Geotechnical Engineering

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Phase II – Environmental Site Assessment

326 & 330 Wilbrod Street
Ottawa, Ontario

Prepared For

Dolyn Construction Ltd.

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Report: PE5378-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the properties addressed 326 & 330 Wilbrod Street, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II Property.

The subsurface investigation for this assessment was conducted on February 15, 2022, and consisted of drilling three boreholes (BH1-22 to BH3-22) throughout the Phase II Property, all three of which were equipped with groundwater monitoring wells.

The boreholes were advanced to depths ranging from approximately 6.71 m to 8.84 m below the existing ground surface and terminated within an overburden layer of grey silty clay. It should be noted that a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 18.21 m below ground surface.

In general, the subsurface soil profile encountered at the borehole locations consists of a surficial layer of fill material (brown silty sand with crushed stone, gravel, and trace demolition debris) over top of brown silty clay, turning grey at deeper depths in line with the water table.

Three soil samples were submitted for laboratory analysis of BTEX, PHCs (F_1-F_4), PAHs, metals, PCBs, EC, SAR, and/or pH parameters. Based on the analytical test results, elevated levels of metals (molybdenum) and EC were detected in Sample BH2-22-SS2 in excess of the selected MECP Table 3 residential coarse-grained soil standards.

It should be noted however, that the exceedance of EC is considered to be due to the use of a substance on surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both, and therefore, is deemed to meet the site standards.

Groundwater samples were recovered on February 24, 2022 from the monitoring wells installed in BH1-22 and BH3-22 and submitted for laboratory analysis of BTEX, PHCs (F_1-F_4), and/or PCB parameters. Based on the analytical test results, none of the aforementioned parameters were detected in the groundwater samples analyzed, and as such, the results are in compliance with the selected MECP Table 3 non-potable groundwater standards.

Recommendations

Soil

Based on the findings of this assessment, metal impacted soil/fill was identified within the northern portion of the Phase II Property. It is our understanding that the Phase II Property is to be redeveloped in the future. Although soil exceeding metals concentrations can be managed at the time of site redevelopment, it is recommended that additional delineation test holes be placed to assess the extent of the molybdenum exceedance.

Prior to off-site disposal of impacted soil at a licensed landfill, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with Ontario Regulation 347/558.

It is recommended that Paterson personnel be present on-site during remediation activities to direct the excavation and segregation of impacted soil, as well as to conduct confirmatory sampling as required. Soil not impacted by metals must be beneficially reused at an appropriate reuse site.

Based on the soil test results, the majority of the on-site soils comply with the MECP Table 2.1 Excess Soil Quality Standards (Ontario Regulation 406/19), for off-site disposal. Additional excess soil testing may be required prior to future site excavation activities.

Monitoring Wells

It is recommended that the monitoring wells be re-assessed prior to site redevelopment, in particular the monitoring well at BH2-22.

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned according to Ontario Regulation 903 (Ontario Water Resources Act), however, we recommend that the wells be maintained for future sampling purposes, at least until the excavation for the foundation has commenced. The monitoring wells will be registered with the MECP under this regulation. Further information can be provided upon request in this regard.

1.0 INTRODUCTION

At the request of Dolyn Construction Ltd., Paterson Group (Paterson) conducted a Phase II – Environmental Site Assessment (Phase II ESA) for the properties addressed 326 & 330 Wilbrod Street, in the City of Ottawa, Ontario. Henceforth, these properties shall be referred to as the Phase II Property.

The purpose of this Phase II ESA has been to address the areas of potential environmental concern (APECs) identified on the Phase II Property as a result the findings of the Phase I ESA.

1.1 Site Description

Addresses:	326 & 330 Wilbrod Street, Ottawa, Ontario.
Legal Description:	Part of Lot C, Concession D (Rideau Front), Formerly the Township of Nepean, in the City of Ottawa, Ontario.
Location:	The Phase II Property is located on the south side of Wilbrod Street, between Friel Street and Chapel Street, in the City of Ottawa, Ontario. Refer to Figure 1 – Key Plan, appended to this report.
Latitude and Longitude:	45° 25' 40" N, 75° 40' 48" W.

Site Description:

Configuration:	Rectangular.
Site Area:	915 m^2 (approximate).
Zoning:	R4 – Residential Fourth Density Zone.
Current Uses:	The Phase II Property is currently vacant.
Services:	The Phase II Property is located within a municipally serviced area.

1.2 Property Ownership

The Phase II Property is currently owned by Konson Homes. Paterson was retained to complete this Phase II ESA by Mr. Doug Burnside of Dolyn Construction Ltd., whose offices are located at 888 Lady Ellen Place, Ottawa, Ontario. Mr. Burnside can be contacted via telephone at 613-224-7268.

1.3 Applicable Site Condition Standard

The site condition standards for the subject property were obtained from Table 3 of the document entitled, *"Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act"*, prepared by the Ministry of the Environment, Conservation and Parks (MECP), and dated April 15, 2011. The selected MECP standards are based on the following considerations:

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

Grain size analysis was not conducted as part of this assessment. The coarse-grained soil standards were selected as a conservative approach.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is currently vacant of any buildings or structures and consists largely of cleared land stripped of topsoil and native vegetation.

The site topography is relatively flat, whereas the regional topography appears to slope down to the north, in the general direction of the Ottawa River. The Phase II Property is considered to be at grade with respect to the adjacent streets and the neighbouring properties.

Water drainage on the Phase II Property occurs primarily via infiltration throughout the property, as well as via surface run-off towards catch basins located on the adjacent streets.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation for this assessment was conducted on February 15, 2022, and consisted of drilling three boreholes (BH1-22 to BH3-22) throughout the Phase II Property, all three of which were equipped with groundwater monitoring wells.

The boreholes were advanced to depths ranging from approximately 6.71 m to 8.84 m below the existing ground surface and terminated within an overburden layer of grey silty clay. It should be noted that a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 18.21 m below ground surface.

3.2 Media Investigated

During the subsurface investigation, soil 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 in the Phase I ESA.

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

- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F_1-F_4);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Metals (including Mercury and Hexavalent Chromium);
- Polychlorinated Biphenyls (PCBs);
- Electrical Conductivity (EC);
- Sodium Adsorption Ratio (SAR).

3.3 Phase I ESA Conceptual Site Model

Geological and Hydrogeological Setting

Based on the available information, the bedrock in the area of the Phase II Property consists of interbedded limestone and shale of the Verulam Formation. The surficial geology consists of fluvial terraces (sand and silt alluvial sediments), with an overburden thickness ranging from approximately 10 m to 15 m.

Groundwater is anticipated to be encountered within the overburden and flow in a northwesterly direction towards the Ottawa River.

Water Bodies and Areas of Natural and Scientific Interest

No water bodies or areas of natural and scientific interest were identified within the Phase I Study Area. The nearest named water body with respect to the Phase II Property is the Rideau River, located approximately 600 m to the east.

Existing Buildings and Structures

No buildings or structures are currently present on the Phase II Property.

Neighbouring Land Use

The neighbouring lands within the Phase I Study Area consist predominantly of residential properties, as well as occasional commercial and institutional properties.

Drinking Water Wells

Based on the availability of municipal services, no drinking water wells are expected to be present within the Phase I Study Area.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 7.1 of the Phase I ESA report, four potentially contaminating activities (PCAs), resulting in areas of potential environmental concern (APECs), were identified on the Phase II Property. These APECs include:

- A former pad-mounted electrical transformer, located in the northern portion of the Phase II Property;
- Fill material of unknown quality generated and/or imported on-site following the demolition of two former on-site buildings, located throughout the Phase II Property;
- The application of road salt during snow and/or ice conditions, located in the northern portion of the Phase II Property;
- An aboveground fuel storage tank, located on the adjacent property to the south (353 Friel Street).

Other off-site PCAs were identified within the Phase I Study Area but were deemed not to be of any environmental concern to the Phase II Property based on their separation distances as well as their inferred down-gradient or cross-gradient orientation with respect to anticipated groundwater flow.

Contaminants of Potential Concern

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

- ❒ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- ❒ Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F_1-F_4);
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs);
- ❒ Metals (including Mercury and Hexavalent Chromium);
- ❒ Polychlorinated Biphenyls (PCBs);
- ❒ Electrical Conductivity (EC);
- ❒ Sodium Adsorption Ratio (SAR).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

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 and APECs associated with the Phase II Property.

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

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation for this assessment was conducted on February 15, 2022, and consisted of drilling three boreholes (BH1-22 to BH3-22) throughout the Phase II Property, all three of which were equipped with groundwater monitoring wells.

The boreholes were advanced to depths ranging from approximately 6.71 m to 8.84 m below the existing ground surface and terminated within an overburden layer of grey silty clay. It should be noted that a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 18.21 m below ground surface.

Under the full-time supervision of Paterson personnel, the boreholes were drilled using a low-clearance drill rig provided by George Downing Estate Drilling of Hawkesbury, Ontario. The locations of the boreholes are illustrated on *"Drawing PE5378-3 – Test Hole Location Plan"*, appended to this report.

4.2 Soil Sampling

Soil 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.

The samples were recovered using a stainless-steel split spoon, while wearing protective gloves (changed after each sample), and immediately placed into plastic bags. If significant contamination was encountered, the samples were instead placed into glass jars. Sampling equipment was routinely washed in soapy water and rinsed with methylhydrate after each split spoon to prevent any cross contamination of the samples. The samples were also stored in coolers to reduce analyte volatilization during transportation.

A total of 28 soil samples were obtained from the boreholes by means of auger and split spoon sampling. The depths at which auger and split spoon samples were obtained from the boreholes are shown as "**AU**" and "**SS**", respectively, on the Soil Profile and Test Data Sheets, appended to this report.

4.3 Field Screening Measurements

All soil samples collected were subjected to a preliminary screening procedure, which included visual screening for colour and evidence of metals, as well as soil vapour screening with a Photo Ionization Detector.

The recovered soil samples 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, ensuring consistency of readings between samples. To measure the soil vapours, the analyser probe was inserted into the nominal headspace above the sample. The sample was then agitated and manipulated gently by hand as the measurement was taken. The peak reading registered within the first 15 seconds was recorded as the vapour measurement. The parts per million (ppm) scale was used to measure concentrations of organic vapours.

The results of the vapour survey are presented on the Soil Profile and Test Data Sheets, appended to this report.

4.4 Groundwater Monitoring Well Installation

Three groundwater monitoring wells were installed on the Phase II Property as part of this assessment. These monitoring wells were constructed using 50 mm diameter Schedule 40 threaded PVC risers and screens. A sand pack consisting of silica sand was placed around the screen with a bentonite seal placed above to minimize cross-contamination.

A summary of the monitoring well construction details are listed below in Table 1 as well as on the Soil Profile and Test Data Sheets provided in Appendix 1.

Upon completion, the groundwater monitoring wells were developed using a dedicated inertial lift pump, with a minimum of three well volumes being removed from the wells at the time of installation. The wells were developed until the appearance of the water was noted to have stabilized. In addition, the ground surface elevations of each borehole were subsequently surveyed with respect to a known geodetic elevation.

Table 1
Monitoring Well Construction Details

Well ID	Ground Surface Elevation (m ASL)	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1-22	70.59	6.10	3.10-6.10	2.74-6.10	0.31-2.74	Stick-Up
BH2-22	70.52	5.94	2.94-5.94	2.59-5.94	0.31-2.59	Stick-Up
BH3-22	70.49	7.62	4.62-7.62	3.96-7.62	0.31-3.96	Stick-Up

4.5 Field Measurement of Water Quality Parameters

Groundwater monitoring and sampling was conducted at BH1-22 and BH3-22 on February 24, 2022. It should be noted that the monitoring well installed in BH2-22 contained a limited amount of groundwater at the time of the field sampling event, and therefore no water quality parameters could be measured from this location.

Following their development and stabilization, water quality parameters were measured at each monitoring well location using a multi-reader probe, the results of which are summarized below in Table 2.

Table 2
Measurement of Water Quality Parameters

Well ID	Temperature (˚C)	Conductivity (µS)	pH (Units)
BH1-22	8	697	8.26
BH3-22	5	594	8.06

4.6 Groundwater Sampling

Groundwater sampling protocols were followed using the MECP document entitled, *"Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario"*, dated May 1996.

Standing water was purged from each monitoring well prior to the recovery of the groundwater samples using dedicated sampling equipment. The samples were then stored in coolers to reduce possible analyte volatilization during their transportation. Further details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan, appended to this report.

4.7 Analytical Testing

The following soil and groundwater samples were submitted for laboratory analysis:

Table 3
Testing Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed										Rationale
		BTEX	PHCs (F_1-F_4)	PAHs	Metals	Hg+	Cr^{VI}	PCBs	EC	SAR	pH	
BH1-22-SS7	4.57 – 5.19 m Silty Clay	X	X					X			X	To assess for potential impacts resulting from the former presence of an on-site pad-mounted transformer.
BH2-22-SS2	0.76 – 1.37 m Fill Material			X	X	X	X		X	X		To assess for potential impacts resulting from the presence of on-site fill material of unknown quality.
BH3-22-AU1	0.31 – 0.60 m Fill Material			X	X	X	X				X	To assess for potential impacts resulting from the presence of on-site fill material of unknown quality.
DUP-1[1]	0.31 – 0.60 m Fill Material				X							For laboratory QA/QC purposes.

1 – Duplicate sample of BH3-22-AU1

Table 4
Testing Parameters for Submitted Groundwater Samples

Sample ID	Screened Interval & Stratigraphic Unit	Parameters Analyzed			Rationale
		BTEX	PHCs (F_1-F_4)	PCBs	
BH1-22-GW1	3.10 – 6.10 m Silty Clay	X	X	X	To assess for potential impacts resulting from the former presence of an on-site pad-mounted transformer.
BH3-22-GW1	4.62 – 7.62 m Silty Clay	X	X		To assess for potential impacts resulting from the presence of an off-site fuel tank to the south.
DUP-1[1]	3.10 – 6.10 m Silty Clay	X	X		For laboratory QA/QC purposes.

1 – Duplicate sample of BH1-22-GW1

It should be noted that the monitoring well installed in BH2-22 contained a limited amount of groundwater at the time of the field sampling event, and therefore no groundwater samples could be obtained from this location.

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) and is accredited and certified by the SCC/CALA for specific tests registered with the association.

4.8 Residue Management

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

4.9 Elevation Surveying

The ground surface elevations at each borehole location were surveyed using a GPS device by Paterson personnel and referenced to a geodetic datum.

4.10 Quality Assurance and Quality Control Measures

A summary of the quality assurance and quality control (QA/QC) measures, undertaken as part of this assessment, is provided in the Sampling and Analysis Plan in Appendix 1.

5.0 REVIEW AND EVALUATION

5.1 Geology

In general, the subsurface soil profile encountered at the borehole locations consists of a surficial layer of fill material (brown silty sand with crushed stone, gravel, and trace demolition debris) over top of brown silty clay, turning grey at deeper depths in line with the water table.

Bedrock was not encountered in any of the boreholes during the field drilling program, however, a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 18.21 m below ground surface.

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

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured using an electronic water level meter at boreholes BH1-22, BH2-22, and BH3-22 on February 24, 2022. The groundwater levels are summarized below in Table 5.

Table 5
Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1-22	70.59	3.35	67.24	February 24, 2022
BH2-22	70.52	5.93	64.59	
BH3-22	70.49	3.71	66.78	

The groundwater at the Phase II Property was encountered within the overburden at depths ranging from approximately 3.35 m to 5.93 m below the existing ground surface.

It should be noted that the monitoring well installed in BH2-22 contained a limited amount of groundwater at the time of the field sampling event, and therefore the water level at this location was deemed questionable.

No unusual visual observations were identified within the recovered groundwater samples.

Using the groundwater elevations recorded during the sampling event, groundwater contour mapping was completed as part of this assessment. According to the mapped contour data, illustrated on *"Drawing PE5378-3 – Test Hole Location Plan"* in the appendix, the groundwater flow on the subject site is anticipated to be in a westerly direction. A horizontal hydraulic gradient of approximately 0.19 m/m was also calculated as part of this assessment.

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. As a result, the coarse-grained soil standards were chosen as a conservative approach.

5.4 Field Screening

Field screening of the soil samples collected during the drilling program resulted in organic vapour readings ranging from 0.3 ppm to 1.6 ppm. In general, the organic vapour readings obtained from the field screening of the soil samples indicate that there is a negligible potential for the presence of volatile substances. 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

Three soil samples were submitted for laboratory analysis of BTEX, PHCs (F_1-F_4), PAHs, metals, PCBs, EC, SAR, and/or pH parameters. The results of the analytical testing are presented below in Tables 6 to 10, as well as on the laboratory certificates of analysis included in Appendix 1.

Table 6
Analytical Test Results – Soil
BTEX & PHCs (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g)	MECP Table 3 Residential Soil Standards (µg/g)
		February 15, 2022	
		BH1-22-SS7	
Benzene	0.02	nd	0.21
Ethylbenzene	0.05	nd	2
Toluene	0.05	nd	2.3
Xylenes	0.05	nd	3.1
PHCs F_1	7	nd	55
PHCs F_2	4	nd	98
PHCs F_3	8	nd	300
PHCs F_4	6	nd	2,800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- nt – not tested for this parameter
- **Bold and Underlined** – value exceeds selected MECP standards

No BTEX or PHC parameter concentrations were detected in the soil samples analyzed, and as such, the results are in compliance with the selected MECP Table 3 residential coarse-grained soil standards.

Table 7
Analytical Test Results – Soil
PAHs

Parameter	MDL (µg/g)	Soil Samples (µg/g)		MECP Table 3 Residential Soil Standards (µg/g)
		February 15, 2022		
		BH2-22-SS2	BH3-22-AU1	
Acenaphthene	0.02	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	0.15
Anthracene	0.02	nd	0.05	0.67
Benzo[a]anthracene	0.02	nd	0.06	0.5
Benzo[a]pyrene	0.02	nd	0.07	0.3
Benzo[b]fluoranthene	0.02	nd	0.06	0.78
Benzo[g,h,i]perylene	0.02	nd	0.04	6.6
Benzo[k]fluoranthene	0.02	nd	0.03	0.78
Chrysene	0.02	nd	0.07	7
Dibenzo[a,h]anthracene	0.02	nd	nd	0.1
Fluoranthene	0.02	0.02	0.16	0.69
Fluorene	0.02	nd	0.02	62
Indeno[1,2,3-cd]pyrene	0.02	nd	0.04	0.38
1-Methylnaphthalene	0.02	nd	nd	0.99
2-Methylnaphthalene	0.02	nd	nd	0.99
Methylnaphthalene (1&2)	0.04	nd	nd	0.99
Naphthalene	0.01	0.01	0.01	0.6
Phenanthrene	0.02	0.12	0.17	6.2
Pyrene	0.02	0.03	0.13	78

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- nt – not tested for this parameter
- **Bold and Underlined** – value exceeds selected MECP standards

All detected PAH parameter concentrations are in compliance with the selected MECP Table 3 residential coarse-grained soil standards.

Table 8
Analytical Test Results – Soil
Metals

Parameter	MDL (µg/g)	Soil Samples (µg/g)		MECP Table 3 Residential Soil Standards (µg/g)
		February 15, 2022		
		BH2-22-SS2	BH3-22-AU1	
Antimony	1.0	nd	nd	7.5
Arsenic	1.0	4.9	2.5	18
Barium	1.0	166	139	390
Beryllium	0.5	nd	nd	4
Boron	5.0	8.1	5.4	120
Cadmium	0.5	nd	nd	1.2
Chromium	5.0	19.0	27.7	160
Chromium VI	0.2	nd	nd	8
Cobalt	1.0	9.0	7.8	22
Copper	5.0	31.6	18.7	140
Lead	1.0	16.3	14.4	120
Mercury	0.1	nd	nd	0.27
Molybdenum	1.0	**7.9**	nd	6.9
Nickel	5.0	35.3	17.8	100
Selenium	1.0	nd	nd	2.4
Silver	0.3	nd	nd	20
Thallium	1.0	nd	nd	1
Uranium	1.0	2.7	nd	23
Vanadium	10.0	28.9	34.1	86
Zinc	20.0	63.5	51.4	340

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- nt – not tested for this parameter
- **Bold and Underlined** – value exceeds selected MECP standards

All detected metal parameter concentrations in the soil samples analyzed are in compliance with the selected MECP Table 3 residential coarse-grained soil standards, with the exception of molybdenum in Sample BH2-22-SS2.

Table 9
Analytical Test Results – Soil
PCBs

Parameter	MDL (µg/g)	Soil Samples (µg/g)	MECP Table 3 Residential Soil Standards (µg/g)
		February 15, 2022	
		BH1-22-SS7	
PCBs (total)	0.05	nd	0.35

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- nt – not tested for this parameter
- **Bold and Underlined** – value exceeds selected MECP standards

No PCB parameter concentrations were detected in the soil sample analyzed, and as such, the results are in compliance with the selected MECP Table 3 residential coarse-grained soil standards.

Table 10
Analytical Test Results – Soil
EC/SAR & pH

Parameter	MDL	Soil Samples (µg/g)			MECP Table 3 Residential Soil Standards (µg/g)
		February 15, 2022			
		BH1-22-SS7	BH2-22-SS2	BH3-22-AU1	
EC	5 µS/cm	nt	**774**	nt	700 µS/cm
SAR	0.01	nt	0.72	nt	5
pH	0.05 units	8.03	nt	7.72	5.00 – 9.00 units

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- nt – not tested for this parameter
- **Bold and Underlined** – value exceeds selected MECP standards

All detected EC/SAR and pH levels in the soil samples analyzed are in compliance with the selected MECP Table 3 residential coarse-grained soil standards, with the exception of EC in Sample BH2-22-SS2

Table 11
Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Sample ID	Depth Interval (m BGS)
Anthracene	0.05	BH3-22-AU1	0.31 m – 0.60 m
Benzo[a]anthracene	0.06	BH3-22-AU1	0.31 m – 0.60 m
Benzo[a]pyrene	0.07	BH3-22-AU1	0.31 m – 0.60 m
Benzo[b]fluoranthene	0.06	BH3-22-AU1	0.31 m – 0.60 m
Benzo[g,h,i]perylene	0.04	BH3-22-AU1	0.31 m – 0.60 m
Benzo[k]fluoranthene	0.03	BH3-22-AU1	0.31 m – 0.60 m
Chrysene	0.07	BH3-22-AU1	0.31 m – 0.60 m
Fluoranthene	0.16	BH3-22-AU1	0.31 m – 0.60 m
Fluorene	0.02	BH3-22-AU1	0.31 m – 0.60 m
Indeno[1,2,3-cd]pyrene	0.04	BH3-22-AU1	0.31 m – 0.60 m
Naphthalene	0.01	BH2-22-SS2 / BH3-22-AU1	0.76 m – 1.37 m / 0.31 m – 0.60 m
Phenanthrene	0.17	BH3-22-AU1	0.31 m – 0.60 m
Pyrene	0.13	BH3-22-AU1	0.31 m – 0.60 m
Arsenic	4.9	BH2-22-SS2	0.76 m – 1.37 m
Barium	166	BH2-22-SS2	0.76 m – 1.37 m
Boron	8.1	BH2-22-SS2	0.76 m – 1.37 m
Chromium	27.7	BH3-22-AU1	0.31 m – 0.60 m
Cobalt	9.0	BH2-22-SS2	0.76 m – 1.37 m
Copper	31.6	BH2-22-SS2	0.76 m – 1.37 m
Lead	16.3	BH2-22-SS2	0.76 m – 1.37 m
Molybdenum	**7.9**	BH2-22-SS2	0.76 m – 1.37 m
Nickel	35.3	BH2-22-SS2	0.76 m – 1.37 m
Uranium	2.7	BH2-22-SS2	0.76 m – 1.37 m
Vanadium	34.1	BH3-22-AU1	0.31 m – 0.60 m
Zinc	63.5	BH2-22-SS2	0.76 m – 1.37 m
EC	**774**	BH2-22-SS2	0.76 m – 1.37 m
SAR	0.72	BH2-22-SS2	0.76 m – 1.37 m
pH	8.03	BH1-22-SS7	4.57 m – 5.19 m

Notes:
- **Bold and Underlined** – value exceeds selected MECP standards

All other parameter concentrations analyzed were below the laboratory detection limits. The laboratory certificates of analysis are provided in Appendix 1.

5.6 Groundwater Quality

Groundwater samples were recovered on February 24, 2022 from the monitoring wells installed in BH1-22 and BH3-22 and submitted for laboratory analysis of BTEX, PHCs (F_1-F_4), and/or PCB parameters. The results of the analytical testing are presented below in Table 12, as well as on the laboratory certificates of analysis included in Appendix 1.

Table 12
Analytical Test Results – Groundwater
BTEX & PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)		MECP Table 3 Non-Potable Groundwater Standards (µg/L)
		February 24, 2022		
		BH1-22-GW1	BH3-22-GW1	
Benzene	0.5	nd	nd	44
Ethylbenzene	0.5	nd	nd	2,300
Toluene	0.5	nd	nd	18,000
Xylenes	0.5	nd	nd	4,200
PHC F_1	25	nd	nd	750
PHC F_2	100	nd	nd	150
PHC F_3	100	nd	nd	500
PHC F_4	100	nd	nd	500

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

No BTEX or PHC parameter concentrations were detected in the groundwater sample analyzed, and as such, the results are in compliance with the selected MECP Table 3 non-potable groundwater standards.

Table 13
Analytical Test Results – Groundwater
PCBs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)	MECP Table 3 Non-Potable Groundwater Standards (µg/L)
		February 24, 2022	
		BH1-22-GW1	
PCBs, total	0.05	nd	7.8

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

No PCB parameter concentrations were detected in the groundwater sample analyzed, and as such, the results are in compliance with the selected MECP Table 3 non-potable groundwater standards.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of this Phase II ESA were handled in accordance with the analytical protocols with respect to holding time, preservation method, storage requirement, and container type.

As per Subsection 47(3) of O. Reg. 153/04, as amended by the Environmental Protection Act, the certificates of analysis have been received for each sample submitted for laboratory analysis and have been appended to this report.

As per the Sampling and Analysis Plan, a duplicate soil sample was obtained from sample BH3-22-AU1 and submitted for laboratory analysis of metal parameters. The relative percent difference (RPD) calculations for the original and duplicate samples are provided below in Table 14.

