PATERSON GROUP

Phase II – Environmental Site Assessment

917 Merivale Road
Ottawa, Ontario

Prepared for 15096332 Canada Inc.

Report: PE6373-1
Date: February 16, 2024

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EXECUTIVE SUMMARY

Assessment

A Phase II-ESA was conducted for the property addressed 917 Merivale Road, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) and their resulting areas of potential environmental concern (APECs) that were identified during the Phase I ESA, as well as, observations made during the subsurface investigation.

Paterson advanced three boreholes on the Phase II Property on January 16, 2024. The boreholes were strategically placed to address the aforementioned APECs and two of which were completed with groundwater monitoring well installations.

Soil

A total of five soil samples (including one duplicate) were submitted for analysis of metals, benzene, toluene, ethylbenzene xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4) and/or polycyclic aromatic hydrocarbons (PAHs).

All of the analyzed metals, BTEX, PHC and PAH parameters are in compliance with the selected MECP Table 3 Standards.

Groundwater

Groundwater samples from monitoring wells installed in BH2-24 and BH3-24 were collected on January 19, 2024, and were submitted for laboratory analysis of BTEX and PHCs (F1-F4). All of the analysed BTEX and PHCs (F1-F4) parameters comply with the selected MECP Table 3 Standards.

Recommendations

Based on the analytical test results, the soil and groundwater beneath the Phase II Property complies with the selected MECP Table 3 Standards. As such, it is our opinion that no further investigative work is required at this time.

<u>Groundwater</u>

It is recommended that monitoring wells installed on the Phase II Property be maintained for future monitoring. The monitoring wells must be decommissioned in accordance with O.Reg. 903 once they are no longer required.

1.0 INTRODUCTION

At the request of 15096332 Canada Inc., Paterson Group (Paterson) conducted a Phase II-Environmental Site Assessment (Phase II-ESA) for the property addressed 917 Merivale Road, in the City of Ottawa, Ontario (herein referred to as the Phase II Property). The purpose of this Phase II-ESA has been to address areas of potential environmental concern (APECs) identified on the Phase II Property, during the Phase I-ESA completed by LRL in 2023.

1.1 Site Description

Address:	917 Merivale Road, Ottawa, Ontario
Location:	The Phase I Property is located on the east side of Merivale Road, at the intersection of Leaside Avenue and Merivale Road, in the City of Ottawa, Ontario. Refer to Figure 1 – Key Plan, appended to this report. For the purposes of this report, Merivale Road runs in a north-south orientation.
Latitude and Longitude:	45 º 22’ 58.15’’ N, 75 º 43’ 57.25’’ W

Site Description:

Configuration:	Rectangular
Site Area:	476 sq. meters
Zoning:	TM [2190] – Traditional Mainstreet Zone

1.2 Property Ownership

Paterson was engaged to conduct this Phase II ESA by Ms. Justine Picard of 15096332 Canada Inc., who can be reached via her office phone number (819) 431-9300.

1.3 Current and Proposed Future Uses

The Phase II Property is currently occupied by a two-storey residential dwelling at the centre of the property. It is our understanding that the property is proposed to be redeveloped with a 6-storey residential apartment building.

1.4 Applicable Site Condition Standard

The soil and groundwater standards for the subject site 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 and Climate Change (MECP), April 15, 2011. The MECP standards are based on the following considerations:

- ❑ Coarse-grained soil conditions
- ❑ Full depth generic site conditions
- ❑ Non-Potable groundwater conditions
- ❑ Residential land use

Section 35 of O.Reg. 153/04 does not apply to the Phase II Property as the neighbouring properties are all serviced by the municipality.

Section 41 of the Regulation does not apply to the Phase II Property, as the Phase II 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 considered to be a Shallow Soil property.

Coarse-grained soil standards were chosen as a conservative approach. Grain size analysis was not completed.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is located on the east side of Merivale Road, at the intersection of Leaside Avenue and Merivale Road, in the City of Ottawa, Ontario. Refer to Figure 1 – Key Plan, appended to this report. For the purposes of this report, Merivale Road runs in a north-south orientation. According to the City of Ottawa website, the Phase II Property is situated in a traditional mainstreet zone with surrounding properties consisting of commercial and residential use.

The Phase II Property is currently occupied by a two-storey residential dwelling at the centre of the property, with landscaped areas surrounding.

The site topography is relatively flat, while the regional topography appears to slightly incline to the south of the property. The Phase II Property is relatively at grade with Merivale Road. Water drainage on the Phase II Property occurs

primarily via infiltration in landscaped areas, with limited sheet flow drainage from the asphaltic concrete driveway to nearby catch basins along Merivale Road.

2.2 Past Investigations

The following report was reviewed prior to conducting this assessment:

- ‘Phase I Environmental Site Assessment, 917 Merivale Road – Ottawa, Ontario’, prepared by LRL, dated September 12, 2023.

Based on the findings of the Phase I - ESA, two off-site PCAs were considered to result in APECs on the Phase II Property. The identified APECs are as follows:

- APEC 1: Former Retail Fuel Outlet
- APEC 2: Existing Automotive Service Garage

As a result of the identified APECs, LRL recommended the completion of a Phase II-ESA to assess the environmental condition of the soil and groundwater on the Phase II Property.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted on January 16, 2024.

The field program consisted of drilling three boreholes, two of which were instrumented with groundwater monitoring wells. Borehole locations were selected to address the APECs identified in the Phase I- ESA. The boreholes were drilled to a maximum depth of approximately 6.1m below the ground surface (mbgs). It should be noted that an existing groundwater monitoring well (MW1) was identified on site and utilized for groundwater flow triangulation purposes.

3.2 Media Investigated

During the subsurface investigation, soil samples and groundwater samples were obtained and submitted for laboratory analysis. The rationale for sampling and analyzing these media is based on the Contaminants of Potential Concern identified during the Phase I-ESA and the identification of fill during the drilling program.

The contaminants of potential concern for the soil and/or groundwater on the Phase II Property include the following:

- ❒ Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)
- ❒ Petroleum Hydrocarbons (PHCs)
- ❒ Metals (including hydride-forming compounds – arsenic (As), antimony (Sb) and selenium (Se));
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs).

3.3 Phase I Conceptual Site Model

Geological mapping information for the Phase II Property was obtained from The Geological Survey of Canada – Urban Geology of the National Capital Area and reviewed as part of this assessment. Based on the available mapping information, the bedrock beneath the Phase I Property is reported to consist of interbedded limestone and dolomite of the Gull River Formation, while the surficial geology reportedly consists of offshore marine sediments (sand and clay) ranging in thickness from approximately 10 to 15 m.

Buildings and Structures

The Phase II Property is currently occupied by a two-storey residential dwelling.

Subsurface Structures and Utilities

The Phase II Property is situated in an area that is serviced by the municipality. Underground utility services on the subject land include water, sanitary and gas services, as shown on Drawing PE6373-1 – Test Hole Location Plan.

Water Bodies and Areas of Natural Significance

No areas of natural significance or water bodies were identified on the Phase II Property. The nearest water body with respect to the Phase II Property is the Rideau River located approximately 2.6 km to the east of the Phase II Property.

Drinking Water Wells

No drinking water wells were noted on the Phase II Property at the time of the previously completed Phase I ESA.

Monitoring Well Records

No monitoring wells were present on the Phase II Property at the time of the Phase I ESA, however, an existing monitoring well was identified at the rear of the property.

Neighbouring Land Use

Neighbouring land use within the Phase I Study Area consists of a mixture of commercial and residential use. The property across Merivale to the southwest addressed 926 Merivale Road is currently occupied by an automotive service garage. Based on its proximity with respect to the Phase I Property, the automotive service garage is considered to represent PCA that results in an APEC on the Phase II Property.

Potentially Contaminating Activities (PCAs) and Areas of Potential Environmental Concern (APECs)

Based on the findings of the Phase I ESA, the following PCAs (as listed in Column A, Table 2 of O.Reg.153/04) were considered to result in areas of potential environmental concern (APECs) on the Phase II Property.

Table 1 - Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern with respect to Phase I Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1 Former Retail Fuel Outlet *(926 Merivale Road)*	Southwestern portion of the Phase I Property	Item 28 – Gasoline and Associated Products Storage in Tanks"	Off-site	BTEX PHCs (F_1-F_4) PAHs[1] Metals[1]	Soil Groundwater
APEC 2 Existing Automotive Service Garage *(926 Merivale Road)*	Southwestern portion of the Phase I Property	"Item 52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems"	Off-site	BTEX PHCs (F_1-F_4) PAHs[1] Metals[1]	Soil Groundwater
APEC 3[2] Fill Material of Unknown Quality	Across the entire Phase I Property	"Item 30 – Importation of Fill Material of Unknown Quality"	On-site	PAHs Metals	Soil

Notes:

1. Included as CoCs in the previous Phase I ESA Report, however, it is our opinion that these CoCs are unlikely to be present on the neighbouring property.
2. Fill material was identified during the field investigation across the Phase II Property.

Contaminants of Potential Concern

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

- ❒ Metals (including hydride-forming compounds – arsenic (As), antimony (Sb) and selenium (Se));
- ❒ Benzene, Toluene, Ethylbenzene, Xylenes (BTEX);
- ❒ Petroleum Hydrocarbons (PHCs F_1-F4);
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs);

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of the Phase I- ESA is considered to be sufficient to conclude that there are PCAs that 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

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

3.5 Impediments

Physical impediments encountered during the Phase II-ESA field program included underground utilities.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation was completed on January 16, 2024.

Three boreholes were drilled to a maximum depth of 6.1m, two of which were instrumented with groundwater monitoring wells. The boreholes were strategically placed to address APECs identified in the Phase I ESA completed by LRL.

The boreholes were drilled with a geoprobe 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 PE6373-1 – Test Hole Location Plan.

4.2 Soil Sampling

A total of 30 soil samples were obtained from the boreholes by means of grab sampling from auger flights/auger samples and split spoon sampling. Full tubed samples were taken at approximate 1.22 m intervals. The depths at which split spoon and auger flight samples were obtained from the boreholes are shown as "**SS**" and "**AU**" respectively on the Soil Profile and Test Data Sheets.

The borehole profiles generally consist of a layer of fill comprised of silty sand, with clay and gravel, underlain by topsoil and native silty sand over silty clay.

Bedrock was not encountered during the subsurface investigation.

Borehole locations are shown on Drawing PE6373-1 – Test Hole Location Plan.

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 photoionization 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 maximum vapour reading measured during the screening process was 2.4 ppm. These results were not considered to be indicative of potential significant contamination from volatile compounds. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

4.4 Groundwater Monitoring Well Installation

Two monitoring wells were installed on the Phase II Property as part of the current subsurface investigation. The monitoring wells consisted of 32-mm Schedule 40 threaded PVC risers and screens.

Monitoring well construction details are listed in Table 2 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Borehole locations and elevations were surveyed geodetically by Paterson personnel using GPS equipment.

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
BH2-24	77.99	6.10	3.00-6.10	2.44-6.10	0-2.44	Flushmount
BH3-24	77.99	6.10	3.00-6.10	2.44-6.10	0-2.44	Stick-up

4.5 Groundwater Sampling

Groundwater sampling protocols were followed using the MECP document entitled “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario”, dated May 1996. Groundwater samples were obtained from each monitoring well, using dedicated sampling equipment. Standing water was purged from each well prior to sampling. Samples were stored in coolers to reduce analyte volatilization during transportation. Details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan in Appendix 1.

4.6 Analytical Testing

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

TABLE 3 – Analyzed Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameter				Rationale
		Metals	BTEX	PHCs F_1-F_4	PAHs	
BH1-24-SS2	0.46-1.22 m Silty Sand (Fill Material)	X			X	Assess upper fill material.
BH2-24-SS2	0.61-1.22 m Silty Sand (Fill Material)	X			X	Assess upper fill material.
BH2-24-SS7	3.66-4.27 m Silty Clay (Native)		X	X		Assess potential soil impacts resulting from off-site automotive service garage and former retail fuel outlet.
BH3-24-SS7	3.66-4.27 m Silty Clay (Native)		X	X		Assess potential soil impacts resulting from off-site automotive service garage and former retail fuel outlet.
DUP-1-23 (BH2-25-SS7)	3.66-4.27 m Silty Clay (Native)		X	X		Duplicate soil sample (BH2-24-SS7) for QA/QC purposes.

TABLE 4 - Testing Parameters for Submitted Groundwater Samples

Sample ID	Screened Interval	Parameter		Rationale
		PHCs F_1-F_4	BTEX	
BH2-24-GW1	3.10-6.10 m Silty Clay	X	X	Assess potential groundwater impacts resulting from off-site automotive service garage and former retail fuel outlet.
BH3-24-GW1	3.10-6.10 m Silty Clay	X	X	Assess potential groundwater impacts resulting from off-site automotive service garage and former retail fuel outlet.
DUP-1-GW (BH2-24-GW1)	3.10-6.10 m Silty Clay	X	X	Duplicate groundwater sample (BH2-24-GW1) for QA/QC purposes.

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

PFAS). 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

The ground surface elevations at each borehole location were surveyed by Paterson personnel using a high-precision GPS unit.

4.9 Quality Assurance and Quality Control Measures

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

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

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

5.0 REVIEW AND EVALUATION

5.1 Geology

The borehole profiles generally consist of a layer of fill comprised of silty sand, with clay and gravel. The fill material was underlain by topsoil and native silty sand over silty clay. Bedrock was not encountered during the subsurface investigation.

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

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling event on January 19, 2024, using an electronic water level meter. Groundwater levels were recorded from the monitoring wells installed in BH2-24, BH3-24, and an identified monitoring well (MW1) at the rear of the property. Groundwater levels are summarized below in Table 5.

TABLE 5 - Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH2-24	77.99	3.71	74.28	January 19, 2024
BH3-24	77.99	3.98	74.01	January 19, 2024
MW1	78.23	3.76	74.47	January 19, 2024

Based on the groundwater elevations measured during the sampling event, groundwater contour mapping was completed. Groundwater contours are shown on Drawing PE6373-1 – Test Hole Location Plan. Based on the contour mapping, groundwater flow at the subject site is in a northwesterly direction, with a horizontal hydraulic gradient of approximately 0.02 m/m.

It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations.

5.3 Fine-Coarse Soil Texture

Grain-size analysis was not completed as part of this investigation. Coarse-grained soil standards were chosen based on the nature of the recovered soil samples.

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in vapour readings ranging from 0 to 2.4 ppm. The PID readings are not considered to be indicative of contamination. The field screening results of each individual soil sample are provided on the Soil Profile and Test Data Sheets appended to this report.

5.5 Soil Quality

Based on the findings of the field screening in combination with sample depth and location, four soil samples, including one duplicate sample, were submitted for analysis of PHCs (F1-F4), BTEX, metals and PAHs. The results of the analytical

testing completed on the Phase II Property are presented in Table 1 in Appendix 1. The laboratory Certificates of Analysis are also provided in Appendix 1.

Metals

Based on analytical test results, metal parameters comply with the selected MECP Table 3 Standards in all samples analysed. The locations of samples tested for metals in the soil are shown on Drawing PE6373-2 – Analytical Testing Plan – Soil.

PAHs

No PAH parameters were identified in any of the samples analysed. The locations of samples tested for PAHs in the soil are shown on PE6373-2 – Analytical Testing Plan – Soil.

PHCs (F_1-F_4)

No PHC parameters were identified in any of the samples analysed. The locations of samples tested for PHCs in the soil are shown on Drawing PE6373-2 – Analytical Testing Plan – Soil.

BTEX

No BTEX parameters were identified in any of the samples analysed. The location of samples tested for BTEX in the soil are shown on Drawing PE6373-2 – Analytical Testing Plan – Soil.

The maximum parameter concentrations identified within the soil samples collected during the current assessment are listed below in Table 6.

TABLE 6: Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Soil Sample	Depth Interval (m BGS)
Arsenic	2.9	BH2-24-SS2	0.61-1.22
Barium	107	BH2-24-SS2	0.61-1.22
Boron	5.1	BH2-24-SS2	0.61-1.22
Chromium	44.4	BH2-24-SS2	0.61-1.22
Cobalt	9.0	BH2-24-SS2	0.61-1.22
Copper	17.6	BH2-24-SS2	0.61-1.22
Lead	9.0	BH1-24-SS2	0.46-1.22
Nickel	23.9	BH2-24-SS2	0.61-1.22
Vanadium	41.5	BH2-24-SS2	0.61-1.22
Zinc	58.7	BH2-24-SS2	0.61-1.22

Notes:
- **Bold and Underlined** – Results exceed the selected MECP standard

All other parameter results were non-detect.

5.6 Groundwater Quality

Two groundwater samples from monitoring wells installed in BH2-24 and BH3-24, were submitted for laboratory analysis of BTEX and PHCs as part of the current assessment.

The results of the analytical testing are presented in Table 2 in Appendix 1. The laboratory Certificates of Analysis are provided in Appendix 1.

PHCs (F_1-F_4)

No PHC parameters were identified in the groundwater samples analysed. As such, the results comply with the selected MECP Table 3 Standards. The locations of the samples tested for PHCs in the groundwater are shown on Drawing PE6373-3 – Analytical Testing Plan – Groundwater.

BTEX

No BTEX parameters were identified in the groundwater samples analysed. As such, the results comply with the selected MECP Table 3 Standards. The locations of the samples tested for BTEX in the groundwater are shown on Drawing PE6373-3 – Analytical Testing Plan – Groundwater.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of the subsurface investigation 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.

One duplicate soil sample was collected from BH2-24-SS7 (DUP-1-23) and was submitted for BTEX and PHCs. One duplicate groundwater sample was collected from BH2-24-GW1 (DUP-1-GW) and was submitted for BTEX and PHCs.

The duplicates were collected with the intent of calculating the relative percent difference (RPD) between duplicate sample values, as a way of assessing the quality of the analytical test results.

All analysed parameters in BH2-24-SS7 and its duplicate sample, DUP-1-23, were not detected above the method detection limit. All analyzed parameters in BH2-

24-GW1 and its duplicate sample, DUP-1-GW, were not detected above the method detection limit.

The quality of the field data collected during the Phase II ESA is considered to be sufficient to meet the overall objectives of the assessment.

5.8 Phase II Conceptual Site Model

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

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

Based on the results of the previously completed Phase I ESA, two PCAs were considered to result in APECs on the Phase II Property. The identified APECs on the Phase II Property are as follows:

- APEC 1: Former Retail Fuel Outlet (PCA#28)
- APEC 2: Existing Automotive Service Garage (PCA#52)
- APEC 3: Fill Material of Unknown Quality (PCA#30)

Fill material was identified during the field investigation program across the Phase II Property.

Contaminants of Potential Concern

The following CPCs were identified with respect to the Phase II Property:

- Metals (including arsenic, selenium and antimony);
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX);
- Petroleum Hydrocarbons (PHCs F_1-F_4);
- Polycyclic Aromatic Hydrocarbons (PAHs);

Subsurface Structures and Utilities

The Phase II Property is situated in an area serviced by the municipality. Underground utility services on the Phase II Property include water, sanitary and gas services.

Physical Setting

Site Stratigraphy

Groundwater was encountered at a maximum depth of 3.98 mbgs in BH3-24.

Site geology details are summarized below.

- Fill material consisting of brown silty sand with clay and gravel, extending to depths of approximately 1.22 m below the existing ground surface.
- Native brown silty sand was encountered at a depth of approximately 1.22 m below the existing ground surface.
- Native brown silty clay was encountered at depths ranging from approximately 2.13 to 2.43 m below the existing ground surface and extended the full depth of the hole.

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is provided in the Soil Profile and Test Data Sheets in Appendix 1.

Hydrogeological Characteristics

Groundwater was encountered within the silty clay at depths ranging from 3.71 to 3.98 m. Based on the groundwater monitoring event, groundwater is interpreted to flow to the northwest beneath the Phase II Property.

Approximate Depth to Bedrock

Bedrock was not encountered in any of the boreholes advanced on the Phase II Property.

Approximate Depth to Water Table

The depth to the water table at the Phase II Property varies between approximately 3.71 to 3.98 m below existing grade.

Sections 41 and 43.1 of the Regulation

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

Section 43.1 of the Regulation does not apply to the subject site as bedrock is not located less than 2 m below ground surface.

Fill Placement

Fill material consisting of brown silty sand with clay and gravel was identified in BH1-24 and BH2-24. No deleterious material was identified in the fill material. The fill material of unknown quality identified on the Phase II Property was considered to represent an APEC.

Existing Buildings and Structures

The Phase II Property is occupied by a two-storey residential dwelling at the centre of the property.

Proposed Buildings and Other Structures

The proposed site development for the Phase II Property will consist of a 6-storey residential apartment building.

Environmental Condition

Areas Where Contaminants are Present

Based on the findings of this Phase II ESA, no contaminant concentrations exceeding MECP Table 3 Residential Standards were identified within the soil or groundwater on the Phase II Property.

Types of Contaminants

Based on the findings of this Phase II ESA, no contaminant concentrations exceeding MECP Table 3 Residential Standards were identified within the soil or groundwater on the Phase II Property.

Contaminated Media

Based on the findings of this Phase II ESA, no contaminant concentrations exceeding MECP Table 3 Residential Standards were identified within the soil or groundwater on the Phase II Property.

What Is Known About Areas Where Contaminants Are Present

Based on the findings of this Phase II ESA, no contaminant concentrations exceeding MECP Table 3 Residential Standards were identified within the soil or groundwater on the Phase II Property.

Distribution and Migration of Contaminants

Based on the findings of this Phase II ESA, no contaminant concentrations exceeding MECP Table 3 Residential Standards were identified within the soil or groundwater on the Phase II Property.

Discharge of Contaminants

Based on the findings of this Phase II ESA, no contaminants have been discharged on the Phase II Property.

Climatic and Meteorological Conditions

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

Based on the findings of this Phase II-ESA, climatic and meteorological conditions are not considered to have affected contaminant distribution on the Phase II Property.

Potential for Vapour Intrusion

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

6.0 CONCLUSIONS

Assessment

A Phase II-ESA was conducted for the property addressed 917 Merivale Road, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) and their resulting areas of potential environmental concern (APECs) that were identified during the Phase I ESA, as well as, observations made during the subsurface investigation.

Paterson advanced three boreholes on the Phase II Property on January 16, 2024. The boreholes were strategically placed to address the aforementioned APECs and two of which were completed with groundwater monitoring well installations.

Soil

A total of five soil samples (including one duplicate) were submitted for analysis of metals, benzene, toluene, ethylbenzene xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4) and/or polycyclic aromatic hydrocarbons (PAHs).

All of the analyzed metals, BTEX, PHC and PAH parameters are in compliance with the selected MECP Table 3 Standards.

Groundwater

Groundwater samples from monitoring wells installed in BH2-24 and BH3-24 were collected on January 19, 2024, and were submitted for laboratory analysis of BTEX and PHCs (F1-F4). All of the analysed BTEX and PHCs (F1-F4) parameters comply with the selected MECP Table 3 Standards.

Recommendations

Based on the analytical test results, the soil and groundwater beneath the Phase II Property complies with the selected MECP Table 3 Standards. As such, it is our opinion that no further investigative work is required at this time.

Groundwater

It is recommended that monitoring wells installed on the Phase II Property be maintained for future monitoring. The monitoring wells must be decommissioned in accordance with O.Reg. 903 once they are no longer required.

7.0 STATEMENT OF LIMITATIONS

This Phase II - Environmental Site Assessment report has been prepared under the supervision of a Qualified Person, in general accordance with O. Reg 153/04. 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 15096332 Canada Inc. Notification from 15096332 Canada Inc. and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

Joshua Dempsey, B.Sc.

Mark D'Arcy, P.Eng., Q.P.ESA

Report Distribution:

- ❒ 15096332 Canada Inc.
- ❒ Paterson Group

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE6373-1 – TEST HOLE LOCATION PLAN

DRAWING PE6373-2 – ANALYTICAL TESTING PLAN – SOIL

DRAWING PE6373-2A – CROSS-SECTION A – A' – SOIL

DRAWING PE6373-3 – ANALYTICAL TESTING PLAN – GROUNDWATER

DRAWING PE6373-3A – CROSS-SECTION A – A' – GROUNDWATER

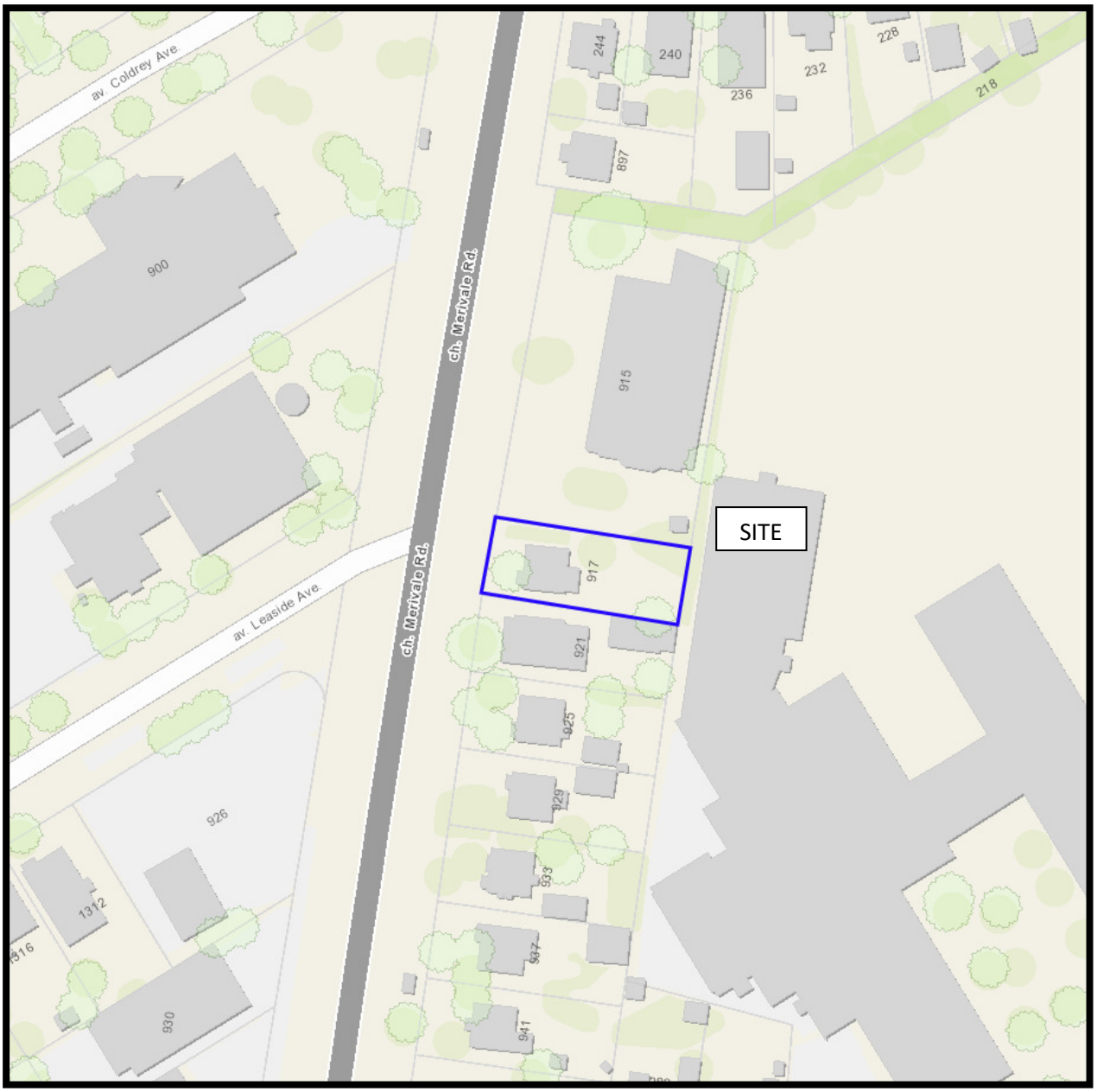
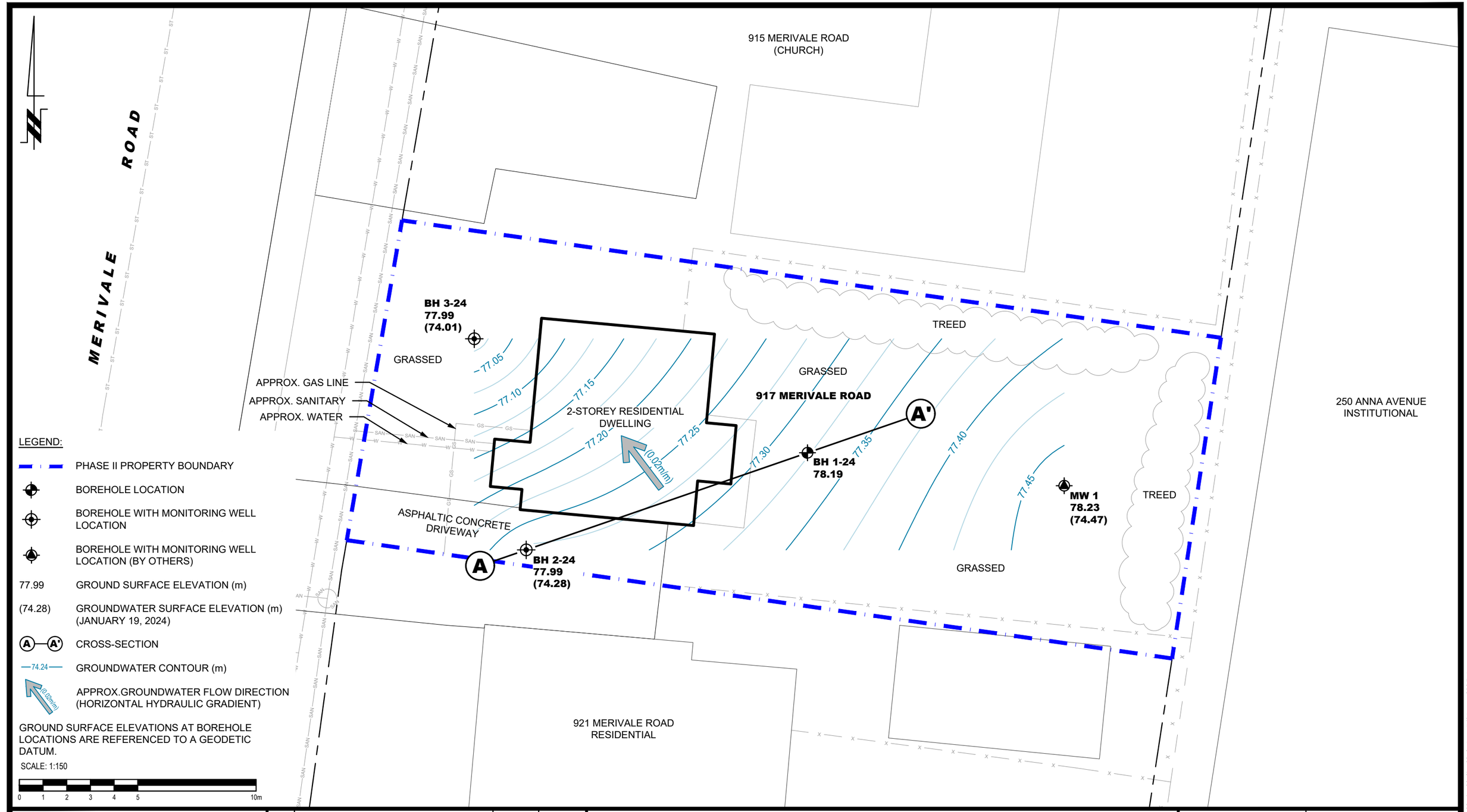


FIGURE 1

KEY PLAN



LEGEND:

- PHASE II PROPERTY BOUNDARY
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION (BY OTHERS)
- 77.99 GROUND SURFACE ELEVATION (m)
- (74.28) GROUNDWATER SURFACE ELEVATION (m) (JANUARY 19, 2024)
- A—A' CROSS-SECTION
- 74.24 GROUNDWATER CONTOUR (m)
- (0.02m/m) APPROX.GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

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

SCALE: 1:150

0 1 2 3 4 5 10m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

15096332 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
917 MERIVALE ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:150	Date: 02/2024
Drawn by: ZS	Report No.: PE6373-1
Checked by: JD	Dwg. No.: PE6373-1
Approved by: MSD	Revision No.:

11x17

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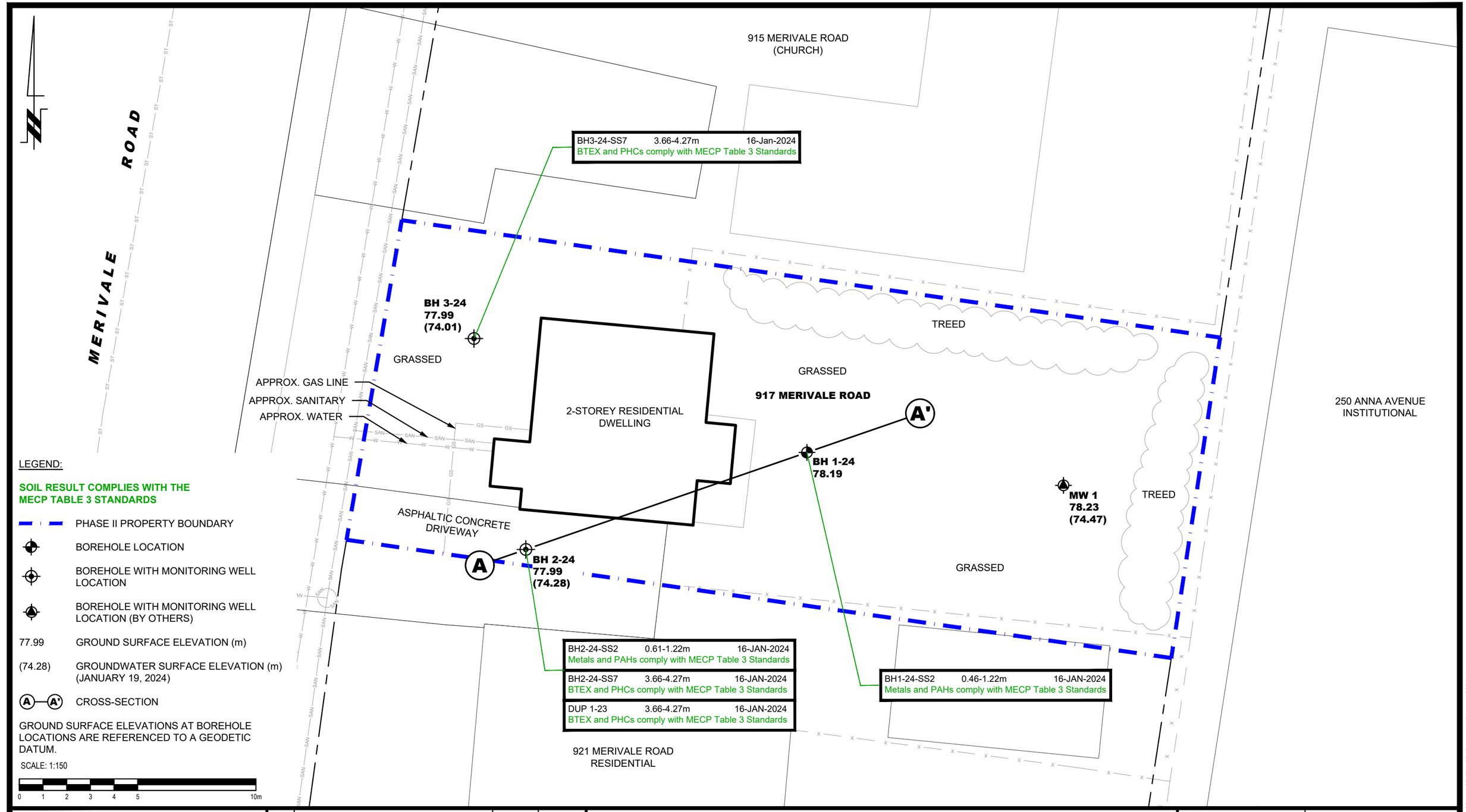

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

- PHASE II PROPERTY BOUNDARY
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION (BY OTHERS)
- 77.99 GROUND SURFACE ELEVATION (m)
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GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:150

0 1 2 3 4 5 10m

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NO.	REVISIONS	DATE	INITIAL

15096332 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
917 MERIVALE ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:150	Date: 02/2024
Drawn by: ZS	Report No.: PE6373-1
Checked by: JD	Dwg. No.: PE6373-2
Approved by: MSD	Revision No.:

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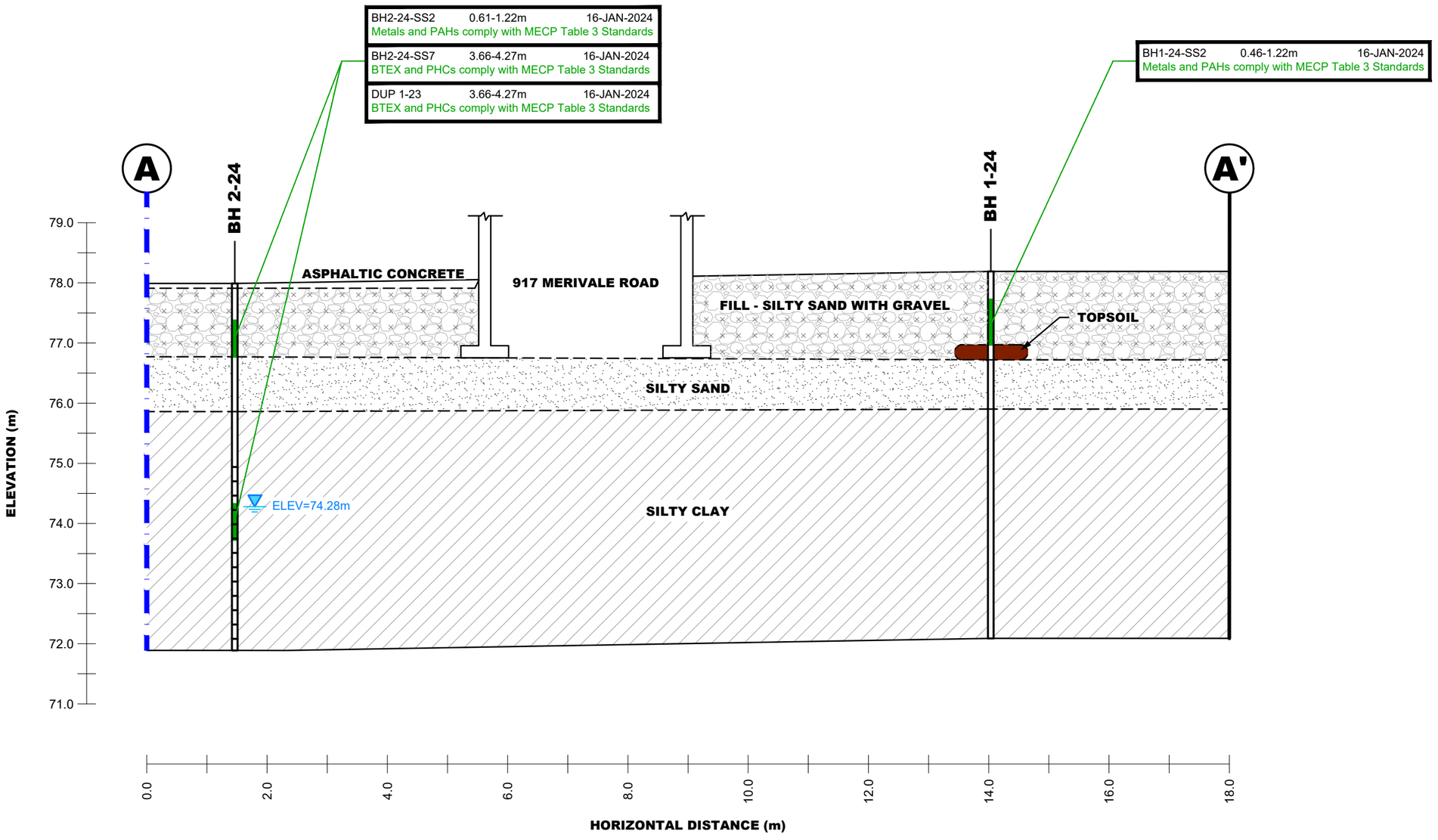

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

15096332 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
917 MERIVALE ROAD

OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - SOIL

Scale: AS SHOWN	Date: 02/2024
Drawn by: ZS	Report No.: PE6373-1
Checked by: JD	Dwg. No.: PE6373-2A
Approved by: MSD	Revision No.:

11x17

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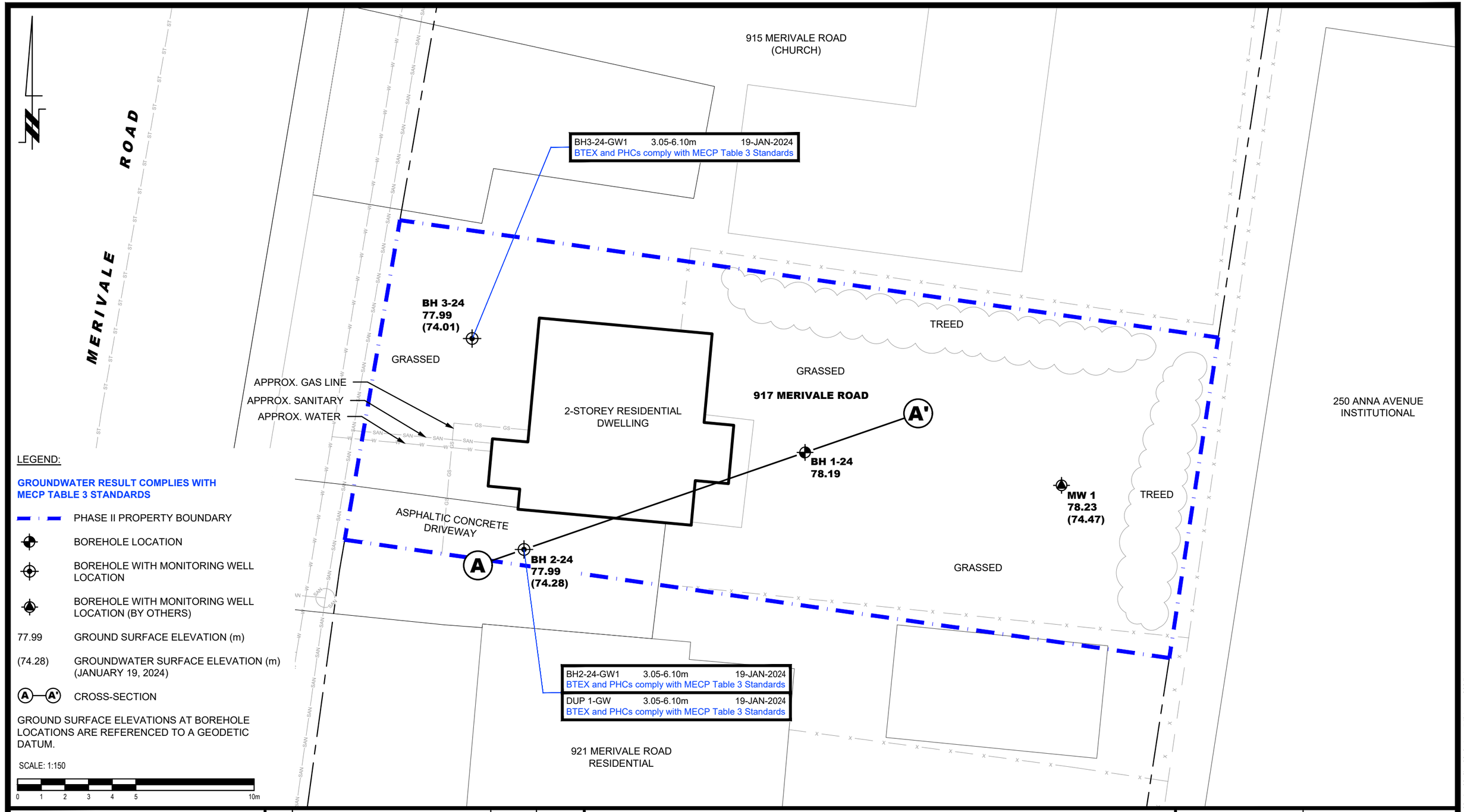

LEGEND:

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

- PHASE II PROPERTY BOUNDARY
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION (BY OTHERS)
- 77.99 GROUND SURFACE ELEVATION (m)
- (74.28) GROUNDWATER SURFACE ELEVATION (m) (JANUARY 19, 2024)
- A—A' CROSS-SECTION

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

SCALE: 1:150

0 1 2 3 4 5 10m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

15096332 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
917 MERIVALE ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - GROUNDWATER

Scale: 1:150	Date: 02/2024
Drawn by: ZS	Report No.: PE6373-1
Checked by: JD	Dwg. No.: PE6373-3
Approved by: MSD	Revision No.:

11x17

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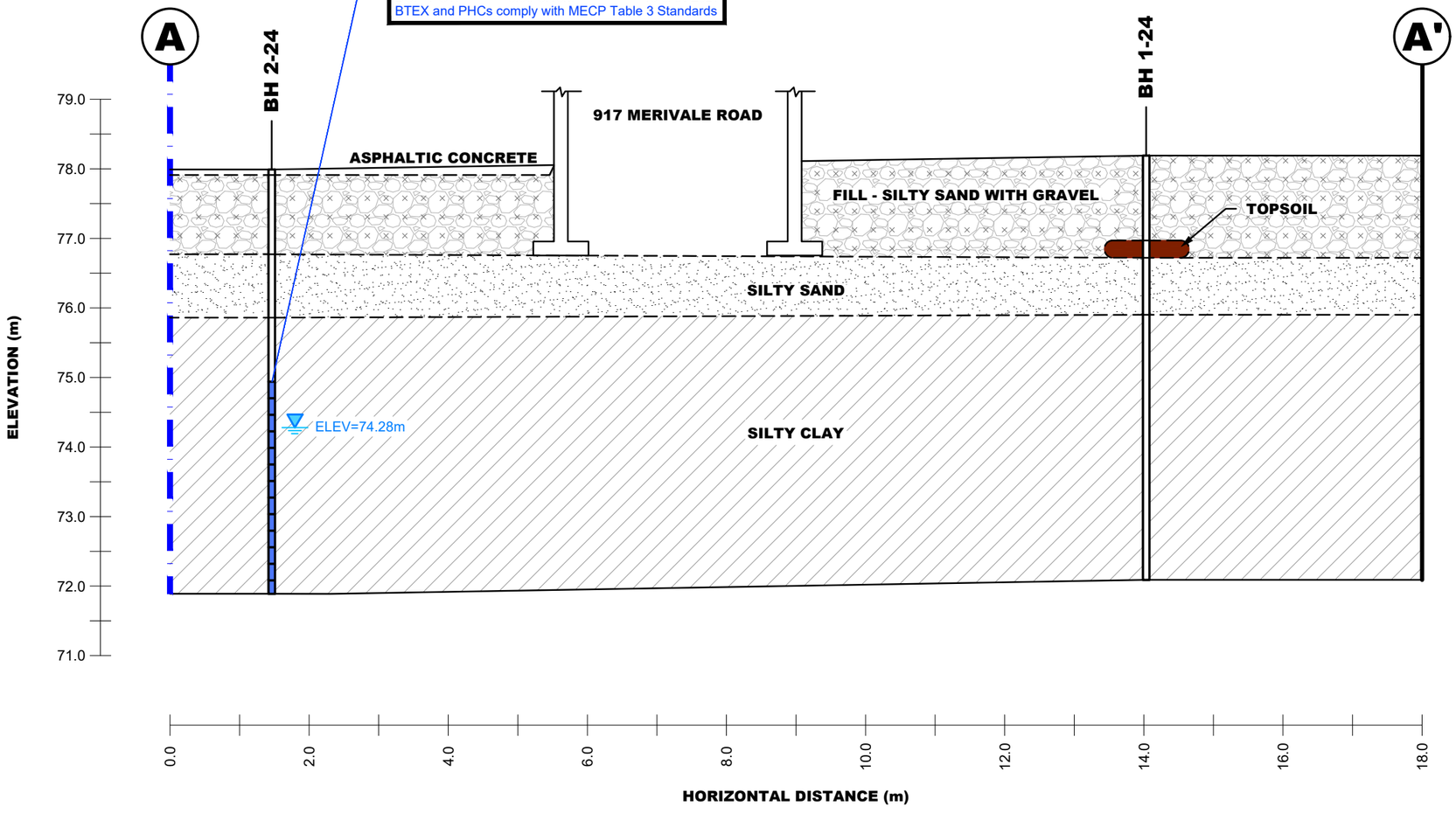
BH2-24-GW1	3.05-6.10m	19-JAN-2024
BTEX and PHCs comply with MECP Table 3 Standards		
DUP 1-GW	3.05-6.10m	19-JAN-2024
BTEX and PHCs comply with MECP Table 3 Standards		



GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

15096332 CANADA INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
917 MERIVALE ROAD

OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - GROUND WATER

Scale: AS SHOWN	Date: 02/2024
Drawn by: ZS	Report No.: PE6373-1
Checked by: JD	Dwg. No.: PE6373-3A
Approved by: MSD	Revision No.:

11x17

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ANALYTICAL TEST RESULTS

LABORATORY CERTIFICATES OF ANALYSIS

PATERSON GROUP

Sampling & Analysis Plan

917 Merivale Road

Ottawa, Ontario

Prepared for 15096332 Canada Inc.

Report: PE6373-SAP
January 16, 2024

TABLE OF CONTENTS

PAGE

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by 15096332 Canada Inc., to conduct a Phase II – Environmental Site Assessment (Phase II-ESA) for the property addressed 917 Merivale Road, in the City of Ottawa, Ontario.

Based on the findings of the Phase I-ESA, the following subsurface investigation program was developed.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-24	Northeastern portion of the Phase II Property; for general coverage purposes	3-6 m; for general coverage purposes.
BH2-24	Southwestern portion of the Phase II Property; to assess potential impacts resulting from the presence of the neighbouring former retail fuel outlet and existing automotive service garage.	3-6 m; to intercept the groundwater table for the purpose of installing a monitoring well.
BH3-24	Northwestern portion of the Phase II Property; to assess potential impacts resulting from the presence of the neighbouring former retail fuel outlet and existing automotive service garage.	3-6 m; to intercept the groundwater table for the purpose of installing a monitoring well.

It should be noted that an existing groundwater monitoring well (MW1) was identified on-site and utilized for groundwater flow triangulation purposes.

Borehole locations are shown on Drawing PE6376-3 – Test Hole Location Plan, appended to the main report.

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

Following the borehole drilling, groundwater monitoring wells will be installed in all three boreholes to allow for the collection of groundwater samples.

2.0 ANALYTICAL TESTING PROGRAM

The analytical testing program for soil at the Phase II Property is based on the following general considerations:

- ❒ At least one sample from each borehole within the identified APECs should be submitted, in order to delineate the horizontal extent of contamination across the site.

- ❒ At least one sample from each stratigraphic unit should be submitted, in order to delineate the vertical extent of contamination at the site.

- ❒ In boreholes where there is visual or olfactory evidence of contamination, or where organic vapour meter or photoionization detector readings indicate the presence of contamination, the 'worst-case' sample from each borehole should be submitted for comparison with MECP site condition standards.

- ❒ In boreholes with evidence of contamination as described above, a sample should be submitted from the stratigraphic unit below the 'worst-case' sample to determine whether the contaminant(s) have migrated downward.

- ❒ Parameters analyzed should be consistent with the Contaminants of Potential Concern identified in the Phase I ESA.

The analytical testing program for soil at the Phase I Property is based on the following general considerations:

- ❒ Groundwater monitoring wells should be installed in all boreholes with visual or olfactory evidence of soil contamination, in stratigraphic units where soil contamination was encountered, where those stratigraphic units are at or below the water table (i.e. a water sample can be obtained).

- ❒ Groundwater monitoring well screens should straddle the water table at sites where the contaminants of concern are suspected to be LNAPLs.

- ❒ At least one groundwater monitoring well should be installed in a stratigraphic unit below the suspected contamination, where said stratigraphic unit is water-bearing.

- ❒ Parameters analyzed should be consistent with the Contaminants of Concern identified in the Phase I ESA and with the contaminants identified in the soil samples.

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

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

Equipment

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

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

Determining Borehole Locations

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

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

Drilling Procedure

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

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

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

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

3.2 Monitoring Well Installation Procedure

Equipment

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

Procedure

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

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

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

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS

Physical impediments to the Sampling and Analysis plan may include:

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

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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

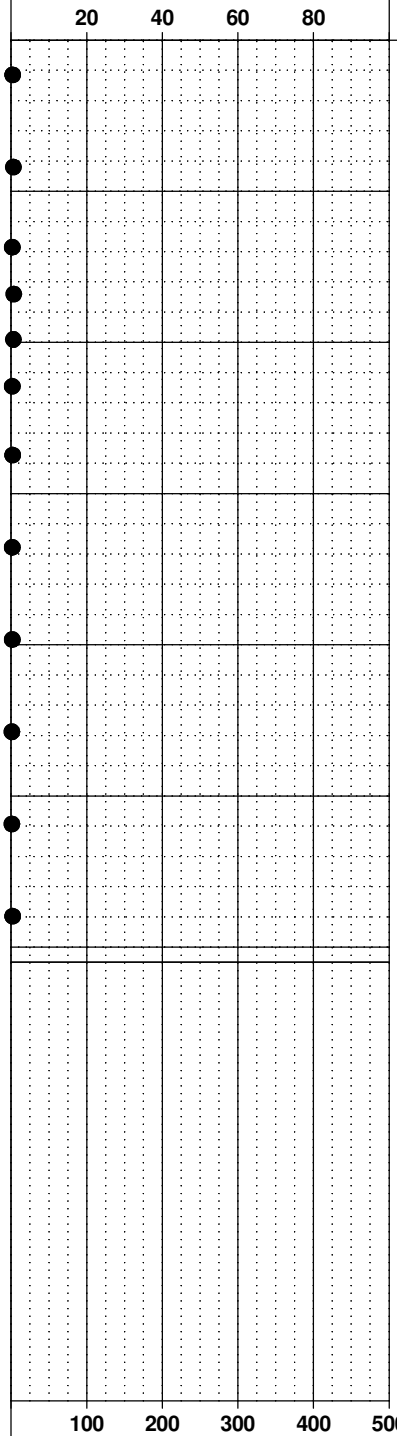
Phase II Environmental Site Assessment
917 Merivale Road
Ottawa, Ontario

EASTING: 364907.748 **NORTHING:** 5027273.096 **ELEVATION:** 78.19
DATUM: Geodetic
REMARKS:
BORINGS BY: Geoprobe **DATE:** January 16, 2024

FILE NO. PE6373
HOLE NO. BH 1-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	78.19
FILL: Brown silty sand with gravel and crushed stone extending to 0.5m depth		SS	1	55			
		SS	2	67		1	77.19
1.22							
TOPSOIL with organics and brown silty sand 1.47		SS	3	50			
Brown **SILTY SAND**						2	76.19
2.29		SS	4	67			
Brown **SILTY CLAY**		SS	5	92		3	75.19
		SS	6	92			
		SS	7	100		4	74.19
- grey by 4.3m depth		SS	8	100			
		SS	9	100		5	73.19
		SS	10	100			
6.10						6	72.19
End of Borehole							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**



▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

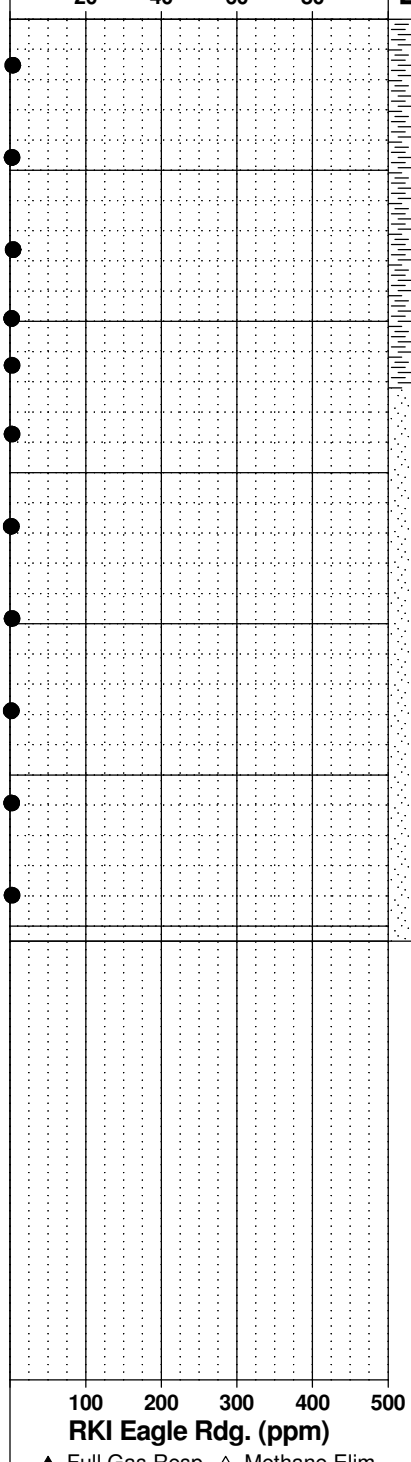
Phase II Environmental Site Assessment
917 Merivale Road
Ottawa, Ontario

EASTING: 364895.866 **NORTHING:** 5027268.991 **ELEVATION:** 77.99
DATUM: Geodetic
REMARKS:
BORINGS BY: Geoprobe **DATE:** January 16, 2024

FILE NO. PE6373
HOLE NO. BH 2-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
ASPHALT 0.08							
FILL: Brown SILTY SAND with clay, gravel and crushed stone		AU	1				
		SS	2	67		1	76.99
1.22							
Brown **SILTY SAND**		SS	3	58			
2.13		SS	4	67		2	75.99
Brown **SILTY CLAY**		SS	5	92			
		SS	6	92		3	74.99
- grey by 3.7m depth		SS	7	100			
		SS	8	100		4	73.99
		SS	9	100		5	72.99
		SS	10	100			
6.10						6	71.99
End of Borehole							
(GWL @ 3.71m - Jan. 19, 2024)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**



Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

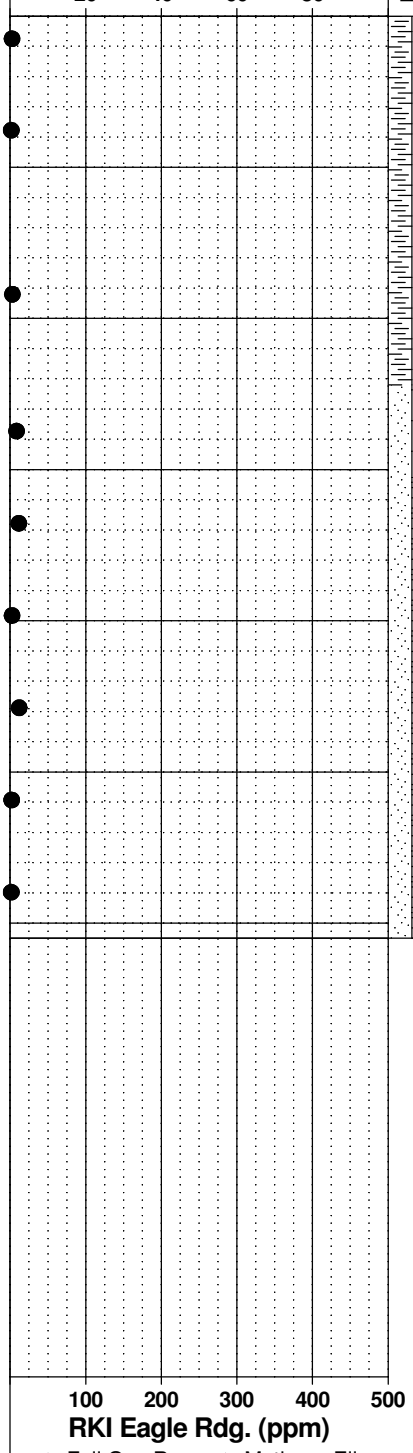
Phase II Environmental Site Assessment
917 Merivale Road
Ottawa, Ontario

EASTING: 364893.67 **NORTHING:** 5027277.913 **ELEVATION:** 77.99
DATUM: Geodetic
REMARKS:
BORINGS BY: Geoprobe **DATE:** January 16, 2024

FILE NO. PE6373
HOLE NO. BH 3-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	77.99
TOPSOIL with organics, brown silty sand and clay, trace gravel		SS	1	85			
0.30							
Brown **SILTY SAND**		SS	2	39		1	76.99
- trace gravel by 1.2m depth		SS	3	4			
		SS	4	4		2	75.99
2.44							
Brown **SILTY CLAY**		SS	5	8		3	74.99
		SS	6	8			
- grey by 3.7m depth		SS	7	17		4	73.99
		SS	8	17			
		SS	9	75		5	72.99
		SS	10	75			
6.10						6	71.99
End of Borehole							
(GWL @ 3.98m - Jan. 19, 2024)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**



Monitoring Well Construction

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

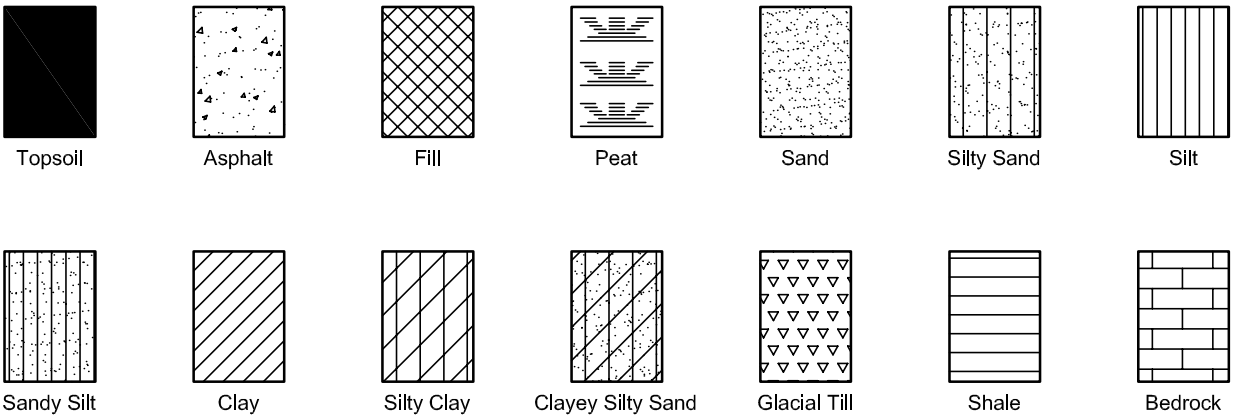
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

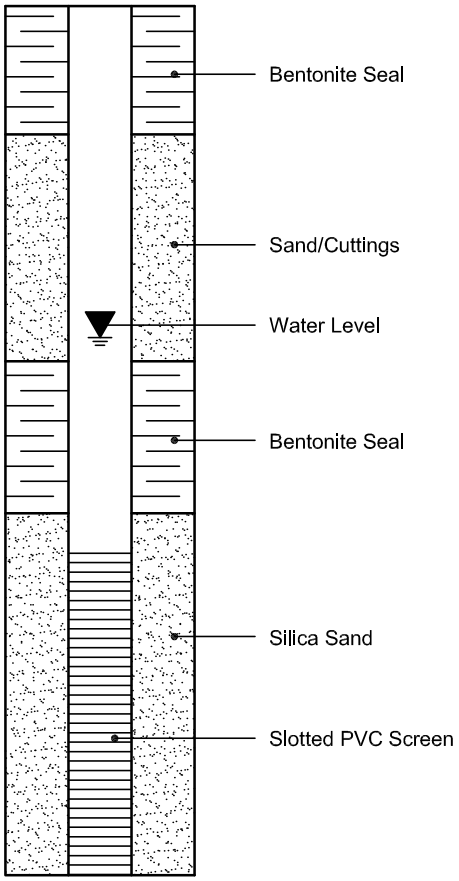
SYMBOLS AND TERMS (continued)

STRATA PLOT

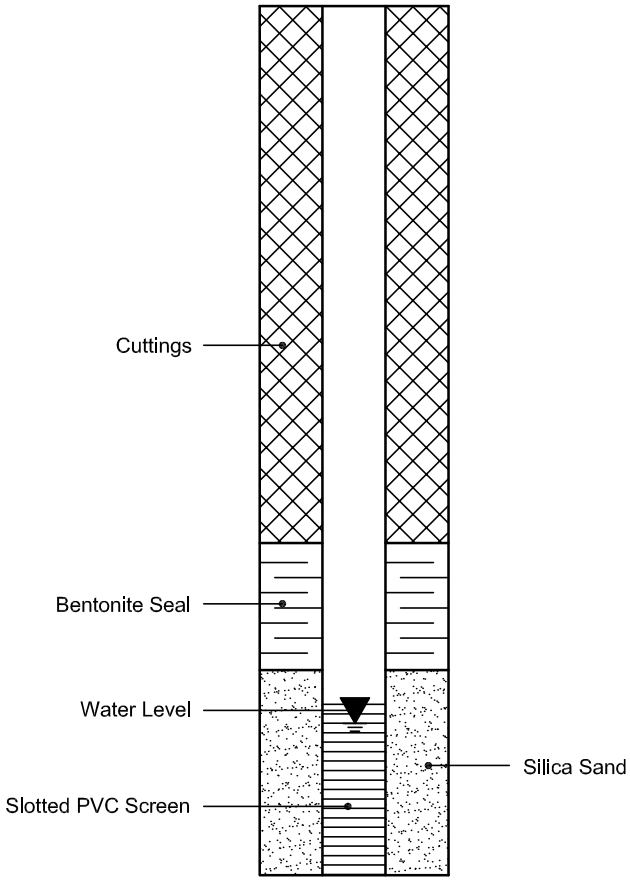


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Parameter	Units	MDL	Regulation	Sample				
				BH1-24-SS2	BH2-24-SS2	BH2-24-SS7	BH3-24-SS7	DUP-1-23 (BH2-24-SS7)
Sample Date (m/d/y)			Reg 153/04 (2011)-Table 3 Residential, coarse	16-Jan-24	16-Jan-24	16-Jan-24	16-Jan-24	16-Jan-24
Metals								
Antimony	ug/g dry	1.0	7.5 ug/g dry	ND	ND	NA	NA	NA
Arsenic	ug/g dry	1.0	18 ug/g dry	1.9	2.9	NA	NA	NA
Barium	ug/g dry	1.0	390 ug/g dry	60.6	107	NA	NA	NA
Beryllium	ug/g dry	0.5	4 ug/g dry	ND	ND	NA	NA	NA
Boron	ug/g dry	5.0	120 ug/g dry	ND	5.1	NA	NA	NA
Cadmium	ug/g dry	0.5	1.2 ug/g dry	ND	ND	NA	NA	NA
Chromium	ug/g dry	5.0	160 ug/g dry	20.3	44.4	NA	NA	NA
Cobalt	ug/g dry	1.0	22 ug/g dry	4.5	9	NA	NA	NA
Copper	ug/g dry	5.0	140 ug/g dry	8.5	17.6	NA	NA	NA
Lead	ug/g dry	1.0	120 ug/g dry	9	7	NA	NA	NA
Molybdenum	ug/g dry	1.0	6.9 ug/g dry	ND	ND	NA	NA	NA
Nickel	ug/g dry	5.0	100 ug/g dry	10.8	23.9	NA	NA	NA
Selenium	ug/g dry	1.0	2.4 ug/g dry	ND	ND	NA	NA	NA
Silver	ug/g dry	0.3	20 ug/g dry	ND	ND	NA	NA	NA
Thallium	ug/g dry	1.0	1 ug/g dry	ND	ND	NA	NA	NA
Uranium	ug/g dry	1.0	23 ug/g dry	ND	ND	NA	NA	NA
Vanadium	ug/g dry	10.0	86 ug/g dry	24.9	41.5	NA	NA	NA
Zinc	ug/g dry	20.0	340 ug/g dry	31.4	58.7	NA	NA	NA
Volatiles								
Benzene	ug/g dry	0.02	0.21 ug/g dry	NA	NA	ND	ND	ND
Ethylbenzene	ug/g dry	0.05	2 ug/g dry	NA	NA	ND	ND	ND
Toluene	ug/g dry	0.05	2.3 ug/g dry	NA	NA	ND	ND	ND
m/p-Xylene	ug/g dry	0.05		NA	NA	ND	ND	ND
o-Xylene	ug/g dry	0.05		NA	NA	ND	ND	ND
Xylenes, total	ug/g dry	0.05	3.1 ug/g dry	NA	NA	ND	ND	ND
Hydrocarbons								
F1 PHCs (C6-C10)	ug/g dry	7	55 ug/g dry	NA	NA	ND	ND	ND
F2 PHCs (C10-C16)	ug/g dry	4	98 ug/g dry	NA	NA	ND	ND	ND
F3 PHCs (C16-C34)	ug/g dry	8	300 ug/g dry	NA	NA	ND	ND	ND
F4 PHCs (C34-C50)	ug/g dry	6	2800 ug/g dry	NA	NA	ND	ND	ND
Semi-Volatiles								
Acenaphthene	ug/g dry	0.02	7.9 ug/g dry	ND	ND	NA	NA	NA
Acenaphthylene	ug/g dry	0.02	0.15 ug/g dry	ND	ND	NA	NA	NA
Anthracene	ug/g dry	0.02	0.67 ug/g dry	ND	ND	NA	NA	NA
Benzo[a]anthracene	ug/g dry	0.02	0.5 ug/g dry	ND	ND	NA	NA	NA
Benzo[a]pyrene	ug/g dry	0.02	0.3 ug/g dry	ND	ND	NA	NA	NA
Benzo[b]fluoranthene	ug/g dry	0.02	0.78 ug/g dry	ND	ND	NA	NA	NA
Benzo[g,h,i]perylene	ug/g dry	0.02	6.6 ug/g dry	ND	ND	NA	NA	NA
Benzo[k]fluoranthene	ug/g dry	0.02	0.78 ug/g dry	ND	ND	NA	NA	NA

Parameter	Units	MDL	Regulation	Sample				
				BH1-24-SS2	BH2-24-SS2	BH2-24-SS7	BH3-24-SS7	DUP-1-23 (BH2-24-SS7)
Sample Date (m/d/y)			Reg 153/04 (2011)-Table 3 Residential, coarse	16-Jan-24	16-Jan-24	16-Jan-24	16-Jan-24	16-Jan-24
Chrysene	ug/g dry	0.02	7 ug/g dry	ND	ND	NA	NA	NA
Dibenzo[a,h]anthracene	ug/g dry	0.02	0.1 ug/g dry	ND	ND	NA	NA	NA
Fluoranthene	ug/g dry	0.02	0.69 ug/g dry	ND	ND	NA	NA	NA
Fluorene	ug/g dry	0.02	62 ug/g dry	ND	ND	NA	NA	NA
Indeno [1,2,3-cd] pyrene	ug/g dry	0.02	0.38 ug/g dry	ND	ND	NA	NA	NA
1-Methylnaphthalene	ug/g dry	0.02	0.99 ug/g dry	ND	ND	NA	NA	NA
2-Methylnaphthalene	ug/g dry	0.02	0.99 ug/g dry	ND	ND	NA	NA	NA
Methylnaphthalene (1&2)	ug/g dry	0.04	0.99 ug/g dry	ND	ND	NA	NA	NA
Naphthalene	ug/g dry	0.01	0.6 ug/g dry	ND	ND	NA	NA	NA
Phenanthrene	ug/g dry	0.02	6.2 ug/g dry	ND	ND	NA	NA	NA
Pyrene	ug/g dry	0.02	78 ug/g dry	ND	ND	NA	NA	NA

Parameter	Units	MDL	Regulation	Sample		
				BH2-24-GW1	BH3-24-GW1	DUP-1-GW (BH2-24)
Sample Date (m/d/y)			Reg 153/04 (2011)-Table 3 Non-Potable Groundwater, coarse	19-Jan-24	19-Jan-24	19-Jan-24
Volatiles						
Benzene	ug/L	0.5	44 ug/L	ND	ND	ND
Ethylbenzene	ug/L	0.5	2300 ug/L	ND	ND	ND
Toluene	ug/L	0.5	18000 ug/L	ND	ND	ND
m/p-Xylene	ug/L	0.5		ND	ND	ND
o-Xylene	ug/L	0.5		ND	ND	ND
Xylenes, total	ug/L	0.5	4200 ug/L	ND	ND	ND
Hydrocarbons						
F1 PHCs (C6-C10)	ug/L	25	750 ug/L	ND	ND	ND
F2 PHCs (C10-C16)	ug/L	100	150 ug/L	ND	ND	ND
F3 PHCs (C16-C34)	ug/L	100	500 ug/L	ND	ND	ND
F4 PHCs (C34-C50)	ug/L	100	500 ug/L	ND	ND	ND

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Certificate of Analysis

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

Client PO: 59246
Project: PE6373
Custody:

Report Date: 22-Jan-2024
Order Date: 17-Jan-2024

Order #: 2403216

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

Paracel ID	Client ID
2403216-01	BH1-24-SS2
2403216-03	BH2-24-SS2
2403216-04	BH2-24-SS7
2403216-05	BH3-24-SS7
2403216-06	DUP-1-23

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	19-Jan-24	22-Jan-24
PHC F1	CWS Tier 1 - P&T GC-FID	19-Jan-24	22-Jan-24
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	18-Jan-24	19-Jan-24
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	22-Jan-24	22-Jan-24
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	18-Jan-24	18-Jan-24
Solids, %	CWS Tier 1 - Gravimetric	18-Jan-24	19-Jan-24

Certificate of Analysis

Report Date: 22-Jan-2024

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

Order Date: 17-Jan-2024

Client PO: 59246

Project Description: PE6373

	Client ID:	BH1-24-SS2	BH2-24-SS2	BH2-24-SS7	BH3-24-SS7	-	-
	Sample Date:	16-Jan-24 09:00	16-Jan-24 09:00	16-Jan-24 09:00	16-Jan-24 09:00		
	Sample ID:	2403216-01	2403216-03	2403216-04	2403216-05		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	87.6	77.9	60.3	63.7	-	-
Metals							
Antimony	1.0 ug/g	<1.0	<1.0	-	-	-	-
Arsenic	1.0 ug/g	1.9	2.9	-	-	-	-
Barium	1.0 ug/g	60.6	107	-	-	-	-
Beryllium	0.5 ug/g	<0.5	<0.5	-	-	-	-
Boron	5.0 ug/g	<5.0	5.1	-	-	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	-	-	-	-
Chromium	5.0 ug/g	20.3	44.4	-	-	-	-
Cobalt	1.0 ug/g	4.5	9.0	-	-	-	-
Copper	5.0 ug/g	8.5	17.6	-	-	-	-
Lead	1.0 ug/g	9.0	7.0	-	-	-	-
Molybdenum	1.0 ug/g	<1.0	<1.0	-	-	-	-
Nickel	5.0 ug/g	10.8	23.9	-	-	-	-
Selenium	1.0 ug/g	<1.0	<1.0	-	-	-	-
Silver	0.3 ug/g	<0.3	<0.3	-	-	-	-
Thallium	1.0 ug/g	<1.0	<1.0	-	-	-	-
Uranium	1.0 ug/g	<1.0	<1.0	-	-	-	-
Vanadium	10.0 ug/g	24.9	41.5	-	-	-	-
Zinc	20.0 ug/g	31.4	58.7	-	-	-	-
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	-	-

	Client ID:	BH1-24-SS2	BH2-24-SS2	BH2-24-SS7	BH3-24-SS7	-	-
	Sample Date:	16-Jan-24 09:00	16-Jan-24 09:00	16-Jan-24 09:00	16-Jan-24 09:00		
	Sample ID:	2403216-01	2403216-03	2403216-04	2403216-05		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Volatiles							
o-Xylene	0.05 ug/g	-	-	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	-	-	<0.05	<0.05	-	-
Toluene-d8	Surrogate	-	-	99.2%	98.0%	-	-
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	-	-	-	-
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	-	-	-	-

	Client ID:	BH1-24-SS2	BH2-24-SS2	BH2-24-SS7	BH3-24-SS7	-	-
	Sample Date:	16-Jan-24 09:00	16-Jan-24 09:00	16-Jan-24 09:00	16-Jan-24 09:00		
	Sample ID:	2403216-01	2403216-03	2403216-04	2403216-05		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Semi-Volatiles							
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	62.5%	66.6%	-	-	-	-
Terphenyl-d14	Surrogate	90.9%	88.8%	-	-	-	-

	Client ID:	DUP-1-23				-	-
	Sample Date:	16-Jan-24 09:00					
	Sample ID:	2403216-06					
	Matrix:	Soil					
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	60.0	-	-	-	-	-
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	-	-	-	-	-
o-Xylene	0.05 ug/g	<0.05	-	-	-	-	-
Xylenes, total	0.05 ug/g	<0.05	-	-	-	-	-
Toluene-d8	Surrogate	101%	-	-	-	-	-
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	-	-	-	-	-

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	*0.899*		*%*	*67.4*	*50-140*			
Surrogate: Terphenyl-d14	*1.43*		*%*	*107*	*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	*6.41*		*%*	*80.1*	*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	4.4	1.0	ug/g	4.2			5.8	30	
Barium	87.6	1.0	ug/g	84.9			3.1	30	
Beryllium	0.7	0.5	ug/g	0.6			8.3	30	
Boron	11.0	5.0	ug/g	10.5			4.6	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	24.0	5.0	ug/g	23.9			0.4	30	
Cobalt	10.4	1.0	ug/g	10.6			2.1	30	
Copper	20.8	5.0	ug/g	20.8			0.1	30	
Lead	14.5	1.0	ug/g	14.1			3.3	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	19.2	5.0	ug/g	18.7			2.7	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	33.3	10.0	ug/g	32.5			2.2	30	
Zinc	69.0	20.0	ug/g	70.0			1.5	30	
Physical Characteristics									
% Solids	88.4	0.1	% by Wt.	87.6			0.9	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	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*6.32*		*%*		*79.0*	*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)	198	7	ug/g	ND	99.0	85-115			
F2 PHCs (C10-C16)	123	4	ug/g	ND	111	60-140			
F3 PHCs (C16-C34)	327	8	ug/g	ND	120	60-140			
F4 PHCs (C34-C50)	202	6	ug/g	ND	117	60-140			
Metals									
Arsenic	53.1	1.0	ug/g	1.7	103	70-130			
Barium	82.9	1.0	ug/g	34.0	97.9	70-130			
Beryllium	49.7	0.5	ug/g	ND	98.8	70-130			
Boron	51.0	5.0	ug/g	ND	93.7	70-130			
Cadmium	48.1	0.5	ug/g	ND	96.1	70-130			
Chromium	61.6	5.0	ug/g	9.6	104	70-130			
Cobalt	54.8	1.0	ug/g	4.2	101	70-130			
Copper	56.5	5.0	ug/g	8.3	96.3	70-130			
Lead	51.5	1.0	ug/g	5.6	91.8	70-130			
Molybdenum	48.2	1.0	ug/g	ND	96.0	70-130			
Nickel	57.4	5.0	ug/g	7.5	99.8	70-130			
Selenium	47.1	1.0	ug/g	ND	93.9	70-130			
Silver	47.0	0.3	ug/g	ND	94.0	70-130			
Thallium	47.2	1.0	ug/g	ND	94.3	70-130			
Uranium	50.9	1.0	ug/g	ND	101	70-130			
Vanadium	65.8	10.0	ug/g	13.0	106	70-130			
Zinc	76.2	20.0	ug/g	28.0	96.3	70-130			
Semi-Volatiles									
Acenaphthene	0.138	0.02	ug/g	ND	83.0	50-140			
Acenaphthylene	0.126	0.02	ug/g	ND	75.8	50-140			
Anthracene	0.135	0.02	ug/g	ND	81.3	50-140			
Benzo [a] anthracene	0.125	0.02	ug/g	ND	74.8	50-140			
Benzo [a] pyrene	0.110	0.02	ug/g	ND	66.2	50-140			
Benzo [b] fluoranthene	0.093	0.02	ug/g	ND	56.1	50-140			
Benzo [g,h,i] perylene	0.102	0.02	ug/g	ND	61.3	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzo [k] fluoranthene	0.088	0.02	ug/g	ND	53.0	50-140			
Chrysene	0.150	0.02	ug/g	ND	90.0	50-140			
Dibenzo [a,h] anthracene	0.122	0.02	ug/g	ND	73.4	50-140			
Fluoranthene	0.133	0.02	ug/g	ND	80.0	50-140			
Fluorene	0.115	0.02	ug/g	ND	68.9	50-140			
Indeno [1,2,3-cd] pyrene	0.122	0.02	ug/g	ND	73.3	50-140			
1-Methylnaphthalene	0.124	0.02	ug/g	ND	74.6	50-140			
2-Methylnaphthalene	0.145	0.02	ug/g	ND	87.0	50-140			
Naphthalene	0.147	0.01	ug/g	ND	88.4	50-140			
Phenanthrene	0.148	0.02	ug/g	ND	88.9	50-140			
Pyrene	0.141	0.02	ug/g	ND	84.7	50-140			
Surrogate: 2-Fluorobiphenyl	*0.843*		*%*		*63.2*	*50-140*			
Surrogate: Terphenyl-d14	*1.31*		*%*		*98.2*	*50-140*			
Volatiles									
Benzene	2.71	0.02	ug/g	ND	67.8	60-130			
Ethylbenzene	3.49	0.05	ug/g	ND	87.2	60-130			
Toluene	3.33	0.05	ug/g	ND	83.4	60-130			
m,p-Xylenes	6.72	0.05	ug/g	ND	84.0	60-130			
o-Xylene	3.18	0.05	ug/g	ND	79.6	60-130			
Surrogate: Toluene-d8	*6.22*		*%*		*77.8*	*50-140*			

Qualifier Notes:

Login Qualifiers :

Container and COC sample IDs don't match. Report includes container IDs as directed by client. -
Applies to Samples: BH1-24-SS2, BH2-24-SS2, BH2-24-SS7, BH3-24-SS7

Sample Data Revisions:

None

Certificate of Analysis

Report Date: 22-Jan-2024

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

Order Date: 17-Jan-2024

Client PO: 59246

Project Description: PE6373

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: 2403216

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2403216	

Client Name: PATERSON GROUP
Contact Name: Joshua Dempsey; Mark D'Arcy
Address: 9 Auriga Drive
Telephone: 613-226-7381

Project Ref: PE6373
Quote #:
PO #: 59246
E-mail: jdempsey@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	
☐ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA
☐ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm
☐ Table ___	Mun:
For RSC: ☐ Yes ☐ No	☐ Other:

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH1-23-SS2	S		1	JAN 16/24				X	X			
2	BH1-23-SS8	|		2	|		1+04	D					
3	BH2-23-SS2	|		1	|				X	X			
4	BH2-23-SS7	|		2	|		X						
5	BH3-23-SS7	↓		1	|		X						
6	DUP-1-23	S		↓	↓		X						
7													
8													
9													
10													

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): Josh Dempsey	Received By Driver/Depot:	Received at Lab: SD	Verified By: SS
Relinquished By (Print): Joshua Dempsey	Date/Time:	Date/Time: Jan 17, 2024 3:30p	Date/Time: Jan 17, 24 1555
Date/Time: JAN 17/2024	Temperature: °C	Temperature: 11.4	pH Verified: ☐ By:

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Certificate of Analysis

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

Client PO: 59276
Project: PE6373
Custody:

Report Date: 26-Jan-2024
Order Date: 23-Jan-2024

Order #: 2404188

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

Paracel ID	Client ID
2404188-01	BH2-24-GW1
2404188-02	BH3-24-GW1
2404188-03	DUP-1-GW

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 624 - P&T GC-MS	24-Jan-24	24-Jan-24
PHC F1	CWS Tier 1 - P&T GC-FID	24-Jan-24	24-Jan-24
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	25-Jan-24	25-Jan-24

	Client ID:	BH2-24-GW1	BH3-24-GW1	DUP-1-GW	-		
	Sample Date:	19-Jan-24 09:00	19-Jan-24 09:00	19-Jan-24 09:00	-	-	-
	Sample ID:	2404188-01	2404188-02	2404188-03	-		
	Matrix:	Ground Water	Ground Water	Ground Water	-		
	MDL/Units						
Volatiles							
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-	-	-
Toluene-d8	Surrogate	105%	105%	104%	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	25	ug/L					
F2 PHCs (C10-C16)	ND	100	ug/L					
F3 PHCs (C16-C34)	ND	100	ug/L					
F4 PHCs (C34-C50)	ND	100	ug/L					
Volatiles								
Benzene	ND	0.5	ug/L					
Ethylbenzene	ND	0.5	ug/L					
Toluene	ND	0.5	ug/L					
m,p-Xylenes	ND	0.5	ug/L					
o-Xylene	ND	0.5	ug/L					
Xylenes, total	ND	0.5	ug/L					
Surrogate: Toluene-d8	*85.4*		*%*	*107*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*83.6*		*%*		*104*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1760	25	ug/L	ND	88.2	85-115			
F2 PHCs (C10-C16)	1640	100	ug/L	ND	102	60-140			
F3 PHCs (C16-C34)	4480	100	ug/L	ND	114	60-140			
F4 PHCs (C34-C50)	2840	100	ug/L	ND	115	60-140			
Volatiles									
Benzene	31.2	0.5	ug/L	ND	78.0	60-130			
Ethylbenzene	38.9	0.5	ug/L	ND	97.4	60-130			
Toluene	38.4	0.5	ug/L	ND	96.1	60-130			
m,p-Xylenes	75.0	0.5	ug/L	ND	93.8	60-130			
o-Xylene	36.0	0.5	ug/L	ND	90.1	60-130			
Surrogate: Toluene-d8	*81.6*		*%*		*102*	*50-140*			

Certificate of Analysis

Report Date: 26-Jan-2024

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

Order Date: 23-Jan-2024

Client PO: **59276**

Project Description: PE6373

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

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: 2404188

Laurent Blvd.
io K1G 4J8
1947
racellabs.com
ace.com

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2404188	

Client Name: Paterson Group	Project Ref: PE6373	Page 1 of 1
Contact Name: Joshua Dempsey	Quote #:	Turnaround Time
Address: 9 Auriga Drive	PO #: 39276	☐ 1 day ☐ 3 day
	E-mail: jdempsey@patersongroup.ca	☐ 2 day ☒ Regular
Telephone: 613-226-7381		Date Required:

☒ REG 153/04 ☐ REG 406/19

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

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
							Required Analysis											
1	BH2-24-GW1	GW		3	JAN 19/24		X											
2	BH3-24-GW1	GW		↓	↓		↓											
3	DUP-1-GW	GW					↓											
4	MW1-GW	GW		↓	↓		H	C	D									
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SO	Verified By: SO
Relinquished By (Print): Joshua Dempsey	Date/Time:	Date/Time: Jan 23, 2024 4:05pm	Date/Time: Jan 23 2024 4:17pm
Date/Time: JAN 23/2024	Temperature: °C	Temperature: 7.0	pH Verified: ☐ By: