP Table 3 Residential Standards.

It should be noted that the fill material and native till contained parameter concentrations, including those that failed the Table 3 Residential Standards, in excess of the MECP Excess Soil Quality, Table 2.1 Residential Standards.

Groundwater samples from all six (6) monitoring wells were recovered and analyzed for VOCs (includes the BTEX group), PHCs and/or PAHs. No free-phase product was observed on the groundwater at any of the monitoring well locations during the groundwater sampling events in April and June of 2022.

With the exception of chloroform, all of the remaining parameter concentrations analyzed were below the laboratory detection limits. The chloroform exceedance identified in the groundwater is a result of the municipal water used for coring bedrock. It is expected that this level will dissipate with time. Chloroform, therefore, is not considered a contaminant of concern. All of the groundwater results comply with selected MECP Table 3 Standards.

Recommendations

Soil

Based on the analytical results, the glacial till in the northeast portion of the Phase II Property is contaminated with PHCs (F2 and F3). A couple of metal parameter concentrations (cobalt and molybdenum) were also in excess of the selected MECP Standards. Three (3) PAH parameter concentrations identified in soil sample BH6-22-AU1/SS2 (fill material), also exceeded the selected standards.

During redevelopment of the Phase II Property, the impacted soil should be removed. The excavation of the soil from the property should be monitored and confirmed by Paterson, which may be conducted in conjunction with the excavation program to segregate clean soil from impacted soil and for final confirmatory purposes.

Any soil and/or fill material in excess of the Table 3 Residential Standards will need to be disposed of at a licensed waste facility. Soil in excess of Table 2.1 Residential Standards may also need to be taken off-site to a licensed landfill, if a suitable soil-reuse site cannot be identified.

A TCLP analysis of a representative soil sample will be required prior to landfill disposal. More information can be provided in this regard prior to remediation.

Groundwater

The groundwater monitoring well, BH4-22-GW1, in which chloroform concentration in excess of the selected standards should be retested to confirm that chloroform has dissipated.

Monitoring Wells

If the monitoring wells installed at the Phase II Property are not going to be used in the future, they should be abandoned according to Ontario Regulation 903. The monitoring wells will be registered with the MECP under this regulation. Further information can be provided up request in this regard.

1.0 INTRODUCTION

At the request of WestUrban Developments Ltd., Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment for 258 Durocher Street, Ottawa, Ontario, herein referred to as the Phase II Property. The purpose of this investigation was to address any areas of potential environmental concern (APECs) identified in the Phase I ESA conducted by Paterson in July of 2022, and delineate the contamination identified as a result of the initial subsurface program completed in April of 2022. The Phase II ESA has been completed in general accordance with the Ontario Regulation (O.Reg.) 153/04.

1.1 Site Description

Address:	258 Durocher Street, Ottawa, Ontario
Location:	The Phase II Property is located on the north side of St. Paul Street and bounded by Durocher Street and Desrosier Street to the east and west, respectively. Refer to Figure 1 - Key Plan in Appendix 1 for the site location.
Zoning:	I1A –Institutional Zone
Latitude and Longitude:	45° 26’ 8” N, 75° 39’ 58” W
Configuration:	Rectangular
Area:	4, 500 m^2 (approximately)

1.2 Property Ownership

The Phase II Property is presently owned by the Riverside Congregation of Jehovah’s Witnesses, currently under contract with WestUrban Developments Limited (WestUrban). Paterson was retained by Mr. Cameron Salisbury of WestUrban, to complete this Phase II ESA. Mr. Salisbury can be reached by telephone at (250) 914-8485.

1.3 Current and Proposed Future Uses

The Phase II Property is unutilized institutional land that was last used for religious purposes by the Kingdom Hall of Jehovah’s Witnesses, Riverside Congregation.

It is our understanding that the Phase II Property will be redeveloped in the future for residential purposes and as such, there is no sensitive change in the proposed land use, from institutional to residential. A Record of Site Condition (RSC) is not required, as per the O.Reg 153/04, as amended.

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 the Environment, Conservation and Parks (MECP), April 2011. The intended use of the Phase II Property is residential, and therefore, the residential standards have been selected for the purpose of this Phase II ESA. The MECP Table 3 Residential Standards are based on the following considerations:

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

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that the property, and the properties within the 250 m study area do 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 considered an environmentally sensitive area, as the pH values at the surface and subsurface are 7.90 and 7.06, respectively.

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

The MECP O.Reg. 406/19 Excess Soil Quality Table 2.1 Residential Standards were used to compare the analytical results, for the purpose of excess soil management and off-site removal.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is occupied by a vacant single-storey building that was last used for religious gatherings. The Phase II Property is situated in a residential area with commercial land use to the south along Montreal Road.

The majority of the Phase II Property is covered in an asphaltic concrete pavement structure with some landscaped areas along the perimeter of the property.

The site topography slopes slightly towards the west, while the regional topography slopes down in a westerly direction towards the Rideau River. Site drainage consists of infiltration on the landscaped areas and sheet flow on the asphalt paved concrete areas to catch basins along Desrosiers and St. Paul Street.

2.2 Past Investigations

A Phase I-ESA was completed by Paterson in July of 2022 in general accordance with the Ontario Regulation (O.Reg.) 153/04. Based on the findings of the Phase I ESA, on-site and off-site potentially contaminating activities (PCAs) were identified, resulting in areas of potential environmental concern (APECs) on the Phase I Property, as shown in Table 1.

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: Former industrial use (manufacturer of aluminum sash)	Northern portion of the Phase I Property	PCA 34 – *"Metal Fabrication,"*	On-site	VOCs PHCs (F_1-F_4) PAHs Metals Hg CrVI	Soil and/or Groundwater
APEC 2: Fill Material of Unknown Quality	Across the Phase I Property	PCA 30 – "*Importation of Fill Material of Unknown Quality,"*	On-site	PAHs Metals	Soil
APEC 3: Prescence of a concrete pad-mounted transformer	Southern side of the Phase I Property	PCA 55 – "*Transformer Manufacturing, Processing and Use*,"	On-site	PHCs (F_1-F_4) PCBs	Soil

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 4: Former automotive repair garage	Northern portion of the Phase I Property	PCA 52 – "*Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems,*"	On-site	BTEX PHCs (F_1-F_4) PAHs	Soil and/or Groundwater
APEC 5[1]: Application of Road Salt	Within the parking areas of the Phase I property	Other: "*Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	EC SAR	Soil
APEC 6: Former industrial sites (tannery and coal shed)	Western side of the Phase I Property	PCA 53 – "*Tannery,"* and Other: "*Coal Storage,"*	Off-site	VOCs PHCs (F_1-F_4) PAHs	Groundwater

1 – In accordance with Section 49.1 of O.Reg. 153/04, standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both. The exemption outlined in Section 49.1 is being relied upon with respect to the Phase II ESA property.

Although not identified as a specific PCA in Table 2 of the O.Reg 153/04, the application of deicing salts for vehicular and pedestrian safety is also considered to represent an APEC (APEC 5) on the Phase I Property.

Based on the findings of the Phase I ESA, it is likely that road salt was applied to the surface of the walkways, paved access lane and parking lot on the northwestern portion of the Phase I Property for the safety of vehicular and pedestrian traffic under conditions of ice and/or snow.

According to Section 49.1 of O.Reg. 153/04, if an applicable site condition standard is exceeded at a property solely because of the following reason, the applicable site condition standard is deemed not to be exceeded for the purpose of Part XV.1 of the Act: “The qualified person has determined, based on a phase one environmental site assessment or a phase two environmental site assessment, that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both.”

In accordance with Section 49.1 of O.Reg. 153/04, any EC and SAR concentrations on the RSC Property that exceed the selected MECP standards for a residential/institutional land use are deemed not to exceed the standards for the purpose of Part XV.1 of the Act. This exemption is being relied upon for APEC 5.

The APECs are shown on Drawing PE5641-1 – Site Plan, while the corresponding PCAs are shown in red on Drawing PE5641-2 – Surrounding Land Use Plan, appended in the Figures section of this report.

A Phase II-ESA was recommended to assess the APECs identified in the Phase I ESA as well as delineate any contamination identified from the initial subsurface program.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The initial subsurface investigation was carried out for the Phase II Property on April 8, 2022. The field program consisted of drilling three (3) boreholes across the Phase II Property. The boreholes were completed to depths ranging from approximately 3.66 to 5.97m below ground surface (mbgs).

A supplemental subsurface program was carried out on the Phase II Property June 17, 2022. Three (3) boreholes were placed on the eastern side of the property to delineate soil impact that was identified during the April 2022 program on the northeast corner and assess any potential impact on the southeast corner of the site. The boreholes were completed to depths ranging from approximately 6.15 to 6.38 mbgs.

All six (6) of the boreholes drilled in April and June 2022 were completed as groundwater monitoring wells in order to access the groundwater table.

3.2 Media Investigated

During the subsurface investigation, soil samples and groundwater samples were obtained and submitted for laboratory analysis. The rationale for sampling and analyzing these media is based on the Contaminants of Potential Concern (CPCs) identified in Table 1, Section 2.2. of this report.

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

According to the Geological Survey of Canada website, the bedrock in the area of the Phase I Property is reported to consist of shale of the Billings Formation. Overburden soils are shown as glacial till, with a drift thickness on the order of 2 to 5 m.

Based on the regional topography, groundwater is expected to flow in a westerly direction.

Areas of Natural Significance and Natural Water Bodies

No areas of natural significance or natural waterbodies are present on the Phase I Property or within the Phase I Study Area.

Drinking Water Wells

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

Fill Placement

Based on the historical use of the Phase I Property, fill material of unknown quality may be present on-site, and as such, this represents an APEC on the Phase I Property.

Existing Buildings and Structures

The southern half of the Phase I Property is occupied by a vacant single-storey building with a basement level. The building was constructed in the early 1970s with a concrete block foundation finished in red-brick with a flat tar-gravel style roof. The subject building was originally used for commercial purposes until 2010. From 2013 and onwards, the building was used for institutional purposes.

The interior of the building was converted to an auditorium (or nave) to accommodate religious gatherings.

The northern half and west side of the Phase I Property exists as an asphaltic concrete paved parking lot associated with the building.

There are no other buildings or structures on the Phase I Property, with the exception of a concrete pad-mounted transformer situated on the south exterior wall of the building. The presence of the transformer on-site represents an APEC.

Subsurface Structures and Utilities

With the exception of the basement and underground utilities, there are no other subsurface structures on the Phase I Property. Underground utilities enter the Phase I Property from St. Paul Street and Desrosiers Street.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area consists of residential to the north, east and west, and commercial to the south, particularly along Montreal Road, of the Phase I Property.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 2.2 of this report, the PCAs that were considered to result in APECs on the Phase I Property are summarized in Table 1, along with their respective locations and contaminants of potential concern (CPCs).

The remaining off-site PCAs were determined not to represent APECs on the Phase I Property, based on the separation distances and/or orientations relative to the subject land.

Contaminants of Potential Concern

As per Section 2.2 of this report, the contaminants of potential concern (CPCs) in soil and/or groundwater include Volatile Organic Compounds (VOCs) which include the BTEX parameters, Petroleum Hydrocarbons (PHCs, F1-F4), Polycyclic Aromatic Hydrocarbons (PAHs) and Metals including arsenic (As), antimony (Sb) and selenium (Se), mercury (Hg) and hexavalent chromium (CrVI), as well as Sodium Adsorption Ratio (SAR) and Electrical Conductivity (EC).

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 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

Two (2) on-site catch basins along the northern side of the subject building, underground utilities that enter the site from Desrosiers Street, and above ground structures along, such as concrete blocks and retaining walls around the eastern perimeter of the subject site and subject building, respectively. Mature trees also limited the areas in which the boreholes were placed, particularly along the northern and southern property boundaries as well as the northeast corner of the site. No other deviations from the Sampling and Analysis Plan were encountered during this subsurface investigation. The Sampling and Analysis Plan for this project is included in Appendix 1 of this report.

3.5 Impediments

There are no known impediments that occurred during the subsurface program aside from those mentioned in the subsection above. No other physical impediments were encountered during the field portion of the Phase II ESA.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

An initial subsurface investigation was conducted on April 8, 2022. The drilling program consisted of drilling three (3) boreholes across the Phase II Property, all of which were completed with groundwater monitoring well installations.

A supplemental subsurface program was conducted on June 17, 2022, which consisted of an additional three (3) boreholes; 2 of which were placed near the northeast corner of the Phase II Property to laterally delineate existing impact. The third borehole was placed on the southeast corner for general coverage.

All of the boreholes were drilled with a low clearance track mounted drill rig. The track mounted drill rig was provided by George Downing Estate Drilling of Hawkesbury, Ontario. Borehole locations are shown on Drawing PE5641-3 – Test Hole Location Plan, appended to this report.

4.2 Soil Sampling

A total of 24 soil samples were obtained from the boreholes by means of direct sampling from auger flights and split spoon sampling. The depths at which auger samples, split spoon samples and rock core samples were obtained from the boreholes are shown as "**AU**", "**SS**" and "**RC**", respectively on the Soil Profile and Test Data Sheets, appended to this report.

The borehole profiles consisted of an asphaltic concrete structure or topsoil, followed by a granular fill and/or crushed stone beneath the concrete structure or a fill material consisting of silty sand to sandy silt with some crushed stone and traces of clay, underlain by shaley till, followed by shale bedrock. Bedrock was encountered at approximately 2.29 to 3.07 mbgs.

A petroleum hydrocarbon odour was noted in the native till layer at BH1-22. No other signs of potential contamination were identified in the remaining boreholes during the field program. The boreholes were terminated in shale bedrock at a maximum depth of 6.38 mbgs.

4.3 Field Screening Measurements

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

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

The PID readings were found to range from 0 to 27.5 ppm in the soil samples obtained.

Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1. The results of the vapour survey are presented on the Soil Profile and Test Data sheets.

4.4 Groundwater Monitoring Well Installation

Groundwater monitoring wells were installed in six (6) boreholes placed on the Phase II Property. The monitoring wells consisted of 30 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.

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
BH1-22	57.87	3.66	2.16-3.66	1.83-3.66	0.13-1.83	Flushmount
BH2-22	57.19	5.97	2.97-5.97	2.44-5.97	0.13-2.44	Flushmount
BH3-22	57.18	4.62	3.12-4.62	2.74-4.62	0.13-2.74	Flushmount
BH4-22	58.64	6.15	2.59-5.69	2.44-5.69	0.13-1.83	Flushmount
BH5-22	57.85	6.38	2.39-5.39	2.34-5.39	0.13-2.34	Flushmount
BH6-22	57.60	6.15	2.62-5.62	2.03-5.62	0.13-2.03	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 Field Measurement of Water Quality Parameters

The groundwater monitoring wells from the April 2022 program were sampled on April 14, 2022.

The water quality parameters were measured in the field using a multi-parameter analyzer. Parameters measured in the field included temperature, pH and electrical conductivity.

Field parameters were measured after each well volume purged. Wells were purged prior to sampling until at least three well volumes had been removed or the field parameters were relatively stable. Stabilized field parameter values are summarized in Table 3.

Table 3: Field Measurement of Water Quality Parameters

Well ID	Temperature (°C)	pH	Electrical Conductivity (µS/cm)
BH1-22	8.2	9.26	2,391
BH2-22	9.7	8.7	3,999
BH3-22	8.5	8.47	2,858

A petroleum hydrocarbon was noted in BH1-22. No other signs of a sheen or odour were identified in the remaining monitoring wells sampled. Field parameters were not measured during the June 2022 program.

4.7 Analytical Testing

Based on the guidelines outlined in the Sampling and Analysis Plan in Appendix 1, the soil and groundwater samples submitted for analytical testing are presented in Tables 3 and 4.

Table 3. Soil Samples Submitted

Sample ID	Sample Depth and Stratigraphic Unit	Parameters Analyzed							Rationale
		BTEX	PHC (F_1-F_4)	PAHs	VOCs[1]	Metals	Hg,CrVI	PCBs	
April 8, 2022									
BH1-22-SS2	0.76-1.37m Fill			X		X			Sample selected to test the quality of fill material.
BH1-22-SS4	2.29-2.89m Native	X	X		X	X	X		Sample selected for analysis based on vapour reading and location just below the water table.
BH2-22-AU1	0.20-0.30m Fill			X		X			Sample selected to test the quality of fill material.
BH3-22-SS2	0.76-1.37m Fill			X		X			Sample selected to test the quality of fill material.
DUP	2.29-2.89m Native	X			X				Duplicate soil sample for QA/QC purpose (BH1-22-SS4).
June 17, 2022									
G1	0-0.05m Fill	X	X					X	Sample selected for analysis based on the presence of a concrete pad-mounted transformer.

Table 3. Soil Samples Submitted

Sample ID	Sample Depth and Stratigraphic Unit	Parameters Analyzed							Rationale
		BTEX	PHC (F_1-F_4)	PAHs	VOCs[1]	Metals	Hg,CrVI	PCBs	
BH4-22-AU1	0.30-0.61m Fill			X		X			Sample selected to test the quality of fill material.
BH5-22-AU1	0.30-0.61 Fill					X			Sample selected to test the quality of fill material.
BH5-22-SS3	1.52-2.13m Native	X	X		X				Sample selected for analysis based on the former use of the site and for delineation.
BH6-22-AU1/SS2	0.30-1.37m Fill			X		X			Sample selected to test the quality of fill material.
BH6-22-SS3	1.52-2.13m Native	X	X		X				Sample selected for analysis based on the former use of the site and for delineation.

Note: [1] VOC analysis includes the BTEX group of parameters

Table 4. Groundwater Samples Submitted

Sample ID	Screened Interval	Parameters Analyzed			Rationale
		PHC (F_1-F_4)	VOCs[1]	PAHs	
April 14, 2022					
BH1-22-GW1	2.16-3.66m	X	X	X	Assessment of potential impacts on the northeastern portion of the site from the former industrial use on-site.
BH2-22-GW1	2.97-5.97m	X	X	X	Assessment of potential impacts on the northwest portion of the site due to the former industrial use on- and off-site.
BH3-22-GW1	3.12-4.62m	X	X	X	Assessment of potential impacts on the southwest corner of the site due to the former land use off-site.
DUP	2.16-3.66m		X		Duplicate groundwater sample for QA/QC purpose (BH1-22-GW1).

Note: [1] VOC analysis includes the BTEX group of parameters

Table 4. Groundwater Samples Submitted

Sample ID	Screened Interval	Parameters Analyzed			Rationale
		PHC (F_1-F_4)	VOCs[1]	PAHs	
June 27, 2022					
BH4-22-GW1	2.59-5.69m	X	X		Assessment of potential impacts due to the former industrial use on- and off-site.
BH5-22-GW1	2.39-5.39m	X	X		Assessment of potential impacts due to the former industrial use on- and off-site.
BH6-22-GW1	2.62-5.62m	X	X		Assessment of potential impacts due to the former industrial use on- and off-site.
BH4-102	2.59-5.69m		X		Duplicate groundwater sample for QA/QC purpose (BH4-22-GW1).

Note: [1] VOC analysis includes the BTEX group of parameters

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

4.8 Residue Management

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

4.9 Elevation Surveying

All of the borehole locations and elevations were surveyed geodetically by Paterson at the time of the subsurface investigation.

4.10 Quality Assurance and Quality Control Measures

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

The profile at the borehole locations consisted of an asphaltic concrete structure or topsoil, followed by a granular fill and/or crushed stone beneath the concrete structure or a fill material consisting of silty sand to sandy silt with some crushed stone and traces of clay, underlain by shaley till, followed by shale bedrock.

Groundwater was encountered in the till layer and bedrock at depths ranging from approximately 2.07 to 3.15m below existing grade.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling events on April 14, 2022 and on June 24, 2022, 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
BH1-22	57.87	2.07	55.80	April 14, 2022
BH2-22	57.19	2.64	54.55	April 14, 2022
BH3-22	57.18	2.60	54.58	April 14, 2022
BH4-22	58.64	3.15	55.49	June 24, 2022
BH5-22	57.85	2.62	55.23	June 24, 2022
BH6-22	57.60	2.58	55.02	June 24, 2022

Groundwater contour mapping was completed for groundwater levels measured on June 24, 2022. The groundwater contours are shown on Drawing PE5641-3–Test Hole Location Plan.

Based on the contour mapping, groundwater beneath the Phase II Property appears to flow in a westerly direction. An average horizontal hydraulic gradient of approximately 0.03m/m was calculated.

5.3 Fine-Coarse Soil Texture

Based on field soil observations, fine-grained soil standards are not applicable to the Phase II Property.

5.4 Soil: Field Screening

The vapour readings were generally less than 28 ppm in the soil samples obtained and were not considered to be indicative of potential hydrocarbon impact with the exception of soil samples BH1-22-SS4 and BH1-22-SS5. A petroleum hydrocarbon odour as well as staining was noted in these soil samples at approximately 2 mbgs. Soil samples submitted for analysis were selected based on the depth, vapour readings and observations.

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

5.5 Soil Quality

Based on the findings of the field screening, in combination with sample depth and location, a total of 10 soil samples as well as a duplicate sample were submitted for analysis of a combination of PHC (F1-F4), VOCs (includes BTEX), PAHs and/or metals, including mercury and hexavalent chromium. The results of the analytical testing, and the selected soil standards, are presented in Tables 6, 7, 8 and 9. The laboratory certificates of analysis are provided in Appendix 1.

Table 6: Analytical Test Results – Soil
BTEX and PHCs (Fractions 1 to 4)

Parameter	MDL (ug/g)	Soil Samples (µg/g)		MECP Table 3 Residential Standards (µg/g)
		April 8, 2022		
		BH1-22-SS4 (2.29-2.89m)	DUP	
Benzene	0.02	nd	nd	0.2
Ethylbenzene	0.05	nd	nd	2
Toluene	0.05	0.06	nd	2.3
Xylenes	0.05	(0.25)	(0.19)	3.1
PHC F1	7	16	NA	55
PHC F2	4	**(520)**	NA	98
PHC F3	8	**(397)**	NA	300
PHC F4	6	nd	NA	2,800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – Parameter not analyzed
- **Bold and Underlined** – Parameter exceeds the selected MECP standards
- (_) – Parameter exceeds the Table 2.1 Residential Standards

Table 6 Continued: Analytical Test Results – Soil
BTEX, PHCs (Fractions 1 to 4) and PCBs

Parameter	MDL (ug/g)	Soil Samples (µg/g) June 17, 2022			MECP Table 3 Residential Standards (µg/g)
		G1 (0-0.30m)	BH5-22-SS3 (1.52-2.13m)	BH6-22-SS3 (1.52-2.13m)	
Benzene	0.02	nd	nd	nd	0.2
Ethylbenzene	0.05	nd	nd	nd	2
Toluene	0.05	nd	nd	nd	2.3
Xylenes	0.05	nd	nd	nd	3.1
PHC F1	7	nd	nd	nd	55
PHC F2	4	nd	(16)	(15)	98
PHC F3	8	19	38	20	300
PHC F4	6	nd	12	15	2,800
PCBs	0.05	nd	NA	NA	0.35

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – Parameter not analyzed
- **Bold and Underlined** – Parameter exceeds the selected MECP standards
- ( ) – Parameter exceeds the Table 2.1 Residential Standards

BTEX and PHC concentrations were identified in the soil samples analyzed. PHC fractions F2 and F3 were identified in soil sample BH1-22-SS4 in excess the selected MECP Table 3 Residential Standards. The remaining results complied with the selected standards.

No detectable PCB concentration was identified in the grab sample (G1).

Concentrations of xylenes, PHCs-F2 and F3 exceeded the Excess Soil Standards, Table 2.1 Residential Standards.

Table 7: Analytical Test Results – Soil
Metals

Parameter	MDL (µg/g)	Soil Sample (µg/g) April 8, 2022				MECP Table 3 Residential Standards (µg/g)
		BH1-22-SS2 (0.76-1.37m)	BH1-22-SS4 (2.29-2.89m)	BH2-22-AU1 (0.2-0.30m)	BH3-22-SS2 (0.76-1.37m)	
Antimony	1.0	nd	nd	nd	nd	7.5
Arsenic	1.0	5.1	9.2	9.2	10.7	18
Barium	1.0	37.1	86.8	81.2	67.9	390
Beryllium	0.5	0.5	1.2	1.0	0.7	4
Boron	5.0	5.0	7.7	6.7	5.3	120
Cadmium	0.5	nd	1.0	0.8	nd	1.2
Chromium VI	0.2	NA	nd	NA	NA	160
Chromium	5.0	15.2	24.3	22.5	20.1	8
Cobalt	1.0	10.6	**(23.0)**	17.8	12.1	22
Copper	5.0	21.3	48.5	47.9	32.5	140
Lead	1.0	11.2	15.3	57.0	45.2	120
Mercury	0.1	NA	nd	NA	NA	0.27
Molybdenum	1.0	3.1	**(8.0)**	6.5	5.0	6.9
Nickel	5.0	31.6	75.1	60.2	38.5	100
Selenium	1.0	nd	2.0	nd	nd	2.4
Silver	0.3	nd	nd	nd	nd	20
Thallium	1.0	nd	1.0	nd	nd	1
Uranium	1.0	1.2	2.9	2.2	2.1	23
Vanadium	10.0	24.9	41.7	36.6	30.4	86
Zinc	20.0	36.2	107	117	96.4	340

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – Parameter not analyzed
- **Bold and Underlined** – Parameter exceeds the selected MECP standards
- (_) – Parameter exceeds the Table 2.1 Residential Standards

Table 7 Continued: Analytical Test Results – Soil
Metals

Parameter	MDL (µg/g)	Soil Sample (µg/g) June 17, 2022			MECP Table 3 Residential Standards (µg/g)
		BH4-22-AU1 (0.3-0.61m)	BH5-22-AU1 (0.3-0.61m)	BH6-22-AU1/SS2 (0.3-1.07m)	
Antimony	1.0	nd	nd	nd	7.5
Arsenic	1.0	2.4	4.8	11.7	18
Barium	1.0	69.2	59.0	62.6	390
Beryllium	0.5	nd	0.5	0.6	4
Boron	5.0	nd	5.7	5.6	120
Cadmium	0.5	0.5	nd	nd	1.2
Chromium	5.0	16.0	18.4	21.2	160
Cobalt	1.0	4.6	7.4	9.4	22
Copper	5.0	13.8	19.3	24.0	140
Lead	1.0	22.8	24.2	28.3	120
Molybdenum	1.0	nd	2.1	2.8	6.9
Nickel	5.0	10.2	22.6	29.0	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	1.0	23
Vanadium	10.0	23.1	26.0	28.0	86
Zinc	20.0	43.6	44.4	104	340

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

With the exception of cobalt and molybdenum in Sample BH1-22-SS4, all other metal concentrations identified in the soil samples analyzed comply with the MECP Table 3 Residential Standards. Based on our experience, it is likely that these parameter concentrations are indicative of naturally occurring levels in the shaley till/shale bedrock; however, further investigation would be required to validate this.

The cobalt and molybdenum concentrations also exceed Excess Soil Standards, Table 2.1 Residential Standards.

Table 8: Analytical Test Results – Soil
PAHs

Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 3 Residential Standards (µg/g)
		April 8, 2022			
		BH1-22-SS2 (0.76-1.37m)	BH2-22-AU1 (0.2-0.30m)	BH3-22-SS2 (0.76-1.37m)	
Acenaphthene	0.02	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	0.15
Anthracene	0.02	nd	0.03	0.04	0.67
Benzo[a]anthracene	0.02	nd	0.09	0.10	0.5
Benzo[a]pyrene	0.02	nd	0.10	0.09	0.3
Benzo[b]fluoranthene	0.02	nd	0.10	0.11	0.78
Benzo[g,h,i]perylene	0.02	nd	0.06	0.06	6.6
Benzo[k]fluoranthene	0.02	nd	0.05	0.06	0.78
Chrysene	0.02	nd	0.10	0.11	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	0.1
Fluoranthene	0.02	nd	0.21	0.24	0.69
Fluorene	0.02	nd	nd	nd	62
Indeno [1,2,3-cd] pyrene	0.02	nd	0.06	0.05	0.38
1-Methylnaphthalene	0.02	nd	nd	nd	0.99
2-Methylnaphthalene	0.02	nd	nd	nd	0.99
Methylnaphthalene (1&2)	0.04	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	0.01	0.6
Phenanthrene	0.02	nd	0.14	0.15	6.2
Pyrene	0.02	nd	0.20	0.19	78

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

Table 8 Continued: Analytical Test Results – Soil
PAHs

Parameter	MDL (µg/g)	Soil Samples (µg/g)		MECP Table 3 Residential Standards (µg/g)
		June 17, 2022		
		BH4-22-AU1 (0.3-0.61m)	BH6-22-AU1/SS2 (0.3-1.37m)	
Acenaphthene	0.02	nd	0.09	7.9
Acenaphthylene	0.02	nd	nd	0.15
Anthracene	0.02	0.12	(0.23)	0.67
Benzo[a]anthracene	0.02	0.08	**(0.64)**	0.5
Benzo[a]pyrene	0.02	0.08	**(0.65)**	0.3
Benzo[b]fluoranthene	0.02	0.09	0.63	0.78
Benzo[g,h,i]perylene	0.02	0.04	0.31	6.6
Benzo[k]fluoranthene	0.02	0.04	0.34	0.78
Chrysene	0.02	0.10	0.77	7
Dibenzo[a,h]anthracene	0.02	nd	0.05	0.1
Fluoranthene	0.02	0.16	**(1.43)**	0.69
Fluorene	0.02	nd	0.10	62
Indeno [1,2,3-cd] pyrene	0.02	0.03	0.29	0.38
1-Methylnaphthalene	0.02	nd	nd	0.99
2-Methylnaphthalene	0.02	nd	nd	0.99
Methylnaphthalene (1&2)	0.04	nd	nd	0.99
Naphthalene	0.01	nd	0.04	0.6
Phenanthrene	0.02	0.11	1.05	6.2
Pyrene	0.02	0.13	1.16	78

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – Parameter exceeds the selected MECP standards
- (_) – Parameter exceeds the Table 2.1 Residential Standards

With the exception of BH1-22-SS2, PAH concentrations were detected in all of the soil samples analyzed. Three (3) PAH parameter concentrations in soil sample BH6-22-AU/SS2 were in excess of the MECP Table 3 Residential Standards.

The concentrations of four (4) PAH parameters are in excess of the Excess Soil Standards, Table 2.1 Residential Standards.

Table 9: Analytical Test Results – Soil - VOCs

Parameter	MDL (ug/g)	Soil Samples (µg/g) April 8, 2022		MECP Table 3 Residential Standards (µg/g)
		BH1-22-SS4 (2.29-2.89m)	DUP	
Acetone	0.50	nd	nd	16
Benzene	0.02	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	13
Bromoform	0.05	nd	nd	0.27
Bromomethane	0.05	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	2.4
Chloroform	0.05	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	19
1,2-Dichlorobenzene	0.05	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	3.5
1,2-Dichloroethane	0.05	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	0.05
cis-1,2-Dichloroethylene	0.05	nd	nd	3.4
trans-1,2-Dichloroethylene	0.05	nd	nd	0.084
1,2-Dichloropropane	0.05	nd	nd	0.05
1,3-Dichloropropene, total	0.05	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	2
Ethylene dibromide (dibromoethane, 1,2-)	0.05	nd	nd	0.05
Hexane	0.05	nd	nd	2.8
Methyl Ethyl Ketone (2-Butanone)	0.50	nd	nd	16
Methyl Isobutyl Ketone	0.50	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	0.1
Styrene	0.05	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	0.28
Toluene	0.05	0.06	nd	2.3
1,1,1-Trichloroethane	0.05	nd	nd	0.38
1,1,2-Trichloroethane	0.05	nd	nd	0.05
Trichloroethylene	0.05	nd	nd	0.061
Trichlorofluoromethane	0.05	nd	nd	4
Vinyl Chloride	0.02	nd	nd	0.02
Xylenes, total	0.05	(0.25)	(0.19)	3.1

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- (_) – Parameter exceeds the Table 2.1 Residential Standards

Table 9 Continued: Analytical Test Results – Soil – VOCs

Parameter	MDL (ug/g)	Soil Samples (µg/g) June 17, 2022		MECP Table 3 Residential Standards (µg/g)
		BH5-22-SS3 (1.52-2.13m)	BH6-22-SS3 (1.52-2.13m)	
Acetone	0.50	nd	nd	16
Benzene	0.02	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	13
Bromoform	0.05	nd	nd	0.27
Bromomethane	0.05	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	2.4
Chloroform	0.05	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	19
1,2-Dichlorobenzene	0.05	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	3.5
1,2-Dichloroethane	0.05	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	0.05
cis-1,2-Dichloroethylene	0.05	nd	nd	3.4
trans-1,2-Dichloroethylene	0.05	nd	nd	0.084
1,2-Dichloropropane	0.05	nd	nd	0.05
1,3-Dichloropropene, total	0.05	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	2
Ethylene dibromide (dibromoethane, 1,2-)	0.05	nd	nd	0.05
Hexane	0.05	nd	nd	2.8
Methyl Ethyl Ketone (2-Butanone)	0.50	nd	nd	16
Methyl Isobutyl Ketone	0.50	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	0.1
Styrene	0.05	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	0.28
Toluene	0.05	nd	nd	2.3
1,1,1-Trichloroethane	0.05	nd	nd	0.38
1,1,2-Trichloroethane	0.05	nd	nd	0.05
Trichloroethylene	0.05	nd	nd	0.061
Trichlorofluoromethane	0.05	nd	nd	4
Vinyl Chloride	0.02	nd	nd	0.02
Xylenes, total	0.05	nd	nd	3.1

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

All VOC parameter concentrations comply with the MECP Table 3 Residential Standards. With the exception of xylene concentrations in BH1-22-SS4, all other VOC parameters comply with the Table 2.1 Residential Standards.

The maximum concentrations of analyzed parameters in the soil at the Phase II Property are summarized below in Table 10.

Table 10: Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Borehole	Depth Interval (m BGS)
Toluene	0.06	BH1-22-SS4	2.29-2.89
Xylenes	0.25		
PHC F1	16		
PHC F2	**520**		
PHC F3	**397**		
PHC F4	15	BH6-22-SS3	1.52-2.13
Arsenic	10.7	BH3-22-SS2	0.76-1.37
Barium	86.8	BH1-22-SS4	2.29-2.89
Beryllium	1.2		
Boron	7.7		
Cadmium	1.0		
Chromium VI	24.3		
Cobalt	**23.0**		
Copper	48.5		
Lead	57.0	BH2-22-AU1	0.2-0.30
Molybdenum	**8.0**	BH1-22-SS4	2.29-2.89
Nickel	75.1		
Selenium	2.0		
Thallium	1.0		
Uranium	2.9	BH1-22-SS4	2.29-2.89
Vanadium	41.7		
Zinc	117	BH2-22-AU1	0.2-0.30
Acenaphthene	0.09	BH6-22-AU1/SS2	0.3-1.37
Anthracene	(0.23)		
Benzo[a]anthracene	**(0.64)**		
Benzo[a]pyrene	**(0.65)**		
Benzo[b]fluoranthene	0.63		
Benzo[g,h,i]perylene	0.31		
Benzo[k]fluoranthene	0.34		
Chrysene	0.77		
Dibenzo[a,h]anthracene	0.05		
Fluoranthene	**(1.43)**		
Fluorene	0.10		
Indeno [1,2,3-cd] pyrene	0.29		
1-Methylnaphthalene	nd		
2-Methylnaphthalene	nd		
Methylnaphthalene (1&2)	nd		
Naphthalene	0.04		
Phenanthrene	1.05		
Pyrene	1.16		

All other parameter concentrations were not detected above the laboratory detection limits.

5.6 Groundwater Quality

Groundwater samples from all of the monitoring wells installed on the Phase II Property were submitted for laboratory analysis of BTEX, PHCs (fraction F1-F4), PAHs and/or VOCs. The groundwater samples were obtained from the screened intervals noted on Table 2. The results of the analytical testing are presented below in Tables 11, 12 and 13. The laboratory certificates of analysis are provided in Appendix 1.

Table 11: Analytical Test Results – Groundwater
BTEX and PHCs (Fractions 1 to 4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)				MECP Table 3 Standards (µg/L)
		April 14, 2022				
		BH1-22-GW (2.16-3.66m)	BH2-22-GW (2.97-5.97m)	BH3-22-GW (3.12-4.62m)	DUP	
Benzene	0.5	nd	nd	nd	nd	44
Ethylbenzene	0.5	nd	nd	nd	nd	2300
Toluene	0.5	nd	nd	nd	nd	18000
Xylenes	0.5	nd	nd	nd	nd	4200
PHC F1	25	nd	nd	nd	NA	750
PHC F2	100	nd	nd	nd	NA	150
PHC F3	100	nd	nd	nd	NA	500
PHC F4	100	nd	nd	nd	NA	500

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

Table 11 Continued: Analytical Test Results – Groundwater
BTEX and PHCs (Fractions 1 to 4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			MECP Table 3 Standards (µg/L)
		June 24, 2022			
		BH4-22-GW1 (2.69-5.69m)	BH5-22-GW1 (2.39-5.39m)	BH6-22-GW1 (2.62-5.62m)	
Benzene	0.5	nd	nd	nd	44
Ethylbenzene	0.5	nd	nd	nd	2300
Toluene	0.5	nd	nd	nd	18000
Xylenes	0.5	nd	nd	nd	4200
PHC F1	25	nd	nd	nd	750
PHC F2	100	nd	nd	nd	150
PHC F3	100	nd	nd	nd	500
PHC F4	100	nd	nd	nd	500

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

No BTEX or PHC concentrations were identified in the groundwater samples analyzed. All of the groundwater samples comply with the selected MECP Table 3 Standards.

Table 12: Analytical Test Results – Groundwater
PAHs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			MECP Table 3 Standards (µg/L)
		April 14, 2022			
		BH1-22-GW (2.16-3.66m)	BH2-22-GW (2.97-5.97m)	BH3-22-GW (3.12-4.62m)	
Acenaphthene	0.05	nd	nd	nd	600
Acenaphthylene	0.05	nd	nd	nd	1.8
Anthracene	0.01	nd	nd	nd	2.4
Benzo[a]anthracene	0.01	nd	nd	nd	4.7
Benzo[a]pyrene	0.01	nd	nd	nd	0.81
Benzo[b]fluoranthene	0.05	nd	nd	nd	0.75
Benzo[g,h,i]perylene	0.05	nd	nd	nd	0.2
Benzo[k]fluoranthene	0.05	nd	nd	nd	0.4
Chrysene	0.05	nd	nd	nd	1
Dibenzo[a,h]anthracene	0.05	nd	nd	nd	0.52
Fluoranthene	0.01	nd	nd	nd	130
Fluorene	0.05	nd	nd	nd	400
Indeno [1,2,3-cd] pyrene	0.05	nd	nd	nd	0.2
1-Methylnaphthalene	0.05	nd	nd	nd	1800
2-Methylnaphthalene	0.05	nd	nd	nd	1800
Methylnaphthalene (1&2)	0.10	nd	nd	nd	1800
Naphthalene	0.05	nd	nd	nd	1400
Phenanthrene	0.05	nd	nd	nd	580
Pyrene	0.01	nd	nd	nd	68

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

No PAHs were identified in the groundwater samples analyzed. All of the groundwater samples comply with the selected MECP Table 3 Standards.

Table 13: Analytical Test Results – Groundwater - VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) April 14, 2022				MECP Table 3 Standards (µg/L)
		BH1-22-GW (2.16-3.66m)	BH2-22-GW (2.97-5.97m)	BH3-22-GW (3.12-4.62m)	DUP	
Acetone	5.0	nd	nd	nd	nd	130000
Benzene	0.5	nd	nd	nd	nd	44
Bromodichloromethane	0.5	nd	nd	nd	nd	85000
Bromoform	0.5	nd	nd	nd	nd	380
Bromomethane	0.5	nd	nd	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	nd	nd	630
Chloroform	0.5	nd	nd	nd	nd	2.4
Dibromochloromethane	0.5	nd	nd	nd	nd	82000
Dichlorodifluoromethane	1.0	nd	nd	nd	nd	4400
1,2-Dichlorobenzene	0.5	nd	nd	nd	nd	4600
1,3-Dichlorobenzene	0.5	nd	nd	nd	nd	9600
1,4-Dichlorobenzene	0.5	nd	nd	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	nd	16
1,3-Dichloropropene, total	0.5	nd	nd	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	nd	nd	2300
Ethylene dibromide	0.2	nd	nd	nd	nd	0.25
Hexane	1.0	nd	nd	nd	nd	51
Methyl Ethyl Ketone	5.0	nd	nd	nd	nd	470000
Methyl Isobutyl Ketone	5.0	nd	nd	nd	nd	140000
Methyl tert-butyl ether	2.0	nd	nd	nd	nd	190
Methylene Chloride	5.0	nd	nd	nd	nd	610
Styrene	0.5	nd	nd	nd	nd	1300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	nd	nd	1.6
Toluene	0.5	nd	nd	nd	nd	18000
1,1,1-Trichloroethane	0.5	nd	nd	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	nd	nd	1.6
Trichlorofluoromethane	1.0	nd	nd	nd	nd	2500
Vinyl Chloride	0.5	nd	nd	nd	nd	0.5
Xylenes, total	0.5	nd	nd	nd	nd	4200

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

Table 13 Continued: Analytical Test Results – Groundwater - VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) June 24, 2022				MECP Table 3 Standards (µg/L)
		BH4-22-GW1 (2.69-5.69m)	BH5-22-GW1 (2.39-5.39m)	BH6-22-GW1 (2.62-5.62m)	BH4-102 (2.69-5.69m)	
Acetone	5.0	nd	nd	nd	nd	130000
Benzene	0.5	nd	nd	nd	nd	44
Bromodichloromethane	0.5	nd	nd	nd	nd	85000
Bromoform	0.5	nd	nd	nd	nd	380
Bromomethane	0.5	nd	nd	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	nd	nd	630
Chloroform	0.5	**3.8**	nd	0.5	**3.6**	2.4
Dibromochloromethane	0.5	nd	nd	nd	nd	82000
Dichlorodifluoromethane	1.0	nd	nd	nd	nd	4400
1,2-Dichlorobenzene	0.5	nd	nd	nd	nd	4600
1,3-Dichlorobenzene	0.5	nd	nd	nd	nd	9600
1,4-Dichlorobenzene	0.5	nd	nd	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	nd	16
1,3-Dichloropropene, total	0.5	nd	nd	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	nd	nd	2300
Ethylene dibromide	0.2	nd	nd	nd	nd	0.25
Hexane	1.0	nd	nd	nd	nd	51
Methyl Ethyl Ketone	5.0	nd	nd	nd	nd	470000
Methyl Isobutyl Ketone	5.0	nd	nd	nd	nd	140000
Methyl tert-butyl ether	2.0	nd	nd	nd	nd	190
Methylene Chloride	5.0	nd	nd	nd	nd	610
Styrene	0.5	nd	nd	nd	nd	1300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	nd	nd	1.6
Toluene	0.5	nd	nd	nd	nd	18000
1,1,1-Trichloroethane	0.5	nd	nd	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	nd	nd	1.6
Trichlorofluoromethane	1.0	nd	nd	nd	nd	2500
Vinyl Chloride	0.5	nd	nd	nd	nd	0.5
Xylenes, total	0.5	nd	nd	nd	nd	4200

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – Parameter exceeds the selected MECP Table 3 standards

With the exception of chloroform, no other VOC concentrations were identified in the groundwater samples analyzed. The chloroform concentrations were in excess of the selected standards; however, these concentrations are considered residual, due to the use of municipal water during the coring of bedrock.

The chloroform in the groundwater is expected to readily dissipate. This well should be resampled for confirmation at a later date. Chloroform in the groundwater is therefore, not considered a contaminant of concern. All of the groundwater samples comply with the selected MECP Table 3 Standards.

All of the analyzed BTEX, PHCs, PAHs and remaining VOCs were not detected above the laboratory detection limits.

5.7 Quality Assurance and Quality Control Results

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

As per the sampling and analysis plan, duplicate samples (DUP) from BH1-22-SS4 and BH1-22-GW during the April 2022 program were obtained and analyzed for VOCs parameters both in soil and groundwater. As part of the June 2022 program, a duplicate groundwater sample (DUP) from BH4-22-GW1 was collected and analyzed for VOCs.

The relative percent different (RPD) for the original soil sample (BH1-22-SS4) and the duplicate sample (DUP) concentrations for the total xylenes was 65%. The RPD is above 20%, which is considered outside the acceptable range. It is not uncommon that smaller concentrations or low values would yield a numerical difference that would be considered large, relative to the original and duplicate values, which in turn, yields larger RPD values.

In other words, if the concentrations were higher or larger values, the difference of the two numerically, would result in a smaller value relative to the original and duplicate values, and hence, resulting in a smaller RDP value. Therefore, RPD is not reliable, quantitatively in a scenario where low concentrations would result in a large numerical difference relative to the concentrations or values used for this purpose.

No detectable VOC concentrations were identified in the original (BH1-22-GW) and duplicate groundwater samples analyzed.

The RPD for the original groundwater sample (BH4-22-GW1) and the duplicate groundwater sample (DUP) concentrations for chloroform was 5.1%. The RPD is considered to be within the acceptable range.

Based on the analytical results for the April and June 2022 subsurface programs, it is our opinion that the quality of the field data collected during these investigations are considered to be sufficient to meet the overall objectives of the Phase II-ESA.

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 under 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 II Property, on- and off-site PCAs and the resultant APECs are summarized in Table 14, along with their respective locations and contaminants of potential concern (CPCs).

Table 14. 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: Former industrial use (manufacturer of aluminum sash)	Northern portion of the Phase I Property	PCA 34 – *"Metal Fabrication,"*	On-site	VOCs PHCs (F_1-F_4) PAHs Metals Hg CrVI	Soil and/or Groundwater
APEC 2: Fill Material of Unknown Quality	Across the Phase I Property	PCA 30 – "*Importation of Fill Material of Unknown Quality,"*	On-site	PAHs Metals	Soil
APEC 3: Prescence of a concrete pad-mounted transformer	Southern side of the Phase I Property	PCA 55 – "*Transformer Manufacturing, Processing and Use*,"	On-site	PHCs (F_1-F_4) PCBs	Soil

Table 14. 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 4: Former automotive repair garage	Northern portion of the Phase I Property	PCA 52 – "*Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems,*"	On-site	BTEX PHCs (F_1-F_4) PAHs	Soil and/or Groundwater
APEC 5[1]: Application of Road Salt	Within the parking areas of the Phase I property	Other: "*Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	EC SAR	Soil
APEC 6: Former industrial sites (tannery and coal shed)	Western side of the Phase I Property	PCA 53 – "*Tannery,"* and Other: "*Coal Storage,"*	Off-site	PHCs (F_1-F_4) PAHs	Groundwater

1 – In accordance with Section 49.1 of O.Reg. 153/04, standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both. The exemption outlined in Section 49.1 is being relied upon with respect to the Phase II ESA property.

Contaminants of Potential Concern

The contaminants of potential concern (CPCs) in soil are:

- ❑ Volatile Organic Compounds (VOCs), which include BTEX parameters;
- ❒ Petroleum hydrocarbons (PHCs, Fractions F_1-F_4);
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs);
- ❒ Polychlorinated Biphenyls (PCBs);
- ❒ Metals, including Arsenic (As), Antimony (Sb) and Selenium (Se); and
- ❒ Mercury (Hg), and Hexavalent Chromium (CrVI).

The contaminants of potential concern (CPCs) in groundwater are:

- ❒ Volatile Organic Compounds (VOCs), which include BTEX parameters;
- ❒ Petroleum hydrocarbons (PHCs, Fractions F_1-F_4); and
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs).

Subsurface Structures and Utilities

With the exception of the basement, underground services and utilities, there are no other known subsurface structures on the Phase II Property. Underground utilities include natural gas, water and sewer services, and enter the Phase II Property from St. Paul Street and Desrosiers Street. The Phase II Property is situated in a municipally serviced area.

Based on standard practice for subsurface utility installation, service trenches are expected to be present approximately 1 to 2 m below existing grade. In general, trench backfill may provide a preferential pathway for contaminant transport if the water table is at or above the base of the trenches, in which case, the water table beneath the Phase II Property is below this depth.

Based on the findings of the Phase II ESA, the underground services are not considered to have created preferential pathways for contaminant migration.

Physical Setting

Site Stratigraphy

The site stratigraphy consists of the following:

- ❒ Pavement structure consisting of asphaltic concrete over crushed stone, extending to depths ranging from approximately 0.08 to 0.20m below grade. This structure was encountered in BH1-22, BH2-22, BH5-22, and BH6-22.

- Topsoil consisting of a 0.05 m thickness was encountered in BH3-22.
- Fill material generally consisting of brown silty sand, some crushed stone or gravel and/or traces of clay was encountered in all of the boreholes. This layer extended to depths of approximately 0.53 to 1.30 mbgs.
- Glacial till consisting of silty sand to sandy silt with some or traces of clay and/or shale fragments, extended to depths of approximately 2.03 to 3.66 mbgs. BH1-22 was terminated in this layer at 3.66 mbgs. Groundwater was encountered in this stratigraphic unit in BH1-22, BH2-22 and BH3-22 in April 2022.
- Shale bedrock was encountered in BH2-22, BH3-22, BH4-22, BH5-22 and BH6-22. These boreholes were terminated at depths ranging between 4.70 to 6.38 mbgs. Groundwater was encountered in this stratigraphic unit in BH4-22, BH5-22 and BH6-22.

Hydrogeological Characteristics

Groundwater at the Phase II Property was encountered within the bedrock during the most recent groundwater sampling event in June 2022. This unit is interpreted to function as the shallow aquifer on the Phase II Property.

Water levels were measured at the Phase II Property on April 14 and June 24, 2022. Groundwater levels during April ranged in depths from approximately 2.07 to 2.64m below grade. Groundwater levels during June ranged in depths from approximately 2.58 to 3.15m below grade. Groundwater levels are expected to fluctuate throughout the year; higher water levels are typically expected during the spring compared to the water levels measured during the summer.

Groundwater contour mapping was conducted for groundwater elevations identified during the June 2022 sampling event. Groundwater flow at the Phase II Property was in a westerly direction, with an average hydraulic gradient of approximately 0.03 m/m.

Approximate Depth to Bedrock

Bedrock was encountered at approximately 2.03 to 3.07 m below the ground surface.

Approximate Depth to Water Table

Depth to water table at the Phase II Property varies between approximately 2.07 to 3.15m below existing grade.

Sections 35, 41 and 43.1 of the Regulation

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that the property, and the properties within the 250 m study area do not rely upon potable groundwater.

Section 41 of O.Reg. 153/04 does not apply to the Phase II Property, as the property is not considered an environmentally sensitive area, as the pH values at the surface and subsurface are 7.90 and 7.06, respectively.

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

Fill Placement

Fill material was identified across the Phase II Property beneath the pavement structure and extending to depths of approximately 0.53 to 1.30m below grade. The fill material generally consists of silty sand, some crushed stone or gravel, and/or traces of clay and organics.

Proposed Buildings and Other Structures

It is our understanding that the Phase II Property will be redeveloped with a residential building.

Existing Buildings and Structures

The southern half of the Phase II Property is occupied by a vacant single-storey building with a basement level. The building was constructed in the early 1970s with a concrete block foundation finished in red-brick with a flat tar-gravel style roof. The subject building was originally used for commercial purposes until 2010. From 2013 and onwards, the building was used for institutional purposes. The interior of the building was converted to an auditorium (or nave) to accommodate religious gatherings.

The northern half and west side of the Phase II Property exists as an asphaltic concrete paved parking lot associated with the building.

There are no other buildings or structures on the Phase I Property, with the exception of a concrete pad-mounted transformer situated on the south exterior wall of the building.

Water Bodies and Areas of Natural Significance

No natural waterbodies are present on the Phase II Property or on properties within a 250 m study area.

Environmental Condition

Areas Where Contaminants are Present

Based on the findings of the Phase II ESA, the native soil in the area of BH1-22 is impacted with PHCs, F2 and F3 and metal concentrations in excess of the MECP Table 3 Residential Standards. The metal concentration are however, suspected to be naturally occurring the in the shaley till layer and shale bedrock. Some PAH concentrations in excess of the selected standards were identified in the fill material at BH6-22.

The groundwater beneath the Phase II Property complies with the MECP Table 3 Standards. The soil and groundwater test results are shown on Drawings PE5641-4–Analytical Testing Plan (Soil) and PE5641-5–Analytical Testing Plan (Groundwater).

Types of Contaminants

Based on the findings of the Phase II ESA, the contaminants identified in the soil on the Phase II Property include PHCs, fractions F2 and F3, metals (cobalt and molybdenum) and PAHs (benzo[a]anthracene, benzo[a]pyrene and fluoranthene).

With the exception of chloroform, no contaminants were identified in the groundwater beneath the Phase II Property. The chloroform exceedances identified in the groundwater is a result of the municipal water used for coring bedrock. It is expected with time, that this level will dissipates and as such, chloroform is not considered a contaminant of concern.

Contaminated Media

The contaminants of concern, specifically PHCs (F2 and F3) and metals (cobalt and molybdenum) are present in the native material/glacial till, approximately 2.2 m below the existing ground surface. Some PAHs were identified in the fill material.

No contaminants of concern were identifed in the groundwater beneath the Phase II Property.

What Is Known About Areas Where Contaminants Are Present

The contaminants of concern are present in the area of the former aluminium window and sash manufacturer on the northeast portion of the Phase II Property, in the native till and fill.

Distribution and Migration of Contaminants

Based on the findings of the Phase II ESA, there has been no distribution or migration of contaminants on the Phase II Property, in that, all of the groundwater results were below the laboratory detection limit.

Discharge of Contaminants

Based on the contaminants present within the native soil, the discharge of the PHCs (F2 and F3) may be due to the presence a former furnace oil tank.

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 findings of the analytical results, the climatic and meteorological conditions are not considered to have affected contaminant distribution at the Phase II Property.

Potential for Vapour Intrusion

The potential for vapour intrusion into the subject building on the Phase II Property is not considered a concern as the subject building is presently vacant. Further, there are no VOCs in the area of the building. The Phase II Property will be remediated during redevelopment and as such, there will be no future risk of vapour intrusion.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for 258 Durocher Street, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address areas of potential environmental concern (APECs) that were identifed on the Phase II Property during the Phase I ESA.

The subsurface programs were carried out in April and June of 2022, by placing a total of six (6) boreholes across the Phase II Property. All six (6) boreholes were completed as groundwater monitoring wells.

The soil profile encountered generally consisted of an asphalt pavement or topsoil followed by a granular material, underlain by a fill material consisting of sandy silt with some crushed stone, clay and traces of organics, followed by a shaley glacial till, overlying shale bedrock. The boreholes were terminated at a maximum depth of 6.38 m below the ground surface. Soil samples were obtained from the boreholes and screened using vapour measurements along with visual and olfactory observations. A petroleum odour was noted in the field at BH1-22.

Based on the screening results in combination with sample depth and location, ten (10) soil samples and a duplicate were submitted for laboratory analysis of volatile organic compounds (VOCs), which include the BTEX group of parameters, petroleum hydrocarbons (PHCs, F_1-F_4), polycyclic aromatic hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), and/or metals, including mercury and hexavalent chromium.

Concentrations of PHC, fractions F2 and F3, metals (cobalt and molybdenum), and PAHs (benzo[a]anthracene, benzo[a]pyrene and fluoranthene) were identified in soil samples BH1-22-SS4 and BH6-22-AU1/SS2, in excess of the selected MECP Table 3 Residential Standards. However, cobalt and molybdenum are considered to be naturally occurring. All other parameter concentrations in the soil samples analyzed complied with the selected MECP Table 3 Residential Standards.

It should be noted that the fill material and native till contained parameter concentrations, including those that failed the Table 3 Residential Standards, in excess of the MECP Excess Soil Quality, Table 2.1 Residential Standards.

Groundwater samples from all six (6) monitoring wells were recovered and analyzed for VOCs (includes the BTEX group), PHCs and/or PAHs. No free-phase product was observed on the groundwater at any of the monitoring well locations during the groundwater sampling events in April and June of 2022.

With the exception of chloroform, all of the remaining parameter concentrations analyzed were below the laboratory detection limits. The chloroform exceedance identified in the groundwater is a result of the municipal water used for coring bedrock. It is expected that this level will dissipate with time. Chloroform, therefore, is not considered a contaminant of concern. All of the groundwater results comply with selected MECP Table 3 Standards.

Recommendations

Soil

Based on the analytical results, the glacial till in the northeast portion of the Phase II Property is contaminated with PHCs (F2 and F3). A couple of metal parameter concentrations (cobalt and molybdenum) were also in excess of the selected MECP Standards. Three (3) PAH parameter concentrations identified in soil sample BH6-22-AU1/SS2 (fill material), also exceeded the selected standards.

During redevelopment of the Phase II Property, the impacted soil should be removed. The excavation of the soil from the property should be monitored and confirmed by Paterson, which may be conducted in conjunction with the excavation program to segregate clean soil from impacted soil and for final confirmatory purposes.

Any soil and/or fill material in excess of the Table 3 Residential Standards will need to be disposed of at a licensed waste facility. Soil in excess of Table 2.1 Residential Standards may also need to be taken off-site to a licensed landfill, if a suitable soil-reuse site cannot be identified.

A TCLP analysis of a representative soil sample will be required prior to landfill disposal. More information can be provided in this regard prior to remediation.

Groundwater

The groundwater monitoring well, BH4-22-GW1, in which chloroform concentration in excess of the selected standards should be retested to confirm that chloroform has dissipated.

Monitoring Wells

It is our recommendation that the monitoring wells installed at the Phase II Property remain viable for future purposes. If theses monitoring wells are not going to be used in the future, they should be abandoned according to Ontario Regulation 903. The monitoring wells will be registered with the MECP under this regulation. Further information can be provided up request in this regard.

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 by the Environmental Protection Act 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.

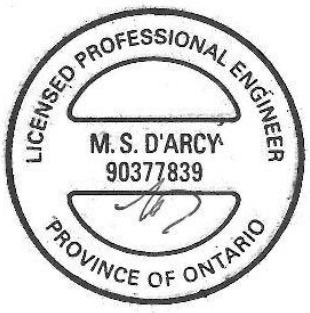
Should any conditions be encountered at the subject site and/or historical information that differ from our findings, we request that we be notified immediately in order to allow for a reassessment.

This report was prepared for the sole use of WestUrban Developments Ltd. Notification from WestUrban Developments Ltd. and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

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

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



Report Distribution:

- ❒ WestUrban Developments Ltd.
- ❒ Paterson Group

FIGURES

Figure 1 - Key Plan

Drawing PE5641-1 – Site Plan

Drawing PE5641-2 – Surrounding Land Use Plan

Drawing PE5641-3 - Test Hole Location Plan

Drawing PE5641-4 – Analytical Testing Plan – Soil

Drawing PE5641-4A –Cross section A-A' – Soil

Drawing PE5641-4B–Cross section B-B' – Soil

Drawing PE5641-5 – Analytical Testing Plan – Groundwater

Drawing PE5641-5A –Cross section A-A' –Groundwater

Drawing PE5641-5B –Cross section B-B' –Groundwater

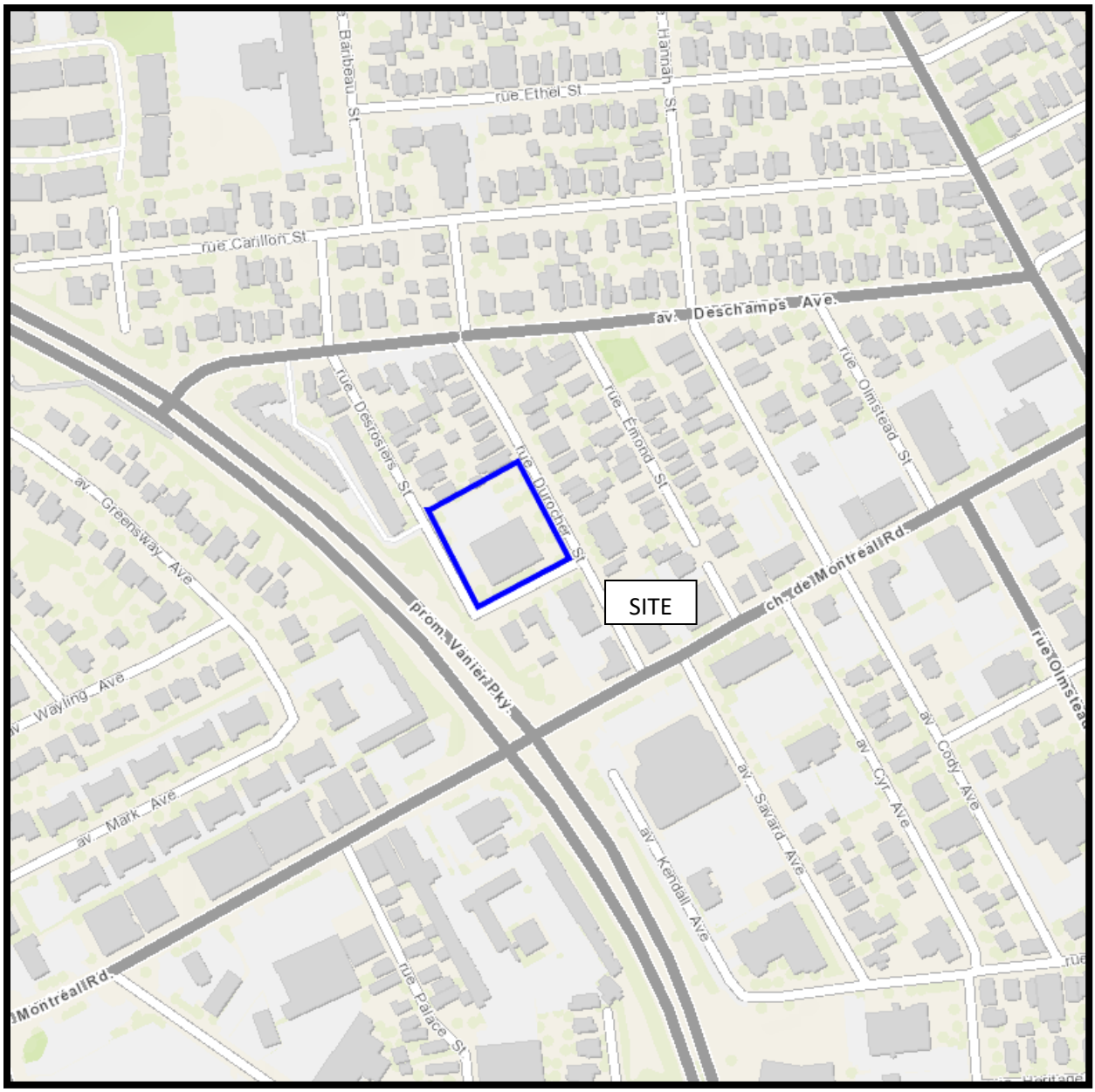
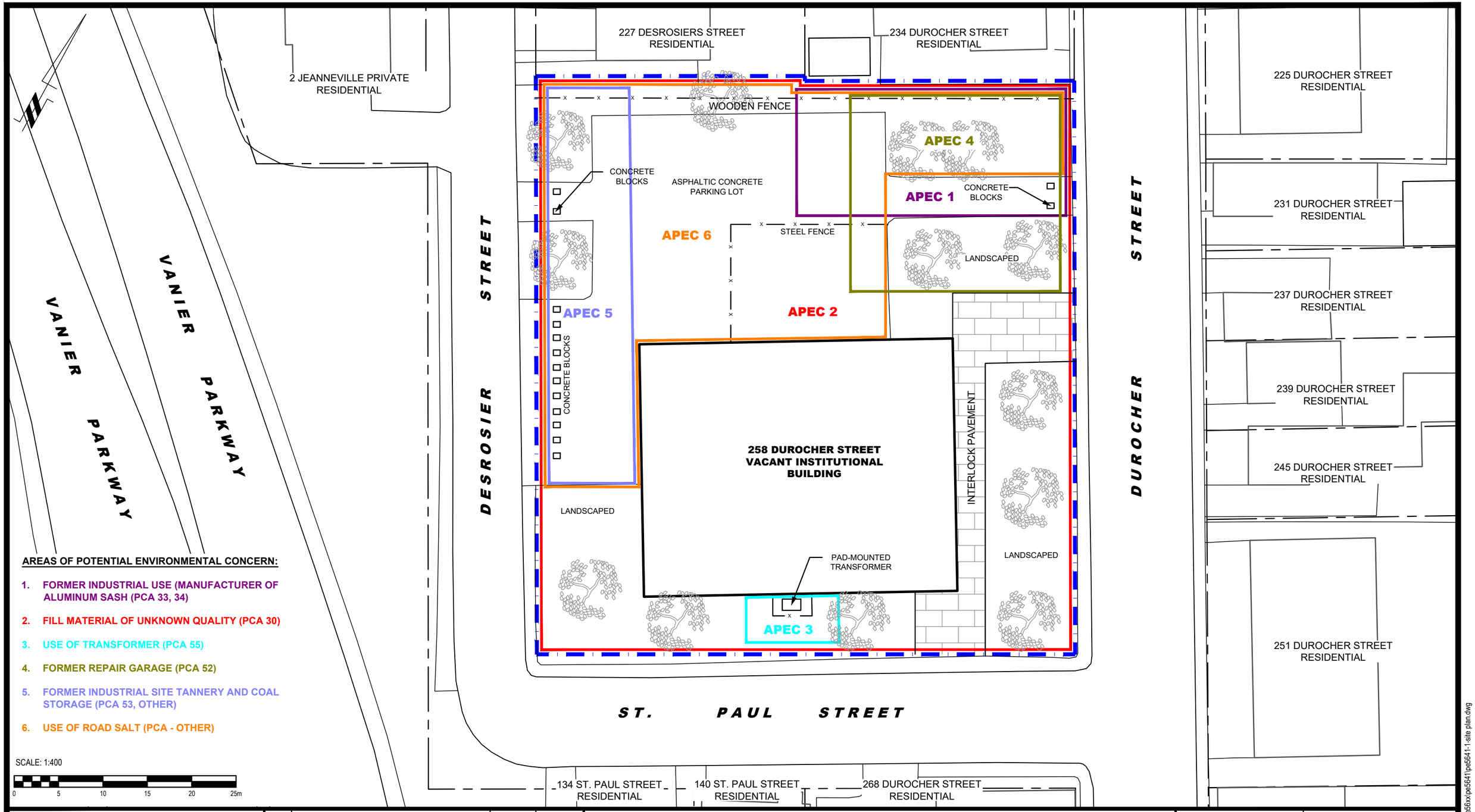


FIGURE 1

KEY PLAN



AREAS OF POTENTIAL ENVIRONMENTAL CONCERN:

1. FORMER INDUSTRIAL USE (MANUFACTURER OF ALUMINUM SASH (PCA 33, 34)
2. FILL MATERIAL OF UNKNOWN QUALITY (PCA 30)
3. USE OF TRANSFORMER (PCA 55)
4. FORMER REPAIR GARAGE (PCA 52)
5. FORMER INDUSTRIAL SITE TANNERY AND COAL STORAGE (PCA 53, OTHER)
6. USE OF ROAD SALT (PCA - OTHER)

SCALE: 1:400

0 5 10 15 20 25m

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NO.	REVISIONS	DATE	INITIAL

WESTURBAN DEVELOPMENTS LTD.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
258 DUROCHER STREET

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:400	Date: 04/2022
Drawn by: YA	Report No.: PE5641-1
Checked by: MW	Dwg. No.: PE5641-1
Approved by: MSD	Revision No.:

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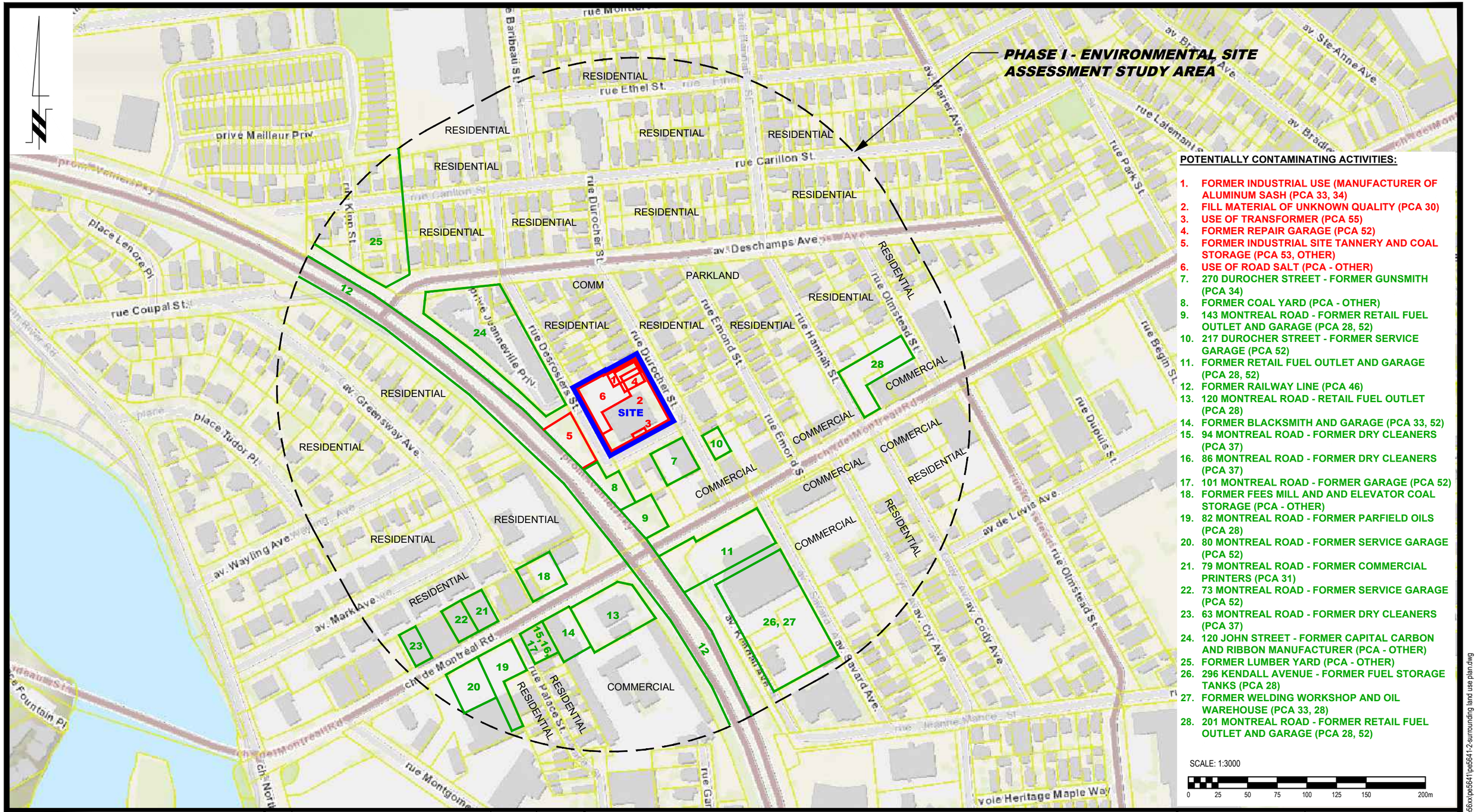

POTENTIALLY CONTAMINATING ACTIVITIES:

1. FORMER INDUSTRIAL USE (MANUFACTURER OF ALUMINUM SASH (PCA 33, 34)
2. FILL MATERIAL OF UNKNOWN QUALITY (PCA 30)
3. USE OF TRANSFORMER (PCA 55)
4. FORMER REPAIR GARAGE (PCA 52)
5. FORMER INDUSTRIAL SITE TANNERY AND COAL STORAGE (PCA 53, OTHER)
6. USE OF ROAD SALT (PCA - OTHER)
7. 270 DUROCHER STREET - FORMER GUNSMITH (PCA 34)
8. FORMER COAL YARD (PCA - OTHER)
9. 143 MONTREAL ROAD - FORMER RETAIL FUEL OUTLET AND GARAGE (PCA 28, 52)
10. 217 DUROCHER STREET - FORMER SERVICE GARAGE (PCA 52)
11. FORMER RETAIL FUEL OUTLET AND GARAGE (PCA 28, 52)
12. FORMER RAILWAY LINE (PCA 46)
13. 120 MONTREAL ROAD - RETAIL FUEL OUTLET (PCA 28)
14. FORMER BLACKSMITH AND GARAGE (PCA 33, 52)
15. 94 MONTREAL ROAD - FORMER DRY CLEANERS (PCA 37)
16. 86 MONTREAL ROAD - FORMER DRY CLEANERS (PCA 37)
17. 101 MONTREAL ROAD - FORMER GARAGE (PCA 52)
18. FORMER FEES MILL AND AND ELEVATOR COAL STORAGE (PCA - OTHER)
19. 82 MONTREAL ROAD - FORMER PARFIELD OILS (PCA 28)
20. 80 MONTREAL ROAD - FORMER SERVICE GARAGE (PCA 52)
21. 79 MONTREAL ROAD - FORMER COMMERCIAL PRINTERS (PCA 31)
22. 73 MONTREAL ROAD - FORMER SERVICE GARAGE (PCA 52)
23. 63 MONTREAL ROAD - FORMER DRY CLEANERS (PCA 37)
24. 120 JOHN STREET - FORMER CAPITAL CARBON AND RIBBON MANUFACTURER (PCA - OTHER)
25. FORMER LUMBER YARD (PCA - OTHER)
26. 296 KENDALL AVENUE - FORMER FUEL STORAGE TANKS (PCA 28)
27. FORMER WELDING WORKSHOP AND OIL WAREHOUSE (PCA 33, 28)
28. 201 MONTREAL ROAD - FORMER RETAIL FUEL OUTLET AND GARAGE (PCA 28, 52)

SCALE: 1:3000

0 25 50 75 100 125 150 200m

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NO.	REVISIONS	DATE	INITIAL

WESTURBAN DEVELOPMENTS LTD.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
258 DUROCHER STREET

OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

Scale: 1:3000	Date: 04/2022
Drawn by: YA	Report No.: PE5641-1
Checked by: MW	Dwg. No.: PE5641-2
Approved by: MSD	Revision No.:

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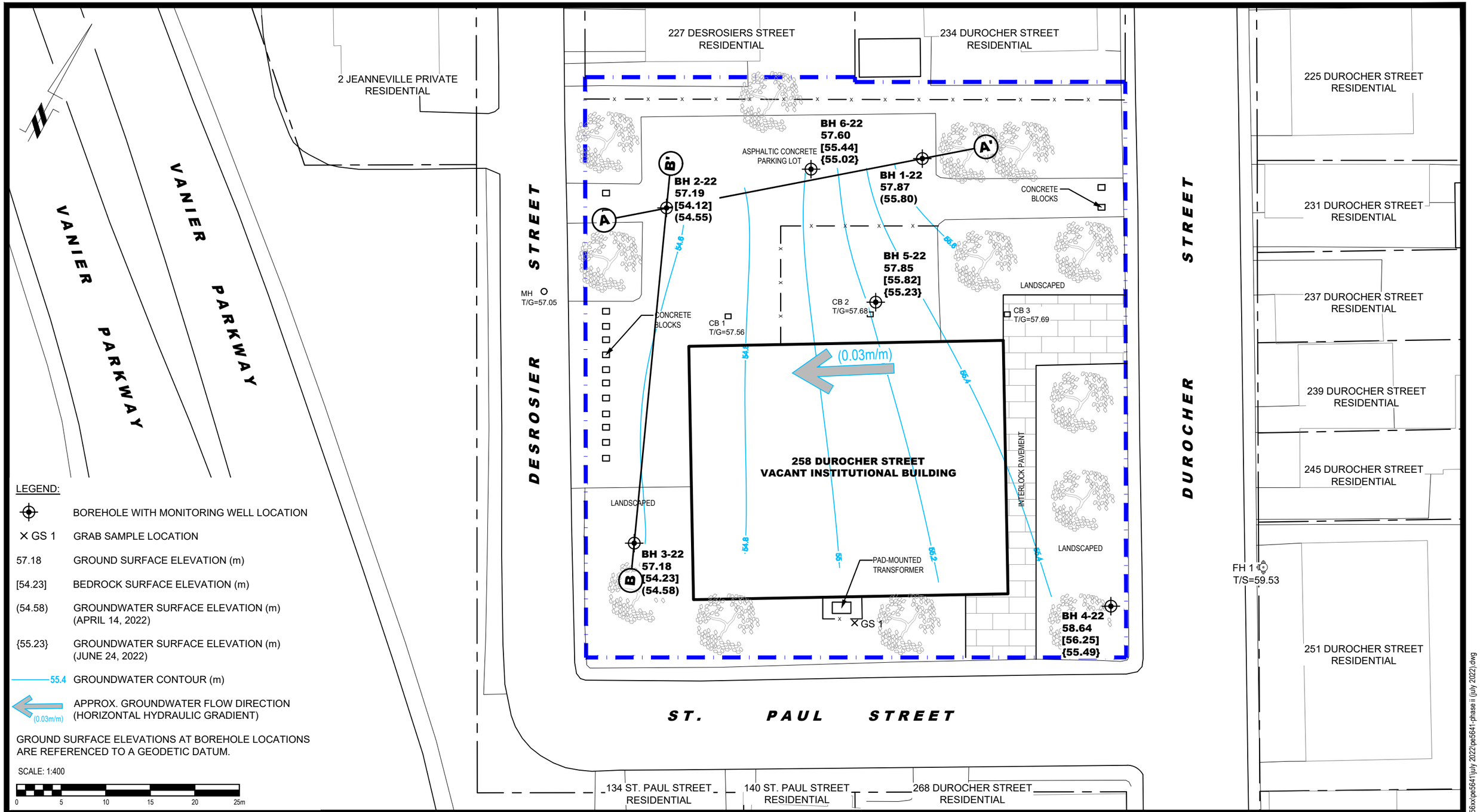

LEGEND:

⊕	BOREHOLE WITH MONITORING WELL LOCATION
× GS 1	GRAB SAMPLE LOCATION
57.18	GROUND SURFACE ELEVATION (m)
[54.23]	BEDROCK SURFACE ELEVATION (m)
(54.58)	GROUNDWATER SURFACE ELEVATION (m) (APRIL 14, 2022)
{55.23}	GROUNDWATER SURFACE ELEVATION (m) (JUNE 24, 2022)
55.4	GROUNDWATER CONTOUR (m)
(0.03m/m)	APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

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

SCALE: 1:400

0 5 10 15 20 25m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

WESTURBAN DEVELOPMENTS LTD.

SUPPLEMENTAL PHASE II - ENVIRONMENTAL SITE ASSESSMENT
258 DUROCHER STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:400	Date: 08/2022
Drawn by: YA	Report No.: PE5641-2
Checked by: MW	Dwg. No.: PE5641-3
Approved by: MSD	Revision No.:

11x17

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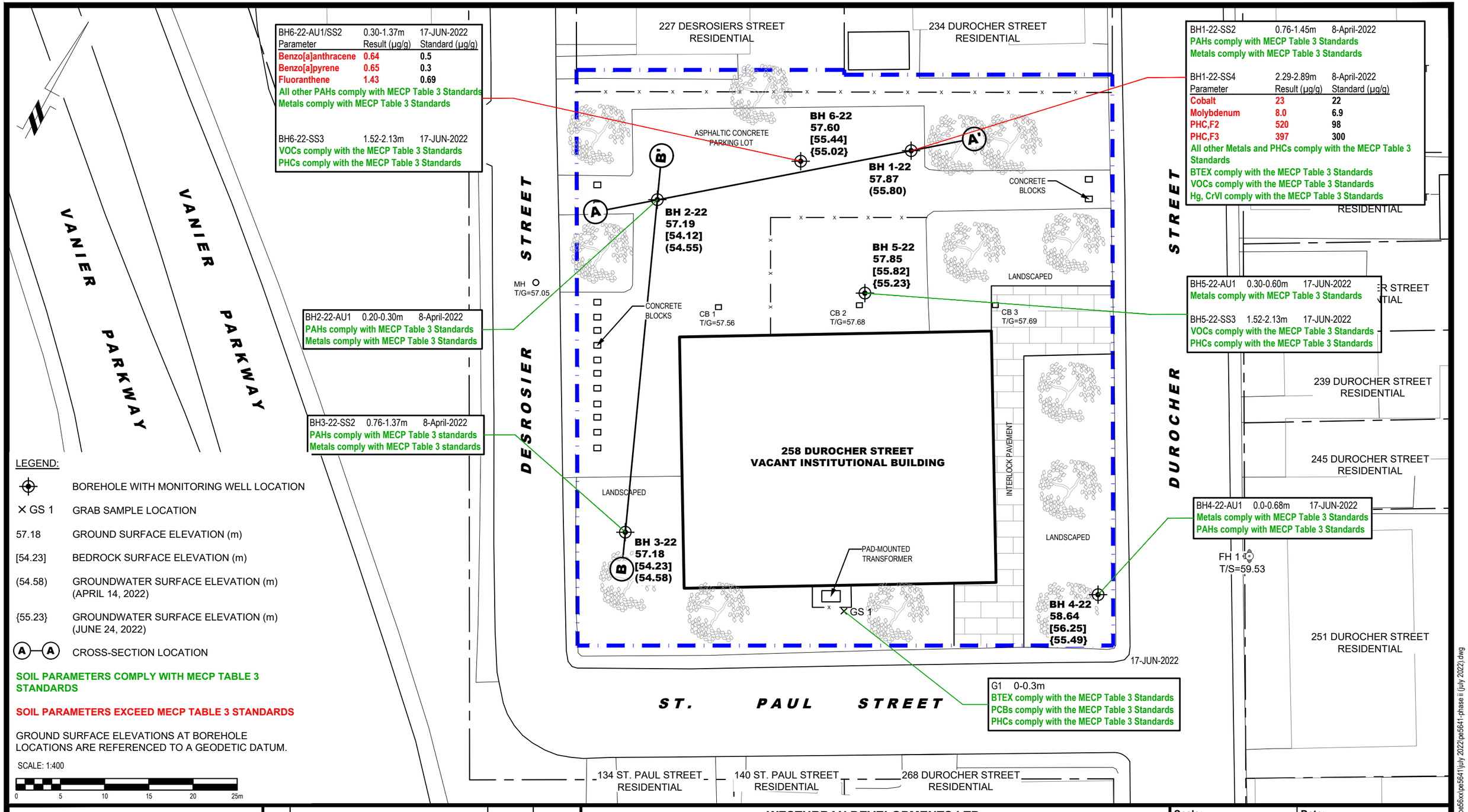

BH6-22-AU1/SS2	0.30-1.37m	17-JUN-2022
Parameter	Result (µg/g)	Standard (µg/g)
Benzo[a]anthracene	0.64	0.5
Benzo[a]pyrene	0.65	0.3
Fluoranthene	1.43	0.69

All other PAHs comply with MECP Table 3 Standards
Metals comply with MECP Table 3 Standards

BH6-22-SS3 1.52-2.13m 17-JUN-2022
VOCs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

BH2-22-AU1 0.20-0.30m 8-April-2022
PAHs comply with MECP Table 3 Standards
Metals comply with MECP Table 3 Standards

BH3-22-SS2 0.76-1.37m 8-April-2022
PAHs comply with MECP Table 3 standards
Metals comply with MECP Table 3 standards

BH1-22-SS2 0.76-1.45m 8-April-2022
PAHs comply with MECP Table 3 Standards
Metals comply with MECP Table 3 Standards

BH1-22-SS4 2.29-2.89m 8-April-2022

Parameter	Result (µg/g)	Standard (µg/g)
Cobalt	23	22
Molybdenum	8.0	6.9
PHC,F2	520	98
PHC,F3	397	300

All other Metals and PHCs comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
VOCs comply with the MECP Table 3 Standards
Hg, CrVI comply with the MECP Table 3 Standards

BH5-22-AU1 0.30-0.60m 17-JUN-2022
Metals comply with MECP Table 3 Standards

BH5-22-SS3 1.52-2.13m 17-JUN-2022
VOCs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

BH4-22-AU1 0.0-0.68m 17-JUN-2022
Metals comply with MECP Table 3 Standards
PAHs comply with MECP Table 3 Standards

G1 0-0.3m
BTEX comply with the MECP Table 3 Standards
PCBs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- × GS 1 — GRAB SAMPLE LOCATION
- 57.18 — GROUND SURFACE ELEVATION (m)
- [54.23] — BEDROCK SURFACE ELEVATION (m)
- (54.58) — GROUNDWATER SURFACE ELEVATION (m) (APRIL 14, 2022)
- {55.23} — GROUNDWATER SURFACE ELEVATION (m) (JUNE 24, 2022)
- (A)—(A) — CROSS-SECTION LOCATION

SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

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

SCALE: 1:400

0 5 10 15 20 25m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

WESTURBAN DEVELOPMENTS LTD

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

258 DUROCHER STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:400	Date: 08/2022
Drawn by: YA	Report No.: PE5641-2
Checked by: MW	Dwg. No.: PE5641-4
Approved by: MSD	Revision No.:

11x17

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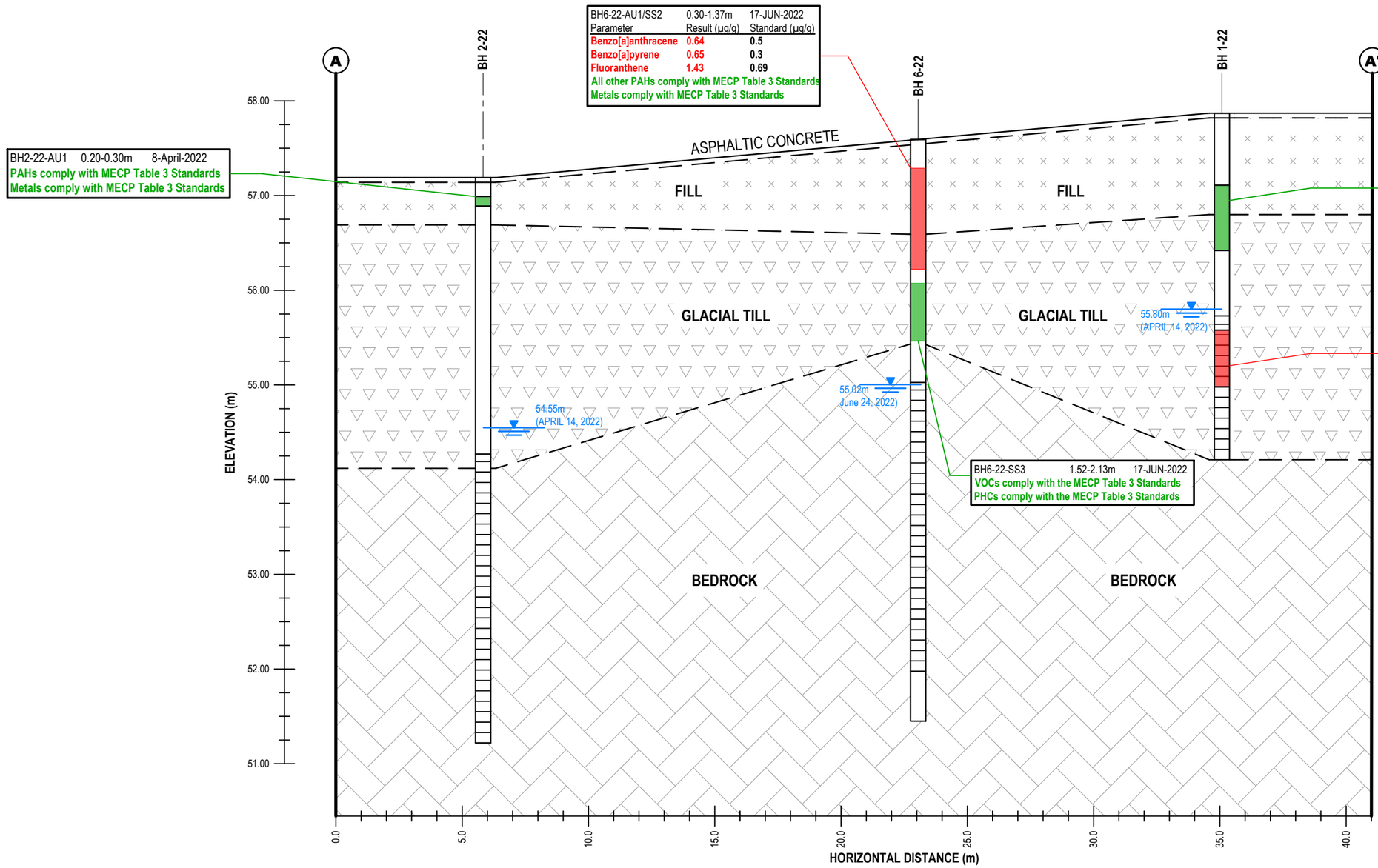

SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

WESTURBAN DEVELOPMENTS LTD.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

258 DUROCHER STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL

Scale: 1:400	Date: 08/2022
Drawn by: YA	Report No.: PE5641-2
Checked by: MW	Dwg. No.: PE5641-4A
Approved by: MSD	Revision No.:

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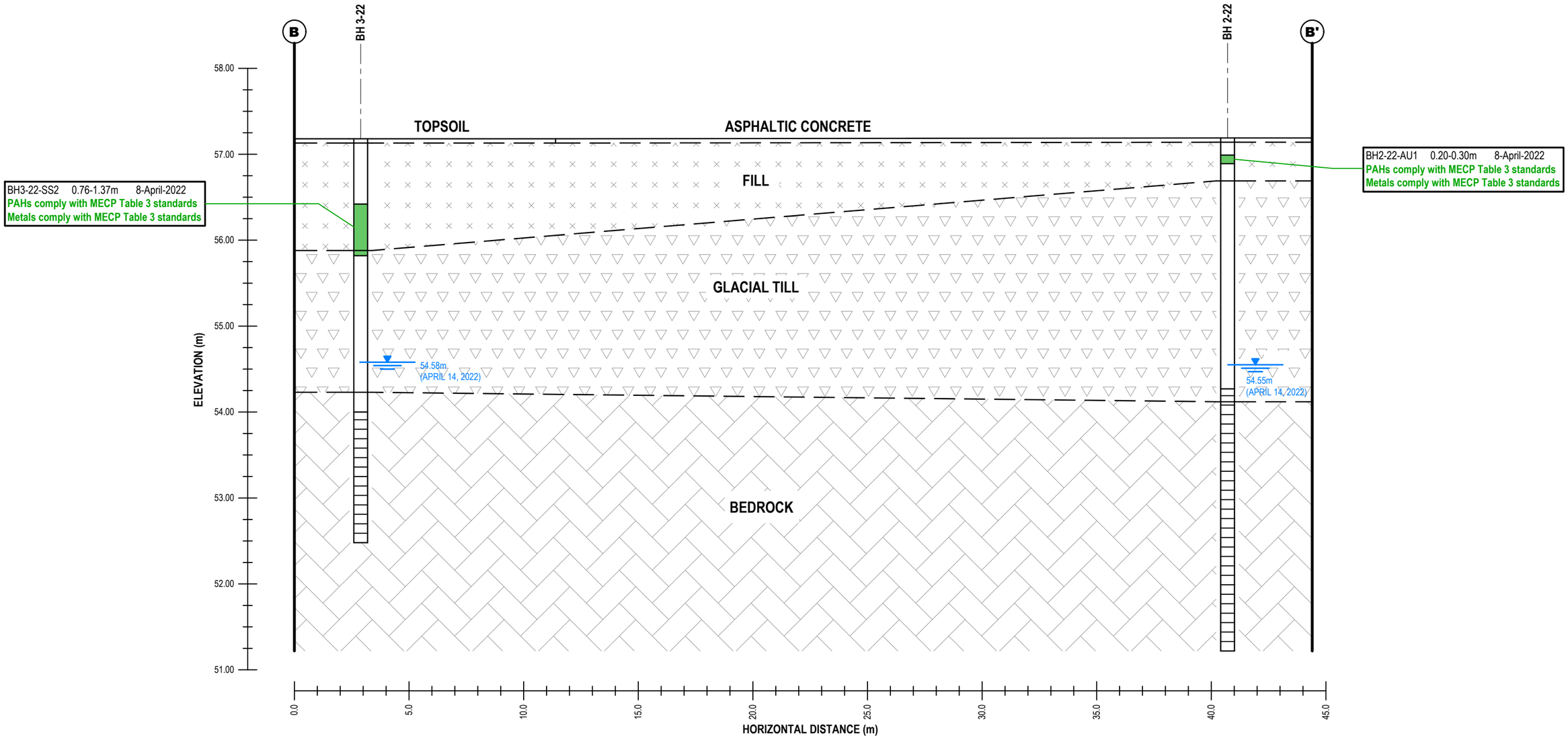

SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

WESTURBAN DEVELOPMENTS LTD.

SUPPLEMENTAL PHASE II - ENVIRONMENTAL SITE ASSESSMENT
258 DUROCHER STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL

Scale: 1:400	Date: 07/2022
Drawn by: YA	Report No.: PE5641-3
Checked by: MW	Dwg. No.: PE5641-7B
Approved by: MSD	Revision No.:

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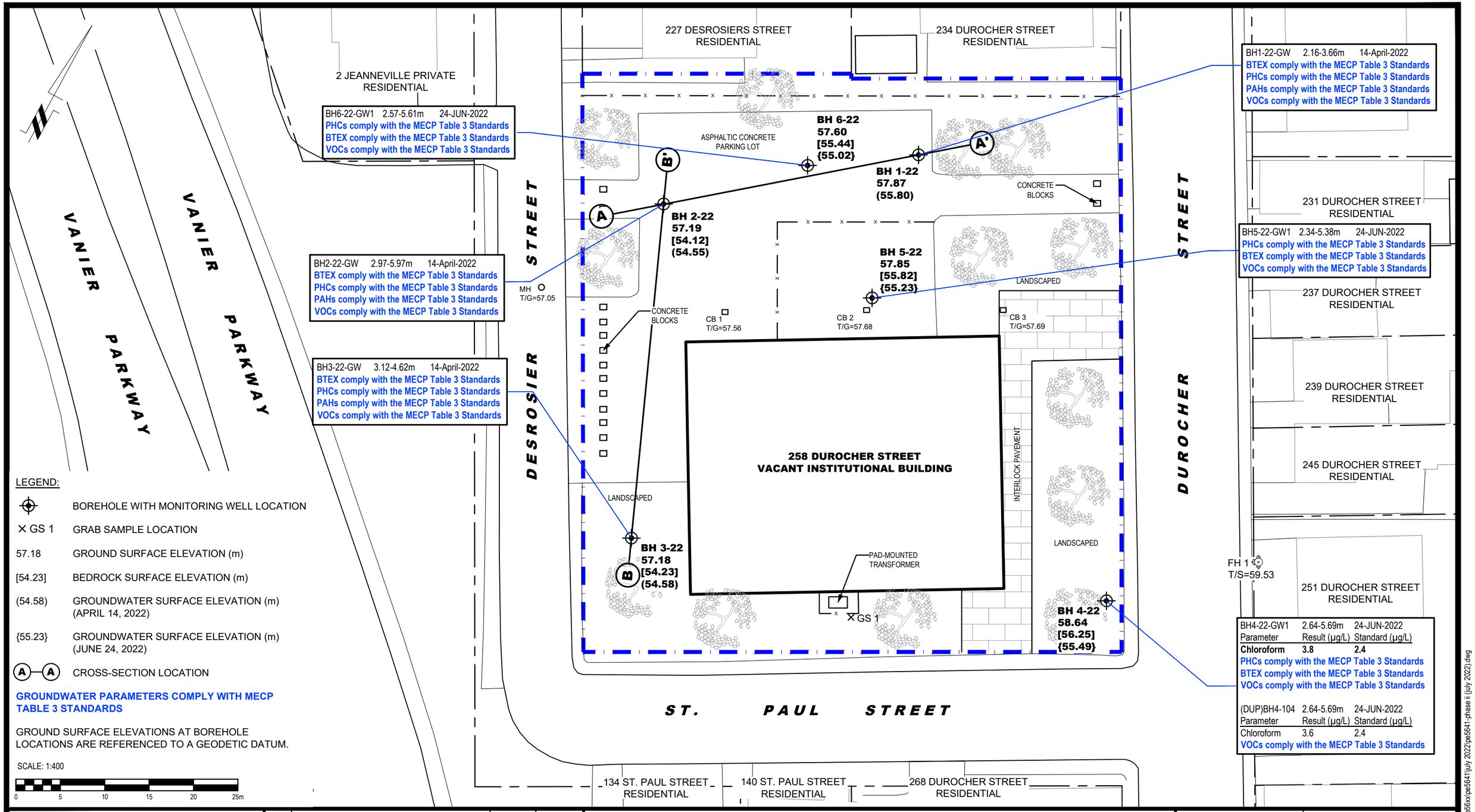

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- × GS 1 — GRAB SAMPLE LOCATION
- 57.18 — GROUND SURFACE ELEVATION (m)
- [54.23] — BEDROCK SURFACE ELEVATION (m)
- (54.58) — GROUNDWATER SURFACE ELEVATION (m) (APRIL 14, 2022)
- {55.23} — GROUNDWATER SURFACE ELEVATION (m) (JUNE 24, 2022)
- A—A — CROSS-SECTION LOCATION

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

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

SCALE: 1:400

0 5 10 15 20 25m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

WESTURBAN DEVELOPMENTS LTD.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

258 DUROCHER STREET

OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - GROUNDWATER**

Scale: 1:400	Date: 08/2022
Drawn by: YA	Report No.: PE5641-2
Checked by: MW	Dwg. No.: PE5641-5
Approved by: MSD	Revision No.:

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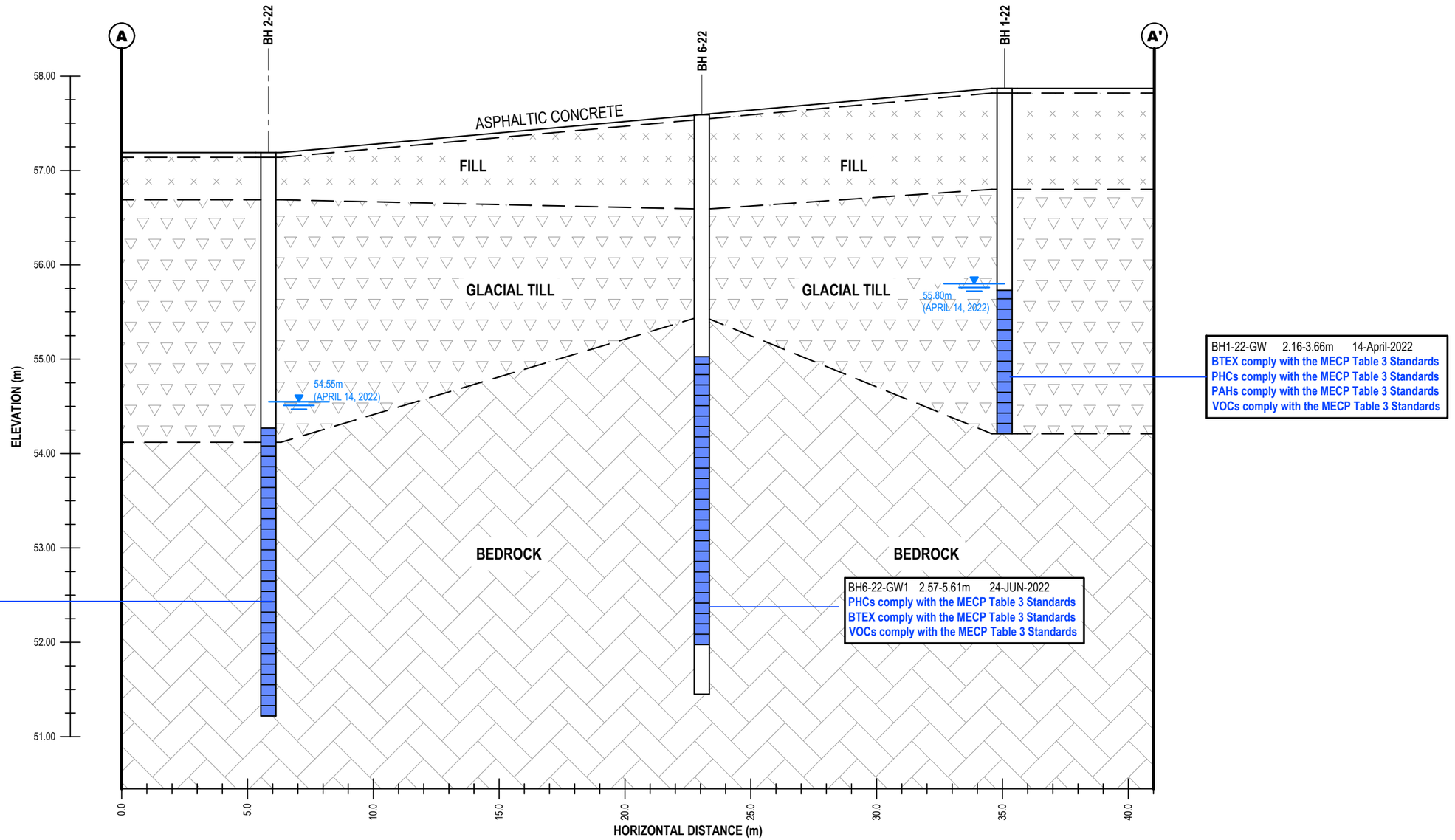

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

WESTURBAN DEVELOPMENTS LTD.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

258 DUROCHER STREET

OTTAWA, ONTARIO

Title: CROSS SECTION A-A' - GROUNDWATER

Scale: 1:400	Date: 08/2022
Drawn by: YA	Report No.: PE5641-2
Checked by: MW	Dwg. No.: PE5641-5A
Approved by: MSD	Revision No.:

11x17

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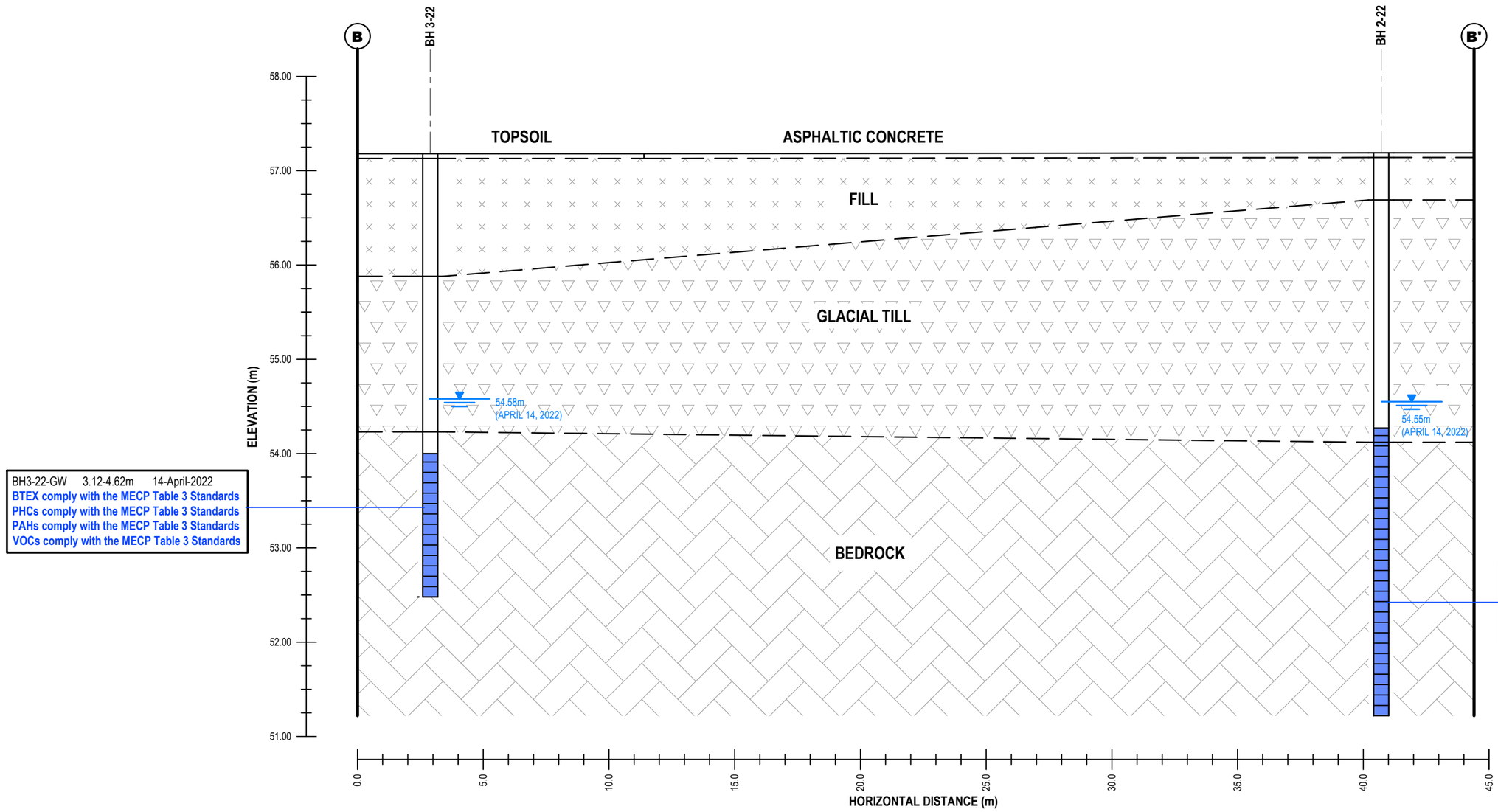

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

WESTURBAN DEVELOPMENTS LTD.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

258 DUROCHER STREET

OTTAWA, ONTARIO

Title: CROSS SECTION B-B' - GROUNDWATER

Scale: 1:400	Date: 08/2022
Drawn by: YA	Report No.: PE5641-2
Checked by: MW	Dwg. No.: PE5641-5B
Approved by: MSD	Revision No.:

11x17

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

Sampling and Analysis Plan

Phase II-Environmental Site Assessment

258 Durocher Street, Ottawa, Ontario

Prepared for WestUrban Developments Ltd.

Report: PE5641-SAP
April 2022

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by WestUrban Developments Ltd. to conduct a Phase II Environmental Site Assessment (ESA) for the property addressed, 258 Durocher Street, Ottawa, Ontario. Based on the Phase I ESA conducted by Paterson, a subsurface investigation program, consisting of borehole drilling was developed to investigate potential areas of environmental impact on the Phase II Property.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-22	Place borehole on the northern side of the Phase II Property to assess the potential soil and groundwater impact due to the former operation of an aluminum sash manufacturer, possible former repair garage and to assess the quality of any fill material.	Drill to an approximate depth of 6m to access the groundwater table for monitoring well installation.
BH2-22	Place borehole on the northwest portion of the Phase II Property to the assess the quality of any fill material and potential groundwater impact due to the former tannery and coal shed.	Drill to an approximate depth of 6m to access the groundwater table for monitoring well installation.
BH3-22	Place borehole on the southwest area of the Phase II Property to assess the quality of the fill material and potential groundwater impact due to the former tannery and coal shed.	Drill to an approximate depth of 6 m to access the groundwater table for monitoring well installation.
BH4-22	Place borehole on the southeast corner of the Phase II Property the assess the quality of any fill material and potential groundwater impact.	Drill to an approximate depth of 6m to access the groundwater table for monitoring well installation.
BH5-22	Place borehole on the northern side of the subject building to delineate contamination found at BH1-22.	Drill to an approximate depth of 6m to access the groundwater table for monitoring well installation.
BH6-22	Place borehole on the central north side of the Phase II Property to delineate contamination found at BH1-22.	Drill to an approximate depth of 6m to access the groundwater table for monitoring well installation.

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 MOECC site condition standards.
- ❒ In boreholes with evidence of contamination as described above, a sample should be submitted from the stratigraphic unit below the 'worst-case' sample to determine whether the contaminant(s) have migrated downward.
- ❒ Parameters analyzed should be consistent with the Contaminants of Potential Concern identified in the Phase I ESA.

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

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

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

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

Equipment

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

- ❒ glass soil sample jars
- ❒ two buckets
- ❒ cleaning brush (toilet brush works well)
- ❒ dish detergent
- ❒ methyl hydrate
- ❒ water (if not available on site - water jugs available in trailer)
- ❒ latex or nitrile gloves (depending on suspected contaminant)
- ❒ RKI Eagle organic vapour meter or MiniRae photoionization detector (depending on contamination suspected).

Determining Borehole Locations

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

All borehole locations and elevations were surveyed geodetically by Paterson Personnel, during the field program.

Drilling Procedure

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

- ❒ Continuous split spoon samples (every 0.6 m or 2') or semi-continuous (every 0.76 m or 2'6") are required.
- ❒ Make sure samples are well sealed in plastic bags with no holes prior to screening and are kept cool but unfrozen.
- ❒ If sampling for VOCs, BTEX, or PHCs F1, a soil core from each soil sample which may be analyzed must be taken and placed in the laboratory-provided methanol vial.
- ❒ Note all and any odours or discolouration of samples.
- ❒ Split spoon samplers must be washed between samples.
- ❒ If obvious contamination is encountered, continue sampling until vertical extent of contamination is delineated.
- ❒ As a general rule, environmental boreholes should be deep enough to intercept the groundwater table (unless this is impossible/impractical - call project manager to discuss).
- ❒ If at all possible, soil samples should be submitted to a preliminary screening procedure on site, either using a RKI Eagle, PID, etc. depending on type of suspected contamination.

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

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

3.2 Monitoring Well Installation Procedure

Equipment

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

Procedure

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

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

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

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

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

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

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
258 Durocher Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5641

REMARKS

HOLE NO. BH 1-22

BORINGS BY CME-55 Low Clearance Drill **DATE** April 8, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.05						0	57.87
FILL: Crushed stone 0.18		AU	1				
FILL: Brown silty sand, some crushed stone and clay							
1.07		SS	2	75	20	1	56.87
		SS	3	75	25	2	55.87
GLACIAL TILL: Compact to dense, black silty sand to sandy silt, some clay and shale fragments							
- shale fragments increasing with depth		SS	4	100	34	3	54.87
		SS	5	43	50+		
3.66							
End of Borehole							
(GWL @ 2.07m -April 14, 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
258 Durocher Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5641

REMARKS

HOLE NO. BH 2-22

BORINGS BY CME-55 Low Clearance Drill **DATE** April 8, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	57.19
Asphaltic concrete 0.05							
FILL: Crushed stone 0.20		AU	1				
FILL: Brown silty sand, some crushed stone 0.53							
		SS	2	50	23	1	56.19
GLACIAL TILL: Compact to dense, black silty sand to sandy silt, some shale fragments, trace clay							
- shale fragments increasing with depth		SS	3	100	17	2	55.19
		SS	4	82	77		
3.07						3	54.19
		RC	1	74	0		
BEDROCK: Very poor quality, black shale						4	53.19
- good quality by 4.5m depth							
						5	52.19
		RC	2	100	85		
5.97							
End of Borehole							
(GWL @ 2.64m -April 14, 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
258 Durocher Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5641

REMARKS

HOLE NO. BH 3-22

BORINGS BY CME-55 Low Clearance Drill **DATE** April 8, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.05		AU	1			0	57.18
FILL: Brown silty sand, trace clay and organics		SS	2	67	12	1	56.18
1.30							
GLACIAL TILL: Compact to dense, black silty sand to sandy silt, trace clay and shale fragments		SS	3	62	28	2	55.18
- shale fragments increasing with depth		SS	4	100	50+		
2.95		SS	5	100	50+	3	54.18
BEDROCK: Fair quality, black shale		RC	1	75	41	4	53.18
4.70							
End of Borehole							
(GWL @ 2.60m -April 14, 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

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
258 Durocher Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5641

REMARKS

HOLE NO. BH 4-22

BORINGS BY CME-55 Low Clearance Drill **DATE** June 17, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	58.64
FILL: Brown silty sand with gravel		AU	1				
0.69							
		SS	2	83	19	1	57.64
GLACIAL TILL: Black silty sand with clay, gravel and shale fragments		SS	3	100	33	2	56.64
2.39		SS	4	67	50+		
		RC	1	97	0	3	55.64
BEDROCK: Very poor to poor quality, black shale		RC	2	100	34	4	54.64
- excellent quality by 4.7m depth						5	53.64
		RC	3	100	100	6	52.64
6.15							
End of Borehole							
(GWL @ 3.15m - June 24, 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.

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9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
258 Durocher Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5641

REMARKS

HOLE NO. BH 5-22

BORINGS BY CME-55 Low Clearance Drill **DATE** June 17, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.05						0	57.85
FILL: Brown silty sand with gravel and crushed stone, trace asphalt 0.69		AU	1				
		SS	2	75	8	1	56.85
GLACIAL TILL: Black silty clay with gravel and shale fragments		SS	3	90	34		
2.03						2	55.85
		RC	1	57	0		
BEDROCK: Very poor to fair quality, black shale						3	54.85
		RC	2	80	69	4	53.85
- excellent quality by 4.9m depth						5	52.85
		RC	3	95	95		
						6	51.85
6.38							
End of Borehole							
(GWL @ 2.62m - June 24, 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

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
258 Durocher Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5641

REMARKS

HOLE NO. BH 6-22

BORINGS BY CME-55 Low Clearance Drill **DATE** June 17, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08						0	57.60
FILL: Brown silty sand to silty clay with gravel		AU	1				
0.91						1	56.60
		SS	2	75	14		
GLACIAL TILL: Black silty sand with clay, gravel and shale fragments		SS	3	100	36		
2.16						2	55.60
		RC	1	44	0		
						3	54.60
BEDROCK: Very poor to fair quality, black shale		RC	2	91	54		
						4	53.60
- good quality by 4.6m depth							
						5	52.60
		RC	3	100	86		
						6	51.60
6.15							
End of Borehole							
(GWL @ 2.58m - June 24, 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

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

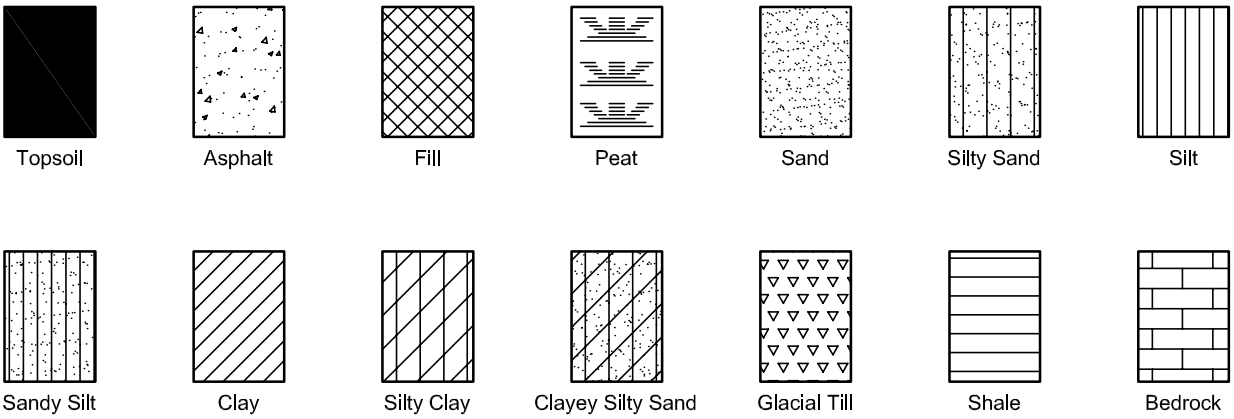
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

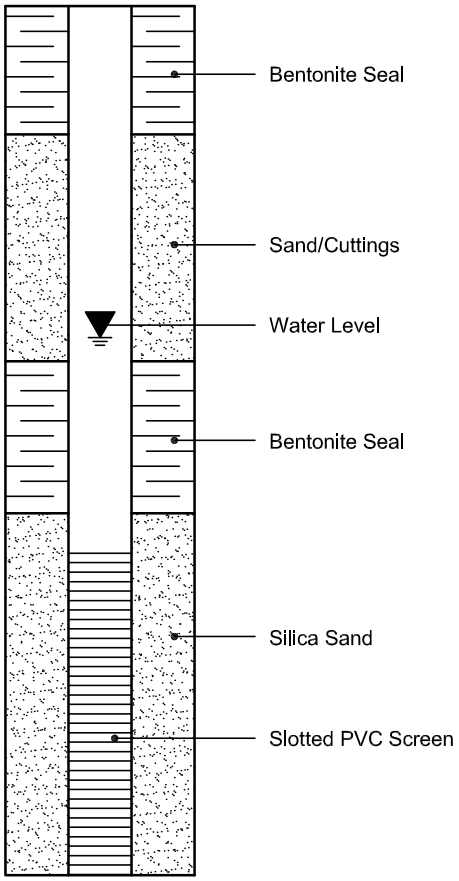
SYMBOLS AND TERMS (continued)

STRATA PLOT

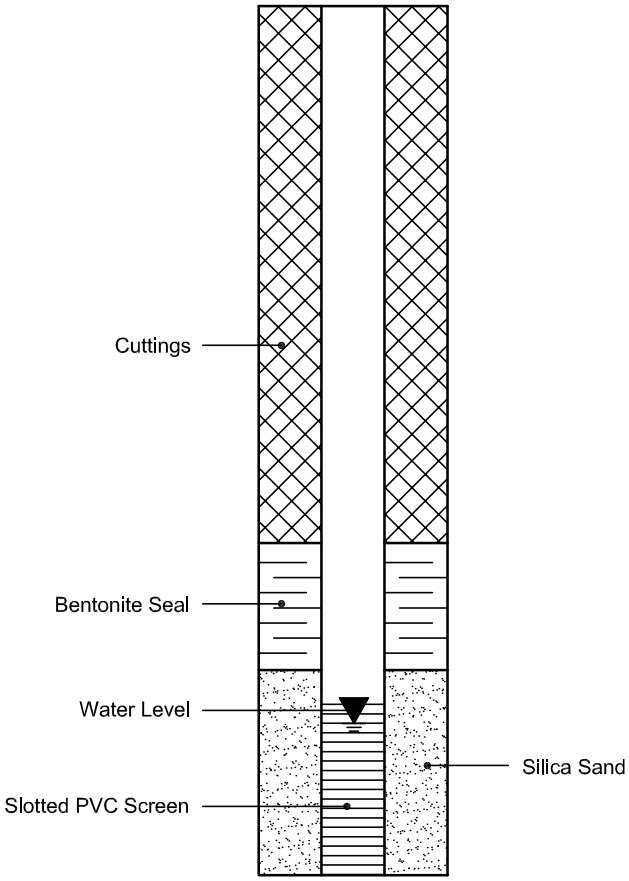


MONITORING WELL AND PIEZOMETER CONSTRUCTION

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: 27354
Project: PE5641
Custody:

Report Date: 18-Apr-2022
Order Date: 11-Apr-2022

Order #: 2216121

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

Paracel ID	Client ID
2216121-01	BH1-22-SS2
2216121-02	BH1-22-SS4
2216121-03	DUP
2216121-05	BH2-22-AU1
2216121-07	BH3-22-SS2

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 18-Apr-2022

Client: Paterson Group Consulting Engineers

Order Date: 11-Apr-2022

Client PO: 27354

Project Description: PE5641

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	14-Apr-22	18-Apr-22
Mercury by CVAA	EPA 7471B - CVAA, digestion	14-Apr-22	14-Apr-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	13-Apr-22	14-Apr-22
PHC F1	CWS Tier 1 - P&T GC-FID	12-Apr-22	13-Apr-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	12-Apr-22	15-Apr-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	13-Apr-22	14-Apr-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	12-Apr-22	13-Apr-22
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	12-Apr-22	13-Apr-22
Solids, %	Gravimetric, calculation	14-Apr-22	14-Apr-22

Certificate of Analysis

Report Date: 18-Apr-2022

Client: Paterson Group Consulting Engineers

Order Date: 11-Apr-2022

Client PO: 27354

Project Description: PE5641

	Client ID:	BH1-22-SS2	BH1-22-SS4	DUP	BH2-22-AU1
	Sample Date:	08-Apr-22 09:00	08-Apr-22 09:00	08-Apr-22 09:00	08-Apr-22 09:00
	Sample ID:	2216121-01	2216121-02	2216121-03	2216121-05
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	87.6	86.3	84.3	89.8
General Inorganics					
pH	0.05 pH Units	-	-	-	7.90
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	-	<1.0
Arsenic	1.0 ug/g dry	5.1	9.2	-	9.2
Barium	1.0 ug/g dry	37.1	86.8	-	81.2
Beryllium	0.5 ug/g dry	0.5	1.2	-	1.0
Boron	5.0 ug/g dry	5.0	7.7	-	6.7
Cadmium	0.5 ug/g dry	<0.5	1.0	-	0.8
Chromium	5.0 ug/g dry	15.2	24.3	-	22.5
Chromium (VI)	0.2 ug/g dry	-	<0.2	-	-
Cobalt	1.0 ug/g dry	10.6	23.0	-	17.8
Copper	5.0 ug/g dry	21.3	48.5	-	47.9
Lead	1.0 ug/g dry	11.2	15.3	-	57.0
Mercury	0.1 ug/g dry	-	<0.1	-	-
Molybdenum	1.0 ug/g dry	3.1	8.0	-	6.5
Nickel	5.0 ug/g dry	31.6	75.1	-	60.2
Selenium	1.0 ug/g dry	<1.0	2.0	-	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	-	<0.3
Thallium	1.0 ug/g dry	<1.0	1.0	-	<1.0
Uranium	1.0 ug/g dry	1.2	2.9	-	2.2
Vanadium	10.0 ug/g dry	24.9	41.7	-	36.6
Zinc	20.0 ug/g dry	36.2	107	-	117
Volatiles					
Acetone	0.50 ug/g dry	-	<0.50	<0.50	-
Benzene	0.02 ug/g dry	-	<0.02	<0.02	-
Bromodichloromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Bromoform	0.05 ug/g dry	-	<0.05	<0.05	-
Bromomethane	0.05 ug/g dry	-	<0.05	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	-	<0.05	<0.05	-
Chlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
Chloroform	0.05 ug/g dry	-	<0.05	<0.05	-
Dibromochloromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Dichlorodifluoromethane	0.05 ug/g dry	-	<0.05	<0.05	-

Certificate of Analysis

Report Date: 18-Apr-2022

Client: Paterson Group Consulting Engineers

Order Date: 11-Apr-2022

Client PO: 27354

Project Description: PE5641

	Client ID:	BH1-22-SS2	BH1-22-SS4	DUP	BH2-22-AU1
	Sample Date:	08-Apr-22 09:00	08-Apr-22 09:00	08-Apr-22 09:00	08-Apr-22 09:00
	Sample ID:	2216121-01	2216121-02	2216121-03	2216121-05
	MDL/Units	Soil	Soil	Soil	Soil
1,2-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	-	<0.05	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	<0.05	<0.05	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	<0.05	-
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	-	<0.05	<0.05	-
Hexane	0.05 ug/g dry	-	<0.05	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	<0.50	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	-	<0.50	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	-	<0.05	<0.05	-
Methylene Chloride	0.05 ug/g dry	-	<0.05	<0.05	-
Styrene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
Toluene	0.05 ug/g dry	-	0.06	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
Trichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Vinyl chloride	0.02 ug/g dry	-	<0.02	<0.02	-
m,p-Xylenes	0.05 ug/g dry	-	0.17	0.11	-
o-Xylene	0.05 ug/g dry	-	0.08	0.08	-
Xylenes, total	0.05 ug/g dry	-	0.25	0.19	-
4-Bromofluorobenzene	Surrogate	-	103%	105%	-
Dibromofluoromethane	Surrogate	-	104%	108%	-
Toluene-d8	Surrogate	-	124%	125%	-

Hydrocarbons

Certificate of Analysis

Report Date: 18-Apr-2022

Client: Paterson Group Consulting Engineers

Order Date: 11-Apr-2022

Client PO: 27354

Project Description: PE5641

	Client ID:	BH1-22-SS2	BH1-22-SS4	DUP	BH2-22-AU1
	Sample Date:	08-Apr-22 09:00	08-Apr-22 09:00	08-Apr-22 09:00	08-Apr-22 09:00
	Sample ID:	2216121-01	2216121-02	2216121-03	2216121-05
	MDL/Units	Soil	Soil	Soil	Soil
F1 PHCs (C6-C10)	7 ug/g dry	-	16	-	-
F2 PHCs (C10-C16)	4 ug/g dry	-	520	-	-
F3 PHCs (C16-C34)	8 ug/g dry	-	397	-	-
F4 PHCs (C34-C50)	6 ug/g dry	-	<6	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	-	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	-	-	<0.02
Anthracene	0.02 ug/g dry	<0.02	-	-	0.03
Benzo [a] anthracene	0.02 ug/g dry	<0.02	-	-	0.09
Benzo [a] pyrene	0.02 ug/g dry	<0.02	-	-	0.10
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	-	-	0.10
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	-	-	0.06
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	-	-	0.05
Chrysene	0.02 ug/g dry	<0.02	-	-	0.10
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	-	-	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	-	-	0.21
Fluorene	0.02 ug/g dry	<0.02	-	-	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	-	-	0.06
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	-	<0.04
Naphthalene	0.01 ug/g dry	<0.01	-	-	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	-	-	0.14
Pyrene	0.02 ug/g dry	<0.02	-	-	0.20
2-Fluorobiphenyl	Surrogate	121%	-	-	109%
Terphenyl-d14	Surrogate	129%	-	-	119%

Certificate of Analysis

Report Date: 18-Apr-2022

Client: Paterson Group Consulting Engineers

Order Date: 11-Apr-2022

Client PO: 27354

Project Description: PE5641

	Client ID:	BH3-22-SS2	-	-	-
	Sample Date:	08-Apr-22 09:00	-	-	-
	Sample ID:	2216121-07	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	79.6	-	-	-
General Inorganics					
pH	0.05 pH Units	7.04	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	10.7	-	-	-
Barium	1.0 ug/g dry	67.9	-	-	-
Beryllium	0.5 ug/g dry	0.7	-	-	-
Boron	5.0 ug/g dry	5.3	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	20.1	-	-	-
Cobalt	1.0 ug/g dry	12.1	-	-	-
Copper	5.0 ug/g dry	32.5	-	-	-
Lead	1.0 ug/g dry	45.2	-	-	-
Molybdenum	1.0 ug/g dry	5.0	-	-	-
Nickel	5.0 ug/g dry	38.5	-	-	-
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	2.1	-	-	-
Vanadium	10.0 ug/g dry	30.4	-	-	-
Zinc	20.0 ug/g dry	96.4	-	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	-	-
Acenaphthylene	0.02 ug/g dry	<0.02	-	-	-
Anthracene	0.02 ug/g dry	0.04	-	-	-
Benzo [a] anthracene	0.02 ug/g dry	0.10	-	-	-
Benzo [a] pyrene	0.02 ug/g dry	0.09	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	0.11	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.06	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	0.06	-	-	-
Chrysene	0.02 ug/g dry	0.11	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	-	-	-
Fluoranthene	0.02 ug/g dry	0.24	-	-	-
Fluorene	0.02 ug/g dry	<0.02	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 27354

Report Date: 18-Apr-2022

Order Date: 11-Apr-2022

Project Description: PE5641

	Client ID:	BH3-22-SS2	-	-	-
	Sample Date:	08-Apr-22 09:00	-	-	-
	Sample ID:	2216121-07	-	-	-
	MDL/Units	Soil	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.05	-	-	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	-	-
Naphthalene	0.01 ug/g dry	0.01	-	-	-
Phenanthrene	0.02 ug/g dry	0.15	-	-	-
Pyrene	0.02 ug/g dry	0.19	-	-	-
2-Fluorobiphenyl	Surrogate	109%	-	-	-
Terphenyl-d14	Surrogate	116%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.44*		*ug/g*		*108*	*50-140*			
Surrogate: Terphenyl-d14	*1.52*		*ug/g*		*114*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*7.94*		*ug/g*		*99.3*	*50-140*			
Surrogate: Dibromofluoromethane	*7.83*		*ug/g*		*97.9*	*50-140*			
Surrogate: Toluene-d8	*9.76*		*ug/g*		*122*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	7.68	0.05	pH Units	7.68			0.0	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	8	4	ug/g	7			11.2	30	
F3 PHCs (C16-C34)	23	8	ug/g	20			13.5	30	
F4 PHCs (C34-C50)	11	6	ug/g	11			2.2	30	
Metals									
Antimony	ND	1.0	ug/g	1.0			NC	30	
Arsenic	7.1	1.0	ug/g	6.5			8.7	30	
Barium	58.0	1.0	ug/g	50.5			13.8	30	
Beryllium	0.9	0.5	ug/g	0.8			5.8	30	
Boron	5.4	5.0	ug/g	5.1			6.3	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	22.5	5.0	ug/g	20.2			10.9	30	
Cobalt	11.6	1.0	ug/g	10.4			11.3	30	
Copper	40.2	5.0	ug/g	36.2			10.4	30	
Lead	13.6	1.0	ug/g	12.4			9.9	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	25.2	5.0	ug/g	22.4			11.7	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	29.9	10.0	ug/g	26.7			11.3	30	
Zinc	75.0	20.0	ug/g	66.5			12.0	30	
Physical Characteristics									
% Solids	76.0	0.1	% by Wt.	76.9			1.3	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	ND	0.02	ug/g	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	ND	0.02	ug/g	ND			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	ND	0.02	ug/g	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	*1.66*		*ug/g*		*107*	*50-140*			
Surrogate: Terphenyl-d14	*1.82*		*ug/g*		*117*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	*8.96*		*ug/g*		*99.0*	*50-140*			
Surrogate: Dibromofluoromethane	*9.49*		*ug/g*		*105*	*50-140*			
Surrogate: Toluene-d8	*10.8*		*ug/g*		*119*	*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)	181	7	ug/g	ND	90.3	80-120			
F2 PHCs (C10-C16)	107	4	ug/g	7	107	60-140			
F3 PHCs (C16-C34)	261	8	ug/g	20	106	60-140			
F4 PHCs (C34-C50)	171	6	ug/g	11	112	60-140			
Metals									
Antimony	36.4	1.0	ug/g	ND	72.6	70-130			
Arsenic	50.3	1.0	ug/g	2.6	95.3	70-130			
Barium	68.0	1.0	ug/g	20.2	95.5	70-130			
Beryllium	48.6	0.5	ug/g	ND	96.5	70-130			
Boron	50.2	5.0	ug/g	ND	96.2	70-130			
Cadmium	47.7	0.5	ug/g	ND	95.2	70-130			
Chromium (VI)	2.8	0.2	ug/g	ND	47.5	70-130			QM-05
Chromium	56.9	5.0	ug/g	8.1	97.6	70-130			
Cobalt	50.7	1.0	ug/g	4.2	93.1	70-130			
Copper	59.0	5.0	ug/g	14.5	88.9	70-130			
Lead	53.6	1.0	ug/g	4.9	97.2	70-130			
Mercury	1.38	0.1	ug/g	ND	91.7	70-130			
Molybdenum	46.4	1.0	ug/g	ND	92.2	70-130			
Nickel	54.5	5.0	ug/g	9.0	91.1	70-130			
Selenium	43.3	1.0	ug/g	ND	86.1	70-130			
Silver	41.3	0.3	ug/g	ND	82.5	70-130			
Thallium	47.6	1.0	ug/g	ND	94.9	70-130			
Uranium	52.0	1.0	ug/g	ND	104	70-130			
Vanadium	59.0	10.0	ug/g	10.7	96.7	70-130			
Zinc	77.2	20.0	ug/g	26.6	101	70-130			
Semi-Volatiles									
Acenaphthene	0.208	0.02	ug/g	ND	107	50-140			
Acenaphthylene	0.184	0.02	ug/g	ND	95.3	50-140			
Anthracene	0.169	0.02	ug/g	ND	87.5	50-140			
Benzo [a] anthracene	0.160	0.02	ug/g	ND	82.6	50-140			
Benzo [a] pyrene	0.185	0.02	ug/g	ND	95.7	50-140			
Benzo [b] fluoranthene	0.233	0.02	ug/g	ND	120	50-140			
Benzo [g,h,i] perylene	0.193	0.02	ug/g	ND	99.8	50-140			
Benzo [k] fluoranthene	0.209	0.02	ug/g	ND	108	50-140			
Chrysene	0.183	0.02	ug/g	ND	94.3	50-140			
Dibenzo [a,h] anthracene	0.206	0.02	ug/g	ND	107	50-140			
Fluoranthene	0.177	0.02	ug/g	ND	91.5	50-140			
Fluorene	0.216	0.02	ug/g	ND	111	50-140			
Indeno [1,2,3-cd] pyrene	0.205	0.02	ug/g	ND	106	50-140			
1-Methylnaphthalene	0.230	0.02	ug/g	ND	119	50-140			
2-Methylnaphthalene	0.248	0.02	ug/g	ND	128	50-140			
Naphthalene	0.221	0.01	ug/g	ND	114	50-140			
Phenanthrene	0.176	0.02	ug/g	ND	91.2	50-140			
Pyrene	0.187	0.02	ug/g	ND	96.4	50-140			
Surrogate: 2-Fluorobiphenyl	*1.68*		*ug/g*		*108*	*50-140*			
Surrogate: Terphenyl-d14	*1.76*		*ug/g*		*114*	*50-140*			
Volatiles									
Acetone	9.78	0.50	ug/g	ND	97.8	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	3.62	0.02	ug/g	ND	90.4	60-130			
Bromodichloromethane	3.50	0.05	ug/g	ND	87.5	60-130			
Bromoform	4.47	0.05	ug/g	ND	112	60-130			
Bromomethane	4.27	0.05	ug/g	ND	107	50-140			
Carbon Tetrachloride	3.68	0.05	ug/g	ND	92.0	60-130			
Chlorobenzene	4.36	0.05	ug/g	ND	109	60-130			
Chloroform	3.86	0.05	ug/g	ND	96.6	60-130			
Dibromochloromethane	4.24	0.05	ug/g	ND	106	60-130			
Dichlorodifluoromethane	2.61	0.05	ug/g	ND	65.2	50-140			
1,2-Dichlorobenzene	3.64	0.05	ug/g	ND	90.9	60-130			
1,3-Dichlorobenzene	3.52	0.05	ug/g	ND	87.9	60-130			
1,4-Dichlorobenzene	3.59	0.05	ug/g	ND	89.8	60-130			
1,1-Dichloroethane	3.66	0.05	ug/g	ND	91.4	60-130			
1,2-Dichloroethane	3.72	0.05	ug/g	ND	93.1	60-130			
1,1-Dichloroethylene	3.57	0.05	ug/g	ND	89.2	60-130			
cis-1,2-Dichloroethylene	3.58	0.05	ug/g	ND	89.6	60-130			
trans-1,2-Dichloroethylene	3.43	0.05	ug/g	ND	85.8	60-130			
1,2-Dichloropropane	3.54	0.05	ug/g	ND	88.4	60-130			
cis-1,3-Dichloropropylene	3.18	0.05	ug/g	ND	79.5	60-130			
trans-1,3-Dichloropropylene	3.32	0.05	ug/g	ND	82.9	60-130			
Ethylbenzene	4.18	0.05	ug/g	ND	104	60-130			
Ethylene dibromide (dibromoethane, 1,2-	4.30	0.05	ug/g	ND	107	60-130			
Hexane	2.76	0.05	ug/g	ND	69.1	60-130			
Methyl Ethyl Ketone (2-Butanone)	10.1	0.50	ug/g	ND	101	50-140			
Methyl Isobutyl Ketone	11.3	0.50	ug/g	ND	113	50-140			
Methyl tert-butyl ether	12.1	0.05	ug/g	ND	121	50-140			
Methylene Chloride	3.46	0.05	ug/g	ND	86.6	60-130			
Styrene	4.13	0.05	ug/g	ND	103	60-130			
1,1,1,2-Tetrachloroethane	4.35	0.05	ug/g	ND	109	60-130			
1,1,2,2-Tetrachloroethane	3.30	0.05	ug/g	ND	82.5	60-130			
Tetrachloroethylene	4.42	0.05	ug/g	ND	111	60-130			
Toluene	4.62	0.05	ug/g	ND	116	60-130			
1,1,1-Trichloroethane	3.85	0.05	ug/g	ND	96.2	60-130			
1,1,2-Trichloroethane	3.65	0.05	ug/g	ND	91.3	60-130			
Trichloroethylene	4.28	0.05	ug/g	ND	107	60-130			
Trichlorofluoromethane	3.74	0.05	ug/g	ND	93.6	50-140			
Vinyl chloride	3.56	0.02	ug/g	ND	88.9	50-140			
m,p-Xylenes	8.40	0.05	ug/g	ND	105	60-130			
o-Xylene	4.33	0.05	ug/g	ND	108	60-130			

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 LTD.

Paracel ID: 2216121

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2216121	

Client Name: PATERSON	Project Ref: PE5641	Page 1 of 1
Contact Name: Mark D'Arcy	Quote #:	**Turnaround Time**
Address: 154 Colonnade Rd	PO #: 27354	☐ 1 day ☐ 3 day
	E-mail: MDarcy@patersongroup.ca mwiteman@patersongroup.ca	☐ 2 day ☒ Regular
Telephone: 613-226-7381		Date Required:

☒ REG 153/04 ☐ REG 406/19 | Other Regulation

☐ Table 1 ☐ Res/Park ☐ Med/Fine | ☐ REG 558 ☐ PWQO

☐ Table 2 ☐ Ind/Comm ☐ Coarse | ☐ CCME ☐ MISA

☒ Table 3 ☐ Agri/Other | ☐ SU - Sani ☐ SU - Storm

☐ Table ___ | Mun: ___

For RSC: ☐ Yes ☐ No | ☐ Other:

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH	Hold			
1	BH1-22-SS2	S		2	08-APR-22				X	X								
2	BH1-22-SS4	S		2			X	X		X	X	X						
3	DUP	S		2				X										
4	BH1-22-SS5	S		2											X			
5	BH2-22-AU1	S		2					X	X				X				
6	BH2-22-SS4	S		2											X			
7	BH3-22-SS2	S		2					X	X				X				
8																		
9																		
10																		

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign): B Drieschner	Received By Driver/Depot: [signature]	Received at Lab: Sunee param Dhmoi	Verified By: [signature]
Relinquished By (Print): Beau Drieschner	Date/Time: 11/04/22 3:31	Date/Time: APR 11, 2022 04.25	Date/Time: Apr 11 2022 5:20
Date/Time: 08-APR-22	Temperature: °C PH.	Temperature: 13.8	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mandy Witteman

Client PO: 55014
Project: PE5641
Custody:

Report Date: 29-Jun-2022
Order Date: 20-Jun-2022

Order #: 2226104

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

Paracel ID	Client ID
2226104-01	G1
2226104-02	BH4-22-AU1
2226104-04	BH5-22-AU1
2226104-05	BH5-22-SS3
2226104-06	BH6-22-AU1/SS2
2226104-07	BH6-22-SS3

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 29-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 20-Jun-2022

Client PO: 55014

Project Description: PE5641

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	22-Jun-22	23-Jun-22
PCBs, total	SW846 8082A - GC-ECD	22-Jun-22	24-Jun-22
PHC F1	CWS Tier 1 - P&T GC-FID	22-Jun-22	23-Jun-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	21-Jun-22	24-Jun-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	22-Jun-22	22-Jun-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	22-Jun-22	29-Jun-22
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	22-Jun-22	23-Jun-22
Solids, %	Gravimetric, calculation	23-Jun-22	23-Jun-22

Certificate of Analysis

Report Date: 29-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 20-Jun-2022

Client PO: 55014

Project Description: PE5641

	Client ID:	G1	BH4-22-AU1	BH5-22-AU1	BH5-22-SS3
	Sample Date:	17-Jun-22 09:00	17-Jun-22 09:00	17-Jun-22 09:00	17-Jun-22 09:00
	Sample ID:	2226104-01	2226104-02	2226104-04	2226104-05
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	92.6	96.3	93.9	86.8
Metals					
Antimony	1.0 ug/g dry	-	<1.0	<1.0	-
Arsenic	1.0 ug/g dry	-	2.4	4.8	-
Barium	1.0 ug/g dry	-	69.2	59.0	-
Beryllium	0.5 ug/g dry	-	<0.5	0.5	-
Boron	5.0 ug/g dry	-	<5.0	5.7	-
Cadmium	0.5 ug/g dry	-	0.5	<0.5	-
Chromium	5.0 ug/g dry	-	16.0	18.4	-
Cobalt	1.0 ug/g dry	-	4.6	7.4	-
Copper	5.0 ug/g dry	-	13.8	19.3	-
Lead	1.0 ug/g dry	-	22.8	24.2	-
Molybdenum	1.0 ug/g dry	-	<1.0	2.1	-
Nickel	5.0 ug/g dry	-	10.2	22.6	-
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	-	23.1	26.0	-
Zinc	20.0 ug/g dry	-	43.6	44.4	-
Volatiles					
Acetone	0.50 ug/g dry	-	-	-	<0.50
Benzene	0.02 ug/g dry	-	-	-	<0.02
Bromodichloromethane	0.05 ug/g dry	-	-	-	<0.05
Bromoform	0.05 ug/g dry	-	-	-	<0.05
Bromomethane	0.05 ug/g dry	-	-	-	<0.05
Carbon Tetrachloride	0.05 ug/g dry	-	-	-	<0.05
Chlorobenzene	0.05 ug/g dry	-	-	-	<0.05
Chloroform	0.05 ug/g dry	-	-	-	<0.05
Dibromochloromethane	0.05 ug/g dry	-	-	-	<0.05
Dichlorodifluoromethane	0.05 ug/g dry	-	-	-	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	-	-	-	<0.05
1,3-Dichlorobenzene	0.05 ug/g dry	-	-	-	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	-	-	-	<0.05
1,1-Dichloroethane	0.05 ug/g dry	-	-	-	<0.05

Certificate of Analysis

Report Date: 29-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 20-Jun-2022

Client PO: 55014

Project Description: PE5641

	Client ID:	G1	BH4-22-AU1	BH5-22-AU1	BH5-22-SS3
	Sample Date:	17-Jun-22 09:00	17-Jun-22 09:00	17-Jun-22 09:00	17-Jun-22 09:00
	Sample ID:	2226104-01	2226104-02	2226104-04	2226104-05
	MDL/Units	Soil	Soil	Soil	Soil
1,2-Dichloroethane	0.05 ug/g dry	-	-	-	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	-	-	-	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	-	-	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	-	-	<0.05
1,2-Dichloropropane	0.05 ug/g dry	-	-	-	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	-	-	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	-	-	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	-	-	-	<0.05
Ethylbenzene	0.05 ug/g dry	-	-	-	<0.05
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	-	-	-	<0.05
Hexane	0.05 ug/g dry	-	-	-	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	-	-	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	-	-	-	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	-	-	-	<0.05
Methylene Chloride	0.05 ug/g dry	-	-	-	<0.05
Styrene	0.05 ug/g dry	-	-	-	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	-	-	<0.05
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	-	-	<0.05
Tetrachloroethylene	0.05 ug/g dry	-	-	-	<0.05
Toluene	0.05 ug/g dry	-	-	-	<0.05
1,1,1-Trichloroethane	0.05 ug/g dry	-	-	-	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	-	-	-	<0.05
Trichloroethylene	0.05 ug/g dry	-	-	-	<0.05
Trichlorofluoromethane	0.05 ug/g dry	-	-	-	<0.05
Vinyl chloride	0.02 ug/g dry	-	-	-	<0.02
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
4-Bromofluorobenzene	Surrogate	-	-	-	96.4%
Dibromofluoromethane	Surrogate	-	-	-	58.6%
Toluene-d8	Surrogate	-	-	-	98.1%
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	-	-	-

Certificate of Analysis

Report Date: 29-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 20-Jun-2022

Client PO: 55014

Project Description: PE5641

	Client ID:	G1	BH4-22-AU1	BH5-22-AU1	BH5-22-SS3
	Sample Date:	17-Jun-22 09:00	17-Jun-22 09:00	17-Jun-22 09:00	17-Jun-22 09:00
	Sample ID:	2226104-01	2226104-02	2226104-04	2226104-05
	MDL/Units	Soil	Soil	Soil	Soil
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	96.2%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	-	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	-	16
F3 PHCs (C16-C34)	8 ug/g dry	19 [1]	-	-	38
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	-	12
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	-	<0.02	-	-
Acenaphthylene	0.02 ug/g dry	-	<0.02	-	-
Anthracene	0.02 ug/g dry	-	0.12	-	-
Benzo [a] anthracene	0.02 ug/g dry	-	0.08	-	-
Benzo [a] pyrene	0.02 ug/g dry	-	0.08	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	-	0.09	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	-	0.04	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	-	0.04	-	-
Chrysene	0.02 ug/g dry	-	0.10	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	<0.02	-	-
Fluoranthene	0.02 ug/g dry	-	0.16	-	-
Fluorene	0.02 ug/g dry	-	<0.02	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	0.03	-	-
1-Methylnaphthalene	0.02 ug/g dry	-	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g dry	-	<0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	-	<0.04	-	-
Naphthalene	0.01 ug/g dry	-	<0.01	-	-
Phenanthrene	0.02 ug/g dry	-	0.11	-	-
Pyrene	0.02 ug/g dry	-	0.13	-	-
2-Fluorobiphenyl	Surrogate	-	135%	-	-
Terphenyl-d14	Surrogate	-	131%	-	-
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	-	-	-
Decachlorobiphenyl	Surrogate	100%	-	-	-

Certificate of Analysis

Report Date: 29-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 20-Jun-2022

Client PO: 55014

Project Description: PE5641

	Client ID:	BH6-22-AU1/SS2	BH6-22-SS3	-	-
	Sample Date:	17-Jun-22 09:00	17-Jun-22 09:00	-	-
	Sample ID:	2226104-06	2226104-07	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	88.3	89.3	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	11.7	-	-	-
Barium	1.0 ug/g dry	62.6	-	-	-
Beryllium	0.5 ug/g dry	0.6	-	-	-
Boron	5.0 ug/g dry	5.6	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	21.2	-	-	-
Cobalt	1.0 ug/g dry	9.4	-	-	-
Copper	5.0 ug/g dry	24.0	-	-	-
Lead	1.0 ug/g dry	28.3	-	-	-
Molybdenum	1.0 ug/g dry	2.8	-	-	-
Nickel	5.0 ug/g dry	29.0	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	1.0	-	-	-
Vanadium	10.0 ug/g dry	28.0	-	-	-
Zinc	20.0 ug/g dry	104	-	-	-
Volatiles					
Acetone	0.50 ug/g dry	-	<0.50	-	-
Benzene	0.02 ug/g dry	-	<0.02	-	-
Bromodichloromethane	0.05 ug/g dry	-	<0.05	-	-
Bromoform	0.05 ug/g dry	-	<0.05	-	-
Bromomethane	0.05 ug/g dry	-	<0.05	-	-
Carbon Tetrachloride	0.05 ug/g dry	-	<0.05	-	-
Chlorobenzene	0.05 ug/g dry	-	<0.05	-	-
Chloroform	0.05 ug/g dry	-	<0.05	-	-
Dibromochloromethane	0.05 ug/g dry	-	<0.05	-	-
Dichlorodifluoromethane	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,1-Dichloroethane	0.05 ug/g dry	-	<0.05	-	-

	Client ID:	BH6-22-AU1/SS2	BH6-22-SS3	-	-
	Sample Date:	17-Jun-22 09:00	17-Jun-22 09:00	-	-
	Sample ID:	2226104-06	2226104-07	-	-
	MDL/Units	Soil	Soil	-	-
1,2-Dichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichloropropane	0.05 ug/g dry	-	<0.05	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	<0.05	-	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	-	-
Ethylene dibromide (dibromoethane, 1	0.05 ug/g dry	-	<0.05	-	-
Hexane	0.05 ug/g dry	-	<0.05	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	<0.50	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	-	<0.50	-	-
Methyl tert-butyl ether	0.05 ug/g dry	-	<0.05	-	-
Methylene Chloride	0.05 ug/g dry	-	<0.05	-	-
Styrene	0.05 ug/g dry	-	<0.05	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	-	-
Tetrachloroethylene	0.05 ug/g dry	-	<0.05	-	-
Toluene	0.05 ug/g dry	-	<0.05	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	<0.05	-	-
Trichloroethylene	0.05 ug/g dry	-	<0.05	-	-
Trichlorofluoromethane	0.05 ug/g dry	-	<0.05	-	-
Vinyl chloride	0.02 ug/g dry	-	<0.02	-	-
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	-	-
4-Bromofluorobenzene	Surrogate	-	89.5%	-	-
Dibromofluoromethane	Surrogate	-	56.0%	-	-
Toluene-d8	Surrogate	-	93.0%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	-	15	-	-
F3 PHCs (C16-C34)	8 ug/g dry	-	20	-	-

Certificate of Analysis

Report Date: 29-Jun-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 20-Jun-2022

Client PO: **55014**

Project Description: PE5641

	Client ID:	BH6-22-AU1/SS2	BH6-22-SS3	-	-
	Sample Date:	17-Jun-22 09:00	17-Jun-22 09:00	-	-
	Sample ID:	2226104-06	2226104-07	-	-
	MDL/Units	Soil	Soil	-	-
F4 PHCs (C34-C50)	6 ug/g dry	-	15	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	0.09	-	-	-
Acenaphthylene	0.02 ug/g dry	<0.02	-	-	-
Anthracene	0.02 ug/g dry	0.23	-	-	-
Benzo [a] anthracene	0.02 ug/g dry	0.64	-	-	-
Benzo [a] pyrene	0.02 ug/g dry	0.65	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	0.63	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.31	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	0.34	-	-	-
Chrysene	0.02 ug/g dry	0.77	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	0.05	-	-	-
Fluoranthene	0.02 ug/g dry	1.43	-	-	-
Fluorene	0.02 ug/g dry	0.10	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.29	-	-	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	-	-
Naphthalene	0.01 ug/g dry	0.04	-	-	-
Phenanthrene	0.02 ug/g dry	1.05	-	-	-
Pyrene	0.02 ug/g dry	1.16	-	-	-
2-Fluorobiphenyl	Surrogate	120%	-	-	-
Terphenyl-d14	Surrogate	132%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.0876*		*ug/g*		*87.6*	*60-140*			
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: Terphenyl-d14	*1.68*		*ug/g*		*126*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2-	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*2.82*		*ug/g*		*88.2*	*50-140*			
Surrogate: Dibromofluoromethane	*1.78*		*ug/g*		*55.7*	*50-140*			
Surrogate: Toluene-d8	*2.83*		*ug/g*		*88.5*	*50-140*			
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	*2.83*		*ug/g*		*88.5*	*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	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	34	8	ug/g	41			19.8	30	
F4 PHCs (C34-C50)	33	6	ug/g	47			NC	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	2.9	1.0	ug/g	2.6			9.6	30	
Barium	54.9	1.0	ug/g	51.6			6.1	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	15.4	5.0	ug/g	13.3			14.8	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	22.1	5.0	ug/g	17.9			20.9	30	
Cobalt	5.7	1.0	ug/g	5.2			8.6	30	
Copper	19.8	5.0	ug/g	17.3			13.7	30	
Lead	81.5	1.0	ug/g	67.2			19.2	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	12.6	5.0	ug/g	11.0			13.5	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	22.2	10.0	ug/g	19.0			15.4	30	
Zinc	67.3	20.0	ug/g	60.7			10.2	30	
PCBs									
PCBs, total	ND	0.05	ug/g	ND			NC	40	
Surrogate: Decachlorobiphenyl	*0.102*		*ug/g*		*94.3*	*60-140*			
Physical Characteristics									
% Solids	72.2	0.1	% by Wt.	76.4			5.7	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	0.122			NC	40	
Benzo [a] anthracene	0.058	0.02	ug/g	0.078			29.5	40	
Benzo [a] pyrene	0.060	0.02	ug/g	0.077			24.9	40	
Benzo [b] fluoranthene	0.060	0.02	ug/g	0.088			38.0	40	
Benzo [g,h,i] perylene	0.049	0.02	ug/g	0.040			21.2	40	
Benzo [k] fluoranthene	0.025	0.02	ug/g	0.043			NC	40	
Chrysene	0.077	0.02	ug/g	0.101			26.9	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	0.115	0.02	ug/g	0.160			33.3	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	0.041	0.02	ug/g	0.035			16.4	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	0.083	0.02	ug/g	0.106			24.8	40	
Pyrene	0.094	0.02	ug/g	0.126			29.2	40	
Surrogate: 2-Fluorobiphenyl	*1.88*		*ug/g*		*136*	*50-140*			
Surrogate: Terphenyl-d14	*1.36*		*ug/g*		*98.4*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	
Bromomethane	ND	0.05	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	*4.04*		*ug/g*		*107*	*50-140*			
Surrogate: Dibromofluoromethane	*2.33*		*ug/g*		*61.6*	*50-140*			
Surrogate: Toluene-d8	*3.58*		*ug/g*		*94.7*	*50-140*			
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*3.58*		*ug/g*		*94.7*	*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)	216	7	ug/g	ND	108	80-120			
F2 PHCs (C10-C16)	105	4	ug/g	ND	112	60-140			
F3 PHCs (C16-C34)	316	8	ug/g	41	119	60-140			
F4 PHCs (C34-C50)	219	6	ug/g	47	117	60-140			
Metals									
Antimony	46.3	1.0	ug/g	ND	92.0	70-130			
Arsenic	55.7	1.0	ug/g	1.0	109	70-130			
Barium	82.9	1.0	ug/g	20.6	125	70-130			
Beryllium	57.9	0.5	ug/g	ND	115	70-130			
Boron	58.7	5.0	ug/g	5.3	107	70-130			
Cadmium	50.8	0.5	ug/g	ND	102	70-130			
Chromium	69.9	5.0	ug/g	7.2	126	70-130			
Cobalt	60.3	1.0	ug/g	2.1	116	70-130			
Copper	62.8	5.0	ug/g	6.9	112	70-130			
Lead	81.3	1.0	ug/g	26.9	109	70-130			
Molybdenum	53.8	1.0	ug/g	ND	107	70-130			
Nickel	62.4	5.0	ug/g	ND	116	70-130			
Selenium	49.7	1.0	ug/g	ND	99.1	70-130			
Silver	41.3	0.3	ug/g	ND	82.5	70-130			
Thallium	52.0	1.0	ug/g	ND	104	70-130			
Uranium	45.5	1.0	ug/g	ND	90.8	70-130			
Vanadium	71.7	10.0	ug/g	ND	128	70-130			
Zinc	80.7	20.0	ug/g	24.3	113	70-130			
PCBs									
PCBs, total	0.457	0.05	ug/g	ND	106	60-140			
Surrogate: Decachlorobiphenyl	*0.107*		*ug/g*		*99.1*	*60-140*			
Semi-Volatiles									
Acenaphthene	0.155	0.02	ug/g	ND	89.4	50-140			
Acenaphthylene	0.151	0.02	ug/g	ND	87.2	50-140			
Anthracene	0.136	0.02	ug/g	ND	81.3	50-140			
Benzo [a] anthracene	0.219	0.02	ug/g	0.078	81.5	50-140			
Benzo [a] pyrene	0.227	0.02	ug/g	0.077	87.2	50-140			
Benzo [b] fluoranthene	0.210	0.02	ug/g	0.088	70.1	50-140			
Benzo [g,h,i] perylene	0.180	0.02	ug/g	0.040	81.1	50-140			
Benzo [k] fluoranthene	0.175	0.02	ug/g	0.043	76.0	50-140			
Chrysene	0.242	0.02	ug/g	0.101	81.5	50-140			
Dibenzo [a,h] anthracene	0.140	0.02	ug/g	ND	80.9	50-140			
Fluoranthene	0.270	0.02	ug/g	0.160	63.3	50-140			
Fluorene	0.172	0.02	ug/g	ND	99.1	50-140			
Indeno [1,2,3-cd] pyrene	0.174	0.02	ug/g	0.035	80.7	50-140			
1-Methylnaphthalene	0.209	0.02	ug/g	ND	121	50-140			
2-Methylnaphthalene	0.240	0.02	ug/g	ND	139	50-140			
Naphthalene	0.164	0.01	ug/g	ND	94.8	50-140			
Phenanthrene	0.238	0.02	ug/g	0.106	76.5	50-140			
Pyrene	0.252	0.02	ug/g	0.126	72.7	50-140			
Surrogate: 2-Fluorobiphenyl	*1.90*		*ug/g*		*137*	*50-140*			
Surrogate: Terphenyl-d14	*1.69*		*ug/g*		*122*	*50-140*			
Volatiles									

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Acetone	10.1	0.50	ug/g	ND	101	50-140			
Benzene	3.66	0.02	ug/g	ND	91.5	60-130			
Bromodichloromethane	3.98	0.05	ug/g	ND	99.6	60-130			
Bromoform	4.61	0.05	ug/g	ND	115	60-130			
Bromomethane	4.69	0.05	ug/g	ND	117	50-140			
Carbon Tetrachloride	3.82	0.05	ug/g	ND	95.5	60-130			
Chlorobenzene	3.97	0.05	ug/g	ND	99.3	60-130			
Chloroform	3.98	0.05	ug/g	ND	99.5	60-130			
Dibromochloromethane	4.05	0.05	ug/g	ND	101	60-130			
Dichlorodifluoromethane	4.09	0.05	ug/g	ND	102	50-140			
1,2-Dichlorobenzene	4.39	0.05	ug/g	ND	110	60-130			
1,3-Dichlorobenzene	4.29	0.05	ug/g	ND	107	60-130			
1,4-Dichlorobenzene	4.27	0.05	ug/g	ND	107	60-130			
1,1-Dichloroethane	3.96	0.05	ug/g	ND	99.0	60-130			
1,2-Dichloroethane	4.10	0.05	ug/g	ND	103	60-130			
1,1-Dichloroethylene	3.88	0.05	ug/g	ND	97.1	60-130			
cis-1,2-Dichloroethylene	3.81	0.05	ug/g	ND	95.4	60-130			
trans-1,2-Dichloroethylene	4.01	0.05	ug/g	ND	100	60-130			
1,2-Dichloropropane	3.64	0.05	ug/g	ND	91.0	60-130			
cis-1,3-Dichloropropylene	4.10	0.05	ug/g	ND	103	60-130			
trans-1,3-Dichloropropylene	3.49	0.05	ug/g	ND	87.1	60-130			
Ethylbenzene	3.56	0.05	ug/g	ND	89.0	60-130			
Ethylene dibromide (dibromoethane, 1,2-	3.99	0.05	ug/g	ND	99.7	60-130			
Hexane	4.28	0.05	ug/g	ND	107	60-130			
Methyl Ethyl Ketone (2-Butanone)	11.5	0.50	ug/g	ND	115	50-140			
Methyl Isobutyl Ketone	12.8	0.50	ug/g	ND	128	50-140			
Methyl tert-butyl ether	10.7	0.05	ug/g	ND	107	50-140			
Methylene Chloride	3.74	0.05	ug/g	ND	93.5	60-130			
Styrene	3.58	0.05	ug/g	ND	89.5	60-130			
1,1,1,2-Tetrachloroethane	4.12	0.05	ug/g	ND	103	60-130			
1,1,2,2-Tetrachloroethane	4.11	0.05	ug/g	ND	103	60-130			
Tetrachloroethylene	3.95	0.05	ug/g	ND	98.7	60-130			
Toluene	3.78	0.05	ug/g	ND	94.6	60-130			
1,1,1-Trichloroethane	3.89	0.05	ug/g	ND	97.4	60-130			
1,1,2-Trichloroethane	3.96	0.05	ug/g	ND	98.9	60-130			
Trichloroethylene	3.84	0.05	ug/g	ND	96.1	60-130			
Trichlorofluoromethane	4.19	0.05	ug/g	ND	105	50-140			
Vinyl chloride	4.24	0.02	ug/g	ND	106	50-140			
m,p-Xylenes	7.61	0.05	ug/g	ND	95.1	60-130			
o-Xylene	3.95	0.05	ug/g	ND	98.8	60-130			
Surrogate: 4-Bromofluorobenzene	*2.17*		*ug/g*		*67.8*	*50-140*			
Surrogate: Dibromofluoromethane	*1.88*		*ug/g*		*58.7*	*50-140*			
Surrogate: Toluene-d8	*2.92*		*ug/g*		*91.2*	*50-140*			
Benzene	3.66	0.02	ug/g	ND	91.5	60-130			
Ethylbenzene	3.56	0.05	ug/g	ND	89.0	60-130			
Toluene	3.78	0.05	ug/g	ND	94.6	60-130			
m,p-Xylenes	7.61	0.05	ug/g	ND	95.1	60-130			
o-Xylene	3.95	0.05	ug/g	ND	98.8	60-130			
Surrogate: Toluene-d8	*2.92*		*ug/g*		*91.2*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

1 : Some peak(s) in the GC-FID Chromatogram are not typical of petroleum hydrocarbon distillates. May be the result of high concentrations of non-mineral based compounds not completely removed by the method cleanup. Results may be biased high.

QC Qualifiers :

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2226104

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2226104	

Client Name: Paterson Group Inc.
Contact Name: Mandy Witteman
Address: 9 Auriga Dr. Ottawa. ON K2E 7T9
Telephone: (613) 800-5574 (direct line)

Project Ref: PE5641
Quote #:
PO #: 55014
E-mail: mwitteman@patersongroup.ca

Page 1 of 1

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	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	PCBs				
1	G1	S		2	June 17/2022		X							X				
2	BH4-22-AU1			~~2~~ 1					X	X								
3	BH4-22-SS3			2			X	X	—	—	H	O	L	D	—	—	—	—
4	BH5-22-AU1			1						X								
5	BH5-22-SS3			2			X	X										
6	BH6-22-AU1/SS2			1					X	X								
7	BH6-22-SS3	↓		2	↓		X	X										
8																		
9																		
10																		

Required Analysis

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: A. TOURIE	Received at Lab: Jvneepam Dhunai	Verified By:
Relinquished By (Print): Nurein Seif	Date/Time: 20/06/22 3:47	Date/Time: JUN 20 2022 14.55	Date/Time: June 21/22 9:55
Date/Time: June 20/2022	Temperature: °C	Temperature: 22.7 C	pH Verified: ☐ By: N/A

Chain of Custody (Blank).xlsx

Revsion 4.0

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mandy Witteman

Client PO: 27366
Project: PE5641
Custody: 118314

Report Date: 26-Apr-2022
Order Date: 19-Apr-2022

Order #: 2217201

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

Paracel ID	Client ID
2217201-01	BH1-22-GW
2217201-02	BH2-22-GW
2217201-03	BH3-22-GW
2217201-04	DUP

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 27366

Report Date: 26-Apr-2022

Order Date: 19-Apr-2022

Project Description: PE5641

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	20-Apr-22	21-Apr-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	25-Apr-22	25-Apr-22
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	25-Apr-22	25-Apr-22
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	20-Apr-22	21-Apr-22

Certificate of Analysis

Report Date: 26-Apr-2022

Client: Paterson Group Consulting Engineers

Order Date: 19-Apr-2022

Client PO: 27366

Project Description: PE5641

	Client ID:	BH1-22-GW	BH2-22-GW	BH3-22-GW	DUP
	Sample Date:	14-Apr-22 09:00	14-Apr-22 09:00	14-Apr-22 09:00	14-Apr-22 09:00
	Sample ID:	2217201-01	2217201-02	2217201-03	2217201-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 27366

Report Date: 26-Apr-2022

Order Date: 19-Apr-2022

Project Description: PE5641

	Client ID:	BH1-22-GW	BH2-22-GW	BH3-22-GW	DUP
	Sample Date:	14-Apr-22 09:00	14-Apr-22 09:00	14-Apr-22 09:00	14-Apr-22 09:00
	Sample ID:	2217201-01	2217201-02	2217201-03	2217201-04
	MDL/Units	Water	Water	Water	Water
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	123%	123%	123%	122%
Dibromofluoromethane	Surrogate	110%	110%	133%	124%
Toluene-d8	Surrogate	109%	109%	108%	108%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-
Semi-Volatiles					
Acenaphthene	0.05 ug/L	<0.05	<0.05	<0.05	-
Acenaphthylene	0.05 ug/L	<0.05	<0.05	<0.05	-
Anthracene	0.01 ug/L	<0.01	<0.01	<0.01	-
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	<0.01	-
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	<0.01	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	<0.05	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	-
Chrysene	0.05 ug/L	<0.05	<0.05	<0.05	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	-
Fluoranthene	0.01 ug/L	<0.01	<0.01	<0.01	-
Fluorene	0.05 ug/L	<0.05	<0.05	<0.05	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	<0.05	-
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	-
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	-
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	<0.10	-
Naphthalene	0.05 ug/L	<0.05	<0.05	<0.05	-
Phenanthrene	0.05 ug/L	<0.05	<0.05	<0.05	-
Pyrene	0.01 ug/L	<0.01	<0.01	<0.01	-
2-Fluorobiphenyl	Surrogate	112%	111%	102%	-
Terphenyl-d14	Surrogate	121%	123%	118%	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						
Benzo [k] fluoranthene	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	*19.9*		*ug/L*		*99.4*	*50-140*			
Surrogate: Terphenyl-d14	*23.6*		*ug/L*		*118*	*50-140*			
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						

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 27366

Report Date: 26-Apr-2022

Order Date: 19-Apr-2022

Project Description: PE5641

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*90.8*		*ug/L*		*114*	*50-140*			
Surrogate: Dibromofluoromethane	*74.7*		*ug/L*		*93.4*	*50-140*			
Surrogate: Toluene-d8	*92.1*		*ug/L*		*115*	*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	4.31	0.5	ug/L	3.91			9.7	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	7.51	0.5	ug/L	6.12			20.4	30	
Dibromochloromethane	2.24	0.5	ug/L	2.32			3.5	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	*100*		*ug/L*		*125*	*50-140*			
Surrogate: Dibromofluoromethane	*99.4*		*ug/L*		*124*	*50-140*			
Surrogate: Toluene-d8	*87.6*		*ug/L*		*109*	*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)	1840	25	ug/L	ND	92.1	68-117			
F2 PHCs (C10-C16)	1360	100	ug/L	ND	85.0	60-140			
F3 PHCs (C16-C34)	3590	100	ug/L	ND	91.5	60-140			
F4 PHCs (C34-C50)	2840	100	ug/L	ND	115	60-140			
Semi-Volatiles									
Acenaphthene	4.61	0.05	ug/L	ND	92.1	50-140			
Acenaphthylene	4.13	0.05	ug/L	ND	82.5	50-140			
Anthracene	4.34	0.01	ug/L	ND	86.7	50-140			
Benzo [a] anthracene	4.22	0.01	ug/L	ND	84.3	50-140			
Benzo [a] pyrene	4.76	0.01	ug/L	ND	95.2	50-140			
Benzo [b] fluoranthene	5.90	0.05	ug/L	ND	118	50-140			
Benzo [g,h,i] perylene	4.80	0.05	ug/L	ND	96.0	50-140			
Benzo [k] fluoranthene	5.86	0.05	ug/L	ND	117	50-140			
Chrysene	4.53	0.05	ug/L	ND	90.5	50-140			
Dibenzo [a,h] anthracene	5.02	0.05	ug/L	ND	100	50-140			
Fluoranthene	4.56	0.01	ug/L	ND	91.3	50-140			
Fluorene	4.45	0.05	ug/L	ND	89.0	50-140			
Indeno [1,2,3-cd] pyrene	5.11	0.05	ug/L	ND	102	50-140			
1-Methylnaphthalene	5.23	0.05	ug/L	ND	105	50-140			
2-Methylnaphthalene	5.46	0.05	ug/L	ND	109	50-140			
Naphthalene	4.85	0.05	ug/L	ND	97.1	50-140			
Phenanthrene	4.26	0.05	ug/L	ND	85.1	50-140			
Pyrene	4.66	0.01	ug/L	ND	93.2	50-140			
Surrogate: 2-Fluorobiphenyl	*21.9*		*ug/L*		*110*	*50-140*			
Surrogate: Terphenyl-d14	*23.4*		*ug/L*		*117*	*50-140*			
Volatiles									
Acetone	70.2	5.0	ug/L	ND	70.2	50-140			
Benzene	28.9	0.5	ug/L	ND	72.2	60-130			
Bromodichloromethane	37.2	0.5	ug/L	ND	92.9	60-130			
Bromoform	32.6	0.5	ug/L	ND	81.4	60-130			
Bromomethane	30.2	0.5	ug/L	ND	75.5	50-140			
Carbon Tetrachloride	33.9	0.2	ug/L	ND	84.6	60-130			
Chlorobenzene	38.9	0.5	ug/L	ND	97.4	60-130			
Chloroform	33.8	0.5	ug/L	ND	84.4	60-130			
Dibromochloromethane	40.7	0.5	ug/L	ND	102	60-130			
Dichlorodifluoromethane	33.9	1.0	ug/L	ND	84.8	50-140			
1,2-Dichlorobenzene	35.8	0.5	ug/L	ND	89.5	60-130			
1,3-Dichlorobenzene	36.3	0.5	ug/L	ND	90.8	60-130			
1,4-Dichlorobenzene	40.6	0.5	ug/L	ND	101	60-130			
1,1-Dichloroethane	33.0	0.5	ug/L	ND	82.4	60-130			
1,2-Dichloroethane	29.1	0.5	ug/L	ND	72.6	60-130			
1,1-Dichloroethylene	30.8	0.5	ug/L	ND	77.0	60-130			
cis-1,2-Dichloroethylene	37.3	0.5	ug/L	ND	93.3	60-130			
trans-1,2-Dichloroethylene	29.2	0.5	ug/L	ND	72.9	60-130			
1,2-Dichloropropane	34.3	0.5	ug/L	ND	85.8	60-130			
cis-1,3-Dichloropropylene	29.6	0.5	ug/L	ND	74.0	60-130			
trans-1,3-Dichloropropylene	40.2	0.5	ug/L	ND	100	60-130			
Ethylbenzene	39.2	0.5	ug/L	ND	97.9	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylene dibromide (dibromoethane, 1,2-	31.1	0.2	ug/L	ND	77.8	60-130			
Hexane	38.6	1.0	ug/L	ND	96.6	60-130			
Methyl Ethyl Ketone (2-Butanone)	83.9	5.0	ug/L	ND	83.9	50-140			
Methyl Isobutyl Ketone	62.2	5.0	ug/L	ND	62.2	50-140			
Methyl tert-butyl ether	99.6	2.0	ug/L	ND	99.6	50-140			
Methylene Chloride	35.3	5.0	ug/L	ND	88.2	60-130			
Styrene	36.1	0.5	ug/L	ND	90.2	60-130			
1,1,1,2-Tetrachloroethane	30.8	0.5	ug/L	ND	76.9	60-130			
1,1,2,2-Tetrachloroethane	40.3	0.5	ug/L	ND	101	60-130			
Tetrachloroethylene	40.9	0.5	ug/L	ND	102	60-130			
Toluene	42.2	0.5	ug/L	ND	106	60-130			
1,1,1-Trichloroethane	34.0	0.5	ug/L	ND	84.9	60-130			
1,1,2-Trichloroethane	32.2	0.5	ug/L	ND	80.6	60-130			
Trichloroethylene	41.7	0.5	ug/L	ND	104	60-130			
Trichlorofluoromethane	33.5	1.0	ug/L	ND	83.8	60-130			
Vinyl chloride	32.7	0.5	ug/L	ND	81.8	50-140			
m,p-Xylenes	74.0	0.5	ug/L	ND	92.5	60-130			
o-Xylene	35.8	0.5	ug/L	ND	89.6	60-130			
Surrogate: 4-Bromofluorobenzene	*93.5*		*ug/L*		*117*	*50-140*			
Surrogate: Dibromofluoromethane	*85.0*		*ug/L*		*106*	*50-140*			
Surrogate: Toluene-d8	*87.4*		*ug/L*		*109*	*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.

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va, Ontario K1G 4J8
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Chain of Custody
(Lab Use Only)
Nº 119314

Page ___ of ___

Client Name: Paterson	Project Reference: PE5641
Contact Name: Mandy Witteman	Quote #
Address: 154 colonnade	PO # 27366
Telephone: 613 226 7381	Email Address: mwitteman@patersongroup.ca

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

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

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

Required Analyses

Paracel Order Number: 2217201

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH1-22-GW	GW		4	Apr 14 2022		✓	✓	✓				
2	BH2-22-GW	↓		↓	↓		✓	✓	✓				
3	BH3-22-GW						✓	✓	✓				
4	Dup	↓		2				✓					
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign): GPat	Received by Driver/Depot: A. Sloune	Received at Lab:
Relinquished By (Print): Grant Paterson	Date/Time: 19/04/22 3:30 PM	Date/Time: 19 Apr 2022 4:20
Date/Time: Apr 19 2022	Temperature: ___ °C	Temperature: 8.0 °C
		Verified By: G
		Date/Time: 19 Apr 2022 5:14
		pH Verified [ ] By: ___

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mandy Witteman

Client PO: 55076
Project: PE5641
Custody:

Report Date: 4-Jul-2022
Order Date: 27-Jun-2022

Order #: 2227104

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

Paracel ID	Client ID
2227104-01	BH4-22-GW1
2227104-02	BH4-102
2227104-03	BH5-22-GW1
2227104-04	BH6-22-GW1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 55076

Report Date: 04-Jul-2022

Order Date: 27-Jun-2022

Project Description: PE5641

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	28-Jun-22	28-Jun-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	30-Jun-22	4-Jul-22
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	28-Jun-22	28-Jun-22

Certificate of Analysis

Report Date: 04-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 27-Jun-2022

Client PO: 55076

Project Description: PE5641

	Client ID:	BH4-22-GW1	BH4-102	BH5-22-GW1	BH6-22-GW1
	Sample Date:	24-Jun-22 09:00	24-Jun-22 09:00	24-Jun-22 09:00	24-Jun-22 09:00
	Sample ID:	2227104-01	2227104-02	2227104-03	2227104-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5 ug/L	3.8	3.6	<0.5	0.5
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Report Date: 04-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 27-Jun-2022

Client PO: 55076

Project Description: PE5641

	Client ID:	BH4-22-GW1	BH4-102	BH5-22-GW1	BH6-22-GW1
	Sample Date:	24-Jun-22 09:00	24-Jun-22 09:00	24-Jun-22 09:00	24-Jun-22 09:00
	Sample ID:	2227104-01	2227104-02	2227104-03	2227104-04
	MDL/Units	Water	Water	Water	Water
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	109%	108%	109%	108%
Dibromofluoromethane	Surrogate	108%	108%	106%	106%
Toluene-d8	Surrogate	98.0%	98.6%	98.2%	98.1%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	-	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	-	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	-	<100	<100

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	*79.5*		*ug/L*		*99.4*	*50-140*			
Surrogate: Dibromofluoromethane	*69.2*		*ug/L*		*86.5*	*50-140*			
Surrogate: Toluene-d8	*82.2*		*ug/L*		*103*	*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	*87.4*		*ug/L*		*109*	*50-140*			
Surrogate: Dibromofluoromethane	*86.4*		*ug/L*		*108*	*50-140*			
Surrogate: Toluene-d8	*78.2*		*ug/L*		*97.8*	*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)	1860	25	ug/L	ND	92.8	68-117			
F2 PHCs (C10-C16)	1870	100	ug/L	ND	113	60-140			
F3 PHCs (C16-C34)	3080	100	ug/L	ND	83.1	60-140			
F4 PHCs (C34-C50)	3370	100	ug/L	ND	126	60-140			
Volatiles									
Acetone	109	5.0	ug/L	ND	109	50-140			
Benzene	36.5	0.5	ug/L	ND	91.2	60-130			
Bromodichloromethane	39.3	0.5	ug/L	ND	98.2	60-130			
Bromoform	31.0	0.5	ug/L	ND	77.5	60-130			
Bromomethane	38.8	0.5	ug/L	ND	96.9	50-140			
Carbon Tetrachloride	29.3	0.2	ug/L	ND	73.2	60-130			
Chlorobenzene	39.6	0.5	ug/L	ND	99.1	60-130			
Chloroform	44.6	0.5	ug/L	ND	112	60-130			
Dibromochloromethane	30.8	0.5	ug/L	ND	77.1	60-130			
Dichlorodifluoromethane	31.7	1.0	ug/L	ND	79.3	50-140			
1,2-Dichlorobenzene	37.5	0.5	ug/L	ND	93.8	60-130			
1,3-Dichlorobenzene	36.2	0.5	ug/L	ND	90.6	60-130			
1,4-Dichlorobenzene	36.1	0.5	ug/L	ND	90.2	60-130			
1,1-Dichloroethane	35.2	0.5	ug/L	ND	88.0	60-130			
1,2-Dichloroethane	37.1	0.5	ug/L	ND	92.6	60-130			
1,1-Dichloroethylene	34.2	0.5	ug/L	ND	85.5	60-130			
cis-1,2-Dichloroethylene	37.9	0.5	ug/L	ND	94.8	60-130			
trans-1,2-Dichloroethylene	31.8	0.5	ug/L	ND	79.6	60-130			
1,2-Dichloropropane	34.2	0.5	ug/L	ND	85.4	60-130			
cis-1,3-Dichloropropylene	44.6	0.5	ug/L	ND	112	60-130			
trans-1,3-Dichloropropylene	30.4	0.5	ug/L	ND	76.1	60-130			
Ethylbenzene	37.3	0.5	ug/L	ND	93.3	60-130			
Ethylene dibromide (dibromoethane, 1,2-	36.4	0.2	ug/L	ND	91.1	60-130			
Hexane	37.5	1.0	ug/L	ND	93.7	60-130			
Methyl Ethyl Ketone (2-Butanone)	63.1	5.0	ug/L	ND	63.1	50-140			
Methyl Isobutyl Ketone	91.4	5.0	ug/L	ND	91.4	50-140			
Methyl tert-butyl ether	98.8	2.0	ug/L	ND	98.8	50-140			
Methylene Chloride	40.8	5.0	ug/L	ND	102	60-130			
Styrene	36.3	0.5	ug/L	ND	90.8	60-130			
1,1,1,2-Tetrachloroethane	30.2	0.5	ug/L	ND	75.5	60-130			
1,1,2,2-Tetrachloroethane	38.4	0.5	ug/L	ND	96.0	60-130			
Tetrachloroethylene	36.7	0.5	ug/L	ND	91.8	60-130			
Toluene	38.1	0.5	ug/L	ND	95.3	60-130			
1,1,1-Trichloroethane	43.4	0.5	ug/L	ND	109	60-130			
1,1,2-Trichloroethane	36.1	0.5	ug/L	ND	90.3	60-130			
Trichloroethylene	32.4	0.5	ug/L	ND	81.0	60-130			
Trichlorofluoromethane	33.1	1.0	ug/L	ND	82.6	60-130			
Vinyl chloride	32.6	0.5	ug/L	ND	81.4	50-140			
m,p-Xylenes	75.2	0.5	ug/L	ND	94.0	60-130			
o-Xylene	38.3	0.5	ug/L	ND	95.7	60-130			
Surrogate: 4-Bromofluorobenzene	*79.8*		*ug/L*		*99.7*	*50-140*			
Surrogate: Dibromofluoromethane	*89.4*		*ug/L*		*112*	*50-140*			
Surrogate: Toluene-d8	*79.9*		*ug/L*		*99.9*	*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: 2227104

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2227104	

Client Name: Paterson Group Inc.	Project Ref: PE5641	Page 1 of 1
Contact Name: Mandy Witteman	Quote #:	Turnaround Time
Address: 9 Auriga Dr. Ottawa	PO #: 55076	☐ 1 day ☐ 3 day
Telephone: (613) 800-5575	E-mail: mwitteman@gmail.com.	☐ 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)

	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	BH4-22-GW1	GW		3	June 24/22		X	X										
2	BH4-102	GW		2	↓			X										
3	BH5-22-GW1	GW		3			X	X										
4	BH6-22-GW1	GW		3			X	X										
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: T. Louise	Received By Lab:	Verified By:
Relinquished By (Print): Nureen Seif	Date/Time: 27/06/22 3:29	Date/Time: June 27/22 16:30	Date/Time: Jun 28 2022 9:18
Date/Time: June 27, 2022	Temperature: °C 21.	Temperature: 20.1	pH Verified: ☐ By: NA

PARACEL LABORATORIES LTD.

Paracel ID: 2227104

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2227104	

Client Name: Paterson Group Inc.
Contact Name: Mandy Witteman
Address: 9 Auriga Dr. Ottawa
Telephone: (613) 800-5575

Project Ref: PE5641
Quote #:
PO #: 55076
E-mail: mwitteman@gmail.com

Page 1 of 1

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)

	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	BH4-22-GW1	GW		3	June 24/22		X	X										
2	BH4-102	GW		2	↓			X										
3	BH5-22-GW1	GW		3			X	X										
4	BH6-22-GW1	GW		3			X	X										
5																		
6																		
7																		
8																		
9																		
10																		

Required Analysis

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nurein Seif	Date/Time: 27/06/22 3:29	Date/Time: June 27/22 16:30	Date/Time: June 28/22 9:18
Date/Time: June 27, 2022	Temperature: °C FF	Temperature: 20.1	pH Verified: ☐ By: NA