Table 14
QA/QC Calculations – Soil

Parameter	MDL (µg/g)	BH3-22-AU1	DUP-1	RPD (%)	QA/QC Result (Target: <20% RPD)
Antimony	1.0	nd	nd	0	Meets Target
Arsenic	1.0	2.5	2.7	7.7	Meets Target
Barium	1.0	139	143	2.8	Meets Target
Beryllium	0.5	nd	nd	0	Meets Target
Boron	5.0	5.4	5.8	7.1	Meets Target
Cadmium	0.5	nd	nd	0	Meets Target
Chromium	5.0	27.7	29.9	7.6	Meets Target
Cobalt	1.0	7.8	7.9	1.3	Meets Target
Copper	5.0	18.7	19.1	2.1	Meets Target
Lead	1.0	14.4	15.5	7.4	Meets Target
Molybdenum	1.0	nd	nd	0	Meets Target
Nickel	5.0	17.8	18.7	4.9	Meets Target
Selenium	1.0	nd	nd	0	Meets Target
Silver	0.3	nd	nd	0	Meets Target
Thallium	1.0	nd	nd	0	Meets Target
Uranium	1.0	nd	nd	0	Meets Target
Vanadium	10.0	34.1	35.8	4.8	Meets Target
Zinc	20.0	51.4	53.4	3.8	Meets Target

Notes:
- **Bold and Underlined** – value exceeds selected MECP standards

The relative percent difference (RPD) calculated for all parameters fell within of the acceptable range of 20%, and as such, is considered to meet the data quality objectives outlined in the Sampling and Analysis Plan, appended to this report.

Similarly, a duplicate groundwater sample was obtained from sample BH1-22-GW1 and submitted for laboratory analysis of BTEX and PHC (F_1-F_4) parameters. The relative percent difference (RPD) calculations for the original and duplicate samples are provided below in Table 15.

Table 15
QA/QC Calculations – Groundwater

Parameter	MDL (µg/L)	BH1-22-GW1	DUP-1	RPD (%)	QA/QC Result (Target: <20% RPD)
Benzene	0.5	nd	nd	0	Meets Target
Ethylbenzene	0.5	nd	nd	0	Meets Target
Toluene	0.5	nd	nd	0	Meets Target
Xylenes	0.5	nd	nd	0	Meets Target
PHC F_1	25	nd	nd	0	Meets Target
PHC F_2	100	nd	nd	0	Meets Target
PHC F_3	100	nd	nd	0	Meets Target
PHC F_4	100	nd	nd	0	Meets Target

Notes:
- **Bold and Underlined** – value exceeds selected MECP standards

The relative percent difference (RPD) calculated for all parameters fell within of the acceptable range of 20%, and as such, is considered to meet the data quality objectives outlined in the Sampling and Analysis Plan, appended to this report.

Based on the results of the QA/QC analysis, the quality of the field data collected during this Phase II ESA is considered to be sufficient to meet the overall objectives of this assessment.

5.8 Phase II Conceptual Site Model

The following section has been prepared in accordance with the requirements of O. Reg. 153/04 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 described in Section 7.1 of the Phase I ESA report, as well as Section 2.2 of this report, the following PCAs, as described by Table 2 of O. Reg. 153/04, are considered to result in a APECs on the Phase II Property:

- *Item 55: "Transformer Manufacturing, Processing, and Use" (APEC #1)*

This PCA was identified as a result of the presence of a former on-site pad-mounted transformer, located within the eastern portion of the Phase II Property.

- *Item 30: "Importation of Fill Material of Unknown Quality" (APEC #2)*

This PCA was identified as a result of the presence of fill material of unknown quality, situated throughout the Phase II Property.

- *No Item Number: "Application of road salt during snow and/or ice conditions" (APEC #3)*

This PCA was identified as a result of the historical application of road salt for de-icing purposes, located within the northern portion of the Phase II Property.

- *Item 28: "Gasoline and Associated Products Storage in Fixed Tanks" (APEC #4)*

This PCA was identified as a result of the presence of an aboveground fuel storage tank, located on the adjacent property to the south (353 Friel Street).

Contaminants of Potential Concern

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

- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F_1-F_4);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Metals (including Mercury and Hexavalent Chromium);
- Polychlorinated Biphenyls (PCBs);
- Electrical Conductivity (EC);
- Sodium Adsorption Ratio (SAR).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

Subsurface Structures and Utilities

Underground service locates were completed prior to the subsurface investigation. Underground utilities on the Phase II Property included electrical cables, natural gas pipelines, as well as municipal water and wastewater services. It should be noted that these utilities have since been removed, following the demolition of the two former buildings on-site.

Physical Setting

Site Stratigraphy

The stratigraphy of the Phase II Property generally consists of:

- Fill material (brown silty sand with crushed stone, gravel, and trace demolition debris); encountered at ground level and extending to depths ranging from approximately 1.45 m to 1.93 m below the existing ground surface.
- Brown silty clay; extending to depths ranging from approximately 3.73 m to 4.50 m below the existing ground surface.
- Grey silty clay; extending to depths ranging from approximately 6.71 m to 8.84 m below the existing ground surface (bottom of boreholes).

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

The groundwater at the Phase II Property was encountered within an overburden layer of silty clay at depths ranging from approximately 3.35 m to 5.93 m below the existing ground surface.

Based on the measured groundwater levels, the groundwater is anticipated to flow in a westerly direction.

Approximate Depth to Bedrock

Bedrock was not encountered in any of the boreholes during the field drilling program, however, a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 18.21 m below ground surface.

Approximate Depth to Water Table

The depth to the water table is approximately 3.35 m to 5.93 m below the existing ground surface.

Sections 41 and 43.1 of Ontario Regulation 153/04

Section 41 of the Regulation does not apply to the Phase II Property, as there are no bodies of water or areas of natural significance located on or within 30 m of the Phase II Property. The Phase II Property is therefore not considered to be environmentally sensitive.

Section 43.1 of the Regulation does not apply to the Phase II Property, since the bedrock is situated at depths greater than 2 m below ground surface, and thus is not considered to be a shallow soil property.

Water Bodies and Areas of Natural and Scientific Interest

No water bodies or areas of natural and scientific interest were identified within the Phase I Study Area. The nearest named water body with respect to the Phase II Property is the Rideau River, located approximately 600 m to the east.

Existing Buildings and Structures

No buildings or structures are currently present on the Phase II Property.

Environmental Condition

Areas Where Contaminants are Present

Based on the analytical test results, metal (molybdenum) and EC impacted soil/fill was identified in BH2-22, located in the northern portion of the Phase II Property.

The contaminants are considered to be a result imported fill material (APEC2), and the use of a salt within the former parking area of the building (APEC3).

Since the exceedance of EC is considered to be the result of a substance which has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both, then by Section 49.1 of the regulation, the standard for EC is considered to have been met.

Based on the analytical test results, the groundwater beneath the Phase II Property is not considered to be contaminated.

Types of Contaminants

The soil/fill within BH2-22 contains elevated levels of molybdenum and EC exceeding the selected MECP Table 3 residential coarse-grained soil standards, however, the EC concentration is deemed to meet the site standard.

No contaminants were identified in the groundwater.

Contaminated Media

Based on the findings of this Phase II ESA, the soil/fill within the northern portion of the Phase II Property is contaminated with metals (molybdenum).

The groundwater beneath the Phase II Property is not considered to be contaminated.

What Is Known About Areas Where Contaminants Are Present

Metal impacted soil/fill was identified in BH2-22, located in the northern portion of the Phase II Property. Based on their shallow nature, the source of these contaminants is suspected to have been the result of the importation and placement of poor quality fill material imported onto the Phase II Property.

The exceedance of EC is considered to be a result of the use of a substance for safety purposes during conditions of snow or ice or both, and is deemed to meet the site standard.

Distribution and Migration of Contaminants

As previously noted, metal and EC impacted soil/fill was identified in the vicinity of BH2-22, located within the northern portion of the Phase II Property. Based on their low mobility, this contamination is anticipated to be limited to the soil/fill in this location.

Discharge of Contaminants

The metal and EC impacted soil/fill material identified in the vicinity of BH2-22 is considered to have resulted from the importation and placement of poor-quality fill material, following the demolition of two former on-site buildings.

Climatic and Meteorological Conditions

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

The downward migration of metal contaminants in the vicinity of BH2-22 is not suspected to have occurred, due to their low mobility. Fluctuations in the groundwater level and groundwater flow are also not considered to have affected any contaminant distribution based on the depth of the water table within the bedrock, well below the shallow soil/fill material.

Potential for Vapour Intrusion

During redevelopment of the Phase II Property, all soils exceeding the selected MECP Table 3 residential coarse-grained soil standards will be removed and disposed of off-site. As such, there is no anticipated potential for future vapour intrusion at the Phase II Property.

Furthermore, exceedances of soil standards were limited to metals (molybdenum). The metals parameter group are not considered to contribute to vapour intrusion in any significant way.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the properties addressed 326 & 330 Wilbrod Street, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II Property.

The subsurface investigation for this assessment was conducted on February 15, 2022, and consisted of drilling three boreholes (BH1-22 to BH3-22) throughout the Phase II Property, all three of which were equipped with groundwater monitoring wells.

The boreholes were advanced to depths ranging from approximately 6.71 m to 8.84 m below the existing ground surface and terminated within an overburden layer of grey silty clay. It should be noted that a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 18.21 m below ground surface.

In general, the subsurface soil profile encountered at the borehole locations consists of a surficial layer of fill material (brown silty sand with crushed stone, gravel, and trace demolition debris) over top of brown silty clay, turning grey at deeper depths in line with the water table.

Three soil samples were submitted for laboratory analysis of BTEX, PHCs (F_1-F_4), PAHs, metals, PCBs, EC, SAR, and/or pH parameters. Based on the analytical test results, elevated levels of metals (molybdenum) and EC were detected in Sample BH2-22-SS2 in excess of the selected MECP Table 3 residential coarse-grained soil standards.

It should be noted however, that the exceedance of EC is considered to be due to the use of a substance on surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both, and therefore, is deemed to meet the site standards.

Groundwater samples were recovered on February 24, 2022 from the monitoring wells installed in BH1-22 and BH3-22 and submitted for laboratory analysis of BTEX, PHCs (F_1-F_4), and/or PCB parameters. Based on the analytical test results, none of the aforementioned parameters were detected in the groundwater samples analyzed, and as such, the results are in compliance with the selected MECP Table 3 non-potable groundwater standards.

Recommendations

Soil

Based on the findings of this assessment, metal impacted soil/fill was identified within the northern portion of the Phase II Property. It is our understanding that the Phase II Property is to be redeveloped in the future. Although soil exceeding metals concentrations can be managed at the time of site redevelopment, it is recommended that additional delineation test holes be placed to assess the extent of the molybdenum exceedance.

Prior to off-site disposal of impacted soil at a licensed landfill, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with Ontario Regulation 347/558.

It is recommended that Paterson personnel be present on-site during remediation activities to direct the excavation and segregation of impacted soil, as well as to conduct confirmatory sampling as required. Soil not impacted by metals must be beneficially reused at an appropriate reuse site.

Based on the soil test results, the majority of the on-site soils comply with the MECP Table 2.1 Excess Soil Quality Standards (Ontario Regulation 406/19), for off-site disposal. Additional excess soil testing may be required prior to future site excavation activities.

Monitoring Wells

It is recommended that the monitoring wells be re-assessed prior to site redevelopment, in particular the monitoring well at BH2-22.

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned according to Ontario Regulation 903 (Ontario Water Resources Act), however, we recommend that the wells be maintained for future sampling purposes, at least until the excavation for the foundation has commenced. The monitoring wells will be registered with the MECP under this regulation. Further information can be provided upon request in this regard.

7.0 STATEMENT OF LIMITATIONS

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

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

Should any conditions be encountered at the Phase II Property 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 Dolyn Construction Ltd. Permission and notification from Dolyn Construction Ltd. and Paterson Group will be required prior to the release of this report to any other party.

Paterson Group Inc.

Nick Sullivan, B.Sc.

Adrian Menyhart, P.Eng., QP$_{ESA}$

Report Distribution:

- Dolyn Construction Ltd.
- Paterson Group Inc.

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE5378-3 – TEST HOLE LOCATION PLAN

DRAWING PE5378-4 – ANALYTICAL TESTING PLAN – SOIL (METALS)

DRAWING PE5378-4A – CROSS SECTION A-A' – SOIL (METALS)

DRAWING PE5378-4B – CROSS SECTION B-B' – SOIL (METALS)

DRAWING PE5378-5 – ANALYTICAL TESTING PLAN – SOIL (EC)

DRAWING PE5378-5A – CROSS SECTION A-A' – SOIL (EC)

DRAWING PE5378-5B – CROSS SECTION B-B' – SOIL (EC)

DRAWING PE5378-6 – ANALYTICAL TESTING PLAN – SOIL (BTEX, PHCs, PCBs, PAHs, SAR)

DRAWING PE5378-6A – CROSS SECTION A-A' – SOIL (BTEX, PHCs, PCBs, PAHs, SAR)

DRAWING PE5378-6B – CROSS SECTION B-B' – SOIL (BTEX, PHCs, PCBs, PAHs, SAR)

DRAWING PE5378-7 – ANALYTICAL TESTING PLAN – GROUNDWATER

DRAWING PE5378-7A – CROSS SECTION A-A' – GROUNDWATER

DRAWING PE5378-7B – CROSS SECTION B-B' – GROUNDWATER

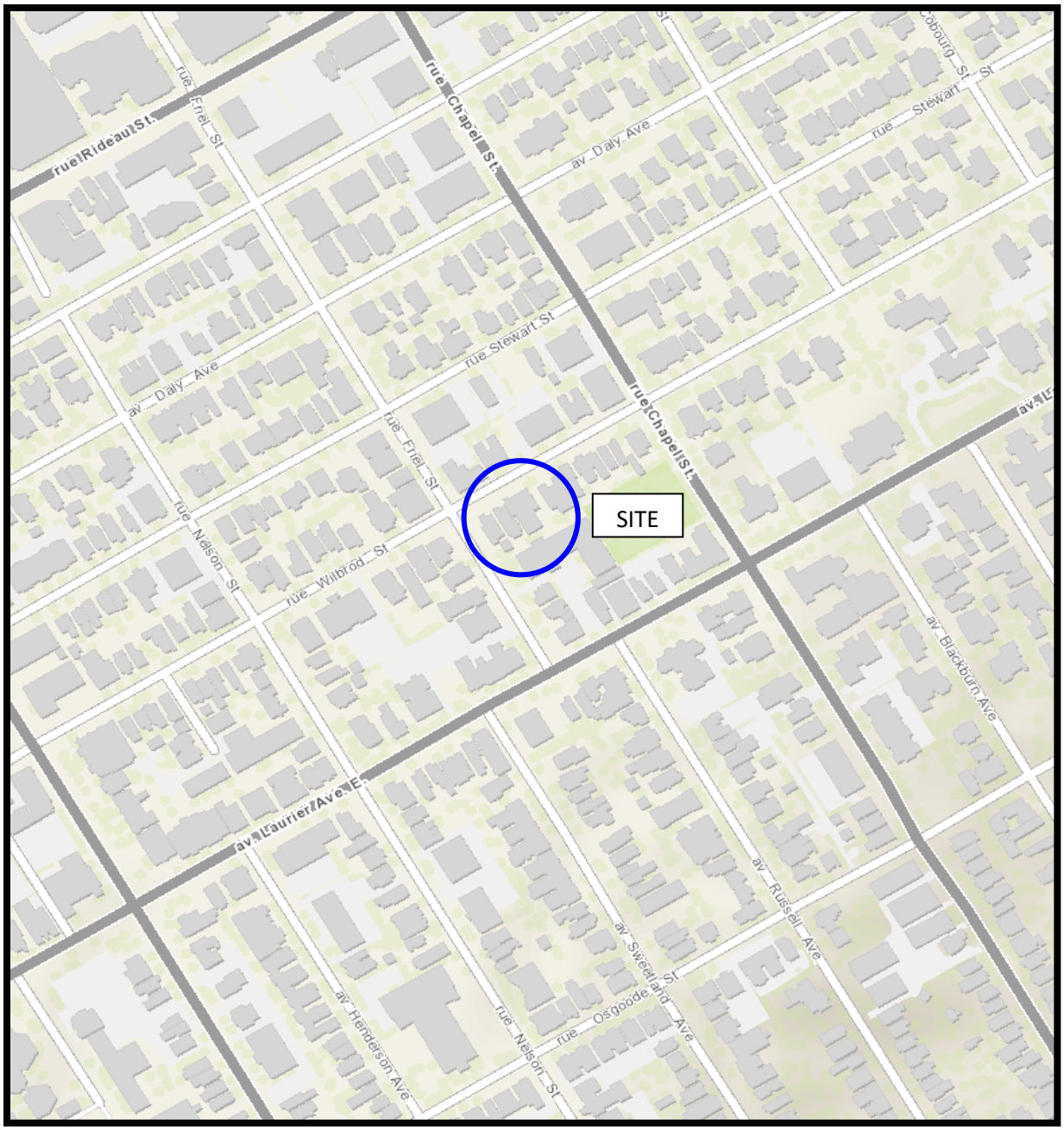

FIGURE 1

KEY PLAN

WILBROD STREET

SIDEWALK

FRIEL STREET

351 FRIEL STREET
RESIDENTIAL

SIDEWALK

338-342 WILBROD STREET
RESIDENTIAL

A

B'

APEC 3

BH 2-22
70.52
(64.59)

326 WILBROD STREET
(DEMOLISHED)

330 WILBROD STREET
(DEMOLISHED)

(0.19m/m)

APEC 2

BH 1-22
70.59
(67.24)

APEC 1

A'

BH 3-22
70.49
(66.78)

APEC 4

B

353 FRIEL STREET
RESIDENTIAL

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- 70.52 — GROUND SURFACE ELEVATION (m)
- (67.24) — GROUNDWATER SURFACE ELEVATION (m) (FEBRUARY 24, 2022)
- B—B' — CROSS SECTION
- 66.5 — GROUNDWATER CONTOUR(m)
- (0.19m/m) — APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

GROUND SURFACE ELEVATION AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:200

0 1 2 3 4 5 10m

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN:

1)	PCA 55	FORMER PAD-MOUNTED TRANSFORMER
2)	PCA 30	FILL MATERIAL OF UNKNOWN QUALITY
3)	PCA N/A	APPLICATION OF ROAD SALT DURING SNOW AND ICE CONDITIONS
4)	PCA 28	EXISTING ABOVEGROUND FUEL STORAGE TANK

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NO.	REVISIONS	DATE	INITIAL

DOLYN CONSTRUCTION LTD.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:200	Date: 03/2022
Drawn by: JM	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-3
Approved by: AM	Revision No.:

11x17

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WILBROD STREET

FRIEL STREET

BH2-22-SS2	0.76-1.37 m	FEB-15-22
Parameter	Result(µg/g)	MECP(µg/g)
Molybdenum	7.9	6.9

Remaining Metals comply with MECP Table 3 Standards

SIDEWALK

A

B'

BH 2-22
70.52
(64.59)

326 WILBROD STREET
(DEMOLISHED)

330 WILBROD STREET
(DEMOLISHED)

BH 1-22
70.59
(67.24)

A'

351 FRIEL STREET
RESIDENTIAL

338-342 WILBROD STREET
RESIDENTIAL

SIDEWALK

BH3-22-AU1 0.31-0.60 m FEB-15-22
Metals comply with MECP Table 3 Standards

BH 3-22
70.49
(66.78)

B

353 FRIEL STREET
RESIDENTIAL

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- 70.52 GROUND SURFACE ELEVATION (m)
- (67.24) GROUNDWATER SURFACE ELEVATION (m) (FEBRUARY 24, 2022)
- B — B' CROSS SECTION

GROUND SURFACE ELEVATION AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:200

0 1 2 3 4 5 10m

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

DOLYN CONSTRUCTION LTD.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (METALS)

Scale: 1:200	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-4
Approved by: AM	Revision No.:

11x17

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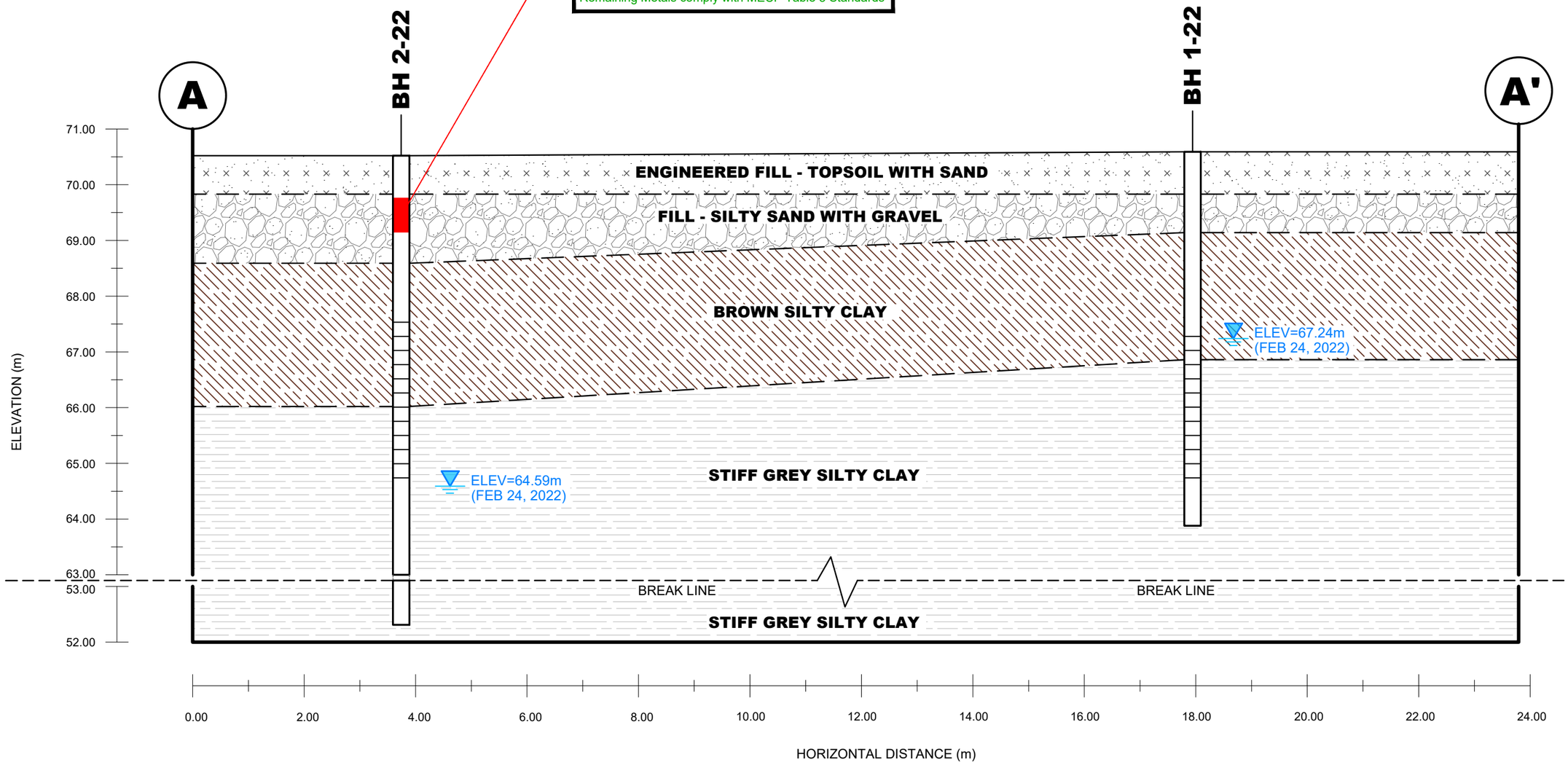
BH2-22-SS2	0.76-1.37 m	FEB-15-22
Parameter	Result(µg/g)	MECP(µg/g)
Molybdenum	7.9	6.9

Remaining Metals comply with MECP Table 3 Standards



SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

DOLYN CONSTRUCTION LTD.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (METALS)

Scale: AS SHOWN	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-4A
Approved by: AM	Revision No.:

11x17

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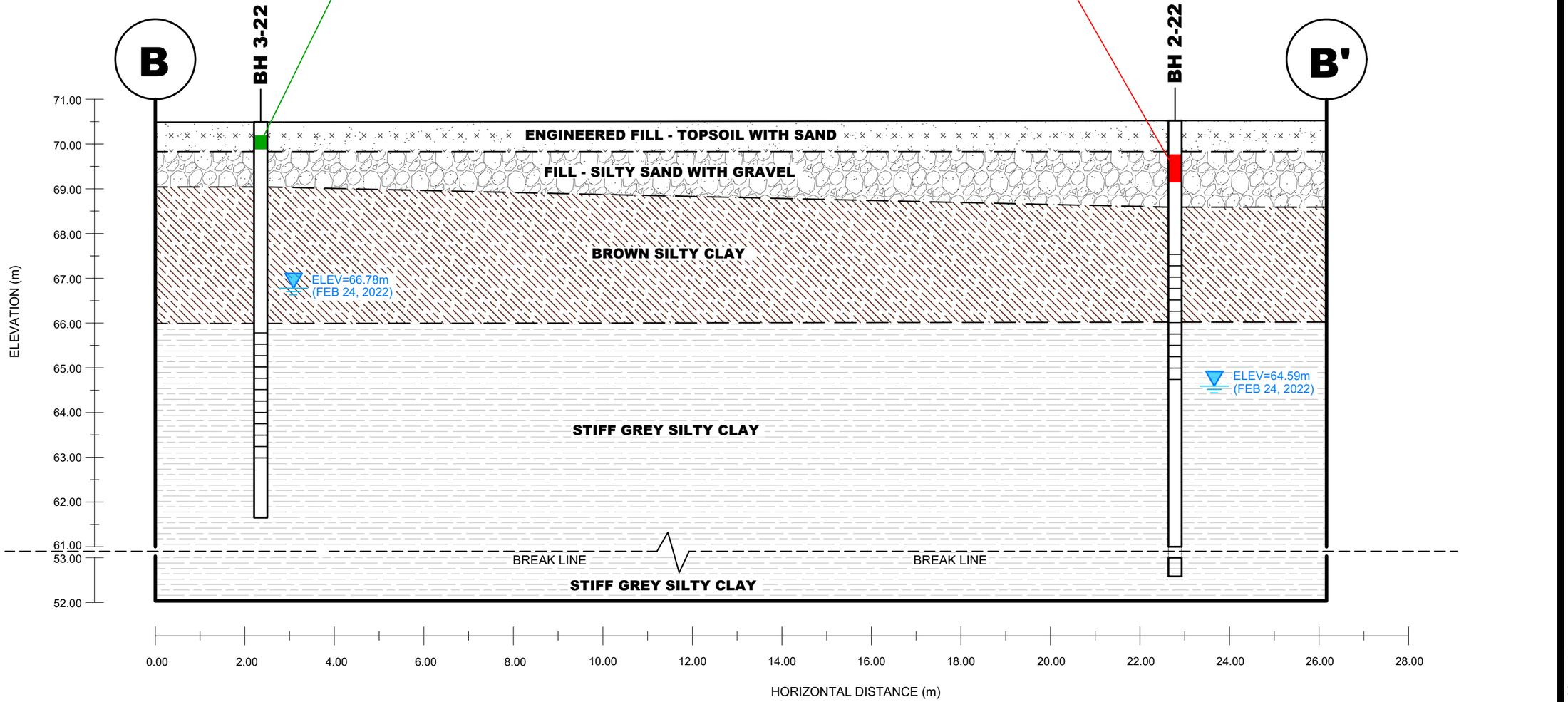
BH3-22-AU1 0.31-0.60 m FEB-15-22
Metals comply with MECP Table 3 Standards

BH2-22-SS2	0.76-1.37 m	FEB-15-22
Parameter	Result(µg/g)	MECP(µg/g)
Molybdenum	7.9	6.9

Remaining Metals comply with MECP Table 3 Standards



SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
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NO.	REVISIONS	DATE	INITIAL

DOLYN CONSTRUCTION LTD.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (METALS)

Scale: AS SHOWN	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-4B
Approved by: AM	Revision No.:

11x17

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WILBROD STREET

FRIEL STREET

BH2-22-SS2	0.76-1.37 m	Feb-15-2022
Parameter	Result(µg/g)	MECP(µg/g)
EC	774	700

SIDEWALK

A

B'

BH 2-22
70.52
(64.59)

326 WILBROD STREET
(DEMOLISHED)

330 WILBROD STREET
(DEMOLISHED)

BH 1-22
70.59
(67.24)

A'

351 FRIEL STREET
RESIDENTIAL

SIDEWALK

338-342 WILBROD STREET
RESIDENTIAL

BH 3-22
70.49
(66.78)

B

353 FRIEL STREET
RESIDENTIAL

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- 70.52 GROUND SURFACE ELEVATION (m)
- (67.24) GROUNDWATER SURFACE ELEVATION (m) (FEBRUARY 24, 2022)
- B — B' CROSS SECTION

GROUND SURFACE ELEVATION AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:200

0 1 2 3 4 5 10m

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (EC)

Scale: 1:200	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-5
Approved by: AM	Revision No.:

11x17

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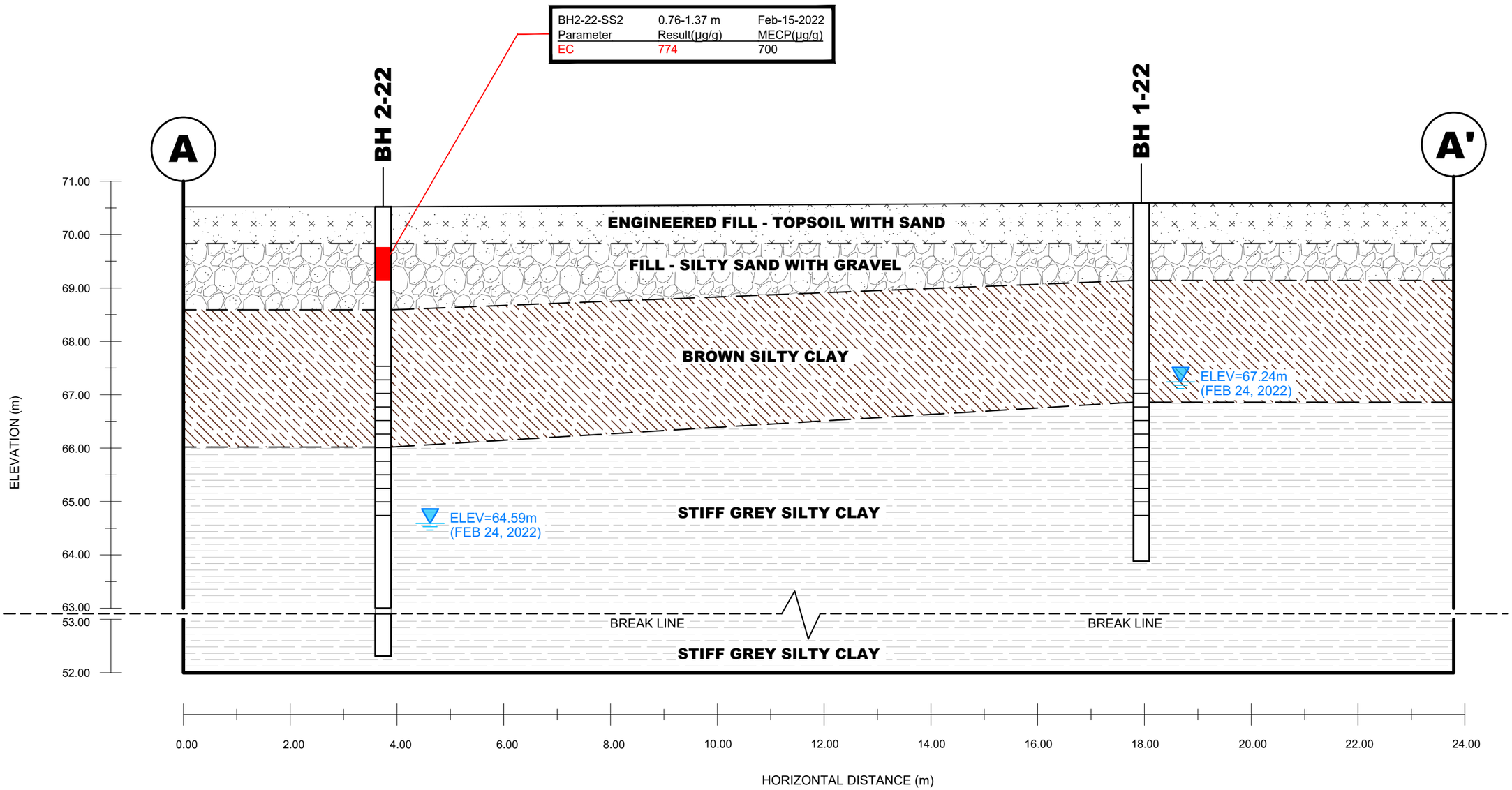
BH2-22-SS2	0.76-1.37 m	Feb-15-2022
Parameter	Result(µg/g)	MECP(µg/g)
EC	774	700



SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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consulting engineers

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (EC)

Scale: AS SHOWN	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-5A
Approved by: AM	Revision No.:

11x17

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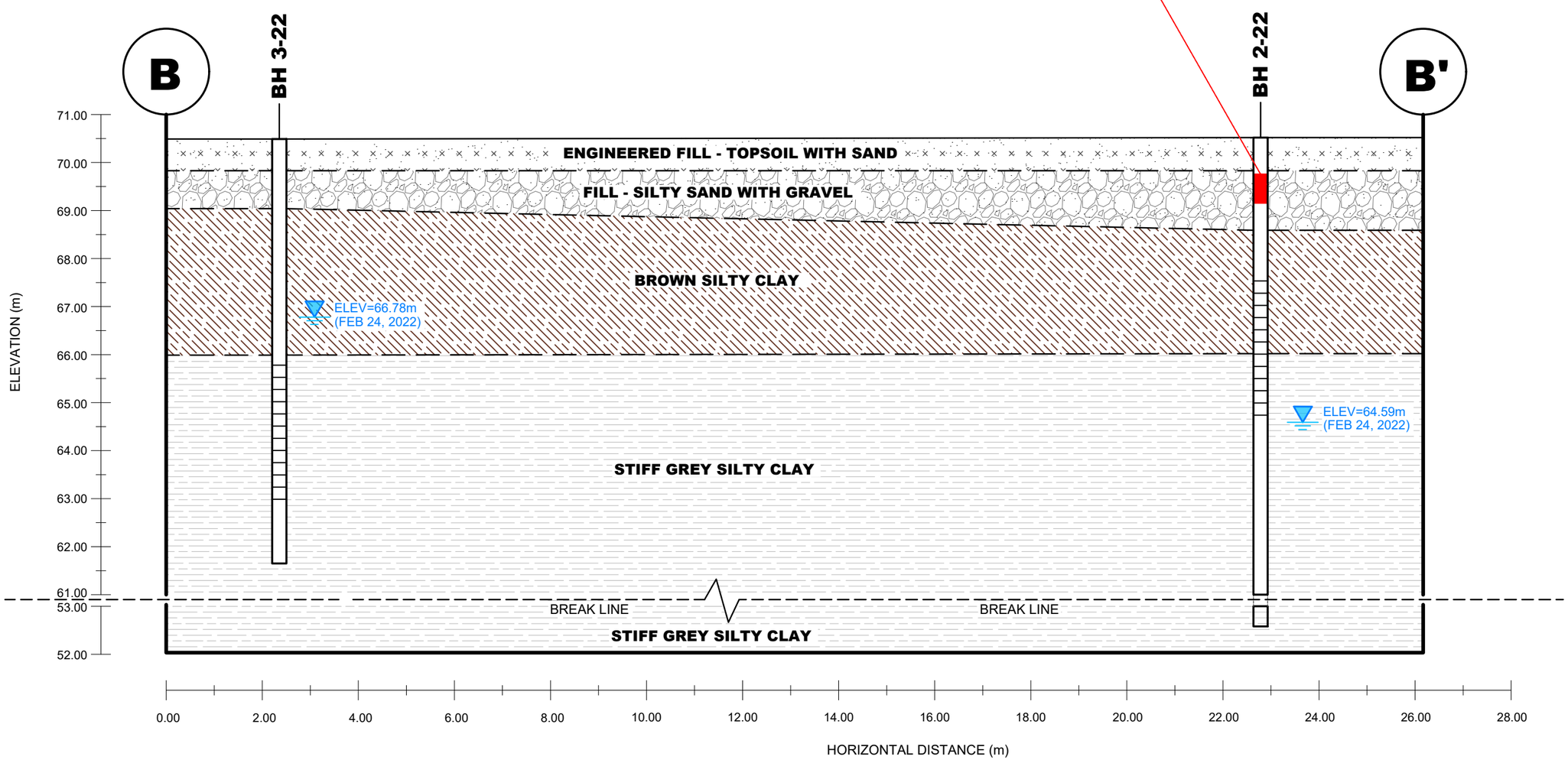
BH2-22-SS2	0.76-1.37 m	Feb-15-2022
Parameter	Result(µg/g)	MECP(µg/g)
EC	774	700



SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (EC)

Scale: AS SHOWN	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-5B
Approved by: AM	Revision No.:

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11x17

WILBROD STREET

FRIEL STREET

SIDEWALK

SIDEWALK

351 FRIEL STREET
RESIDENTIAL

326 WILBROD STREET
(DEMOLISHED)

330 WILBROD STREET
(DEMOLISHED)

338-342 WILBROD STREET
RESIDENTIAL

353 FRIEL STREET
RESIDENTIAL

BH2-22-SS2 0.76-1.37 m FEB-15-22
PAHs, SAR comply with MECP Table 3 Standards

BH1-22-SS7 4.57-5.19 m FEB-15-22
BTEX, PHCs, PCBs comply with MECP Table 3 Standards

BH3-22-AU1 0.31-0.60 m FEB-15-22
PAHs comply with MECP Table 3 Standards

A

A'

B

B'

BH 2-22
70.52
(64.59)

BH 1-22
70.59
(67.24)

BH 3-22
70.49
(66.78)

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- 70.52 GROUND SURFACE ELEVATION (m)
- (67.24) GROUNDWATER SURFACE ELEVATION (m) (FEBRUARY 24, 2022)
- B—B' CROSS SECTION

GROUND SURFACE ELEVATION AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:200

0 1 2 3 4 5 10m

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

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

Scale: 1:200	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-6
Approved by: AM	Revision No.:

11x17

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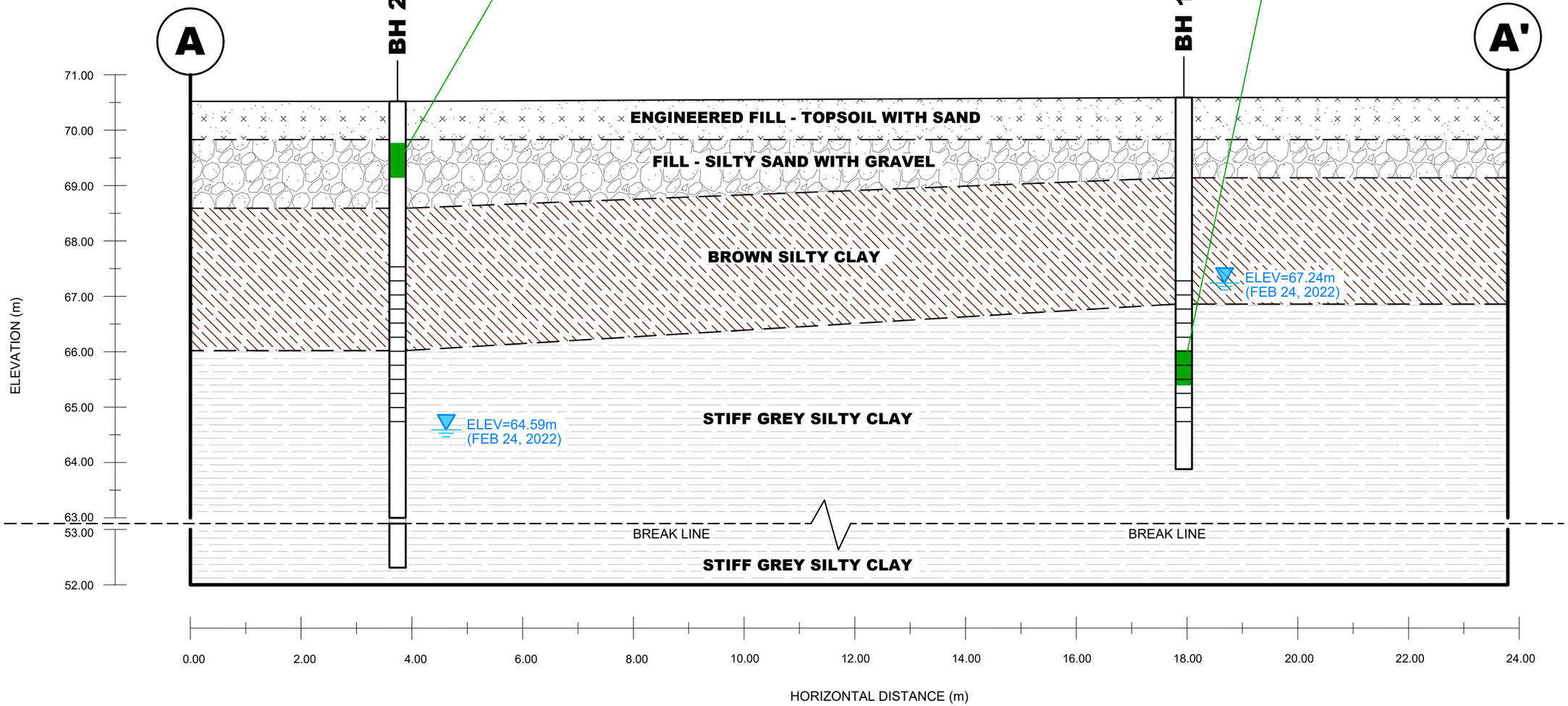
BH2-22-SS2 0.76-1.37 m FEB-15-22
PAHs, SAR comply with MECP Table 3 Standards

BH1-22-SS7 4.57-5.19 m FEB-15-22
BTEX, PHCs, PCBs comply with MECP Table 3 Standards



SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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consulting engineers

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-6A
Approved by: AM	Revision No.:

11x17

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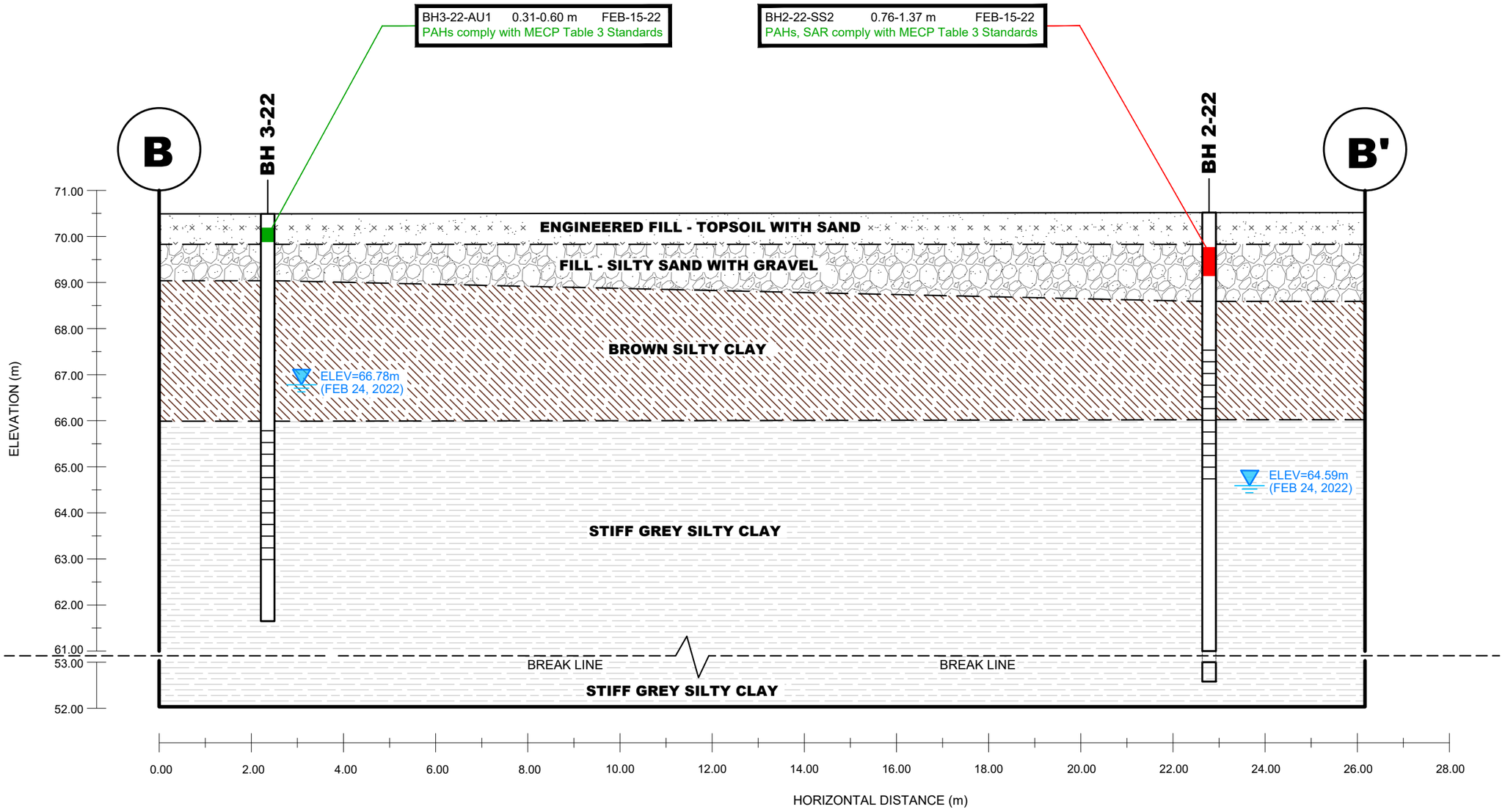

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-6B
Approved by: AM	Revision No.:

11x17

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WILBROD STREET

FRIEL STREET

SIDEWALK

SIDEWALK

351 FRIEL STREET
RESIDENTIAL

353 FRIEL STREET
RESIDENTIAL

326 WILBROD STREET
(DEMOLISHED)

330 WILBROD STREET
(DEMOLISHED)

338-342 WILBROD STREET
RESIDENTIAL

A

A'

B

B'

BH 2-22
70.52
(64.59)

BH 1-22
70.59
(67.24)

BH 3-22
70.49
(66.78)

BH1-22-GW1 3.10-6.10 m FEB-24-22
BTEX, PHCs, PCBs comply with MECP Table 3 Standards

BH3-22-GW1 4.62-7.62 m FEB-24-22
BTEX and PHCs comply with MECP Table 3 Standards

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- 70.52 GROUND SURFACE ELEVATION (m)
- (67.24) GROUNDWATER SURFACE ELEVATION (m) (FEBRUARY 24, 2022)
- B—B' CROSS SECTION

GROUND SURFACE ELEVATION AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:200

0 1 2 3 4 5 10m

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULTS EXCEED MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - GROUNDWATER (BTEX, PHCs, PCBs)

Scale: 1:200	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-7
Approved by: AM	Revision No.:

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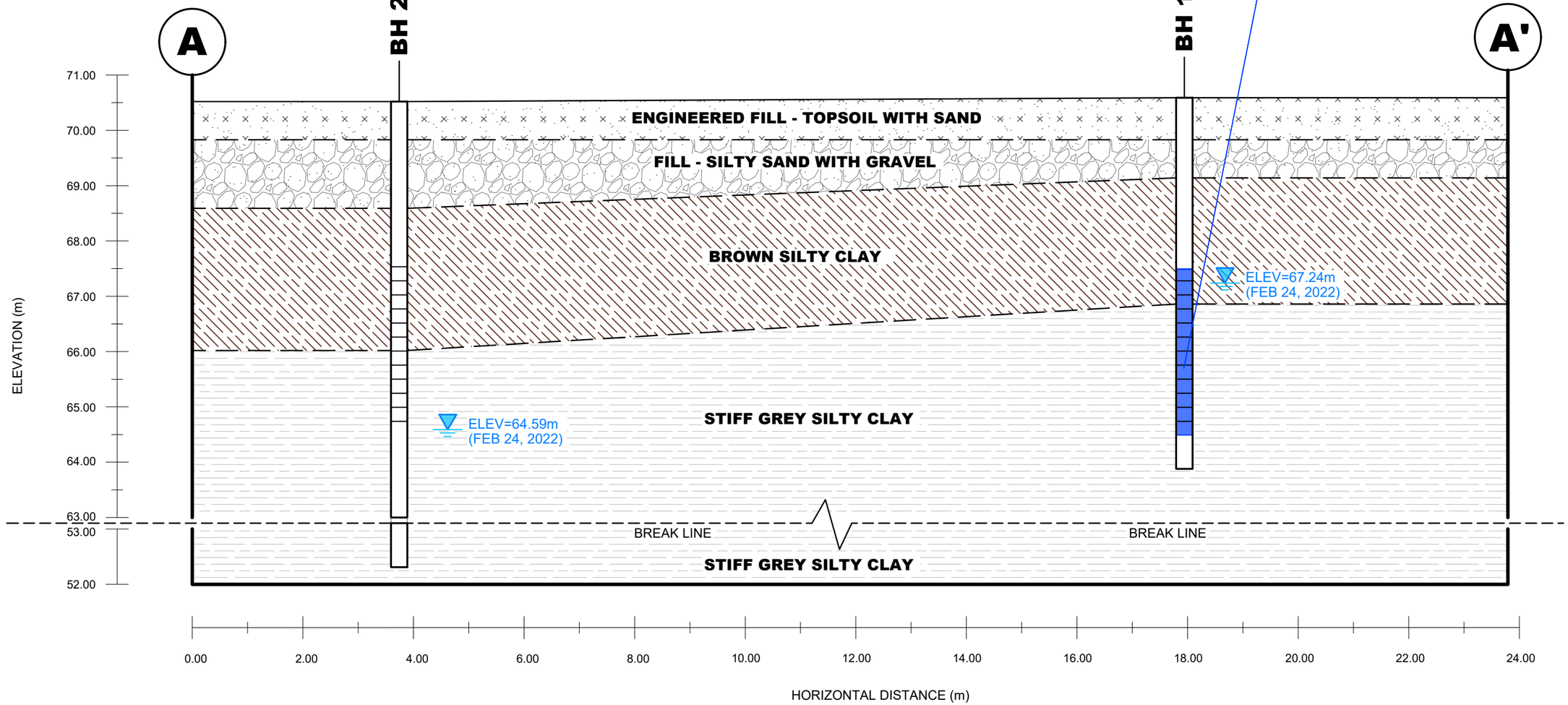
BH1-22-GW1 3.10-6.10 m FEB-24-22
BTEX, PHCs, PCBs comply with MECP Table 3 Standards



GROUNDWATER RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULTS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
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Approved by: AM	Revision No.:

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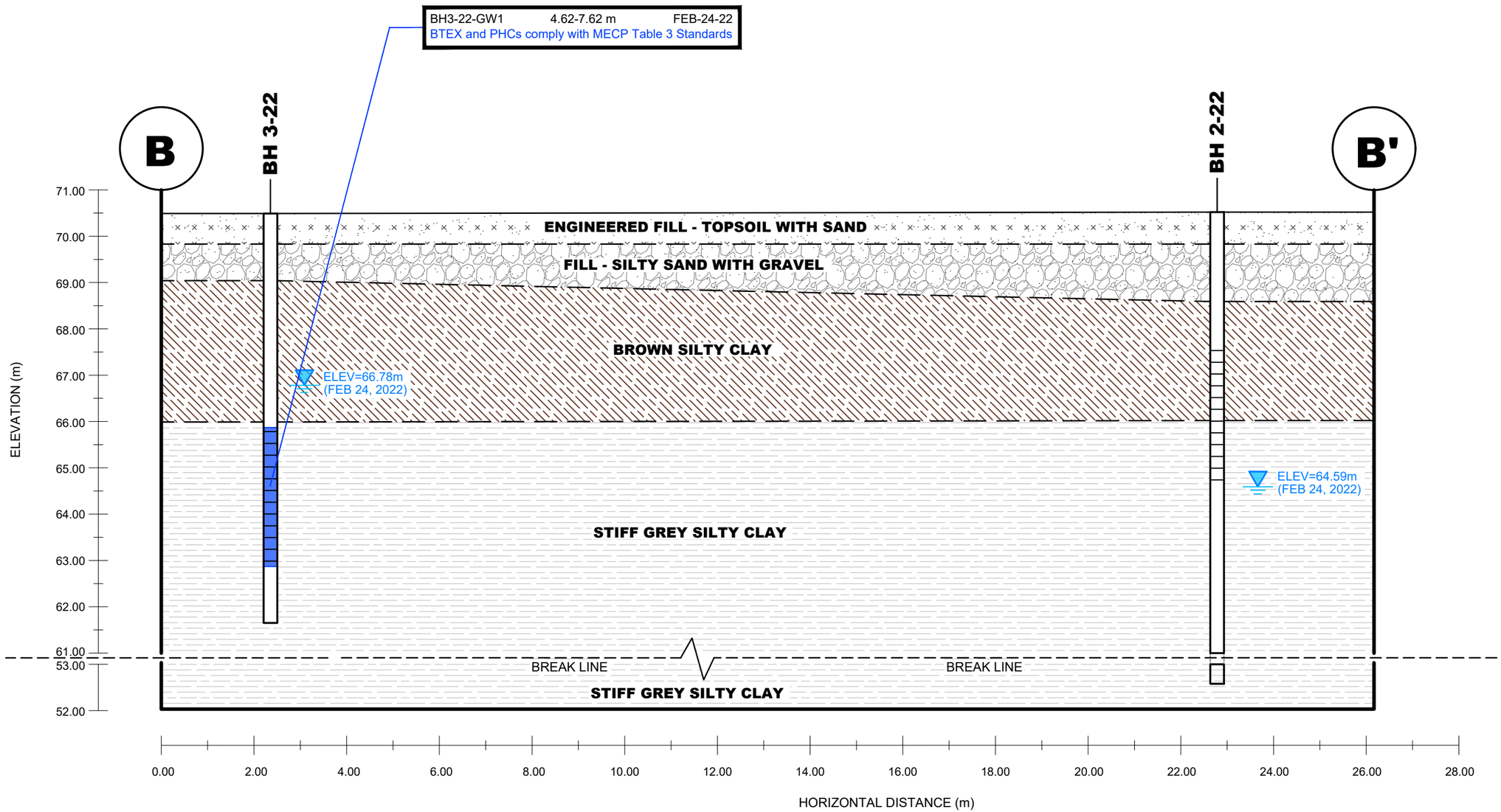

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 & 326 WILBROD STREET

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 03/2022
Drawn by: YA	Report No.: PE5378-2
Checked by: NS	Dwg. No.: PE5378-7B
Approved by: AM	Revision No.:

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Paterson Group Inc.

Consulting Engineers
154 Colonnade Road South
Ottawa (Nepean), Ontario
Canada K2E 7J5

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Sampling & Analysis Plan

Phase II – Environmental Site Assessment
326 & 330 Wilbrod Street
Ottawa, Ontario

Prepared For

Dolyn Construction Inc.

February 1, 2022

Report: PE5378-SAP

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM 1
2.0 ANALYTICAL TESTING PROGRAM 2
3.0 STANDARD OPERATING PROCEDURES 3
3.1 Environmental Drilling Procedure 3
3.2 Monitoring Well Installation Procedure 6
3.3 Monitoring Well Sampling Procedure 7
4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) 8
5.0 DATA QUALITY OBJECTIVES 9
6.0 PHYSICAL IMPEDIMENTS 10

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Dolyn Construction Inc., to conduct a Phase II – Environmental Site Assessment (Phase II ESA) for the properties addressed 326 & 330 Wilbrod Street, 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
BH1-22	Eastern portion of Phase I Property; to assess for potential impacts resulting from the presence of fill material of unknown quality as well as a former pad-mounted transformer.	5-8 m; for geotechnical purposes and to intercept the groundwater table for the purpose of installing a groundwater monitoring well.
BH2-22	Northern portion of Phase I Property; to assess for potential impacts resulting from the presence of fill material of unknown quality and for general coverage purposes.	5-8 m; for geotechnical purposes and to intercept the groundwater table for the purpose of installing a groundwater monitoring well.
BH3-22	Southern portion of Phase I Property; to assess for potential impacts resulting from the presence of fill material of unknown quality and for general coverage purposes.	5-8 m; for geotechnical purposes and to intercept the groundwater table for the purpose of installing a groundwater monitoring well.

Borehole locations are shown on *"Drawing PE5378-3 – 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 I Property is based on the following general considerations:

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

The analytical testing program for 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.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Residential Building
326 and 330 Wilbrod Street - Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5378

REMARKS

HOLE NO. BH 1-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 February 15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	70.59
FILL: Brown silty sand with crushed stone, gravel, trace construction debris		AU	1				
0.76							
FILL: Brown silty sand trace gravel		SS	2	75	15	1	69.59
1.45							
Very stiff brown **SILTY CLAY**		SS	3	83	18	2	68.59
		SS	4	100	7		
		SS	5	83	P	3	67.59
3.73							
Very stiff to stiff grey **SILTY CLAY**		SS	6	100	P	4	66.59
		SS	7	100	P	5	65.59
		SS	8	92	P		
		SS	9	83	P	6	64.59
6.71							
End of Borehole							
(GWL at 4.22 m depth - Feb 24, 2022)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Residential Building
326 and 330 Wilbrod Street - Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5378

REMARKS

HOLE NO. BH 2-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 February 15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	70.52
FILL: Topsoil with brown silty clay sand and gravel		AU	1				
0.69		SS	2	50	50+	1	69.52
FILL: Brown silty sand with gravel, trace clay and rock fragments		SS	3	58	40	2	68.52
1.93		SS	4	79	8		
Hard to very stiff brown **SILTY CLAY**		SS	5	83	P	3	67.52
		SS	6	0	P	4	66.52
4.50		SS	7	100	P	5	65.52
Stiff grey **SILTY CLAY**		SS	8	100	P	6	64.52
6.71		SS	9	100	P	7	63.52
Dynamic Cone Penetration Test commenced at 6.71 m depth. Cone pushed to 15.3 m depth.						8	62.52
						9	61.52
						10	60.52
						11	59.52
						12	58.52
						13	57.52
						14	56.52
						15	55.52
						16	54.52
						17	53.52
18.21						18	52.52
End of Borehole							
Practical refusal to DCPT at 18.21 m depth							
(GWL at 5.93 m depth - Feb 24, 2022)							

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

20 40 60 80

100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Residential Building
326 and 330 Wilbrod Street - Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5378

REMARKS

HOLE NO. BH 3-22

BORINGS BY CME-55 Low Clearance Drill **DATE** 2022 February 15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	70.49
FILL: Brown silty clay with sand, gravel and topsoil		AU	1				
		SS	2	42	8	1	69.49
1.45							
Very stiff brown **SILTY CLAY**		SS	3	42	5	2	68.49
		SS	4	92	P		
						3	67.49
		SS	5	75	P		
		SS	6	83	P	4	66.49
4.50							
Very stiff to stiff grey **SILTY CLAY**		SS	7	100	P	5	65.49
		SS	8	100	P		
						6	64.49
		SS	9	100	P		
						7	63.49
		SS	10	100	P		
						8	62.49
8.84							
End of Borehole							
(GWL at 4.47 m depth - Feb 24, 2022)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

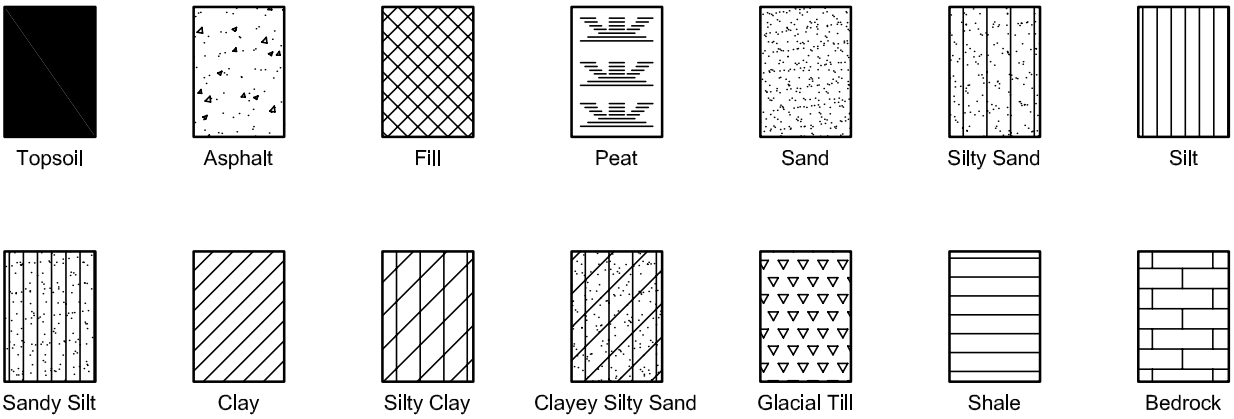
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

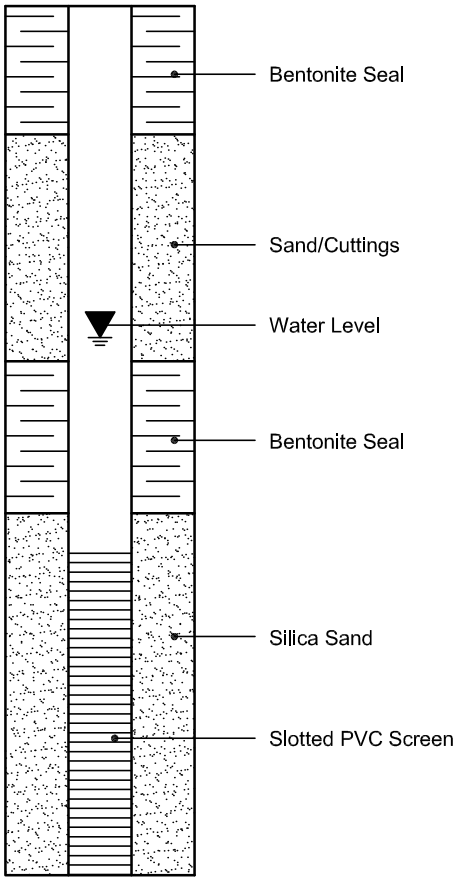
SYMBOLS AND TERMS (continued)

STRATA PLOT

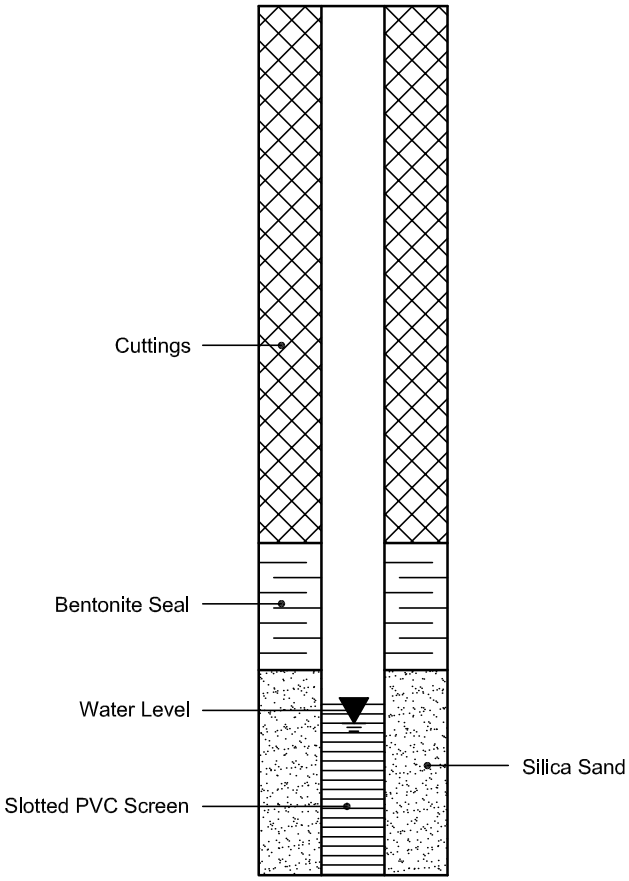


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Nick Sullivan

Client PO: 34000
Project: PE5378
Custody: 136819

Report Date: 7-Mar-2022
Order Date: 25-Feb-2022

Order #: 2209476

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

Paracel ID	Client ID
2209476-01	BH1-22-SS7
2209476-02	BH2-22-SS2
2209476-03	BH3-22-AU1
2209476-04	DUP-1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 07-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 25-Feb-2022

Client PO: 34000

Project Description: PE5378

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	28-Feb-22	1-Mar-22
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	28-Feb-22	1-Mar-22
Conductivity	MOE E3138 - probe @25 °C, water ext	2-Mar-22	3-Mar-22
Mercury by CVAA	EPA 7471B - CVAA, digestion	2-Mar-22	3-Mar-22
PCBs, total	SW846 8082A - GC-ECD	28-Feb-22	4-Mar-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	3-Mar-22	3-Mar-22
PHC F1	CWS Tier 1 - P&T GC-FID	28-Feb-22	1-Mar-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	26-Feb-22	28-Feb-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	2-Mar-22	2-Mar-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	1-Mar-22	4-Mar-22
SAR	Calculated	1-Mar-22	2-Mar-22
Solids, %	Gravimetric, calculation	28-Feb-22	1-Mar-22

Certificate of Analysis

Report Date: 07-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 25-Feb-2022

Client PO: 34000

Project Description: PE5378

	Client ID:	BH1-22-SS7	BH2-22-SS2	BH3-22-AU1	DUP-1
	Sample Date:	15-Feb-22 09:00	15-Feb-22 09:00	15-Feb-22 09:00	15-Feb-22 09:00
	Sample ID:	2209476-01	2209476-02	2209476-03	2209476-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	58.4	91.1	83.7	84.0
General Inorganics					
SAR	0.01 N/A	-	0.72	-	-
Conductivity	5 uS/cm	-	774	-	-
pH	0.05 pH Units	8.03	-	7.72	-
Metals					
Antimony	1.0 ug/g dry	-	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	-	4.9	2.5	2.7
Barium	1.0 ug/g dry	-	166	139	143
Beryllium	0.5 ug/g dry	-	<0.5	<0.5	<0.5
Boron	5.0 ug/g dry	-	8.1	5.4	5.8
Cadmium	0.5 ug/g dry	-	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	-	19.0	27.7	29.9
Chromium (VI)	0.2 ug/g dry	-	<0.2	<0.2	-
Cobalt	1.0 ug/g dry	-	9.0	7.8	7.9
Copper	5.0 ug/g dry	-	31.6	18.7	19.1
Lead	1.0 ug/g dry	-	16.3	14.4	15.5
Mercury	0.1 ug/g dry	-	<0.1	<0.1	-
Molybdenum	1.0 ug/g dry	-	7.9	<1.0	<1.0
Nickel	5.0 ug/g dry	-	35.3	17.8	18.7
Selenium	1.0 ug/g dry	-	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	-	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	-	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	-	2.7	<1.0	<1.0
Vanadium	10.0 ug/g dry	-	28.9	34.1	35.8
Zinc	20.0 ug/g dry	-	63.5	51.4	53.4
Volatiles					
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	130%	-	-	-
Hydrocarbons					

Certificate of Analysis

Report Date: 07-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 25-Feb-2022

Client PO: 34000

Project Description: PE5378

	Client ID:	BH1-22-SS7	BH2-22-SS2	BH3-22-AU1	DUP-1
	Sample Date:	15-Feb-22 09:00	15-Feb-22 09:00	15-Feb-22 09:00	15-Feb-22 09:00
	Sample ID:	2209476-01	2209476-02	2209476-03	2209476-04
	MDL/Units	Soil	Soil	Soil	Soil
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	-	<0.02	<0.02	-
Acenaphthylene	0.02 ug/g dry	-	<0.02	<0.02	-
Anthracene	0.02 ug/g dry	-	<0.02	0.05	-
Benzo [a] anthracene	0.02 ug/g dry	-	<0.02	0.06	-
Benzo [a] pyrene	0.02 ug/g dry	-	<0.02	0.07	-
Benzo [b] fluoranthene	0.02 ug/g dry	-	<0.02	0.06	-
Benzo [g,h,i] perylene	0.02 ug/g dry	-	<0.02	0.04	-
Benzo [k] fluoranthene	0.02 ug/g dry	-	<0.02	0.03	-
Chrysene	0.02 ug/g dry	-	<0.02	0.07	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	<0.02	<0.02	-
Fluoranthene	0.02 ug/g dry	-	0.02	0.16	-
Fluorene	0.02 ug/g dry	-	<0.02	0.02	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	<0.02	0.04	-
1-Methylnaphthalene	0.02 ug/g dry	-	<0.02	<0.02	-
2-Methylnaphthalene	0.02 ug/g dry	-	<0.02	<0.02	-
Methylnaphthalene (1&2)	0.04 ug/g dry	-	<0.04	<0.04	-
Naphthalene	0.01 ug/g dry	-	0.01	0.01	-
Phenanthrene	0.02 ug/g dry	-	0.12	0.17	-
Pyrene	0.02 ug/g dry	-	0.03	0.13	-
2-Fluorobiphenyl	Surrogate	-	121%	116%	-
Terphenyl-d14	Surrogate	-	132%	124%	-
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	-	-	-
Decachlorobiphenyl	Surrogate	125%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%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 (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.106*		*ug/g*		*106*	*60-140*			
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.45*		*ug/g*		*109*	*50-140*			
Surrogate: Terphenyl-d14	*1.43*		*ug/g*		*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						

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 34000

Report Date: 07-Mar-2022

Order Date: 25-Feb-2022

Project Description: PE5378

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.70*		*ug/g*		*109*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	8.59	0.01	N/A	5.37			46.1	30	QR-04
Conductivity	1000	5	uS/cm	1000			0.3	5	
pH	8.56	0.05	pH Units	8.60			0.5	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	62	4	ug/g	60			3.3	30	
F3 PHCs (C16-C34)	647	8	ug/g	616			5.0	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g	1.6			NC	30	
Arsenic	2.8	1.0	ug/g	3.2			15.5	30	
Barium	145	1.0	ug/g	149			3.3	30	
Beryllium	ND	0.5	ug/g	0.5			NC	30	
Boron	5.5	5.0	ug/g	6.0			8.2	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	21.2	5.0	ug/g	21.6			1.9	30	
Cobalt	7.5	1.0	ug/g	7.9			4.2	30	
Copper	18.0	5.0	ug/g	18.9			4.8	30	
Lead	6.0	1.0	ug/g	6.4			5.8	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	1.3	1.0	ug/g	1.7			22.2	30	
Nickel	19.7	5.0	ug/g	21.5			9.0	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	1.0	1.0	ug/g	1.2			10.1	30	
Vanadium	32.9	10.0	ug/g	34.5			4.9	30	
Zinc	37.4	20.0	ug/g	39.2			4.6	30	
PCBs									
PCBs, total	ND	0.05	ug/g	ND			NC	40	
Surrogate: Decachlorobiphenyl	*0.122*		*ug/g*		*97.2*	*60-140*			
Physical Characteristics									
% Solids	61.2	0.1	% by Wt.	69.6			12.8	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	0.026			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	0.024			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	*1.87*		*ug/g*		*111*	*50-140*			
Surrogate: Terphenyl-d14	*1.94*		*ug/g*		*116*	*50-140*			

Certificate of Analysis

Report Date: 07-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 25-Feb-2022

Client PO: 34000

Project Description: PE5378

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*14.1*		*ug/g*		*123*	*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)	171	7	ug/g	ND	85.3	80-120			
F2 PHCs (C10-C16)	150	4	ug/g	60	96.8	60-140			
F3 PHCs (C16-C34)	876	8	ug/g	616	114	60-140			
F4 PHCs (C34-C50)	154	6	ug/g	ND	107	60-140			
Metals									
Antimony	44.5	1.0	ug/g	ND	87.7	70-130			
Arsenic	50.8	1.0	ug/g	1.3	99.1	70-130			
Barium	109	1.0	ug/g	59.8	98.7	70-130			
Beryllium	48.1	0.5	ug/g	ND	95.9	70-130			
Boron	45.2	5.0	ug/g	ND	85.7	70-130			
Cadmium	48.9	0.5	ug/g	ND	97.7	70-130			
Chromium (VI)	3.4	0.2	ug/g	ND	65.0	70-130			QM-05
Chromium	57.7	5.0	ug/g	8.7	98.1	70-130			
Cobalt	51.6	1.0	ug/g	3.1	97.0	70-130			
Copper	55.0	5.0	ug/g	7.5	94.8	70-130			
Lead	47.9	1.0	ug/g	2.5	90.6	70-130			
Mercury	1.56	0.1	ug/g	ND	104	70-130			
Molybdenum	49.2	1.0	ug/g	ND	97.1	70-130			
Nickel	56.4	5.0	ug/g	8.6	95.5	70-130			
Selenium	46.6	1.0	ug/g	ND	92.7	70-130			
Silver	44.8	0.3	ug/g	ND	89.5	70-130			
Thallium	46.9	1.0	ug/g	ND	93.5	70-130			
Uranium	48.0	1.0	ug/g	ND	95.1	70-130			
Vanadium	63.7	10.0	ug/g	13.8	99.8	70-130			
Zinc	61.3	20.0	ug/g	ND	91.2	70-130			
PCBs									
PCBs, total	0.571	0.05	ug/g	ND	113	60-140			
Surrogate: Decachlorobiphenyl	*0.143*		*ug/g*		*113*	*60-140*			
Semi-Volatiles									
Acenaphthene	0.230	0.02	ug/g	ND	109	50-140			
Acenaphthylene	0.179	0.02	ug/g	ND	85.3	50-140			
Anthracene	0.176	0.02	ug/g	ND	83.9	50-140			
Benzo [a] anthracene	0.150	0.02	ug/g	ND	71.2	50-140			
Benzo [a] pyrene	0.178	0.02	ug/g	ND	84.9	50-140			
Benzo [b] fluoranthene	0.209	0.02	ug/g	ND	99.4	50-140			
Benzo [g,h,i] perylene	0.195	0.02	ug/g	ND	93.1	50-140			
Benzo [k] fluoranthene	0.204	0.02	ug/g	ND	96.9	50-140			
Chrysene	0.224	0.02	ug/g	ND	106	50-140			
Dibenzo [a,h] anthracene	0.187	0.02	ug/g	ND	89.2	50-140			
Fluoranthene	0.176	0.02	ug/g	ND	84.0	50-140			
Fluorene	0.215	0.02	ug/g	ND	102	50-140			
Indeno [1,2,3-cd] pyrene	0.187	0.02	ug/g	ND	89.2	50-140			
1-Methylnaphthalene	0.263	0.02	ug/g	0.026	113	50-140			
2-Methylnaphthalene	0.269	0.02	ug/g	0.024	117	50-140			
Naphthalene	0.249	0.01	ug/g	ND	118	50-140			
Phenanthrene	0.197	0.02	ug/g	ND	93.8	50-140			
Pyrene	0.179	0.02	ug/g	ND	85.1	50-140			
Surrogate: 2-Fluorobiphenyl	*2.00*		*ug/g*		*119*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Surrogate: Terphenyl-d14	*2.27*		*ug/g*		*135*	*50-140*			
Volatiles									
Benzene	3.78	0.02	ug/g	ND	94.5	60-130			
Ethylbenzene	3.85	0.05	ug/g	ND	96.2	60-130			
Toluene	3.82	0.05	ug/g	ND	95.5	60-130			
m,p-Xylenes	7.41	0.05	ug/g	ND	92.6	60-130			
o-Xylene	3.80	0.05	ug/g	ND	95.1	60-130			
Surrogate: Toluene-d8	*8.17*		*ug/g*		*102*	*50-140*			

Qualifier Notes:

QC Qualifiers :

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

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2209476

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2209476	№ 136819

Client Name: Paterson Group	Project Ref: PE5378	Page __ of __
Contact Name: Nick Sullivan	Quote #:	Turnaround Time: ☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Address: 154 Colonnade Rd	PO #: 34000	
Telephone:	E-mail: nsullivan@patersongroup.ca	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)	PCBs	pH	EC/SAR		
1	BH1-22-SS7	S		3	Feb 15/2022		X							X	X			
2	BH2-22-SS2	↓		2	↓				X	X	X	X				X		
3	BH3-22-AG1			2					X	X	X	X			X			
4	DUP-1			1						X								
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): Kat Linscott	Received By Driver/Depot: Mike Bruce	Received at Lab: Svneeparm Rahmani	Verified By: BC
Relinquished By (Print): Kat Linscott	Date/Time: Feb 25, 2022 01:07	Date/Time: Feb 25, 2022 01:59	Date/Time: Feb 25, 22 15:38
Date/Time: February 25/2022	Temperature: °C	Temperature: 4.9 °C	pH Verified: ☐ By:

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1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Nick Sullivan

Client PO: 33982
Project: PE5378
Custody: 136945

Report Date: 2-Mar-2022
Order Date: 24-Feb-2022

Order #: 2209377

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

Paracel ID	Client ID
2209377-01	BH1-22-GW1
2209377-02	BH3-22-GW1
2209377-03	DUP

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 02-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 24-Feb-2022

Client PO: 33982

Project Description: PE5378

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	26-Feb-22	26-Feb-22
PCBs, total	EPA 608 - GC-ECD	25-Feb-22	25-Feb-22
PHC F1	CWS Tier 1 - P&T GC-FID	25-Feb-22	26-Feb-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	28-Feb-22	2-Mar-22

Certificate of Analysis

Report Date: 02-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 24-Feb-2022

Client PO: 33982

Project Description: PE5378

	Client ID:	BH1-22-GW1	BH3-22-GW1	DUP	-
	Sample Date:	24-Feb-22 09:00	24-Feb-22 09:00	24-Feb-22 09:00	-
	Sample ID:	2209377-01	2209377-02	2209377-03	-
	MDL/Units	Water	Water	Water	-
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	104%	103%	103%	-
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	-
PCBs					
PCBs, total	0.05 ug/L	<0.05	-	-	-
Decachlorobiphenyl	Surrogate	105%	-	-	-

Certificate of Analysis

Report Date: 02-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 24-Feb-2022

Client PO: 33982

Project Description: PE5378

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
PCBs									
PCBs, total	ND	0.05	ug/L						
Surrogate: Decachlorobiphenyl	*0.662*		*ug/L*		*132*	*60-140*			
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	*82.5*		*ug/L*		*103*	*50-140*			

Certificate of Analysis

Report Date: 02-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 24-Feb-2022

Client PO: 33982

Project Description: PE5378

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	*81.6*		*ug/L*		*102*	*50-140*			

Certificate of Analysis

Report Date: 02-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 24-Feb-2022

Client PO: 33982

Project Description: PE5378

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1940	25	ug/L	ND	97.0	68-117			
F2 PHCs (C10-C16)	1380	100	ug/L	ND	86.2	60-140			
F3 PHCs (C16-C34)	3850	100	ug/L	ND	98.2	60-140			
F4 PHCs (C34-C50)	2660	100	ug/L	ND	107	60-140			
PCBs									
PCBs, total	1.12	0.05	ug/L	ND	112	65-135			
Surrogate: Decachlorobiphenyl	*0.602*		*ug/L*		*120*	*60-140*			
Volatiles									
Benzene	40.4	0.5	ug/L	ND	101	60-130			
Ethylbenzene	29.0	0.5	ug/L	ND	72.4	60-130			
Toluene	32.4	0.5	ug/L	ND	81.1	60-130			
m,p-Xylenes	73.7	0.5	ug/L	ND	92.1	60-130			
o-Xylene	34.8	0.5	ug/L	ND	86.9	60-130			
Surrogate: Toluene-d8	*79.5*		*ug/L*		*99.4*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PARACEL LABORATORIES LT

Paracel ID: 2209377

Blvd. 4J8 s.com

Paracel Order Number (Lab Use Only): 2209377

Chain Of Custody

(Lab Use Only)

№ 136945

Client Name: Paterson	Project Ref: PE 5378
Contact Name: Nick Sullivan	Quote #:
Address: 154 Colonnade	PO #: 33982
Telephone: 613 226 7381	E-mail: NSullivan@Patersongroup.ca

Page __ of __

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

Date Required:

☒ REG 153/04 ☐ REG 406/19

☒ Table 1 ☐ Res/Park ☐ Med/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ Table ___

For RSC: ☐ Yes ☐ No

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

Mun:

☐ Other:

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	PCB's				
1	BH1-22-GW1	GW		4	Feb 24 2022		✓							✓				
2	BH3-22-GW1	↓		3	↓		✓											
3	DUP	↓		3	↓		✓											
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): GPat	Received By Driver/Depot: [signature]	Received at Lab: [signature] Dolmai	Verified By: [signature]
Relinquished By (Print): Grant Paterson	Date/Time: 24/02/22 3:40	Date/Time: Feb 24, 2022 04.45	Date/Time: Feb 24 2022 5:36
Date/Time: Feb 24 2022	Temperature: °C PH	Temperature: 16.1 °C	pH Verified: ☐ By: