PATERSON GROUP

Phase II Environmental Site Assessment

145 Thad Johnson Private
Ottawa, Ontario

Prepared for Jennings Developments

Report: PE6238-2
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EXECUTIVE SUMMARY

Assessment

The subsurface investigation consisted of placing seven boreholes (BH1-23 through BH7-23) across the Phase II Property. Three of the seven boreholes were instrumented with groundwater monitoring wells.

The general stratigraphy encountered during the field program consisted of topsoil overlying a fill material. The fill material consisted of brown silty sand with gravel and some cobbles and crushed stone, followed compacted sand with varying amounts of silt, gravel, cobbles and boulders. Fill material was encountered in all of the boreholes. Intermittent layers of compact, brown sandy silt were observed within the sand deposit. These silty sand layers were noted as wet during the field program and is considered to have created a perched water table. No deleterious material or signs of contamination was observed during the field program.

Bedrock was not encountered during the field program. Inferred bedrock was encountered by dynamic cone penetration test at a depth of 7.47 m at BH 2-23.

Eight soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and/or metals as well as electrical conductivity (EC) and sodium adsorption ration (SAR). With the exception of some metal parameters, other groups of analyse concentrations were undetected about the laboratory limit. All of the soil samples analyzed, complied with the MECP Table 3 Commercial Standards.

Instead, two soils samples from the deepest split spoon samples (BH6-23-SS8 and BH7-23-SS8) were submitted for the analyses of BTEX, PHCs (F1-F4), VOCs and PAHs. Both of these boreholes were equipped with groundwater monitoring wells. No detectable concentration of any of the analyzed parameters were identified at approximately 5.36-5.97 mbgs within the soil.

Furthermore, soil sample BH6-23-SS4, which was found to be notably damp during the drilling program (perched water table), was submitted for analysis of PHC and BTEX. Any impacts resulting from discharges at the surface would been intercepted by these silty, damp strata. No detections were reported in this soil sample.

Recommendations

It is our understanding that the Phase II Property is slated for site developed. Excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19 – On-site and Excess Soil Management.

Monitoring Wells

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

1.0 INTRODUCTION

At the request of Jennings Developments, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment (ESA) at 145 Thad Johnson Private (the Phase II Property), in the City of Ottawa, Ontario. The purpose of this Phase II ESA is to address the areas of potential environmental concern (APECs) identified on the Phase II Property, during the Phase I ESA conducted by Paterson in August 2023.

1.1 Site Description

Address:	145 Thad Johnson Private, Ottawa, Ontario
Location:	The site is located at the west end of Thad Johnson Private, between Airport Parkway and Thad Johnson Private, in the City of Ottawa, Ontario. Refer to Figure 1 - Key Plan in the Figures section following the text.
Latitude and Longitude:	45° 19’ 33.80" N, 75° 39' 19.92" W

Site Description:

Configuration:	Irregular
Area:	17,355 m^2 (approximately)
Zoning:	T1A –Transportation Zone.
Current Use:	The Phase II Property exists as undeveloped vacant land.
Services:	The Phase II Property is situated in a municipally serviced area.

1.2 Property Ownership

Paterson was engaged to conduct this Phase I-ESA by Mr. Chris Packman of Jennings Developments. The head office is located at 141 Laurier Avenue, Ottawa, Ontario. Mr. Packman can be reached by telephone at (343) 961-8380.

1.3 Current and Proposed Future Uses

The Phase II Property exists as undeveloped vacant land.

It is our understanding that the Phase II Property will be developed for commercial purposes, which will consist of a warehouse and associated vehicular parking.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 3 of the document entitled “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”, prepared by the Ontario Ministry of Environment, Conservation and Parks (MECP), April 2011. The MECP selected Table 3 Standards are based on the following considerations:

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

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

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

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

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

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is situated in a commercial area. The Phase II Property is situated in a municipally serviced area. Since the Phase II Property has never been developed, underground utilities and/or structures are not expected to be present on-site.

The site is accessible by a gravelled access lane, off of Thad Johnson Private. With the exception of a small, gravelled area, the majority of the ground surface is vegetated with low to medium brush.

Site drainage consists primarily of infiltration across the site with some sheet flow and overflow occurring on the gravelled area. The site topography is above the grade of the access roadway along the western property boundary, Thad Johnson Private to the south and the neighbouring properties to the north and east, and slopes down in all directions. The regional topography slopes in a northerly direction.

A depiction of the Phase II Property is shown on Drawing PE6238-1 – Site Plan, appended in the Figures section of this report.

2.2 Past Investigations

Based on the findings of the Phase I ESA recently completed by Paterson for the Phase II Property, several PCAs were identified and considered to represent APECs. As per Column A of Table 2 of the O.Reg. 153/04, as amended, the following on-site PCA and resultant APEC is:

- PCA 30 – "Importation of Fill Material of Unknown Quality," due to the importation of fill material (circa 2005) and use as a former snow dump (circa 2017) on the Phase I Property (APEC 1).

The off-site PCAs and resultant APECs on the Phase I Property are:

- PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the former presence of above ground fuel tanks at 140 Thad Johnson Private (APEC 2).
- PCA Other – "Hazardous Waste Generation," due to operations associated with a commercial transportation company at 140 Thad Johnson Private (APEC 2).
- PCA 27 – "Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles," due to the presence of airplane service, repair and maintenance airplane hangar at 350 Comet Private. (APEC 3).
- PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the former presence of above ground fuel tanks at 350 Comet Private. (APEC 3).

- ❒ PCAs Other – "Hazardous Waste Generator and 150-L Jet Fuel Spill," due to the presence of airplane service, repair and maintenance garage at 350 Comet Private and reported fuel spills. (APEC 3).

The APECs are shown on Drawing PE6238-1 – Site Plan. The remaining off-site PCAs identified within the Phase I Study Area were not considered to result in APECs based on their separation distances and/or orientations (down or cross-gradient) with respect to the Phase I Property. These off-site PCAs are identified in green, shown on Drawing PE6238-2– Surrounding Land Use Plan.

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

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted on September 5 and September 6, 2023. The field program consisted of drilling seven boreholes to address the APECs identified on the Phase II Property in conjunction with a geotechnical investigation. Three of the seven boreholes were completed with monitoring well installations. The boreholes were drilled to a maximum depth of 7.67 m below the ground surface (mbgs).

3.2 Media Investigated

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

Contaminants of potential concern on the Phase II Property included benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), metals (including arsenic (As), antimony (Sb) and selenium (Se)), and/or electrical conductivity (EC) and sodium adsorption ratio (SAR).

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 dolomite of the Oxford Formation.

The overburden is reported to consist of plain till with an overburden thickness ranging from 5 to 10 m over the entire site.

Fill Material

Based on the historical review of the Phase I Property, fill material of unknown quality is present on-site due to the backfill of the former aggregate pit; as such, the presence of fill material represents an APEC.

Areas of Natural Significance and Natural Bodies of Water

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

Subsurface Structures and Utilities

The Phase I Property is situated in a municipally serviced area; however, the Phase I Property is undeveloped and vacant; as such, it is expected that there are no underground utilities and/or structures present on-site.

Existing Buildings and Structures

There are no permanent structures present on the Phase I Property. A portable washroom is present on-site. No other structures are present.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area consists of commercial/industrial properties including aircraft services, maintenances and airfreight transportation that utilizes the Ottawa International Airport's infrastructure.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

The on- and off-site PCAs and resultant APECs as well as the CPCs have been summarized 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: Importation of fill material of unknown quality	Across the Phase I Property	PCA 30 – Importation of Fill Material of Unknown Quality	On-site	BTEX PHCs PAHs Metals EC, SAR	Soil
APEC 2: Resulting from the former presence of ASTs, and waste generation	Southern part of the Phase I Property	PCA 28 – Gasoline and Associated Products Storage in Fixed Tanks PCA Other – Hazardous Waste Generation	Off-site	VOCs PHCs PAHs Glycol	Groundwater
APEC 3: Resulting from an airplane service maintenance and repair hangar, former ASTs, waste generation, and former 130-L jet fuel spill	Western side of the Phase I Property	PCA 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles PCA 28 – Gasoline and Associated Products Storage in Fixed Tanks PCAs Other – Hazardous Waste Generation and fuel spill	Off-site	VOCs PHCs PAHs	Groundwater

Contaminants of Potential Concern

As per Section 7.1 of the Phase I ESA report, the contaminants of potential concern (CPCs) in soil and/or groundwater include Volatile Organic Compounds (VOCs), Petroleum Hydrocarbons (PHCs, F1-F4), Polycyclic Aromatic Hydrocarbons (PAHs), metals (including arsenic (As), antimony (Sb) and selenium (Se)), glycol and/or Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR).

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 on- and off-site 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

During the groundwater sampling event on September 15, 2023, all three groundwater monitoring wells were found to be without any water. Without any water in the monitoring wells, no groundwater samples were collected.

In absence of groundwater, the deepest split spoon soil sample was submitted for analytical testing to provide analytical coverage at the deepest point of the subsurface investigation.

Further discussion will be provided later in this report.

3.5 Impediments

No impediments to the subsurface investigation were encountered.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation conducted for this Phase II ESA consisted of drilling seven boreholes (BH1-23 through BH7-23) across the Phase II Property. The boreholes were drilled to depths ranging from 3.66 to 6.71 m below ground surface (mbgs).

The boreholes were drilled using a low clearance track mounted drill rig operated by George Downing Estate Drilling of Hawkesbury, Ontario, under full-time supervision of Paterson personnel. The borehole locations are indicated on the attached Drawing PE6238-3 - Test Hole Location Plan.

4.2 Soil Sampling

A total of 59 soil samples were obtained from the boreholes by means of grab sampling from auger flights/auger samples and split spoon sampling. Split spoon samples were taken at approximate 0.76 m intervals.

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

The soil profile generally consisted of topsoil overlying a fill layer, except an asphalt concrete structure at BH6-23. The fill layer was generally observed to consist of brown silty sand with gravel, cobbles and crushed stone extending to approximate depths of 0.8 m to 2.3 m. A deposit of compact to very dense, brown sand with varying amounts of silt, gravel, cobbles, boulders was encountered underlying the fill material at all boreholes and extended to the maximum depth of the boreholes. Intermittent layers of compact, brown sandy silt were observed within the sand deposit at borehole BH 5-23.

During soil sampling, soil samples that were found to contain higher levels of silt were noted to be visibly damp. It is suspected that that lenses of silty material within the deposit of brown sand have created a perched water table.

Bedrock was not encountered during the subsurface program. Bedrock surface was inferred at practical refusal, at a depth of 7.47 m below the ground surface (mbgs) at BH 2-23.

No unusual odours or staining were observed in any of the boreholes during the field program.

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 0.1 to 13.1 ppm in the soil samples obtained.

These PID results do not indicate the potential for significant contamination from volatile contaminants. No unusual odours or staining were observed in any of the boreholes during the field program.

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

Three groundwater monitoring wells (BH2-23, BH6-23 and BH7-23) were installed on the Phase II Property as part of the subsurface investigation. The monitoring wells consisted of 50 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
BH2-23	115.75	6.71	3.71-6.71	2.69-6.71	0.18-2.69	Stick-up
BH6-23	117.18	6.71	1.57-4.57	1.40-4.57	0.18-1.40	Flushmount
BH7-23	115.08	6.71	3.10 -6.10	2.74-6.10	0.18-2.74	Stick-up

Borehole locations and elevations were surveyed geodetically by Paterson personnel.

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 could not be obtained from the monitoring wells installed during the subsurface investigation. At the time of installation, several silty soil samples at BH2-23, BH6-23 and BH7-23 were found to be damp, indicating the possibility that the water table was encountered. As a result, monitoring wells targeted depths where these damp samples were encountered.

Upon returning to the Phase II-Property, all three wells were dry. Based on further assessment, it is considered likely that the intermittent silty stratigraphy in certain areas has acted as a perched water table.

In the absence of groundwater, certain damp soil samples were selected for analytical testing, in addition to samples collected from the final depth of

boreholes (e.g. sample BH6-23-SS4, which was found to be damp, or sample BH7-23-SS9, collected at approximately 6.0 m below grade).

Soil samples from these depths would provide indication of potentially impacted groundwater.

4.6 Analytical Testing

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

TABLE 3: Soil Samples Submitted and Analyzed Parameters

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed						Rationale
		BTEX	PHCs (F_1-F_4)	VOCs	PAHs	Metals	EC/SAR	
September 5, 2023								
BH1-23-AU1	0.076-0.76m Fill				X	X		Sample depth selected to assess the quality of the fill material, based on visual and vapour screening.
BH1-23-SS2	0.76-1.37m Fill	X	X					Sample depth selected to assess the quality of the fill material, based on vapour screening.
BH2-23-AU1	0.076-0.76m Fill	X	X		X	X	X	Sample depth selected to assess the quality of the fill material, based on visual and vapour screening.
BH7-23-AU1	0.076-0.76m Fill					X		Duplicate soil sample from BH1-23-AU1, for QA/QC purposes.
September 6, 2023								
BH6-23-SS4	1.37-2.89m Sand	X	X					Sample depth selected to assess the soil quality, based on vapour screening.
BH6-23-SS8	5.36-5.97m Sand	X	X	X	X			Sample selected based on sample depth and vapour screening.
BH7-23-AU1	0.076-0.76m Fill	X	X		X	X	X	Sample depth selected to assess the quality of the fill material, based on visual and vapour screening.
BH7-23-SS5	3.05-3.66m Sand	X	X					Sample depth selected to assess the soil quality, based on vapour screening.
BH7-23-SS8	5.36-5.97m Till	X	X	X	X			Sample selected based on sample depth and vapour screening.

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

4.7 Residue Management

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

4.8 Elevation Surveying

Boreholes were surveyed at geodetic elevations by Paterson personnel.

4.9 Quality Assurance and Quality Control Measures

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

5.0 REVIEW AND EVALUATION

5.1 Geology

Site soils generally consisted of topsoil or asphalt pavement, followed by fill material or silty sand, underlain by sand with some silt and stones with traces of clay. The fill material consisting of silty sand with gravel and crushed stone was encountered in all borehole locations.

Bedrock was not encountered during the field program. Bedrock was inferred at practical refusal at 7.47 mbgs.

The groundwater table was not encountered during the field program.

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

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were not measured during the groundwater sampling event on September 15, 2023. The monitoring wells were dry at the time of sampling;

as such, a groundwater contouring map was not completed as part of this program.

5.3 Fine-Coarse Soil Texture

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

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in vapour readings ranging from 0.1 to 13.1 ppm. No visual observations or odours were noted during the field program.

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

5.5 Soil Quality

Nine soil samples were submitted for a combination of BTEX, PHCs (F1-F4), VOCs, PAHs and/or Metals, as well as pH and EC/SAR analysis. The results of the analytical testing are presented in Tables 4 to 7. The laboratory Certificate of Analysis is provided in Appendix 1.

TABLE 4: Analytical Test Results – Soil
BTEX and PHCs F_1-F_4

Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Commercial Standards (µg/g)
		September 5, 2023		September 6, 2023		
		BH1-23-SS2	BH2-23-AU1	BH6-23-SS4	BH7-23-AU1	
Benzene	0.02	nd	nd	nd	nd	0.32
Toluene	0.05	nd	nd	nd	nd	68
Ethylbenzene	0.05	nd	nd	nd	nd	9.5
Xylenes	0.05	nd	nd	nd	nd	26
PHC F_1	7	nd	nd	nd	nd	55
PHC F_2	4	nd	nd	nd	nd	230
PHC F_3	8	nd	nd	nd	nd	1700
PHC F_4	6	nd	nd	nd	nd	3300

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

TABLE 4 Continued: Analytical Test Results – Soil
BTEX and PHCs F1-F4

Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Commercial Standards (µg/g)
		September 6, 2023				
		BH6-23-SS4	BH6-23-SS8	BH7-23-SS5	BH7-23-SS8	
Benzene	0.02	nd	nd	nd	nd	0.32
Toluene	0.05	nd	nd	nd	nd	68
Ethylbenzene	0.05	nd	nd	nd	nd	9.5
Xylenes	0.05	nd	nd	nd	nd	26
PHC F_1	7	nd	nd	nd	nd	55
PHC F_2	4	nd	nd	nd	nd	230
PHC F_3	8	nd	nd	nd	nd	1700
PHC F_4	6	nd	nd	nd	nd	3300

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

No detectable BTEX or PHC (F1-F4) concentrations were identified in the soil samples analyzed. The analytical results for BTEX and PHCs (F1-F4) comply with the selected MECP Table 3 Commercial Standards.

TABLE 5: Analytical Test Results – Soil
PAHs

Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 3 Commercial Standards (µg/g)
		September 5, 2023		September 6, 2023	
		BH1-23-AU1	BH2-23-AU1	BH7-23-AU1	
Acenaphthene	0.02	nd	nd	nd	96
Acenaphthylene	0.02	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	nd	0.96
Benzo[a]pyrene	0.02	nd	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	nd	0.96
Benzo[g,h,i]perylene	0.02	nd	nd	nd	9.6
Benzo[k]fluoranthene	0.02	nd	nd	nd	0.96
Chrysene	0.02	nd	nd	nd	9.6
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	nd	9.6
Fluorene	0.02	nd	nd	nd	62
Indeno [1,2,3-cd] pyrene	0.02	nd	nd	nd	0.76
1-Methylnaphthalene	0.02	nd	nd	nd	76
2-Methylnaphthalene	0.02	nd	nd	nd	76
Methylnaphthalene (1&2)	0.04	nd	nd	nd	76
Naphthalene	0.01	nd	nd	nd	9.6
Phenanthrene	0.02	nd	nd	nd	12
Pyrene	0.02	nd	nd	nd	96

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

TABLE 5 Continued: Analytical Test Results – Soil
PAHs

Parameter	MDL (µg/g)	Soil Samples (µg/g) September 6, 2023		MECP Table 3 Commercial Standards (µg/g)
		BH6-23-SS8	BH7-23-SS8	
Acenaphthene	0.02	nd	nd	96
Acenaphthylene	0.02	nd	nd	0.15
Anthracene	0.02	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	0.96
Benzo[a]pyrene	0.02	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	0.96
Benzo[g,h,i]perylene	0.02	nd	nd	9.6
Benzo[k]fluoranthene	0.02	nd	nd	0.96
Chrysene	0.02	nd	nd	9.6
Dibenzo[a,h]anthracene	0.02	nd	nd	0.1
Fluoranthene	0.02	nd	nd	9.6
Fluorene	0.02	nd	nd	62
Indeno [1,2,3-cd] pyrene	0.02	nd	nd	0.76
1-Methylnaphthalene	0.02	nd	nd	76
2-Methylnaphthalene	0.02	nd	nd	76
Methylnaphthalene (1&2)	0.04	nd	nd	76
Naphthalene	0.01	nd	nd	9.6
Phenanthrene	0.02	nd	nd	12
Pyrene	0.02	nd	nd	96

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

No detectable PAH concentrations were identified in the soil samples analyzed. The analytical results for PAHs comply with the selected MECP Table 3 Commercial Standards.

TABLE 6: Analytical Test Results – Soil
VOCs

Parameter	MDL (µg/g)	Soil Samples (µg/g) September 6, 2023		MECP Table 3 Commercial Standards (µg/g)
		BH6-23-SS8	BH7-23-SS8	
Acetone	0.50	nd	nd	16
Benzene	0.02	nd	nd	0.32
Bromodichloromethane	0.05	nd	nd	18
Bromoform	0.05	nd	nd	0.61
Bromomethane	0.05	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	0.21
Chlorobenzene	0.05	nd	nd	2.4
Chloroform	0.05	nd	nd	0.47
Dibromochloromethane	0.05	nd	nd	13
Dichlorodifluoromethane	0.05	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	6.8
1,3-Dichlorobenzene	0.05	nd	nd	9.6
1,4-Dichlorobenzene	0.05	nd	nd	0.2
1,1-Dichloroethane	0.05	nd	nd	17
1,2-Dichloroethane	0.05	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	0.064
cis-1,2-Dichloroethylene	0.05	nd	nd	55
trans-1,2-Dichloroethylene	0.05	nd	nd	1.3
1,2-Dichloropropane	0.05	nd	nd	0.16
1,3-Dichloropropene, total	0.05	nd	nd	0.18
Ethylbenzene	0.05	nd	nd	9.5
Ethylene dibromide (dibromoethane, 1,2-)	0.05	nd	nd	0.05
Hexane	0.05	nd	nd	46
Methyl Ethyl Ketone (2-Butanone)	0.50	nd	nd	70
Methyl Isobutyl Ketone	0.50	nd	nd	31
Methyl tert-butyl ether	0.05	nd	nd	11
Methylene Chloride	0.05	nd	nd	1.6
Styrene	0.05	nd	nd	34
1,1,1,2-Tetrachloroethane	0.05	nd	nd	0.087
1,1,2,2-Tetrachloroethane	0.05	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	4.5
Toluene	0.05	nd	nd	68
1,1,1-Trichloroethane	0.05	nd	nd	6.1
1,1,2-Trichloroethane	0.05	nd	nd	0.05
Trichloroethylene	0.05	nd	nd	0.91
Trichlorofluoromethane	0.05	nd	nd	4
Vinyl Chloride	0.02	nd	nd	0.032
Xylenes, total	0.05	nd	nd	26

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

No detectable VOC concentrations were identified in the soil samples analyzed. The analytical results comply for VOCs with the selected MECP Table 3 Commercial Standards.

TABLE 7: Analytical Test Results – Soil
Metals

Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Commercial Standards (µg/g)
		September 5, 2023			September 7, 2023	
		BH1-23-SS2	BH7-23-AU1 (DUP-BH1)	BH2-23-AU1	BH7-23-AU1	
Antimony	1.0	nd	nd	nd	nd	40
Arsenic	1.0	1.9	2.0	3.1	1.5	18
Barium	1.0	40.6	40.5	115	27.2	670
Beryllium	0.5	nd	nd	nd	nd	8
Boron	5.0	nd	nd	6.9	nd	120
Cadmium	0.5	nd	nd	nd	nd	1.9
Chromium	5.0	11.4	11.9	12.8	7.0	160
Cobalt	1.0	5.2	5.3	5.8	3.5	80
Copper	5.0	12.0	12.3	12.4	8.4	230
Lead	1.0	4.2	4.0	6.9	2.1	120
Molybdenum	1.0	nd	nd	nd	nd	40
Nickel	5.0	7.2	7.4	10.0	5.0	270
Selenium	1.0	nd	nd	nd	nd	5.5
Silver	0.3	nd	nd	nd	nd	40
Thallium	1.0	nd	nd	nd	nd	3.3
Uranium	1.0	nd	nd	nd	nd	33
Vanadium	10.0	23.3	25.1	22.0	17.8	86
Zinc	20.0	nd	nd	20.2	nd	340

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

Several metal parameter concentrations were identified below the selected MECP standards. The analytical results for metals comply with the selected MECP Table 3 Commercial Standards.

Electrical conductivity (EC), sodium adsorption ratio (SAR), and pH were analyzed for two (2) soil samples, BH2-23-AU1 and BH7-23-AU1. All of the parameters analyzed, comply with the MECP Table 3 Commercial Standards.

The analytical results for soil are shown on Drawing PE6238-4 – Analytical Testing Plan.

The maximum concentrations of analyzed parameters in the soil at the Phase II Property are summarized in Table 8.

TABLE 8: Maximum Concentrations – Soil			
Parameter	**Maximum Concentration (µg/g)**	**Soil Sample**	**Depth Interval (m BGS)**
Arsenic	3.1	BH2-23-AU1	0.076-0.76m; Fill
Barium	115		
Boron	6.9		
Chromium	12.8		
Cobalt	5.8		
Copper	12.4		
Nickel	10.0		
Vanadium	25.1	BH7-23-AU1 (DUP-BH1)	0.076-0.76m; Fill
Zinc	20.2	BH2-23-AU1	0.076-0.76m; Fill

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

5.6 Groundwater Quality

As discussed previously in this report, it was not possible to retrieve groundwater samples and therefore, the quality of the groundwater was not assessed due to the limitation.

Instead, two soils samples from the deepest split spoon samples (BH6-23-SS8 and BH7-23-SS8) with sufficient soil recovery, were submitted for the analyses of BTEX, PHCs (F1-F4), VOCs and PAHs. Both of these boreholes were equipped with groundwater monitoring wells. No detectable concentration of any of the analyzed parameters were identified at approximately 6.0 to 6.7 mbgs.

Furthermore, soil sample BH6-23-SS4, which was found to be notably damp during the drilling program (perched water table), was submitted for analysis of PHC and BTEX. Any impacts resulting from discharges at the surface would been intercepted by this silty, damp stratum. No detections were reports in this soil sample.

5.7 Quality Assurance and Quality Control Results

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

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

A duplicate soil sample (BH7-23-AU1) was obtained from BH1-23-AU1 and analyzed for metals.

Test results for the original and duplicate soil samples and relative percent difference (RPD) for the detected parameter concentrations are provided in Table 9.

TABLE 9: QA/QC Results – Soil (Metals)

Parameter	BH1-23-AU1	DUP (BH7-23-AU1)	RDP (%)	QA/QC Results
Arsenic	1.9	2	5	Within the acceptable range
Barium	40.6	40.5	0	Within the acceptable range
Chromium	11.4	11.9	4	Within the acceptable range
Cobalt	5.2	5.3	2	Within the acceptable range
Copper	12	12.3	2	Within the acceptable range
Lead	4.2	4	5	Within the acceptable range
Nickel	7.2	7.4	3	Within the acceptable range
Vanadium	23.3	25.1	7	Within the acceptable range

All of the RDP values for the detected metal concentrations are within the acceptable range.

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

5.8 Phase II Conceptual Site Model

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

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

As indicated in Table 1, Section 2.2 of this report, several PCAs were identified and considered to represent APECs. As per Column A of Table 2 of the O.Reg. 153/04, as amended, the following on-site PCA and resultant APEC is:

- PCA 30 – "Importation of Fill Material of Unknown Quality," due to the importation of fill material (circa 2005) and use as a former snow dump (circa 2017) on the Phase I Property (APEC 1).

The off-site PCAs and resultant APECs on the Phase I Property are:

- PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the former presence of above ground fuel tanks at 140 Thad Johnson Private (APEC 2).
- PCA Other – "Hazardous Waste Generation," due to operations associated with a commercial transportation company at 140 Thad Johnson Private (APEC 2).
- PCA 27 – "Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles," due to the presence of airplane service, repair and maintenance airplane hangar at 350 Comet Private. (APEC 3).
- PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the former presence of above ground fuel tanks at 350 Comet Private. (APEC 3).
- PCAs Other – "Hazardous Waste Generator and 150-L Jet Fuel Spill," due to the presence of airplane service, repair and maintenance garage at 350 Comet Private and reported fuel spills. (APEC 3).

The APECs are shown on Drawing PE6238-1 – Site Plan. The remaining off-site PCAs identified within the Phase I Study Area were not considered to result in APECs based on their separation distances and/or orientations (down or cross-gradient) with respect to the Phase I Property. These off-site PCAs are identified in green, shown on Drawing PE6238-2– Surrounding Land Use Plan.

Contaminants of Potential Concern

The following Contaminants of Potential Concern (CPCs) were identified with respect to the soil and/or groundwater on the Phase II Property:

- Volatile Organic Compounds (VOCs);
- Petroleum Hydrocarbons (PHCs, F1-F4);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Metals, including hydride forming compounds (arsenic, antimony and selenium);
- Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR).

Subsurface Structures and Utilities

The Phase II Property is undeveloped and vacant land situated in a municipally serviced area. Based on underground utility locates completed prior to the subsurface investigation, no services were reported below the Phase II property

Physical Setting

Site Stratigraphy

The site stratigraphy consists of:

- Topsoil with an approximate thickness of 0.05 to 0.08 m was encountered in all of the boreholes, except BH6-23. Groundwater was not encountered in this layer.
- Asphalt concrete was encountered at BH6-23 with an approximate thickness of 0.05m. Groundwater was not encountered in this layer.
- Fill material consisting of silty sand with gravel was encountered in all of the boreholes, except BH6-23. Fill material consisting of sand with gravel was encountered at BH6-23. This fill layer extended to depths of approximately 0.78 to 2.29 mbgs. Groundwater was not encountered in this layer.
- Sand was encountered at BH5-23 and BH6-23, extending to depths of 2.23 and 6.71, respectively. BH6-23 was terminated in this stratified layer. Groundwater was not encountered in this layer.
- Sand with gravel and traces of silty clay was encountered at BH1-23 and BH4-23 and terminated in this stratified layer at a depth of 6.71 mbgs. Groundwater was not encountered in this layer.
- Sand with gravel, stones and cobbles was encountered in BH2-23, BH3-23 and BH6-23 and terminated in this stratified layer at depths of 3.66 to 6.71 mbgs. Groundwater was not encountered in this layer; however, perched water was encountered at BH6-23.
- Intermittent layers of sand, followed by sandy silt layers were encountered in BH 5-23, and terminated in an underlying sand layer at 6.71 mbgs. Groundwater was not encountered in this layer.

Bedrock depth was not confirmed during the investigations, but rather inferred at practical refusal at 7.47 mbgs.

Based on mapping provided by the Geological Survey of Canada, the bedrock in the area of the Phase II Property is reported to consist of dolomite of the Oxford Formation, and is reported to be present at a depth of approximately 5 to 10 m below grade.

Hydrogeological Characteristics

Groundwater levels were not measured beneath the Phase II Property.

Approximate Depth to Bedrock

Bedrock depth at the Phase II Property was not encountered during the subsurface program. Bedrock was inferred at practical refusal to augering at 7.47 mbgs. Based on available mapping provided by the Geological Survey of Canada, bedrock is reported to be present at a depth of approximately 5 to 10 m below grade.

Approximate Depth to Water Table

The water table was not encountered during the groundwater sampling event.

Section 35 of Ontario Regulation 153/04: Non-Potable Groundwater

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 Ontario Regulation 153/04: Environmentally Sensitive Areas

Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) does not apply to the Phase II Property, in that the Phase II Property is not within 30m of an environmentally sensitive area and the surface soil pH is within the acceptable range.

Section 43.1 of Ontario Regulation 153/04: Shallow Soil Property or Water Body

Section 43.1(1a) of the Regulation does not apply to the Phase II Property as bedrock is not located less than 2 m below ground surface.

Section 43.1(1b) of the regulation does not apply to the Phase II Property, as there are no water bodies located on or within 30 m of the Phase II Property.

Existing Buildings and Structures

There are no permanent structures present on the Phase II Property. A portable washroom is present on-site. No other structures are present.

Proposed Buildings and Other Structures

It is our understanding that the Phase II Property will be developed for commercial purposes, which will consist of a slab-on-grade warehouse and associated vehicular surface parking lot.

Environmental Condition

Areas Where Contaminants are Present

Based on the findings of the Phase II ESA, the analytical result for soil complies with the selected MECP Table 3 Commercial Standards.

Groundwater was not encountered during the field program.

Soil results from this program are shown on Drawing PE6238-4 – Analytical Testing Plan.

Types of Contaminants

No contaminants of potential concern were identified in the soil test results. The test results comply with the selected MECP Table 3 Commercial Standards.

Contaminated Media

Based on the findings of the Phase II ESA program, there is no impacted soil. All of the analytical results complied to the selected MECP Table 3 Standards.

Although groundwater samples have not been analysed for contaminants of potential concern, soil samples collected from soil strata acting as a perched water table did not show any signs of impacts. Additionally, samples collected at the deepest investigated depths, which are suspected to be closest to the actual groundwater table, have also been free of any impacts.

What Is Known About Areas Where Contaminants Are Present

Based on the findings of the Phase II ESA program, there is no impacted soil. All of the analytical results complied to the selected MECP Table 3 Standards.

Distribution of Contaminants

Based on the findings of the Phase II ESA program, there are no contaminants of concern beneath the Phase II Property in soil. As such, no distribution is expected to have occurred on-site.

Migration of Contaminants

Based on the findings of the Phase II ESA program, there are no contaminants of concern beneath the Phase II Property in soil. As such, no migration is expected to have occurred on-site.

Discharge of Contaminants

Based on the findings of this Phase II ESA, discharge of contaminants is not considered to have occurred on-site or off-site.

Climatic and Meteorological Conditions

Given that there are no contaminants currently present beneath the Phase II Property, climatic and meteorological conditions are not considered to have affected contaminant distribution at the Phase II Property.

Potential for Vapour Intrusion

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

6.0 CONCLUSIONS

Assessment

A Phase II Environmental Site Assessment (ESA) was conducted for the property addressed 145 Thad Johnson Private, in the City of Ottawa, Ontario. The purpose of this Phase II ESA was to address the potentially contaminating activities (PCAs) that were identified during the Phase I ESA and considered to result in areas of potential environmental concern (APECs) on the Phase II Property.

The subsurface investigation consisted of placing seven boreholes (BH1-23 through BH7-23) across the Phase II Property. Three of the seven boreholes were instrumented with groundwater monitoring wells.

The general stratigraphy encountered during the field program consisted of topsoil overlying a fill material. The fill material consisted of brown silty sand with gravel and some cobbles and crushed stone, followed compacted sand with varying amounts of silt, gravel, cobbles and boulders. Fill material was encountered in all of the boreholes. Intermittent layers of compact, brown sandy silt were observed within the sand deposit. These silty sand layers were noted as wet during the field program and is considered to have created a perched water table. No deleterious material or signs of contamination was observed during the field program.

Bedrock was not encountered during the field program. Inferred bedrock was encountered by dynamic cone penetration test at a depth of 7.47 m at BH 2-23.

Eight soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and/or metals as well as electrical conductivity (EC) and sodium adsorption ration (SAR). With the exception of some metal parameters, other groups of analyse concentrations were undetected about the laboratory limit. All of the soil samples analyzed, complied with the MECP Table 3 Commercial Standards.

Instead, two soils samples from the deepest split spoon samples (BH6-23-SS8 and BH7-23-SS8) were submitted for the analyses of BTEX, PHCs (F1-F4), VOCs and PAHs. Both of these boreholes were equipped with groundwater monitoring wells. No detectable concentration of any of the analyzed parameters were identified at approximately 5.36-5.97 mbgs within the soil.

Furthermore, soil sample BH6-23-SS4, which was found to be notably damp during the drilling program (perched water table), was submitted for analysis of PHC and BTEX. Any impacts resulting from discharges at the surface would been intercepted by these silty, damp strata. No detections were reports in this soil sample.

Recommendations

It is our understanding that the Phase II Property is slated for site developed. Soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19 – On-site and Excess Soil Management.

Monitoring Wells

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

7.0 STATEMENT OF LIMITATIONS

This Phase II - Environmental Site Assessment report has been prepared for the Phase II Property. 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 Jennings Developments. Notification from Jennings Developments, and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

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

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

Report Distribution:

- Jennings Developments
- Paterson Group

FIGURES

Figure 1 - Key Plan

Drawing PE6238-1 – Site Plan

Drawing PE6238-2 – Surrounding Land Use Plan

Drawing PE6238-3 – Test Hole Location Plan

Drawing PE6238-4 – Analytical Testing Plan – Soil

Drawing PE6238-4A – Cross-Section A-A' Plan – Soil

Drawing PE6238-4B – Cross-Section B-B' Plan – Soil

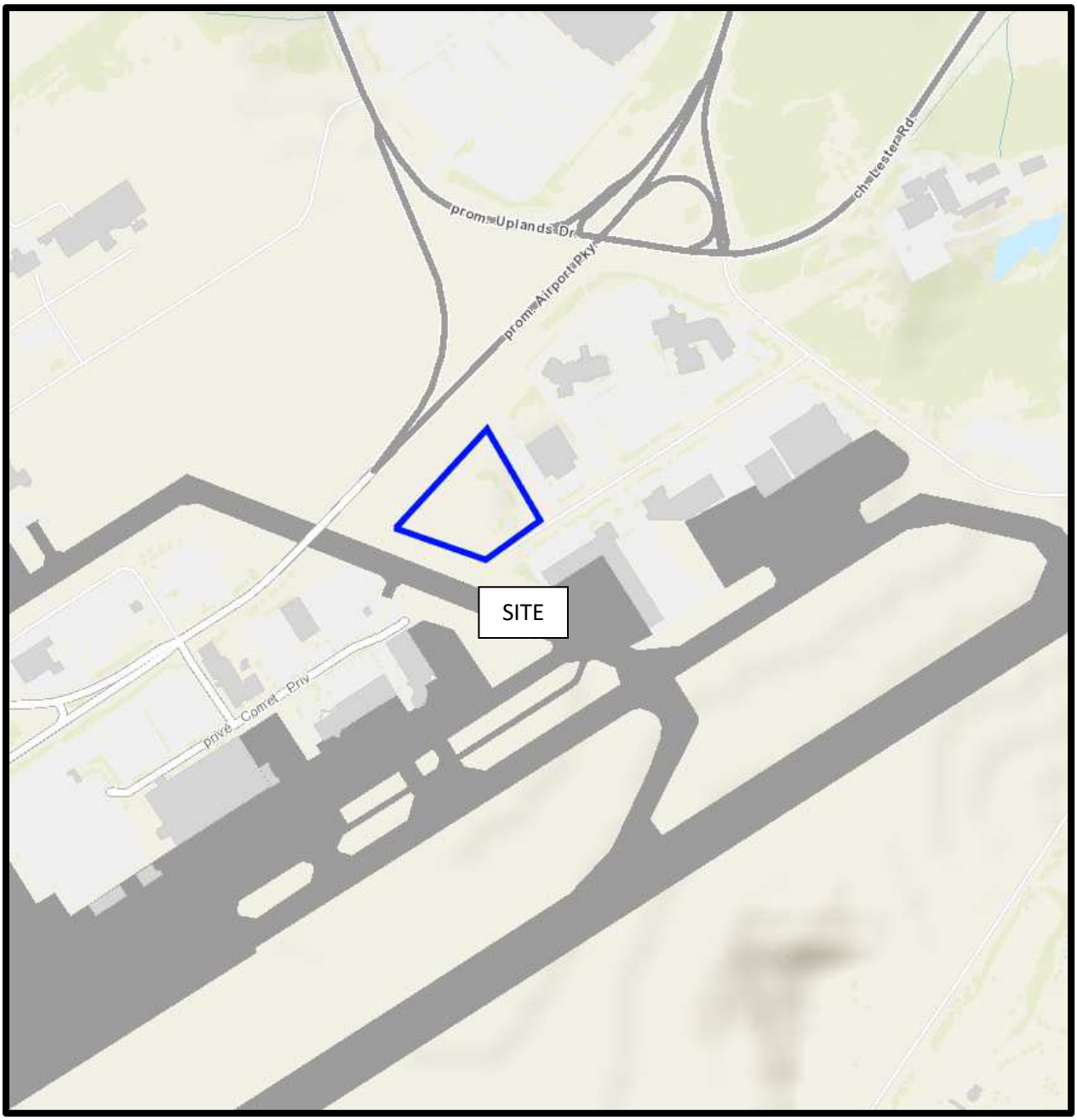

FIGURE 1

KEY PLAN

AIRPORT PARKWAY

VACANT

#237 COMET PRIVATE
AIRPLANE HANGER
EXPRESS FLAIR TRANSPORTATION

ASPHALTIC CONCRETE DRIVEWAY

APEC 3

GRASSED

GRAVELLED AREA

GRASSED

APEC 1

GRAVEL ACCESS ROAD

APEC 2

GRASSED

COMET PRIVATE

PRIVATE ROADWAY

#145 THAD JOHNSON PRIVATE
GATE GOURMET

#350 COMET PRIVATE

THAD JOHNSON PRIVATE

#140 THAD JOHNSON PRIVATE
FEDEX WAREHOUSE

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN:

1. **FORMER AGGREGATE PIT - IMPORTATION OF FILL MATERIAL OF UNKNOWN QUALITY (PCA 30)**
2. **140 THAD JOHNSON PRIVATE - FORMER PRESENCE OF ABOVEGROUND FUEL STORAGE TANK, AND WASTE GENERATOR OF HALOGENATED SOLVENTS (PCA 28 AND OTHER)**
3. **350 COMET PRIVATE - MAINTENANCE AND REPAIR OF AIRPLANES, FORMER PRESENCE OF 2 ABOVEGROUND FUEL STORAGE TANKS, WASTE GENERATOR AND FORMER 150L JET FUEL SPILL (PCA 27, 28)**

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NO.	REVISIONS	DATE	INITIAL
0			

JENNINGS DEVELOPMENTS

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
145 THAD JOHNSON PRIVATE (PART OF 1000 AIRPORT PARKWAY)
OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:1250	Date: 08/2023
Drawn by: MPG	Report No.: PE6238-1
Checked by: MW	Dwg. No.: PE6238-1
Approved by: MSD	Revision No.:

11x17

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POTENTIALLY CONTAMINATING ACTIVITIES:

1. FORMER AGGREGATE PIT - IMPORTATION OF FILL MATERIAL OF UNKNOWN QUALITY (PCA 30)
2. 140 THAD JOHNSON PRIVATE - PRESENCE OF ABOVEGROUND FUEL STORAGE TANK, AND WASTE GENERATOR OF HALOGENATED SOLVENTS (PCA 28 AND OTHER)
3. 350 COMET PRIVATE - MAINTENANCE AND REPAIR OF AIRPLANES, FORMER PRESENCE OF 2 ABOVEGROUND FUEL STORAGE TANKS, WASTE GENERATOR AND FORMER 150L JET FUEL SPILL (PCA 27, 28)
4. 130 THAD JOHNSON PRIVATE - OPERATIONAL HANGER, USE OF DE-ICING AGENT AND FORMER PRESENCE OF ABOVEGROUND FUEL STORAGE TANK (PCA 3, 4 AND 28)
5. 340 COMET PRIVATE - FORMER PRESENCE OF ABOVEGROUND FUEL STORAGE TANKS (PCA 28)

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PHASE I - ENVIRONMENTAL SITE ASSESSMENT
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OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

Scale: 1:4000	Date: 08/2023
Drawn by: MPG	Report No.: PE6238-1
Checked by: MW	Dwg. No.: PE6238-2
Approved by: MSD	Revision No.:

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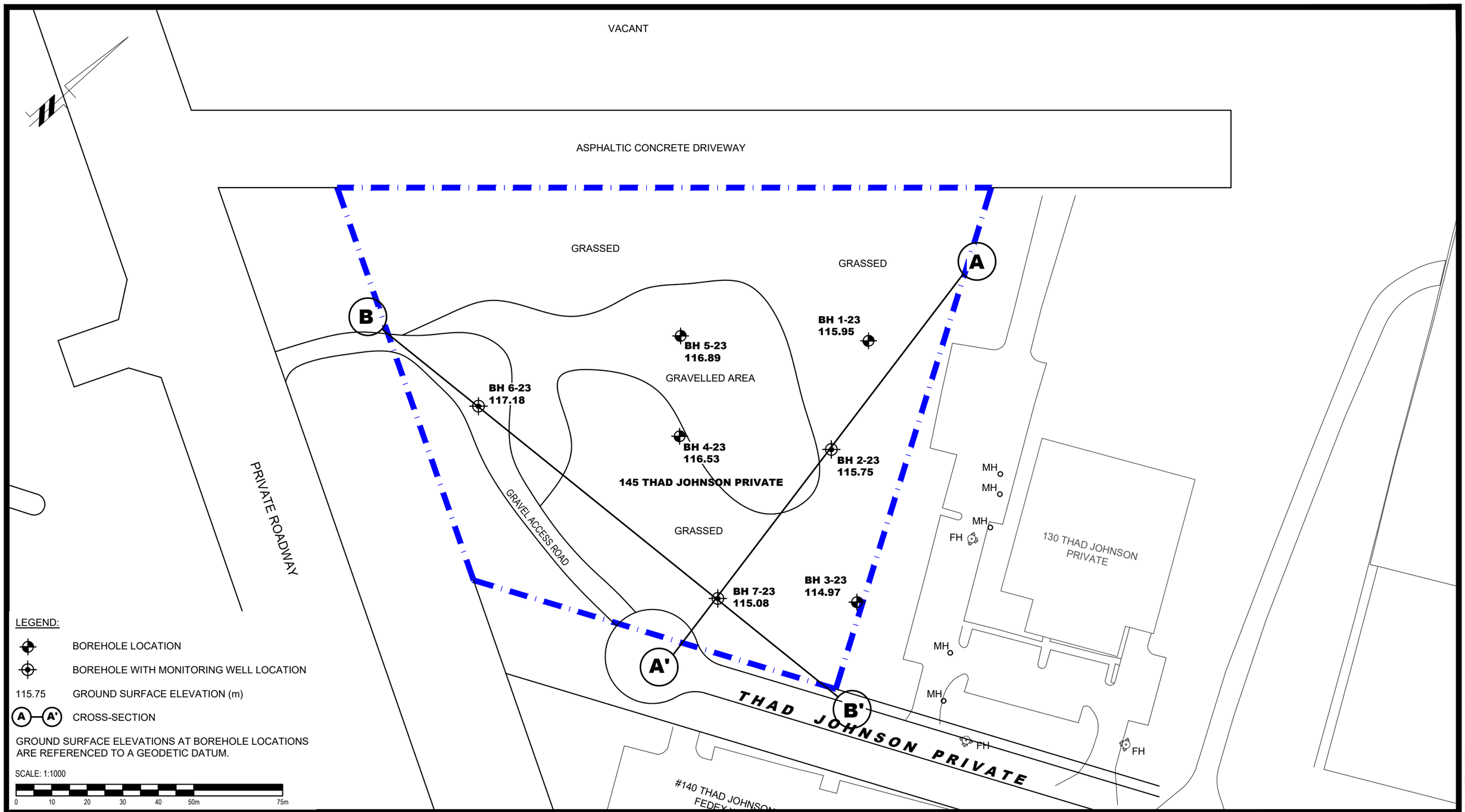

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JENNINGS DEVELOPMENTS

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
145 THAD JOHNSON PRIVATE

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1000	Date: 09/2023
Drawn by: GK	Report No.: PE6238-2
Checked by: MW	Dwg. No.: PE6238-3
Approved by: MSD	Revision No.:

11x17

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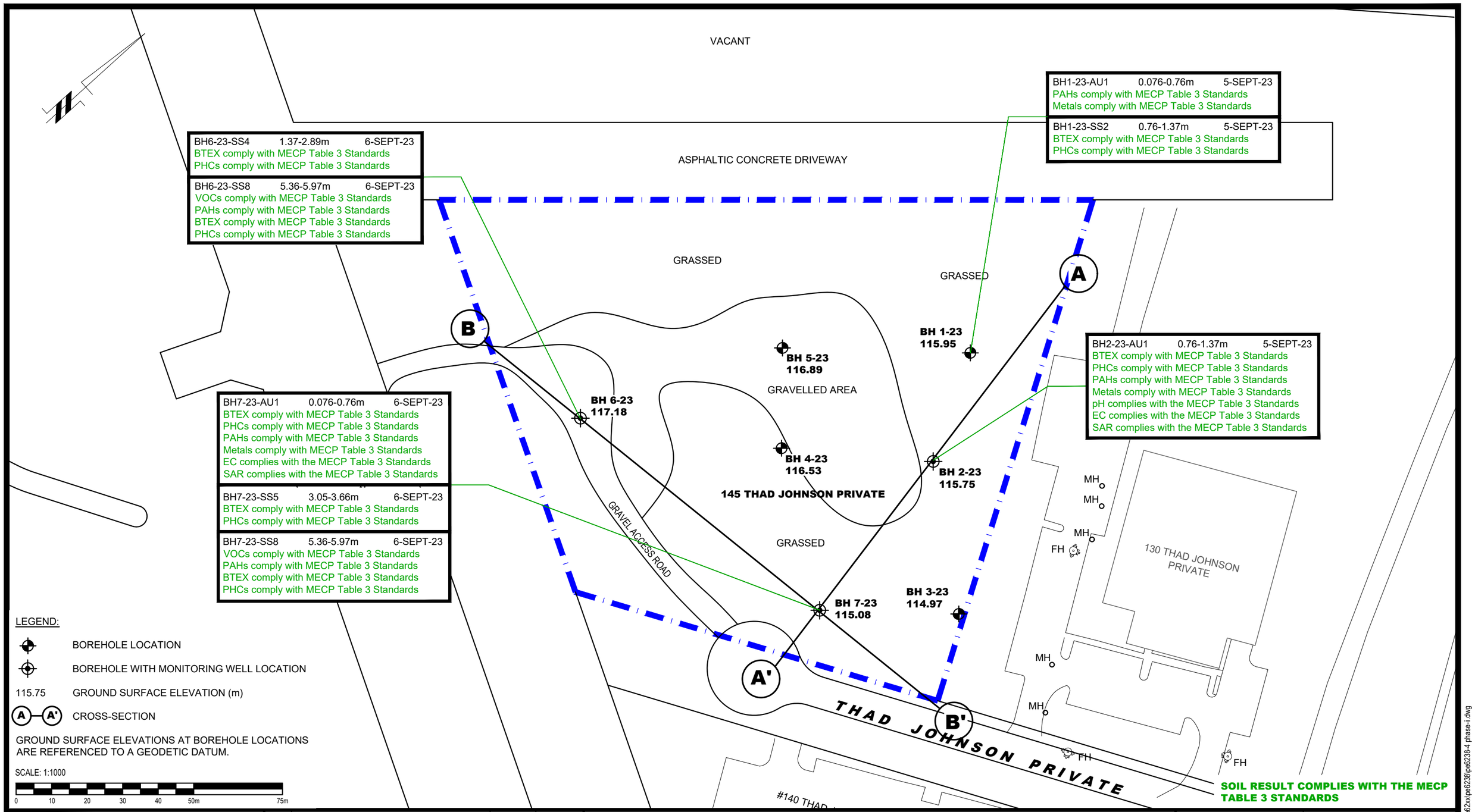

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
145 THAD JOHNSON PRIVATE

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:1000	Date: 09/2023
Drawn by: GK	Report No.: PE6238-2
Checked by: MW	Dwg. No.: PE6238-4
Approved by: MSD	Revision No.:

11x17

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BH1-23-AU1 0.076-0.76m 5-SEPT-23
PAHs comply with MECP Table 3 Standards
Metals comply with MECP Table 3 Standards

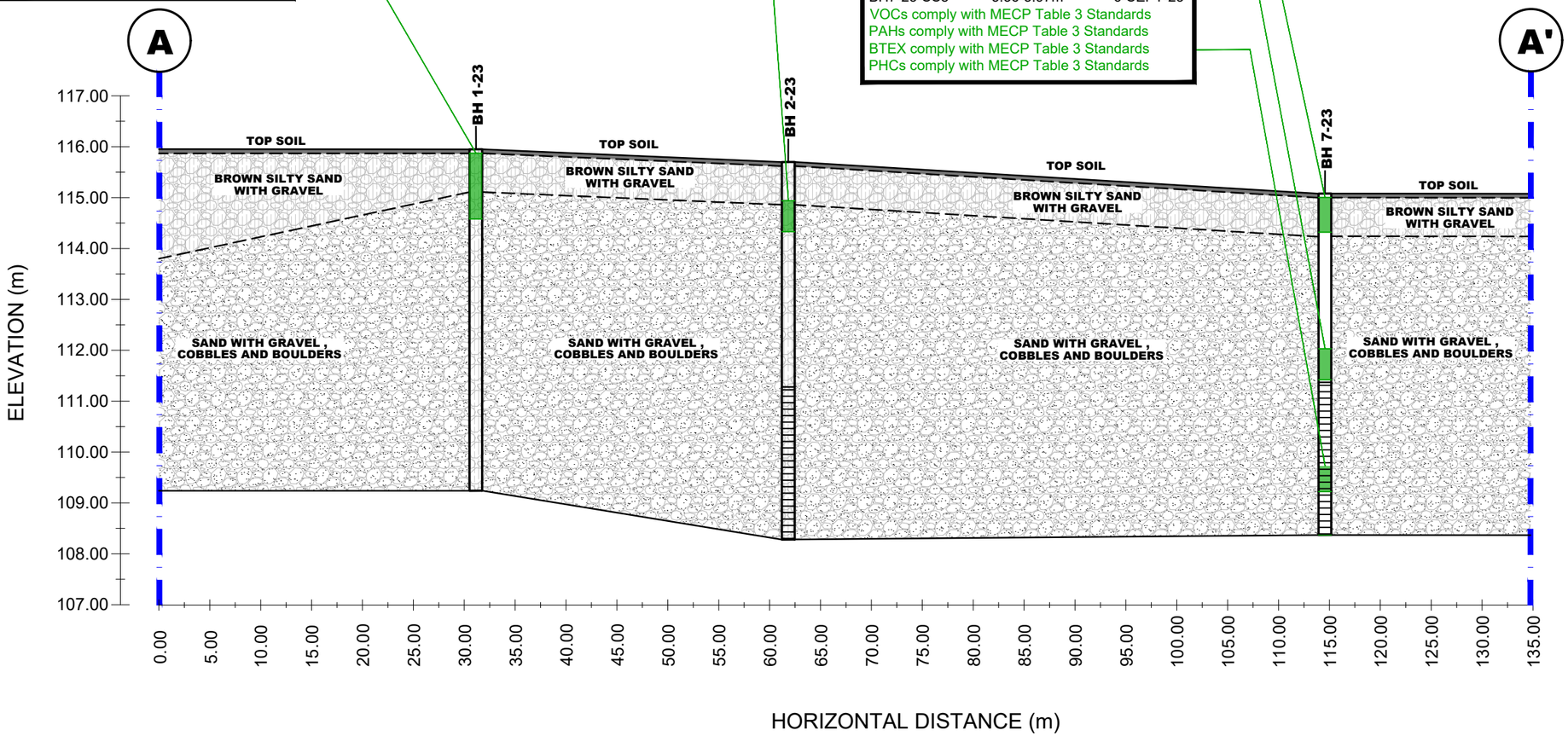
BH1-23-SS2 0.76-1.37m 5-SEPT-23
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH2-23-AU1 0.76-1.37m 5-SEPT-23
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards
PAHs comply with MECP Table 3 Standards
Metals comply with MECP Table 3 Standards
pH complies with the MECP Table 3 Standards
EC complies with the MECP Table 3 Standards
SAR complies with the MECP Table 3 Standards

BH7-23-AU1 0.076-0.76m 6-SEPT-23
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards
PAHs comply with MECP Table 3 Standards
Metals comply with MECP Table 3 Standards
EC complies with the MECP Table 3 Standards
SAR complies with the MECP Table 3 Standards

BH7-23-SS5 3.05-3.66m 6-SEPT-23
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH7-23-SS8 5.36-5.97m 6-SEPT-23
VOCs comply with MECP Table 3 Standards
PAHs comply with MECP Table 3 Standards
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards



SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

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JENNINGS DEVELOPMENTS

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
145 THAD JOHNSON PRIVATE

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL

Scale: 1:500	Date: 09/2023
Drawn by: GK	Report No.: PE6238-2
Checked by: MW	Dwg. No.: PE6238-4A
Approved by: MSD	Revision No.:

11x17

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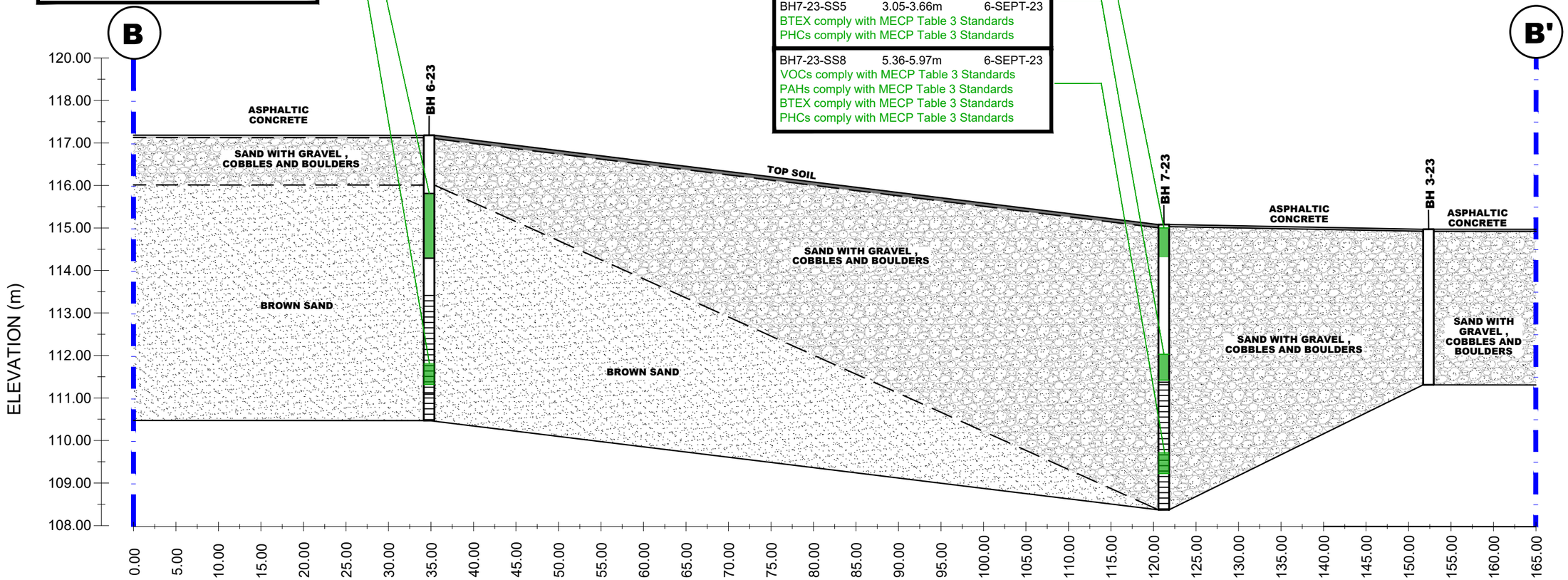
BH6-23-SS4 1.37-2.89m 6-SEPT-23
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH6-23-SS8 5.36-5.97m 6-SEPT-23
VOCs comply with MECP Table 3 Standards
PAHs comply with MECP Table 3 Standards
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH7-23-AU1 0.076-0.76m 6-SEPT-23
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards
PAHs comply with MECP Table 3 Standards
Metals comply with MECP Table 3 Standards
EC complies with the MECP Table 3 Standards
SAR complies with the MECP Table 3 Standards

BH7-23-SS5 3.05-3.66m 6-SEPT-23
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH7-23-SS8 5.36-5.97m 6-SEPT-23
VOCs comply with MECP Table 3 Standards
PAHs comply with MECP Table 3 Standards
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards



SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

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JENNINGS DEVELOPMENTS

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
145 THAD JOHNSON PRIVATE

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL

Scale: 1:500	Date: 09/2023
Drawn by: GK	Report No.: PE6238-2
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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

PATERSON GROUP

Sampling and Analysis Plan

Phase II-Environmental Site Assessment
145 Thad Johnson Private
Ottawa, Ontario

Prepared for Jennings Developments

Report: PE6238-SAP
September 2023

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Jennings Developments to conduct a Phase II Environmental Site Assessment (ESA) for the Phase II ESA Property located at 145 Thad Johnson Private, Ottawa, Ontario.

The Phase II ESA was carried out to address the APECs identified in the Phase I ESA that was completed in August of 2023 by Paterson, in conjunction with the geotechnical investigation. The following subsurface investigation program was developed to investigate the potential environmental concerns that were identified in the Phase I ESA.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-23	Assess the soil condition on the Phase II Property due to APEC 1.	Boreholes to be advanced to approximately 6.10 m for geotechnical purposes.
BH2-23	Assess the soil condition on the Phase II Property due to APEC 1 and delineate potential groundwater impact due to APECs 1 and 3.	Boreholes to be advanced to approximately 6.70 m to intercept the groundwater table.
BH3-23	Assess the soil condition on the Phase II Property due to APEC 1.	Boreholes to be advanced to approximately 6.10 m for geotechnical purposes.
BH4-23	Assess the soil condition on the Phase II Property due to APEC 1.	Boreholes to be advanced to approximately 6.10 m for geotechnical purposes.
BH5-23	Assess the soil condition on the Phase II Property due to APEC 1.	Boreholes to be advanced to approximately 6.10 m for geotechnical purposes.
BH6-23	Assess the soil and groundwater conditions on the Phase II Property due to APECs 1 and 3.	Boreholes to be advanced to approximately 6.10 m to intercept the groundwater table.
BH7-23	Assess the soil and groundwater conditions on the Phase II Property due to APECs 1 and 2.	Boreholes to be advanced to approximately 6.10 m to intercept the groundwater table.

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

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

2.0 ANALYTICAL TESTING PROGRAM

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

- ❒ At least one sample from each borehole should be submitted, in order to delineate the horizontal extent of contamination across the site.
- ❒ At least one sample from each stratigraphic unit should be submitted, in order to delineate the vertical extent of contamination at the site.
- ❒ In boreholes where there is visual or olfactory evidence of contamination, or where organic vapour meter or photoionization detector readings indicate the presence of contamination, the 'worst-case' sample from each borehole should be submitted for comparison with MECP's 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.

After drilling is completed a plan with the borehole locations must be provided. Distances should be measured using a measuring tape or wheel rather than paced off. Elevations were surveyed at geodetic elevations by Paterson personnel.

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 and is especially important when dealing with suspected VOCs.

Screening Procedure

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

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

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

3.2 Monitoring Well Installation Procedure

Equipment

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

Procedure

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

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

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

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

145 Thad Johnson Private

DATUM: Geodetic **EASTING:** 371012.727 **NORTHING:** 5021071.597 **ELEVATION:** 115.95

PROJECT: Proposed Commercial Development

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: September 5, 2023

FILE NO. PE6238

HOLE NO. BH 1-23

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE No.	SAMPLE Type	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 115.95 m										
TOPSOIL 0.08 m EL 115.87 m		AU1				PAHs Metals	0	0.9		No Data
FILL: Brown silty sand with gravel 0.76 m EL 115.19 m		SS2		100	50+	BTEX PHCs	1	0.7		
FILL: Brown silty sand with gravel and crushed stone, occasional cobbles		SS3		33	50+			0.5		
2.29 m EL 113.66 m		SS4		83	37		2	0.3		
Dense to very dense, brown SAND with gravel, trace silt		SS5		92	36		3	0.5		
		SS6		75	38		4	0.7		
		SS7		75	50+		5	0.5		
		SS8		67	50+		6	0.6		
		SS9		67	50+		7	0.6		
6.71 m EL 109.24 m							8			
End of Borehole							9			

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

145 Thad Johnson Private

DATUM: Geodetic **EASTING:** 371028.332 **NORTHING:** 5021043.283 **ELEVATION:** 115.75

PROJECT: Proposed Commercial Development

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: September 5, 2023

FILE NO. PE6238

HOLE NO. BH 2-23

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE No.	SAMPLE Type	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 115.75 m										
TOPSOIL 0.08 m EL 115.67 m		AU1				BTEX, PHCs, PAHs, Metals EC/SAR	0	1.0		
FILL: Brown silty sand with gravel 0.76 m EL 114.99 m		SS2		100	29		1	0.6		
Compact to very dense, brown SAND with gravel, cobbles and boulders		SS3		83	28		2	0.5		
		SS4		0	50+					
		SS5		92	43		3	0.5		
		SS6		0	50+		4	0.4		
		SS7		75	34		5	0.5		
		SS8		100	50+			0.4		
		SS9		83	50+		6	0.6		
6.71 m EL 109.04 m							7			
Dynamic Cone Penetration Test commenced at 6.71m depth.										
7.47 m EL 108.28 m							8			
End of Borehole										
Practical DCPT refusal at 7.47m depth.							9			
(BH dry - Sep. 15, 2023)										

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

145 Thad Johnson Private

DATUM: Geodetic **EASTING:** 371064.998 **NORTHING:** 5021019.73 **ELEVATION:** 114.97

PROJECT: Proposed Commercial Development

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: September 5, 2023

FILE NO. PE6238

HOLE NO. BH 3-23

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE No.	SAMPLE Type	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 114.97 m										
TOPSOIL 0.05 m EL 114.92 m		AU1					0	0.8		No Data
FILL: Brown silty sand with gravel		SS2		100	28		1	0.5		
1.22 m EL 113.75 m										
Compact to very dense, brown SAND with gravel, cobbles and boulders		SS3		75	12		2	0.2		
		SS4		83	50+		3	0.2		
		SS5		83	50+			0.1		
3.66 m EL 111.31 m										
End of Borehole							4			
							5			
							6			
							7			
							8			
							9			

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

145 Thad Johnson Private

DATUM: Geodetic **EASTING:** 370996.87 **NORTHING:** 5021014.186 **ELEVATION:** 116.53

PROJECT: Proposed Commercial Development

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: September 5, 2023

FILE NO. PE6238

HOLE NO. BH 4-23

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE No.	SAMPLE Type	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 116.53 m										
TOPSOIL 0.08 m EL 116.45 m		AU1					0	0.3		No Data
FILL: Brown silty sand with gravel		SS2		100	43		1	0.4		
1.17 m EL 115.36 m										
FILL: Brown sand with gravel and cobbles 1.45 m EL 115.08 m		SS3		92	34		2	0.5		
		SS4		100	37			0.4		
Dense to very dense, brown to grey SAND with gravel		SS5		100	31		3	0.3		
		SS6		100	36		4	0.3		
		SS7		100	50+		5	0.2		
		SS8		100	43			0.4		
		SS9		100	34		6	0.4		
6.71 m EL 109.82 m										
End of Borehole							7			
							8			
							9			

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

145 Thad Johnson Private

DATUM: Geodetic **EASTING:** 370976.138 **NORTHING:** 5021033.368 **ELEVATION:** 116.89

PROJECT: Proposed Commercial Development

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: September 6, 2023

FILE NO. PE6238

HOLE NO. BH 5-23

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE No.	SAMPLE Type	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 116.89 m										
TOPSOIL 0.08 m EL 116.81 m		AU1					0	2.4		No Data
FILL: Brown silty sand with gravel		SS2		100	38		1	1.4		
1.45 m EL 115.44 m										
Dense, brown SAND		SS3		100	36		2	1.1		
2.21 m EL 114.68 m										
Compact, brown SANDY SILT		SS4		100	29			3.2		
2.8 m EL 114.09 m										
Dense, brown SAND		SS5		100	36		3	1.4		
3.73 m EL 113.16 m										
Compact, brown SANDY SILT		SS6		75	28		4	4.6		
4.5 m EL 112.39 m										
Dense to compact, brown SAND		SS7		75	42		5	3.3		
		SS8		83	21		6	3.7		
		SS9		96	20			2.3		
6.71 m EL 110.18 m							7			
End of Borehole							8			
							9			

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

145 Thad Johnson Private

DATUM: Geodetic **EASTING:** 370952.526 **NORTHING:** 5020977.953 **ELEVATION:** 117.18

PROJECT: Proposed Commercial Development

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: September 6, 2023

FILE NO. **PE6238**

HOLE NO. BH 6-23

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE No.	SAMPLE Type	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 117.18 m										
Asphaltic concrete 0.05 m EL 117.13 m		AU1					0	1.6		
FILL: Brown sand with gravel 1.17 m EL 116.01 m		SS2		100	22		1	0.7		
		SS3		92	35		2	3.3		
Compact to dense, brown SAND		SS4		83	21	BTEX PHCs		3.6		
		SS5		100	38		3	1.8		
		SS6		100	48		4	0.4		
		SS7		100	39		5	1.9		
		SS8		100	41		6	0.4		
		SS9		83	32	BTEX,VOCs PHCs, PAHs		2.2		
6.71 m EL 110.47 m End of Borehole (BH dry - Sep. 15, 2023)							7			
							8			
							9			

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

145 Thad Johnson Private

DATUM: Geodetic **EASTING:** 371037.904 **NORTHING:** 5020991.438 **ELEVATION:** 115.08

PROJECT: Proposed Commercial Development

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: September 6, 2023

FILE NO. **PE6238**

HOLE NO. BH 7-23

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE No.	SAMPLE Type	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 115.08 m										
TOPSOIL 0.08 m EL 115 m		AU1				BTEX, PHCs, PAHs, Metals EC/SAR	0	8.6		
FILL: Brown silty sand, trace gravel 0.76 m EL 114.32 m		SS2		100	21		1	6.1		
		SS3		100	29		2	13.1		
Compact to very dense, brown SAND with gravel, cobbles and boulders		SS4		92	25			6.2		
		SS5		67	21	BTEX PHCs	3	10.3		
		SS6		83	41		4	9.6		
		SS7		55	50+			2.7		
		SS8		55	50+	BTEX,VOCs PHCs, PAHs	5	2.9		
		SS9		4	50+		6	0.7		
6.71 m EL 108.37 m										
End of Borehole							7			
(BH dry - Sep. 15, 2023)							8			
							9			

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

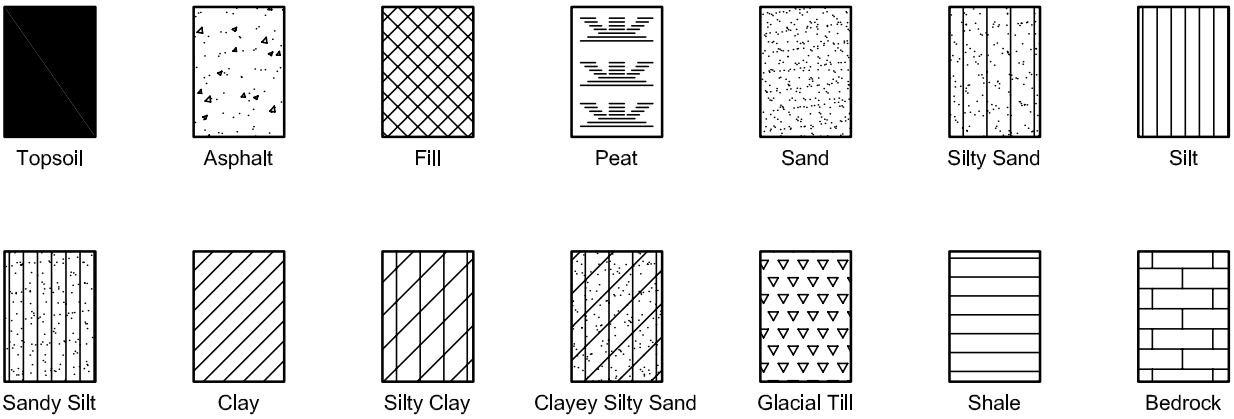
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

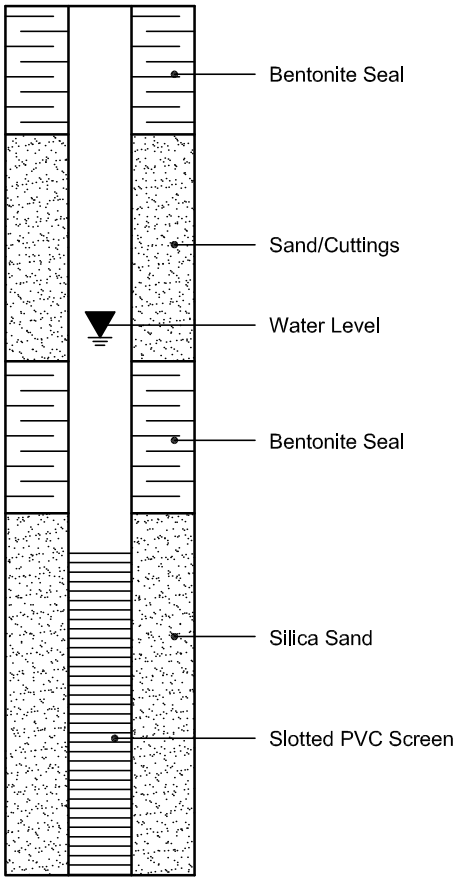
SYMBOLS AND TERMS (continued)

STRATA PLOT

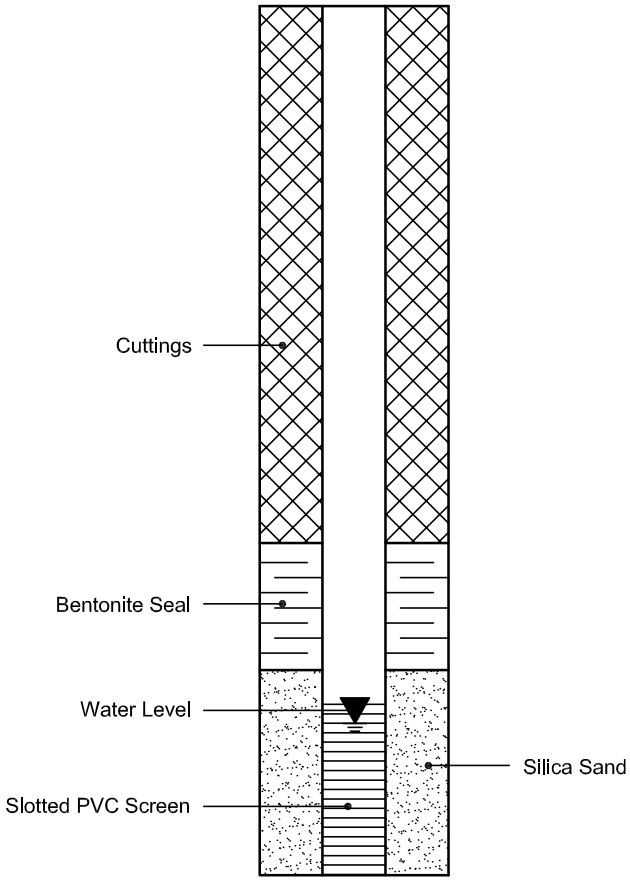


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mandy Witteman

Client PO:
Project: PE6238
Custody: 141894

Report Date: 12-Sep-2023
Order Date: 6-Sep-2023

Order #: 2336197

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

Paracel ID	Client ID
2336197-01	BH1-23-AU1
2336197-02	BH1-23-SS2
2336197-03	BH7-23-AU1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	8-Sep-23	9-Sep-23
PHC F1	CWS Tier 1 - P&T GC-FID	8-Sep-23	9-Sep-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	7-Sep-23	9-Sep-23
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	11-Sep-23	11-Sep-23
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	8-Sep-23	10-Sep-23
Solids, %	CWS Tier 1 - Gravimetric	8-Sep-23	11-Sep-23

Certificate of Analysis

Report Date: 12-Sep-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 6-Sep-2023

Client PO:

Project Description: PE6238

	Client ID:	BH1-23-AU1	BH1-23-SS2	BH7-23-AU1	-	-	-
	Sample Date:	05-Sep-23 09:00	05-Sep-23 09:00	05-Sep-23 09:00	-		
	Sample ID:	2336197-01	2336197-02	2336197-03	-		
	Matrix:	Soil	Soil	Soil	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	96.3	97.4	96.6	-	-	-
Metals							
Antimony	1 ug/g	<1.0	-	<1.0	-	-	-
Arsenic	1 ug/g	1.9	-	2.0	-	-	-
Barium	1 ug/g	40.6	-	40.5	-	-	-
Beryllium	0.5 ug/g	<0.5	-	<0.5	-	-	-
Boron	5 ug/g	<5.0	-	<5.0	-	-	-
Cadmium	0.5 ug/g	<0.5	-	<0.5	-	-	-
Chromium	5 ug/g	11.4	-	11.9	-	-	-
Cobalt	1 ug/g	5.2	-	5.3	-	-	-
Copper	5 ug/g	12.0	-	12.3	-	-	-
Lead	1 ug/g	4.2	-	4.0	-	-	-
Molybdenum	1 ug/g	<1.0	-	<1.0	-	-	-
Nickel	5 ug/g	7.2	-	7.4	-	-	-
Selenium	1 ug/g	<1.0	-	<1.0	-	-	-
Silver	0.3 ug/g	<0.3	-	<0.3	-	-	-
Thallium	1 ug/g	<1.0	-	<1.0	-	-	-
Uranium	1 ug/g	<1.0	-	<1.0	-	-	-
Vanadium	10 ug/g	23.3	-	25.1	-	-	-
Zinc	20 ug/g	<20.0	-	<20.0	-	-	-
Volatiles							
Benzene	0.02 ug/g	-	<0.02	-	-	-	-
Ethylbenzene	0.05 ug/g	-	<0.05	-	-	-	-
Toluene	0.05 ug/g	-	<0.05	-	-	-	-
m,p-Xylenes	0.05 ug/g	-	<0.05	-	-	-	-

	Client ID:	BH1-23-AU1	BH1-23-SS2	BH7-23-AU1	-	-	-
	Sample Date:	05-Sep-23 09:00	05-Sep-23 09:00	05-Sep-23 09:00	-		
	Sample ID:	2336197-01	2336197-02	2336197-03	-		
	Matrix:	Soil	Soil	Soil	-		
	MDL/Units						
Volatiles							
o-Xylene	0.05 ug/g	-	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	-	<0.05	-	-	-	-
Toluene-d8	Surrogate	-	102%	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	-	<7	-	-	-	-
F2 PHCs (C10-C16)	4 ug/g	-	<4	-	-	-	-
F3 PHCs (C16-C34)	8 ug/g	-	<8	-	-	-	-
F4 PHCs (C34-C50)	6 ug/g	-	<6	-	-	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	-	-	-	-	-
Acenaphthylene	0.02 ug/g	<0.02	-	-	-	-	-
Anthracene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [a] anthracene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [a] pyrene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [b] fluoranthene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	-	-	-	-	-
Chrysene	0.02 ug/g	<0.02	-	-	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	-	-	-	-	-
Fluoranthene	0.02 ug/g	<0.02	-	-	-	-	-
Fluorene	0.02 ug/g	<0.02	-	-	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	-	-	-	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	-	-	-	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	-	-	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	-	-	-	-	-

	Client ID:	BH1-23-AU1	BH1-23-SS2	BH7-23-AU1	-		
	Sample Date:	05-Sep-23 09:00	05-Sep-23 09:00	05-Sep-23 09:00	-	-	-
	Sample ID:	2336197-01	2336197-02	2336197-03	-		
	Matrix:	Soil	Soil	Soil	-		
	MDL/Units						
Semi-Volatiles							
Naphthalene	0.01 ug/g	<0.01	-	-	-	-	-
Phenanthrene	0.02 ug/g	<0.02	-	-	-	-	-
Pyrene	0.02 ug/g	<0.02	-	-	-	-	-
2-Fluorobiphenyl	Surrogate	57.0%	-	-	-	-	-
Terphenyl-d14	Surrogate	53.1%	-	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Metals								
Antimony	ND	1.0	ug/g					
Arsenic	ND	1.0	ug/g					
Barium	ND	1.0	ug/g					
Beryllium	ND	0.5	ug/g					
Boron	ND	5.0	ug/g					
Cadmium	ND	0.5	ug/g					
Chromium	ND	5.0	ug/g					
Cobalt	ND	1.0	ug/g					
Copper	ND	5.0	ug/g					
Lead	ND	1.0	ug/g					
Molybdenum	ND	1.0	ug/g					
Nickel	ND	5.0	ug/g					
Selenium	ND	1.0	ug/g					
Silver	ND	0.3	ug/g					
Thallium	ND	1.0	ug/g					
Uranium	ND	1.0	ug/g					
Vanadium	ND	10.0	ug/g					
Zinc	ND	20.0	ug/g					
Semi-Volatiles								
Acenaphthene	ND	0.02	ug/g					
Acenaphthylene	ND	0.02	ug/g					
Anthracene	ND	0.02	ug/g					
Benzo [a] anthracene	ND	0.02	ug/g					
Benzo [a] pyrene	ND	0.02	ug/g					
Benzo [b] fluoranthene	ND	0.02	ug/g					
Benzo [g,h,i] perylene	ND	0.02	ug/g					
Benzo [k] fluoranthene	ND	0.02	ug/g					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*0.724*		*%*	*54.3*	*50-140*			
Surrogate: Terphenyl-d14	*0.878*		*%*	*65.8*	*50-140*			
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	*7.95*		*%*	*99.4*	*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)	ND	8	ug/g	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	1.5	1.0	ug/g	1.9			20.0	30	
Barium	59.0	1.0	ug/g	66.4			11.9	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	ND	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	15.1	5.0	ug/g	15.6			3.0	30	
Cobalt	5.2	1.0	ug/g	5.4			3.4	30	
Copper	7.5	5.0	ug/g	8.0			6.5	30	
Lead	9.3	1.0	ug/g	8.9			3.9	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	8.5	5.0	ug/g	8.8			3.8	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	24.4	10.0	ug/g	25.6			4.7	30	
Zinc	21.0	20.0	ug/g	21.6			2.7	30	
Physical Characteristics									
% Solids	73.9	0.1	% by Wt.	75.1			1.5	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	0.026	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	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	1.41	0.02	ug/g	1.29			8.4	40	
2-Methylnaphthalene	3.03	0.02	ug/g	2.78			8.7	40	
Naphthalene	2.11	0.01	ug/g	1.91			10.0	40	
Phenanthrene	0.057	0.02	ug/g	0.041			32.2	40	
Pyrene	ND	0.02	ug/g	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	*1.10*		*%*		*63.5*	*50-140*			
Surrogate: Terphenyl-d14	*1.11*		*%*		*64.0*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*8.44*		*%*		*102*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	197	7	ug/g	ND	114	85-115			
F2 PHCs (C10-C16)	84	4	ug/g	ND	103	60-140			
F3 PHCs (C16-C34)	251	8	ug/g	ND	124	60-140			
F4 PHCs (C34-C50)	146	6	ug/g	ND	114	60-140			
Metals									
Arsenic	45.5	1.0	ug/g	ND	89.5	70-130			
Barium	66.6	1.0	ug/g	26.6	80.0	70-130			
Beryllium	48.1	0.5	ug/g	ND	95.9	70-130			
Boron	44.5	5.0	ug/g	ND	86.6	70-130			
Cadmium	43.4	0.5	ug/g	ND	86.6	70-130			
Chromium	53.9	5.0	ug/g	6.2	95.4	70-130			
Cobalt	47.8	1.0	ug/g	2.1	91.4	70-130			
Copper	47.0	5.0	ug/g	ND	87.6	70-130			
Lead	49.9	1.0	ug/g	3.6	92.6	70-130			
Molybdenum	45.1	1.0	ug/g	ND	89.7	70-130			
Nickel	48.9	5.0	ug/g	ND	90.8	70-130			
Selenium	44.7	1.0	ug/g	ND	89.1	70-130			
Silver	46.8	0.3	ug/g	ND	93.6	70-130			
Thallium	46.0	1.0	ug/g	ND	91.8	70-130			
Uranium	51.2	1.0	ug/g	ND	102	70-130			
Vanadium	56.9	10.0	ug/g	10.2	93.4	70-130			
Zinc	51.4	20.0	ug/g	ND	85.5	70-130			
Semi-Volatiles									
Acenaphthene	0.144	0.02	ug/g	ND	66.4	50-140			
Acenaphthylene	0.204	0.02	ug/g	ND	94.0	50-140			
Anthracene	0.174	0.02	ug/g	ND	80.2	50-140			
Benzo [a] anthracene	0.188	0.02	ug/g	ND	86.5	50-140			
Benzo [a] pyrene	0.179	0.02	ug/g	ND	82.4	50-140			
Benzo [b] fluoranthene	0.203	0.02	ug/g	ND	93.5	50-140			
Benzo [g,h,i] perylene	0.198	0.02	ug/g	ND	91.2	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzo [k] fluoranthene	0.168	0.02	ug/g	ND	77.3	50-140			
Chrysene	0.180	0.02	ug/g	ND	82.9	50-140			
Dibenzo [a,h] anthracene	0.177	0.02	ug/g	ND	81.8	50-140			
Fluoranthene	0.160	0.02	ug/g	ND	73.6	50-140			
Fluorene	0.168	0.02	ug/g	ND	77.6	50-140			
Indeno [1,2,3-cd] pyrene	0.158	0.02	ug/g	ND	72.8	50-140			
1-Methylnaphthalene	0.149	0.02	ug/g	ND	89.6	50-140			
2-Methylnaphthalene	0.170	0.02	ug/g	ND	102	50-140			
Naphthalene	0.107	0.01	ug/g	ND	64.1	50-140			
Phenanthrene	0.214	0.02	ug/g	0.041	79.5	50-140			
Pyrene	0.162	0.02	ug/g	ND	74.6	50-140			
Surrogate: 2-Fluorobiphenyl	*1.23*		*%*		*70.7*	*50-140*			
Surrogate: Terphenyl-d14	*1.15*		*%*		*66.1*	*50-140*			
Volatiles									
Benzene	3.63	0.02	ug/g	ND	90.8	60-130			
Ethylbenzene	3.04	0.05	ug/g	ND	76.0	60-130			
Toluene	3.11	0.05	ug/g	ND	77.8	60-130			
m,p-Xylenes	6.22	0.05	ug/g	ND	77.7	60-130			
o-Xylene	3.02	0.05	ug/g	ND	75.6	60-130			
Surrogate: Toluene-d8	*7.43*		*%*		*92.9*	*50-140*			

Qualifier Notes:

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 unlesss otherwise noted.

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.

PARACE LABORATORIES LTI

Paracel ID: 2336197

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2336197	№ 141894

Client Name: ~~[redacted]~~ Patersongroup
Contact Name: Mandy Witteman
Address: 9 Auriga Dr. Ottawa
Telephone: 613-800-5575

Project Ref: PE6238
Quote #:
PO #:
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)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
1	BH1-23-AU1	S		1	Sept 5/23	9AM			X	X								
2	BH1-23-SS2	S		2	↓	9AM	X											
3	BH7-23-AU1	S		1	Sept 5/23	9AM			~~X~~	X								
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:
Relinquished By (Print): Mandy Witteman	Date/Time:	Date/Time: Sep 6 2023 14h11
Date/Time: Sept 5/23	Temperature: °C	Temperature: 19.7 °C

Verified By:
Date/Time: Sep 6 2023 15h10
pH Verified: ☐ By: NA

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Certificate of Analysis

Paterson Group Consulting Engineers
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mandy Witteman

Client PO: 58317
Project: PE6238
Custody: 141899

Report Date: 13-Sep-2023
Order Date: 7-Sep-2023

Order #: 2336356

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

Paracel ID	Client ID
2336356-01	BH6-23-SS4
2336356-02	BH7-23-SS5

Approved By:

Dale Robertson, BSc
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	8-Sep-23	9-Sep-23
PHC F1	CWS Tier 1 - P&T GC-FID	8-Sep-23	9-Sep-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	7-Sep-23	10-Sep-23
Solids, %	CWS Tier 1 - Gravimetric	8-Sep-23	11-Sep-23

Certificate of Analysis

Report Date: 13-Sep-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 7-Sep-2023

Client PO: **58317**

Project Description: PE6238

	Client ID:	BH6-23-SS4	BH7-23-SS5	-	-	-	-
	Sample Date:	06-Sep-23 10:00	06-Sep-23 11:00	-	-		
	Sample ID:	2336356-01	2336356-02	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	83.6	87.8	-	-	-	-
Volatiles							
Benzene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene	0.05 ug/g	<0.05	<0.05	-	-	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	-	-	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene-d8	Surrogate	109%	104%	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	-	-	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	-	-	-	-
F3 PHCs (C16-C34)	8 ug/g	<8	<8	-	-	-	-
F4 PHCs (C34-C50)	6 ug/g	<6	<6	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	*2.48*		*%*	*77.6*	*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)	ND	8	ug/g	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Physical Characteristics									
% Solids	73.9	0.1	% by Wt.	75.1			1.5	25	
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*3.90*		*%*		*108*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F2 PHCs (C10-C16)	84	4	ug/g	ND	103	60-140			
F3 PHCs (C16-C34)	251	8	ug/g	ND	124	60-140			
F4 PHCs (C34-C50)	146	6	ug/g	ND	114	60-140			
Volatiles									
Benzene	4.62	0.02	ug/g	ND	115	60-130			
Ethylbenzene	4.07	0.05	ug/g	ND	102	60-130			
Toluene	4.68	0.05	ug/g	ND	117	60-130			
m,p-Xylenes	9.31	0.05	ug/g	ND	116	60-130			
o-Xylene	4.72	0.05	ug/g	ND	118	60-130			
Surrogate: Toluene-d8	*3.25*		*%*		*102*	*50-140*			

Certificate of Analysis

Report Date: 13-Sep-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 7-Sep-2023

Client PO: **58317**

Project Description: PE6238

Qualifier Notes:

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 unlesss otherwise noted.

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.

PARACE LABORATORIES LT

Paracel ID: 2336356

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2336356	№ 141899

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

Project Ref: PE6238
Quote #:
PO #: 58317
E-mail: mwitteman@patersongroup.ca

Page __ of __

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

☒ REG 153/04 ☐ REG 406/19

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

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
1	BH6-23-SS4	S		2	Sept 6/23	10 AM	X											
2	BH7-23-SS5	S		2	Sept 6/23	11 AM	X											
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Walk In

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: 1656
Relinquished By (Print): Mandy Witteman	Date/Time:	Date/Time: Sept 7/23
Date/Time: Sept. 7, 2023	Temperature: °C	Temperature: 9.8 °C

Verified By:
Date/Time: Sept 8/23 905
pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers (Ottawa)
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mandy Witteman

Client PO: 58317
Project: PE6238
Custody: 141903

Report Date: 18-Sep-2023
Order Date: 13-Sep-2023

Order #: 2337322

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

Paracel ID	Client ID
2337322-01	BH2-23-AU1
2337322-02	BH7-23-AU1

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	14-Sep-23	15-Sep-23
Conductivity	MOE E3138 - probe @25 °C, water ext	15-Sep-23	15-Sep-23
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	14-Sep-23	15-Sep-23
PHC F1	CWS Tier 1 - P&T GC-FID	14-Sep-23	15-Sep-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	13-Sep-23	16-Sep-23
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	15-Sep-23	15-Sep-23
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	13-Sep-23	14-Sep-23
SAR	Calculated	15-Sep-23	18-Sep-23
Solids, %	CWS Tier 1 - Gravimetric	14-Sep-23	15-Sep-23

Certificate of Analysis

Report Date: 18-Sep-2023

Client: **Paterson Group Consulting Engineers (Ottawa)**

Order Date: 13-Sep-2023

Client PO: 58317

Project Description: PE6238

	Client ID:	BH2-23-AU1	BH7-23-AU1	-	-	-	-
	Sample Date:	05-Sep-23 11:00	06-Sep-23 11:00	-	-		
	Sample ID:	2337322-01	2337322-02	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	95.6	97.8	-	-	-	-
General Inorganics							
SAR	0.01 N/A	1.09	0.10	-	-	-	-
Conductivity	5 uS/cm	144	75	-	-	-	-
pH	0.05 pH Units	7.96	-	-	-	-	-
Metals							
Antimony	1 ug/g	<1.0	<1.0	-	-	-	-
Arsenic	1 ug/g	3.1	1.5	-	-	-	-
Barium	1 ug/g	115	27.2	-	-	-	-
Beryllium	0.5 ug/g	<0.5	<0.5	-	-	-	-
Boron	5 ug/g	6.9	<5.0	-	-	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	-	-	-	-
Chromium	5 ug/g	12.8	7.0	-	-	-	-
Cobalt	1 ug/g	5.8	3.5	-	-	-	-
Copper	5 ug/g	12.4	8.4	-	-	-	-
Lead	1 ug/g	6.9	2.1	-	-	-	-
Molybdenum	1 ug/g	<1.0	<1.0	-	-	-	-
Nickel	5 ug/g	10.0	5.0	-	-	-	-
Selenium	1 ug/g	<1.0	<1.0	-	-	-	-
Silver	0.3 ug/g	<0.3	<0.3	-	-	-	-
Thallium	1 ug/g	<1.0	<1.0	-	-	-	-
Uranium	1 ug/g	<1.0	<1.0	-	-	-	-
Vanadium	10 ug/g	22.0	17.8	-	-	-	-
Zinc	20 ug/g	20.2	<20.0	-	-	-	-
Volatiles							

Certificate of Analysis

Report Date: 18-Sep-2023

Client: **Paterson Group Consulting Engineers (Ottawa)**

Order Date: 13-Sep-2023

Client PO: **58317**

Project Description: **PE6238**

	Client ID:	BH2-23-AU1	BH7-23-AU1	-	-	-	-
	Sample Date:	05-Sep-23 11:00	06-Sep-23 11:00	-	-		
	Sample ID:	2337322-01	2337322-02	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Volatiles							
Benzene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene	0.05 ug/g	<0.05	<0.05	-	-	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	-	-	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene-d8	Surrogate	105%	101%	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	-	-	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	-	-	-	-
F3 PHCs (C16-C34)	8 ug/g	<8	<8	-	-	-	-
F4 PHCs (C34-C50)	6 ug/g	<6	<6	-	-	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Acenaphthylene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Anthracene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [a] anthracene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [a] pyrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [b] fluoranthene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Chrysene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Fluoranthene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Fluorene	0.02 ug/g	<0.02	<0.02	-	-	-	-

	Client ID:	BH2-23-AU1	BH7-23-AU1	-	-		
	Sample Date:	05-Sep-23 11:00	06-Sep-23 11:00	-	-	-	-
	Sample ID:	2337322-01	2337322-02	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Semi-Volatiles							
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	-	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.04	-	-	-	-
Naphthalene	0.01 ug/g	<0.01	<0.01	-	-	-	-
Phenanthrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Pyrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
2-Fluorobiphenyl	Surrogate	54.0%	56.2%	-	-	-	-
Terphenyl-d14	Surrogate	56.2%	56.5%	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics								
Conductivity	ND	5	uS/cm					
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Metals								
Antimony	ND	1.0	ug/g					
Arsenic	ND	1.0	ug/g					
Barium	ND	1.0	ug/g					
Beryllium	ND	0.5	ug/g					
Boron	ND	5.0	ug/g					
Cadmium	ND	0.5	ug/g					
Chromium	ND	5.0	ug/g					
Cobalt	ND	1.0	ug/g					
Copper	ND	5.0	ug/g					
Lead	ND	1.0	ug/g					
Molybdenum	ND	1.0	ug/g					
Nickel	ND	5.0	ug/g					
Selenium	ND	1.0	ug/g					
Silver	ND	0.3	ug/g					
Thallium	ND	1.0	ug/g					
Uranium	ND	1.0	ug/g					
Vanadium	ND	10.0	ug/g					
Zinc	ND	20.0	ug/g					
Semi-Volatiles								
Acenaphthene	ND	0.02	ug/g					
Acenaphthylene	ND	0.02	ug/g					
Anthracene	ND	0.02	ug/g					
Benzo [a] anthracene	ND	0.02	ug/g					
Benzo [a] pyrene	ND	0.02	ug/g					
Benzo [b] fluoranthene	ND	0.02	ug/g					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*0.905*		*%*	*67.9*	*50-140*			
Surrogate: Terphenyl-d14	*0.762*		*%*	*57.1*	*50-140*			
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	*8.01*		*%*	*100*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	7.39	0.01	N/A	17.8			82.9	30	QR-04
Conductivity	1760	5	uS/cm	1730			1.9	5	
pH	7.67	0.05	pH Units	7.74			0.9	2.3	
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)	ND	8	ug/g	9			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	10.8	1.0	ug/g	8.5			23.6	30	
Barium	68.5	1.0	ug/g	53.9			23.8	30	
Beryllium	0.7	0.5	ug/g	0.6			24.7	30	
Boron	7.5	5.0	ug/g	6.7			10.9	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	22.5	5.0	ug/g	17.8			23.2	30	
Cobalt	10.1	1.0	ug/g	7.9			24.4	30	
Copper	17.1	5.0	ug/g	13.7			22.4	30	
Lead	10.2	1.0	ug/g	8.1			22.9	30	
Molybdenum	1.5	1.0	ug/g	1.8			17.3	30	
Nickel	25.2	5.0	ug/g	20.0			22.7	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	35.8	10.0	ug/g	29.1			20.9	30	
Zinc	47.9	20.0	ug/g	37.9			23.4	30	
Physical Characteristics									
% Solids	86.0	0.1	% by Wt.	83.2			3.4	25	
Semi-Volatiles									

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*0.825*		*%*		*57.2*	*50-140*			
Surrogate: Terphenyl-d14	*0.868*		*%*		*60.2*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*10.3*		*%*		*108*	*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)	165	7	ug/g	ND	95.6	85-115			
F2 PHCs (C10-C16)	79	4	ug/g	ND	89.2	60-140			
F3 PHCs (C16-C34)	239	8	ug/g	9	106	60-140			
F4 PHCs (C34-C50)	145	6	ug/g	ND	105	60-140			
Metals									
Arsenic	49.0	1.0	ug/g	3.4	91.1	70-130			
Barium	70.2	1.0	ug/g	21.6	97.2	70-130			
Beryllium	45.3	0.5	ug/g	ND	90.1	70-130			
Boron	44.7	5.0	ug/g	ND	84.1	70-130			
Cadmium	43.6	0.5	ug/g	ND	87.1	70-130			
Chromium	54.9	5.0	ug/g	7.1	95.6	70-130			
Cobalt	48.9	1.0	ug/g	3.2	91.4	70-130			
Copper	49.9	5.0	ug/g	5.5	88.9	70-130			
Lead	46.3	1.0	ug/g	3.2	86.1	70-130			
Molybdenum	44.4	1.0	ug/g	ND	87.4	70-130			
Nickel	53.1	5.0	ug/g	8.0	90.2	70-130			
Selenium	41.4	1.0	ug/g	ND	82.7	70-130			
Silver	41.3	0.3	ug/g	ND	82.6	70-130			
Thallium	44.0	1.0	ug/g	ND	87.8	70-130			
Uranium	43.9	1.0	ug/g	ND	87.3	70-130			
Vanadium	59.7	10.0	ug/g	11.6	96.2	70-130			
Zinc	59.4	20.0	ug/g	ND	88.5	70-130			
Semi-Volatiles									
Acenaphthene	0.112	0.02	ug/g	ND	62.3	50-140			
Acenaphthylene	0.127	0.02	ug/g	ND	70.4	50-140			
Anthracene	0.115	0.02	ug/g	ND	63.6	50-140			
Benzo [a] anthracene	0.138	0.02	ug/g	ND	76.6	50-140			
Benzo [a] pyrene	0.121	0.02	ug/g	ND	66.9	50-140			
Benzo [b] fluoranthene	0.125	0.02	ug/g	ND	69.6	50-140			
Benzo [g,h,i] perylene	0.192	0.02	ug/g	ND	106	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzo [k] fluoranthene	0.117	0.02	ug/g	ND	65.0	50-140			
Chrysene	0.138	0.02	ug/g	ND	76.5	50-140			
Dibenzo [a,h] anthracene	0.121	0.02	ug/g	ND	67.2	50-140			
Fluoranthene	0.104	0.02	ug/g	ND	57.5	50-140			
Fluorene	0.119	0.02	ug/g	ND	65.9	50-140			
Indeno [1,2,3-cd] pyrene	0.111	0.02	ug/g	ND	61.4	50-140			
1-Methylnaphthalene	0.164	0.02	ug/g	ND	91.2	50-140			
2-Methylnaphthalene	0.167	0.02	ug/g	ND	92.7	50-140			
Naphthalene	0.135	0.01	ug/g	ND	75.1	50-140			
Phenanthrene	0.123	0.02	ug/g	ND	68.4	50-140			
Pyrene	0.101	0.02	ug/g	ND	55.8	50-140			
Surrogate: 2-Fluorobiphenyl	*0.817*		*%*		*56.7*	*50-140*			
Surrogate: Terphenyl-d14	*0.760*		*%*		*52.7*	*50-140*			
Volatiles									
Benzene	3.88	0.02	ug/g	ND	96.9	60-130			
Ethylbenzene	3.28	0.05	ug/g	ND	81.9	60-130			
Toluene	3.41	0.05	ug/g	ND	85.3	60-130			
m,p-Xylenes	6.68	0.05	ug/g	ND	83.5	60-130			
o-Xylene	3.28	0.05	ug/g	ND	81.9	60-130			
Surrogate: Toluene-d8	*7.58*		*%*		*94.8*	*50-140*			

Qualifier Notes:

QC Qualifiers:

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

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unlesss otherwise noted.

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: 2337322

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2337322	Nº 141903

Client Name: Paterson Group Inc.	Project Ref: PE6238	Page 1 of 1
Contact Name: Mandy Witteman	Quote #:	Turnaround Time
Address: 9 Auriga Dr. Ottawa	PO #: 58317	☐ 1 day ☐ 3 day
Telephone: (613) 800-5575	E-mail: mwitteman@patersongroup.ca	☐ 2 day ☒ Regular
		Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR	pH			
1	BH2-23-AU1	S		3	Sept. 5/23	11 AM	X		X	X				X	X			
2	~~BH7-23-SS2 (Bag)~~	~~S~~																
3	BH7-23-AU1	S		3	Sept 6/23	11 AM	X		X	X				X				
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By: Hiral
Relinquished By (Print): Mandy Witteman	Date/Time:	Date/Time: Sep 13 20:31 14	Date/Time: Sept 13, 23 | 16:36
Date/Time: Sept. 13/2023	Temperature: °C	Temperature: 17.4 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers (Ottawa)
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mandy Witteman

Client PO: 58317
Project: PE6238
Custody: 141906

Report Date: 22-Sep-2023
Order Date: 14-Sep-2023

Order #: 2337426

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

Paracel ID	Client ID
2337426-01	BH6-23-SS8
2337426-02	BH7-23-SS8

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	19-Sep-23	19-Sep-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	15-Sep-23	20-Sep-23
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	15-Sep-23	22-Sep-23
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	19-Sep-23	19-Sep-23
Solids, %	CWS Tier 1 - Gravimetric	18-Sep-23	19-Sep-23

	Client ID:	BH6-23-SS8	BH7-23-SS8	-	-	-	-
	Sample Date:	06-Sep-23 13:00	06-Sep-23 12:00	-	-		
	Sample ID:	2337426-01	2337426-02	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	96.5	93.1	-	-	-	-
Volatiles							
Acetone	0.5 ug/g	<0.50	<0.50	-	-	-	-
Benzene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Bromodichloromethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Bromoform	0.05 ug/g	<0.05	<0.05	-	-	-	-
Bromomethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Carbon Tetrachloride	0.05 ug/g	<0.05	<0.05	-	-	-	-
Chlorobenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Chloroform	0.05 ug/g	<0.05	<0.05	-	-	-	-
Dibromochloromethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Dichlorodifluoromethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,2-Dichlorobenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,3-Dichlorobenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,4-Dichlorobenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1-Dichloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,2-Dichloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1-Dichloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
cis-1,2-Dichloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,2-Dichloropropane	0.05 ug/g	<0.05	<0.05	-	-	-	-
cis-1,3-Dichloropropylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
trans-1,3-Dichloropropylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,3-Dichloropropene, total	0.05 ug/g	<0.05	<0.05	-	-	-	-
Ethylene dibromide (dibromoethane,	0.05 ug/g	<0.05	<0.05	-	-	-	-

Certificate of Analysis

Report Date: 22-Sep-2023

Client: **Paterson Group Consulting Engineers (Ottawa)**

Order Date: 14-Sep-2023

Client PO: **58317**

Project Description: **PE6238**

	Client ID:	BH6-23-SS8	BH7-23-SS8	-	-	-	-
	Sample Date:	06-Sep-23 13:00	06-Sep-23 12:00	-	-		
	Sample ID:	2337426-01	2337426-02	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Volatiles							
Ethylbenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Hexane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.5 ug/g	<0.50	<0.50	-	-	-	-
Methyl Isobutyl Ketone	0.5 ug/g	<0.50	<0.50	-	-	-	-
Methyl tert-butyl ether	0.05 ug/g	<0.05	<0.05	-	-	-	-
Methylene Chloride	0.05 ug/g	<0.05	<0.05	-	-	-	-
Styrene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Tetrachloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1,1-Trichloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
1,1,2-Trichloroethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Trichloroethylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Trichlorofluoromethane	0.05 ug/g	<0.05	<0.05	-	-	-	-
Vinyl chloride	0.02 ug/g	<0.02	<0.02	-	-	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	-	-	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	-	-	-	-
Dibromofluoromethane	Surrogate	78.7%	88.4%	-	-	-	-
Toluene-d8	Surrogate	85.0%	86.4%	-	-	-	-
4-Bromofluorobenzene	Surrogate	114%	118%	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	-	-	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	-	-	-	-

	Client ID:	BH6-23-SS8	BH7-23-SS8	-	-	-	-
	Sample Date:	06-Sep-23 13:00	06-Sep-23 12:00	-	-		
	Sample ID:	2337426-01	2337426-02	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Hydrocarbons							
F3 PHCs (C16-C34)	8 ug/g	<8	<8	-	-	-	-
F4 PHCs (C34-C50)	6 ug/g	<6	<6	-	-	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Acenaphthylene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Anthracene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [a] anthracene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [a] pyrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [b] fluoranthene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Chrysene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Fluoranthene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Fluorene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	-	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.04	-	-	-	-
Naphthalene	0.01 ug/g	<0.01	<0.01	-	-	-	-
Phenanthrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Pyrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
2-Fluorobiphenyl	Surrogate	105%	97.6%	-	-	-	-
Terphenyl-d14	Surrogate	56.5%	72.5%	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%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					
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	*1.47*		*%*	*110*	*50-140*			
Surrogate: Terphenyl-d14	*0.885*		*%*	*66.4*	*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					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
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					
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					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*3.59*		*%*	*112*	*50-140*			
Surrogate: Dibromofluoromethane	*2.16*		*%*	*67.4*	*50-140*			
Surrogate: Toluene-d8	*2.65*		*%*	*83.0*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	665	4	ug/g	676			1.7	30	
F3 PHCs (C16-C34)	2950	8	ug/g	2940			0.5	30	
F4 PHCs (C34-C50)	268	6	ug/g	247			8.5	30	
Physical Characteristics									
% Solids	73.7	0.1	% by Wt.	73.2			0.6	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	*1.25*		*%*		*83.9*	*50-140*			
Surrogate: Terphenyl-d14	*0.912*		*%*		*61.2*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	
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	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*3.75*		*%*		*113*	*50-140*			
Surrogate: Dibromofluoromethane	*2.76*		*%*		*83.4*	*50-140*			
Surrogate: Toluene-d8	*2.82*		*%*		*85.0*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	177	7	ug/g	ND	103	85-115			
F2 PHCs (C10-C16)	729	4	ug/g	676	52.1	60-140			QM-06
F3 PHCs (C16-C34)	3130	8	ug/g	2940	76.3	60-140			
F4 PHCs (C34-C50)	437	6	ug/g	247	120	60-140			
Semi-Volatiles									
Acenaphthene	0.204	0.02	ug/g	ND	110	50-140			
Acenaphthylene	0.220	0.02	ug/g	ND	118	50-140			
Anthracene	0.157	0.02	ug/g	ND	84.5	50-140			
Benzo [a] anthracene	0.203	0.02	ug/g	ND	109	50-140			
Benzo [a] pyrene	0.168	0.02	ug/g	ND	89.9	50-140			
Benzo [b] fluoranthene	0.123	0.02	ug/g	ND	66.0	50-140			
Benzo [g,h,i] perylene	0.149	0.02	ug/g	ND	80.2	50-140			
Benzo [k] fluoranthene	0.096	0.02	ug/g	ND	51.4	50-140			
Chrysene	0.183	0.02	ug/g	ND	98.1	50-140			
Dibenzo [a,h] anthracene	0.096	0.02	ug/g	ND	51.6	50-140			
Fluoranthene	0.161	0.02	ug/g	ND	86.5	50-140			
Fluorene	0.201	0.02	ug/g	ND	108	50-140			
Indeno [1,2,3-cd] pyrene	0.111	0.02	ug/g	ND	59.7	50-140			
1-Methylnaphthalene	0.167	0.02	ug/g	ND	89.8	50-140			
2-Methylnaphthalene	0.203	0.02	ug/g	ND	109	50-140			
Naphthalene	0.152	0.01	ug/g	ND	81.5	50-140			
Phenanthrene	0.217	0.02	ug/g	ND	116	50-140			
Pyrene	0.164	0.02	ug/g	ND	87.8	50-140			
Surrogate: 2-Fluorobiphenyl	*1.30*		*%*		*87.2*	*50-140*			
Surrogate: Terphenyl-d14	*0.984*		*%*		*66.0*	*50-140*			
Volatiles									
Acetone	12.1	0.50	ug/g	ND	121	50-140			
Benzene	4.75	0.02	ug/g	ND	119	60-130			
Bromodichloromethane	5.13	0.05	ug/g	ND	128	60-130			
Bromoform	3.83	0.05	ug/g	ND	95.9	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	4.09	0.05	ug/g	ND	102	50-140			
Carbon Tetrachloride	4.93	0.05	ug/g	ND	123	60-130			
Chlorobenzene	3.89	0.05	ug/g	ND	97.2	60-130			
Chloroform	5.16	0.05	ug/g	ND	129	60-130			
Dibromochloromethane	3.96	0.05	ug/g	ND	98.9	60-130			
Dichlorodifluoromethane	4.87	0.05	ug/g	ND	122	50-140			
1,2-Dichlorobenzene	3.64	0.05	ug/g	ND	91.0	60-130			
1,3-Dichlorobenzene	3.52	0.05	ug/g	ND	88.0	60-130			
1,4-Dichlorobenzene	3.74	0.05	ug/g	ND	93.6	60-130			
1,1-Dichloroethane	4.68	0.05	ug/g	ND	117	60-130			
1,2-Dichloroethane	5.17	0.05	ug/g	ND	129	60-130			
1,1-Dichloroethylene	4.67	0.05	ug/g	ND	117	60-130			
cis-1,2-Dichloroethylene	4.59	0.05	ug/g	ND	115	60-130			
trans-1,2-Dichloroethylene	4.81	0.05	ug/g	ND	120	60-130			
1,2-Dichloropropane	4.60	0.05	ug/g	ND	115	60-130			
cis-1,3-Dichloropropylene	4.53	0.05	ug/g	ND	113	60-130			
trans-1,3-Dichloropropylene	4.47	0.05	ug/g	ND	112	60-130			
Ethylbenzene	3.51	0.05	ug/g	ND	87.8	60-130			
Ethylene dibromide (dibromoethane, 1,2-)	3.86	0.05	ug/g	ND	96.5	60-130			
Hexane	4.25	0.05	ug/g	ND	106	60-130			
Methyl Ethyl Ketone (2-Butanone)	13.4	0.50	ug/g	ND	134	50-140			
Methyl Isobutyl Ketone	11.5	0.50	ug/g	ND	115	50-140			
Methyl tert-butyl ether	12.7	0.05	ug/g	ND	127	50-140			
Methylene Chloride	4.62	0.05	ug/g	ND	115	60-130			
Styrene	3.31	0.05	ug/g	ND	82.9	60-130			
1,1,1,2-Tetrachloroethane	3.95	0.05	ug/g	ND	98.7	60-130			
1,1,2,2-Tetrachloroethane	3.11	0.05	ug/g	ND	77.8	60-130			
Tetrachloroethylene	3.87	0.05	ug/g	ND	96.8	60-130			
Toluene	3.88	0.05	ug/g	ND	96.9	60-130			
1,1,1-Trichloroethane	5.17	0.05	ug/g	ND	129	60-130			
1,1,2-Trichloroethane	4.77	0.05	ug/g	ND	119	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Trichloroethylene	5.11	0.05	ug/g	ND	128	60-130			
Trichlorofluoromethane	4.93	0.05	ug/g	ND	123	50-140			
Vinyl chloride	5.05	0.02	ug/g	ND	126	50-140			
m,p-Xylenes	7.69	0.05	ug/g	ND	96.1	60-130			
o-Xylene	3.88	0.05	ug/g	ND	97.0	60-130			
Surrogate: 4-Bromofluorobenzene	*2.05*		*%*		*64.1*	*50-140*			
Surrogate: Dibromofluoromethane	*2.07*		*%*		*64.6*	*50-140*			
Surrogate: Toluene-d8	*2.57*		*%*		*80.2*	*50-140*			

Qualifier Notes:

QC Qualifiers:

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

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unlesss otherwise noted.

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: 2337426

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2337426	№ 141906

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

Project Ref: PE6238
Quote #:
PO #: 58317
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 ☐ Other:

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table
Mun:
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)					
1	BH6-23-SS8	S		2	Sept 6/23	1pm	X	X	X									
2	BH7-23-SS8	S		2	Sept 6/23	12pm	X	X	X									
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SD
Relinquished By (Print): Mandy Witte	Date/Time:	Date/Time: Sept 14, 2023 3:30pm
Date/Time: Sept 14/23	Temperature: °C	Temperature: 6.9 °C
		Verified By: Hina
		Date/Time: Sept 14, 23 15:37
		pH Verified: ☐ By: