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Phase II Environmental Site Assessment

Part of 525 Legget Drive and
Part of 359 Terry Fox Drive
City of Ottawa, Ontario

Prepared For

KRP Properties

January 24, 2022

Report: PE5413-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the subject site addressed Part of 525 Legget Drive and 359 Terry Fox Drive, in the Ottawa, Ontario. The purpose of the Phase II ESA was to address the Areas of Potential Environmental Concern identified on the Phase II ESA Property.

The subsurface investigation consisted of placing five (5) boreholes across the Phase II Property, four (4) which were instrumented with groundwater monitoring wells. The general soil profile encountered during the field program consisted of a pavement structure overlying fill material consisting of silty sand, crushed stone and/or silty clay, followed by interbedded sandstone and dolomite bedrock. Bedrock was encountered during the drilling program at depths ranging from approximately 1.1 to 3.0 mbgs. No deleterious or signs of contamination was identified during the field program.

Six (6) soil samples, including a duplicate sample, were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F_1-F_4), polychlorinated biphenyls (PBCs), volatile organic compounds (VOCs) and/or metals (including hydride forming compounds: arsenic (As), Antimony (Sb), Selenium (Se)). All of the soil results complied with MECP Table 7 Residential Standards.

The sodium adsorption ratio (SAR) and electrical conductivity (EC) on-site were identifed in excess of the selected standard, however, based on the O.Reg. 153/04, Section 49.1, any EC and SAR concentrations on the Phase II ESA Property that exceeded the MECP Table 7 Standards for a residential/institutional land use are deemed not to be exceeded for the purpose of Part XV.1 of the Act. This exemption is being relied upon and as such, the elevated values (EC/SAR) are deemed to meet the applicable site standards.

Groundwater samples from monitoring wells BH1-21, BH3-21 and BH5-21 were collected during the interim of December 15 to 22, 2021. No free product or petroleum hydrocarbon sheen was noted on the purge water during the groundwater sampling events.

Groundwater samples were analyzed for BTEX, PHCs and/or VOCs. With the exception of chloroform, all analyzed parameter concentrations complied with the MECP Table 7 Standards.

The chloroform concentration in excess of the standards is not considered a contaminant as the elevated concentration was due to the use of municipal water during bedrock coring and is expected that this concentration will dissipate over time.

Recommendations

It is our understanding that the Phase II ESA Property will be redeveloped with a 31-storey residential apartment building with two (2) levels of underground parking. Due to the change in land use to a more sensitive land use (commercial to residential), a record of site condition (RSC) will be required as per O.Reg 154/03.

Based on the findings of the Phase II ESA, all analyzed soil and groundwater samples comply with the MECP Table 7 Standards for a residential land use. No further environmental investigation is recommended at this time.

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

Monitoring Wells

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

1.0 INTRODUCTION

At the request of KRP Properties, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment at the subject site referred to as Part of 525 Legget Drive and Part of 359 Terry Fox Drive (the Phase II ESA Property), in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address areas of potential environmental concern (APECs) identified on the Phase II ESA Property, during the Phase I ESA conducted by Paterson in September of 2021.

1.1 Site Description

Address:	Part of 525 Legget Drive and Part of 358 Terry Fox Drive, Ottawa, Ontario.
Location:	The Phase II ESA Property is located on the south side of Terry Fox Drive, approximately 235 m east of Legget Drive, in the City of Ottawa, Ontario. The Phase II ESA Property is shown on Figure 1 - Key Plan following the body of this report.
Legal Description:	Part of Lot 8, Concession 4, Geographic Township of March, and part of Blocks 10 and 11 of Plan 4M1096, in the City of Ottawa.
PIN(s):	04517-1135 and 04517-0745
Latitude and Longitude:	45° 56' 56.52" N, 75° 54’ 59.90" W.

Site Description:

Configuration:	Irregular.
Site Area:	7,000 m^2 (approximate).
Zoning:	IP6 – Business Park Zone.

1.2 Property Ownership

Paterson was engaged to conduct this Phase II ESA by Mr. Richard Goldstein of KRP Properties. The office of KRP Properties is located at 525 Legget Drive, Ottawa, Ontario.

1.3 Current and Proposed Future Uses

The Phase II ESA Property is currently drive lanes, parking, and landscaped areas associated with a commercial office building and the Brookstreet Hotel.

It is our understanding that the Phase II ESA Property will be redeveloped with a 31-storey residential apartment building with two (2) levels of underground parking.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 7 of the document entitled “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”, prepared by the Ontario Ministry of Environment, Conservation and Parks (MECP), April 2011. The MECP selected Table 7 Standards are based on the following considerations:

- ❒ Coarse-grained soil conditions
- ❒ Generic site conditions for shallow soils
- ❒ Non-potable groundwater conditions
- ❒ Residential land use

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

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

Section 43.1 of O.Reg. 153/04 does apply to the Phase II ESA Property in that the property is a Shallow Soil property.

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

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II ESA Property is Part of 525 Legget Drive (and part of 359 Terry Fox Drive), which is located on the south side of Terry Fox Drive, west of Shirley Brook, in the City of Ottawa, Ontario. The site is situated a predominately commercial area.

The Phase II ESA Property currently exists as an asphaltic concrete paved parking lot associated with the Brookfield Hotel, and a laneway fronting Terry Fox Drive. Site drainage consists primarily of sheetflow to catch basins located on site.

The site is relatively flat and at the grade of the adjacent properties and the stormwater management ponds to the east, while the regional topography slopes downwards in a northeasterly direction.

2.2 Past Investigations

Paterson completed a Phase I ESA in September of 2021 for the Phase II ESA Property. Based on the findings of the Phase I ESA, three (3) potentially contaminating activities (PCAs) were on the Phase II ESA Property:

- PCA 55 – "Transformer Manufacturing, Processing and Use," associated with the presence of a concrete pad-mounted transformer on the site (APEC 1).
- PCA other – "Waste production," associated with halogenated solvents from the manufacturing of computer parts off-site at 359 Terry Fox Drive (APEC 2).
- PCA Other – "Use of Road Salt for Deicing," across the Phase I Property (APEC 3).

Although not identified as a specific PCA in Table 2, the application of deicing salts for vehicular and pedestrian safety is also considered to represent an APEC (APEC 3) on the Phase I ESA Property.

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

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

In accordance with Section 49.1 of O.Reg. 153/04, any EC and SAR concentrations on the RSC Property that exceed the MECP Table 7 standards for a residential/institutional land use are deemed not to be exceeded for the purpose of Part XV.1 of the Act. This exemption is being relied on for APEC 3.

The APECs are shown on Drawing PE5413-1–Site Plan, while the corresponding PCAs are shown in red on Drawing PE5413-2 – Surrounding Land Use Plan, in the Figures section of the Phase I ESA.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted On December 8 and 9 of 2021. The field program consisted of drilling 5 boreholes to address the APECs identified during the Phase I ESA. Four (4) of the boreholes (BH1-21, BH2-21, BH3-21, and BH5-21) were cored into the bedrock and completed with monitoring well installations. Boreholes were drilled to a maximum depth of 7.0 m below the ground surface (mbgs).

3.2 Media Investigated

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

Contaminants of potential concern on the Phase II ESA Property include benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs) and metals (including arsenic, antimony and selenium), as well as electrical conductivity (EC) and sodium adsorption ratio (SAR). These CPCs may be present in the soil and/or groundwater beneath the Phase II ESA Property.

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

Based on information from the Geological Survey of Canada mapping, drift thickness in the area of the subject site is on the order of 5 to 10 m across the site. The overburden consisted of alluvial sediments and bedrock consisting of interbedded sandstone and dolomite of the March Formation.

Existing Buildings and Structures

A concrete block pump is situated on the southeastern side of the Phase I ESA Property. Three (3) concrete pad-mounted transformer is present along the eastern property boundary of the Phase I ESA Property. These transformers represent APECs on the Phase I ESA Property.

Subsurface Services and Utilities

The Phase I ESA Property is situated in a municipally serviced area. Underground structures include stormwater and municipal water entering from Legget Drive and Terry Fox Drive, respectively.

Areas of Natural Significance

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

Water Bodies

Shirley's Brook is located approximately 30 m east of the Phase I ESA Property. No other natural water bodies were identified in the Phase I Study Area. Stormwater management ponds are present to the immediate east of the site.

Water Wells

There are no potable water wells or monitoring wells within the Phase I study area.

Neighbouring Land Use

Neighbouring land use in the Phase I study area consists primarily of commercial (hotel and office buildings). Land use is shown on Drawing PE5413-2 - Surrounding Land Use Plan.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 2.2 of this report, two (2) PCAs and the resultant APECs are summarized in Table 2, along with their respective locations and contaminants of potential concern (CPCs).

Table 1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1 Resulting from the presence of a pad-mounted transformer	Central portion of the Phase I ESA property	PCA 55 – Transformer manufacturing, processing and use	On-site	PHCs (F_1-F_4) PCBs	Soil
APEC 2 Resulting from the former waste production	Northern portion of the Phase I ESA Property	PCA other – Waste production	Off-site	VOCs	Soil and groundwater
APEC3[1] Resulting in the use of road salt	Across the Phase I ESA Property	PCA Other – Use of Road Salt for Deicing	On-site	EC SAR	Soil

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

Contaminants of Potential Concern

As per Table 2 of this report, the Contaminants of Potential Concern (CPCs) include benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs) and metals (including arsenic, antimony and selenium), as well as electrical conductivity (EC) and sodium adsorption ratio (SAR) on or beneath the Phase I ESA Property.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I-ESA is considered to be sufficient to conclude that there are on- and off-site PCAs that are considered to result in APECs on the Phase I ESA Property.

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

3.4 Deviations from Sampling and Analysis Plan

The Phase II ESA Property is situated in a shallow soil area, and as such, the percent recovery for some soil samples were quite low.

3.5 Impediments

A borehole could not be drilled near the (concrete pad transformer) at the northern entrance of the site due to underground utilities in the immediate area. A grab sample was collected to assess the potential impact due the concrete pad transformer located on the northeast corner of the Phase II ESA Property.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation conducted for this Phase II ESA consisted of drilling5 boreholes (BH1-21 through BH5-21) across the Phase II ESA Property. The boreholes were drilled to a maximum depth of 7.0 m below ground surface (bgs) to intercept groundwater.

The boreholes were drilled using a low clearance track mounted drill rig operated by George Downing Estate Drilling of Hawkesbury, Ontario, under full-time supervision of Paterson personnel. The borehole locations are indicated on the attached Drawing PE5413-3 - Test Hole Location Plan.

4.2 Soil Sampling

A total of 15 soil samples were obtained from the boreholes by means of grab sampling from auger flights/auger samples and split spoon sampling. Split spoon samples were taken at approximate 0.76 m intervals.

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

The borehole profiles generally consist of an asphaltic concrete structure followed by fill material consisting of silty sand or sand with crushed stone, gravel and traces of clay, underlain by silty clay or glacial till, followed by sandstone interbedded dolomite.

4.3 Field Screening Measurements

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

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

The PID readings were found to range from 0.4 to 4.7 ppm in the soil samples obtained. These results do not indicate the potential for significant contamination from volatile contaminants. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1. The results of the vapour survey are presented on the Soil Profile and Test Data sheets.

4.4 Groundwater Monitoring Well Installation

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

Borehole locations and elevations were surveyed geodetically by Paterson personnel.

TABLE 2. Monitoring Well Construction Details						
Well ID	**Ground Surface Elevation**	**Total Depth (m BGS)**	**Screened Interval (m BGS)**	**Sand Pack (m BGS)**	**Bentonite Seal (m BGS)**	**Casing Type**
BH1-21	73.60	6.27	3.27-6.27	2.62-6.27	0.15-2.62	Flushmount
BH2-21	75.70	6.17	3.17-6.17	2.51-6.17	0.15-2.51	Flushmount
BH3-21	75.66	5.49	2.49-5.49	1.85-5.49	0.15-1.85	Flushmount
BH5-21	76.69	6.96	3.96-6.96	3.30-3.96	0.15-3.30	Flushmount

4.5 Groundwater Sampling

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

4.6 Analytical Testing

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

TABLE 3: Soil Samples Submitted and Analyzed Parameters								
Sample ID	**Sample Depth / Stratigraphic Unit**	**Parameters Analyzed**						**Rationale**
		BTEX	**PHCs (F1-F4)**	**VOCs**	**PCBs**	**Metals**	**EC/SAR**	
December 8 and 9, 2021								
BH1-21-SS2	0.76-1.37 Fill	X	X	X		X	X	Assess potential soil impacts due to an off-site waste generator, and the quality of the refill material.
BH2-21-SS2	0.76-1.37 Silty clay	X	X		X		X	Assess potential soil impact due to the presence of an on-site transformer.
BH3-21-AU1/SS2	0.13-1.14 Fill	X	X	X		X	X	Assess potential soil impacts due to an off-site waste generator, and the quality of the refill material.

TABLE 3: Soil Samples Submitted and Analyzed Parameters								
Sample ID	Sample Depth / Stratigraphic Unit	Parameters Analyzed						Rationale
		BTEX	PHCs (F1-F4)	VOCs	PCBs	Metals	EC/SAR	
BH4-21-SS2	0.76-1.37 Fill	X	X	X	X	X	X	Assess potential soil impacts due to an on-site transformer, an off-site waste generator, and the quality of the refill material.
BH5-21-SS3	1.52-2.13 Fill	X	X	X		X	X	Assess potential soil impacts due to an off-site waste generator, and the quality of the refill material.
G1-21	0.15-0.76 Fill	X	X				X	Assess potential impact due to the presence of a transformer.
DUP	0.76-1.37 Silty clay	X	X					Duplicate soil sample (BH2-21-SS2) for QA/QC purposes.

TABLE 4: Groundwater Samples Submitted and Analyzed Parameters					
Sample ID	Screened Interval (m)	Parameters Analyzed			Rationale
		BTEX	PHCs (F1-F4)	VOCs	
December 14, 2021					
BH1-21-GW1	3.27-6.27	X	X	X	General Coverage
BH3-21-GW1	2.49-5.49	X	X	X	Assess potential groundwater impacts due to potential off-site waste generator.
BH5-21-GW1	3.96-6.96	X	X	X	Assess potential groundwater impacts due to potential off-site waste generator
DUP	2.49-5.49	X	X		Duplicate groundwater sample (BH3-21-GW1) for QA/QC purposes.

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

4.7 Residue Management

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

4.8 Elevation Surveying

Boreholes were surveyed to geodetic elevations by Paterson personnel.

4.9 Quality Assurance and Quality Control Measures

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

5.0 REVIEW AND EVALUATION

5.1 Geology

Site soils consist of fill material consisting of silty sand or sand with crushed stone and gravel and traces of clay, followed by silty sand and/or glacial till, underlain by sandstone interbedded with dolomite.

Bedrock was encountered at depths ranging from approximately 1.1 to 3.0 m below grade. Bedrock was cored to a maximum depth of 7.0 m below grade.

Groundwater was encountered within the overburden at depths ranging from approximately 1.35 to 2.93 mbgs.

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

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling event on December 14, 2021 using an electronic water level meter. Groundwater levels are summarized below in Table 5.

TABLE 5: Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1-21	75.22	2.53	73.69	December 22, 2021
BH2-21	75.70	2.39	72.77	December 22, 2021
BH3-21	75.66	1.18	74.31	December 22, 2021
BH5-21	76.69	2.50	74.12	December 22, 2021

Based on the groundwater elevations measured during the sampling events, groundwater contour mapping was completed. Groundwater contours are shown on Drawing PE5413-3. Based on the contour mapping, groundwater flow at the Phase II ESA Property is in an easterly direction. A horizontal hydraulic gradient of approximately 0.024m/m was calculated.

5.3 Fine-Coarse Soil Texture

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

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in vapour readings ranging from 0.4 to 4.7 ppm. The field screening results of each individual soil sample are provided on the Soil Profile and Test Data Sheets appended to this report.

5.5 Soil Quality

Six (6) soil samples, plus a duplicate were submitted for BTEX, PHCs (F1-F4), VOCs, PCBs and/or metals analysis. The results of the analytical testing are presented in Tables 6, 7, 8 and 9. The laboratory certificate of analysis is provided in Appendix 1.

TABLE 6: Analytical Test Results – Soil
BTEX and PHCs F_1-F_4

Parameter	MDL (µg/g)	Soil Samples (µg/g) December 8, 2021				MECP Table 7 Residential Standards (µg/g)
		BH1-21-SS2	BH2-21-SS2	BH3-21-AU1/SS2	BH4-21-SS2	
Benzene	0.02	nd	nd	nd	nd	.21
Toluene	0.05	nd	nd	nd	nd	2.3
Ethylbenzene	0.05	nd	nd	nd	nd	2
Xylenes	0.05	0.19	nd	nd	nd	3.1
PHC F_1	7	12	nd	nd	nd	55
PHC F_2	4	23	nd	nd	8	98
PHC F_3	8	271	nd	282	88	300
PHC F_4	6	556	nd	587	149	2800
PHC $F_{4\ Gravimetric}$	6	801	NA	1060	334	2800

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

TABLE 6 Continued: Analytical Test Results – Soil
BTEX and PHCs F_1-F_4

Parameter	MDL (µg/g)	Soil Samples (µg/g) December 8 and 9, 2021			MECP Table 7 Residential Standards (µg/g)
		BH5-21-SS2	G1-21	DUP	
Benzene	0.02	nd	nd	nd	.21
Toluene	0.05	nd	nd	nd	2.3
Ethylbenzene	0.05	nd	nd	nd	2
Xylenes	0.05	nd	nd	nd	3.1
PHC F_1	7	nd	nd	nd	55
PHC F_2	4	nd	nd	nd	98
PHC F_3	8	28	9	nd	300
PHC F_4	6	51	3	nd	2800

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

With the exception of Xylene, no other BTEX parameters were identified in any of the soil samples analyzed. Concentrations of PHCs were detected in all the samples except for BH2-21-SS2 and the DUP. All of the identified concentrations comply with the MECP Table 7 Residential Standards.

TABLE 7: Analytical Test Results – Soil - Metals

Parameter	MDL (µg/g)	Soil Samples (µg/g) December 8 and 9, 2021				MECP Table 7 Residential Standards (µg/g)
		BH1-21-SS2	BH3-21-AU1/SS2	BH4-21-SS2	BH5-21-SS2	
Antimony	1.0	nd	nd	nd	nd	7.5
Arsenic	1.0	1.1	1.9	1.8	1.7	18
Barium	1.0	29.9	88.4	85.8	220	390
Beryllium	0.5	nd	nd	nd	nd	4
Boron	5.0	5.7	17.8	nd	12.0	120
Cadmium	0.5	nd	nd	nd	nd	1.2
Chromium	5.0	8.0	14.1	22.4	7.2	160
Cobalt	1.0	1.6	4.6	4.9	2.6	22
Copper	5.0	nd	9.1	9.7	nd	140
Lead	1.0	3.9	7.6	4.0	9.9	120
Molybdenum	1.0	nd	nd	nd	nd	6.9
Nickel	5.0	nd	10.9	12.4	7.8	100
Selenium	1.0	nd	nd	nd	nd	2.4
Silver	0.3	nd	nd	nd	nd	20
Thallium	1.0	nd	nd	nd	nd	1
Uranium	1.0	nd	nd	nd	nd	23
Vanadium	10.0	nd	13.9	27.4	nd	86
Zinc	20.0	nd	nd	nd	nd	340

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

Metal parameters were detected in all of the soil samples analyzed. All metal concentrations comply with the selected MECP Table 7 Residential Standards.

TABLE 7: Analytical Test Results – Soil
PCBs

Parameter	MDL (µg/g)	Soil Samples (µg/g) December 8 and 9, 2021			MECP Table 7 Residential Standards (µg/g)
		BH-21-SS2	BH4-21-SS2	G1-21	
PCBs, total	0.05	nd	nd	nd	0.35

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

PCB concentrations were below the laboratory detection limit and as such, all of the tested PCB concentration comply with the MECP Table 7 Residential Standards.

TABLE 8: Analytical Test Results – Soil - VOCs

Parameter	MDL (µg/g)	Soil Samples (µg/g) December 8 and 9, 2021				MECP Table 7 Residential Standards (µg/g)
		BH1-21-SS2	BH3-21-AU1/SS2	BH4-21-SS2	BH5-21-SS2	
Acetone	0.50	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	3.5
1,2-Dichloroethane	0.05	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	0.05
cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	3.4
trans-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	0.084
1,2-Dichloropropane	0.05	nd	nd	nd	nd	0.05
1,3-Dichloropropene, total	0.05	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	2
Ethylene dibromide (dibromoethane, 1,2-)	0.05	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	2.8
Methyl Ethyl Ketone (2-Butanone)	0.50	nd	nd	nd	nd	16

TABLE 8: Analytical Test Results – Soil - VOCs

Parameter	MDL (µg/g)	Soil Samples (µg/g) December 8 and 9, 2021				MECP Table 7 Residential Standards (µg/g)
		BH1-21-SS2	BH3-21-AU1/SS2	BH4-21-SS2	BH5-21-SS2	
Methyl Isobutyl Ketone	0.50	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	0.28
Toluene	0.05	nd	nd	nd	nd	2.3
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	0.38
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	0.05
Trichloroethylene	0.05	nd	nd	nd	nd	0.061
Trichlorofluoromethane	0.05	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	0.02
Xylenes, total	0.05	0.19	nd	nd	nd	3.1

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

With the exception of Xylene, no other VOC parameters were identified in any of the soil samples analyzed. All of the tested VOC parameters comply with the MECP Table 7 Residential Standards.

TABLE 9: Analytical Test Results – Soil
Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR)

Parameter	MDL	Soil Samples December 8 and 9, 2021						MECP Table 7 Residential Standards
		BH1-21-SS2	BH2-21-SS2	BH3-21-SSAu1/SS2	BH4-21-SS2	BH5-21-SS3	G1-21	
SAR (N/A)	0.01	0.68	**15.7**	**10.4**	**5.88**	**6.22**	3.81	5 N/A
Conductivity (uS/cm)	5	234	**2210**	**1210**	**2370**	**2380**	473	700 uS/cm)

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MD
- **Bold and Underlines** – Parameter exceeds the selected MECP Standards

The sodium adsorption ratio (SAR) and electrical conductivity (EC) at BH2-21 thought BH5-21 are in excess of the selected standard, however, based on the O.Reg. 153/04, Section 49.1, any EC and SAR concentrations on the Phase II ESA Property that exceeded the MECP Table 7 Standards for a residential/institutional land use are deemed not to be exceeded for the purpose of Part XV.1 of the Act. This exemption is being relied upon and as such, the elevated values (EC/SAR) are deemed to meet the applicable site standards.

The analytical results for BTEX, PHCs, VOCs and Metals tested in soil are shown on Drawing PE5413-4 – Analytical Testing Plan – Soil (BTEX, PHCs, VOCs) and Drawing PE5413-5 – Analytical Testing Plan – Soil (Metals and EC/SAR).

The maximum concentrations of analyzed parameters in the soil at the site are summarized in Table 10.

TABLE 10: Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Borehole	Depth Interval (m BGS)
Xylenes	0.19	BH1-21-SS2	0.76-1.37, Fill
PHC F_1	12		
PHC F_2	23		
PHC F_3	282	BH3-21-AU1/SS2	0.13-1.37, Fill
PHC F_4	587		
PHC $F_{4\ Gravimetric}$	1060		
Arsenic	1.9		
Barium	220	BH5-21-SS3	1.52-2.13, Fill
Boron	17.8	BH3-21-AU1/SS2	0.13-1.37, Fill
Chromium	22.4	BH4-21-SS2	0.76-1.37, Fill
Cobalt	4.9		
Copper	9.7		
Lead	9.9	BH5-21-SS3	1.52-2.13, Fill
Nickel	12.4	BH4-21-SS2	0.76-1.37, Fill
Vanadium	27.4		
SAR (N/A)	**15.7**	BH2-21-SS2	0.76-1.37, Silty clay
Conductivity (uS/cm)	**2380**	BH5-21-SS3	1.52-2.13, Fill

Notes:
- **Bold and Underlines** – Parameter exceeds the selected MECP Standards

No other parameters were identified above the laboratory method detection limits. EC and SAR values are meet the applicable standards, as per Section 49.1 of the O.Reg 153/04.

5.6 Groundwater Quality

Groundwater samples from monitoring wells installed in BH1-21, BH3-21 and BH5-21, plus a duplicate were submitted for laboratory analysis of PHC (fractions, F1-F4) and VOCs analyses, which include the BTEX group. The groundwater samples were obtained from the screened intervals noted in Table 2. The results of the analytical testing are presented in Tables 11 and 12. The laboratory certificates of analysis are provided in Appendix 1.

TABLE 11: Analytical Test Results – Groundwater
BTEX and PHCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) December 14, 2021			MECP Table 7 Standards (µg/L)
		BH3-21-GW1	BH5-21-GW1	DUP	
Benzene	0.5	nd	nd	nd	0.5
Toluene	0.5	nd	nd	nd	320
Ethylbenzene	0.5	nd	nd	nd	54
Xylenes	0.5	nd	nd	nd	72
PHC F_1	25	nd	nd	nd	420
PHC F_2	100	nd	nd	nd	150
PHC F_3	100	nd	nd	nd	200
PHC F_4	100	nd	nd	nd	200

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

No detectable BTEX or PHC concentrations were identified in the groundwater samples analyzed. All of the groundwater results comply with the MECP Table 7 Standards.

TABLE 12: Analytical Test Results – Groundwater - VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) December 14 and 22, 2021				MECP Table 7 Residential Standards (µg/L)
		BH1-21-GW1	BH3-21-GW1	BH5-21-GW1	Trip Blank	
Acetone	5.0	nd	226	nd	nd	100000
Benzene	0.5	nd	nd	nd	nd	0.5
Bromodichloromethane	0.5	nd	nd	nd	nd	67000
Bromoform	0.5	nd	nd	nd	nd	5
Bromomethane	0.5	nd	nd	nd	nd	0.89
Carbon Tetrachloride	0.2	nd	nd	nd	nd	0.2
Chlorobenzene	0.5	nd	nd	nd	nd	140 L
Chloroform	0.5	nd	**7.2**	nd	nd	2 L
Dibromochloromethane	0.5	nd	nd	nd	nd	65000
Dichlorodifluoromethane	1.0	nd	nd	nd	nd	3500
1,2-Dichlorobenzene	0.5	nd	nd	nd	nd	150
1,3-Dichlorobenzene	0.5	nd	nd	nd	nd	7600
1,4-Dichlorobenzene	0.5	nd	nd	nd	nd	0.5
1,1-Dichloroethane	0.5	nd	nd	nd	nd	11
1,2-Dichloroethane	0.5	nd	nd	nd	nd	0.5
1,1-Dichloroethylene	0.5	nd	nd	nd	nd	0.5
cis-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	nd	0.58
1,3-Dichloropropene, total	0.5	nd	nd	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	nd	nd	54

TABLE 12: Analytical Test Results – Groundwater - VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L) December 14 and 22, 2021				MECP Table 7 Residential Standards (µg/L)
		BH1-21-GW1	BH3-21-GW1	BH5-21-GW1	Trip Blank	
Ethylene dibromide (dibromoethane, 1,2-)	0.2	nd	nd	nd	nd	0.2
Hexane	1.0	nd	nd	nd	nd	5
Methyl Ethyl Ketone (2-Butanone)	5.0	nd	nd	nd	nd	21000
Methyl Isobutyl Ketone	5.0	nd	nd	nd	nd	5200
Methyl tert-butyl ether	2.0	nd	nd	nd	nd	15
Methylene Chloride	5.0	nd	nd	nd	nd	26
Styrene	0.5	nd	nd	nd	nd	43
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	nd	1.1
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	nd	0.5
Tetrachloroethylene	0.5	nd	nd	nd	nd	0.5
Toluene	0.5	nd	nd	nd	nd	320
1,1,1-Trichloroethane	0.5	nd	nd	nd	nd	23
1,1,2-Trichloroethane	0.5	nd	nd	nd	nd	0.5
Trichloroethylene	0.5	nd	nd	nd	nd	0.5
Trichlorofluoromethane	1.0	nd	nd	nd	nd	2000
Vinyl Chloride	0.5	nd	nd	nd	nd	0.5
Xylenes, Total	0.5	nd	nd	nd	nd	72

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlines** – Parameter exceeds the selected MECP Standards

Chloroform concentration in groundwater sample BH3-21-GW1 was in excess of the selected MECP standard. The elevated chloroform concentration is due of the municipal water used for coring bedrock. It is expected that the concentration of chloroform will dissipate over time and as such, it is not considered a contaminant. All VOC parameters comply with the MECP Table 7 Standards. The analytical results for BTEX, PHCs and VOCs tested in groundwater are shown on Drawing PE5413-5–Analytical Testing Plan – Groundwater.

The maximum concentrations of analyzed parameters in the groundwater at the site are summarized below in Table 13.

TABLE 13: Maximum Concentrations – Groundwater

Parameter	Maximum Concentration (µg/L)	Borehole	Screened Interval (m BGS)
Acetone	226	BH3-21-GW1	2.49-5.49
Chloroform	7.2		

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

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of the December 2021 sampling events were handled in accordance with the Analytical Protocol with respect to preservation method, storage requirement, and container type.

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

A duplicate soil sample and groundwater sample (DUP) were obtained from BH2-21-SS2 and BH3-21-GW1 and analyzed for BTEX and PHCs. The test concentrations for BH2-21-SS2 and the duplicate soil sample were below the detection limit.

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

5.8 Phase II Conceptual Site Model

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

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

Based on the results of the Phase I ESA completed for the Phase II ESA Property, three (3) PCAs and the resultant APECs are summarized in Table13, along with their respective locations and contaminants of potential concern (CPCs).

Table 13: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1 Resulting from the presence of a pad-mounted transformer	Central portion of the Phase I ESA property	PCA 55 – Transformer manufacturing, processing and use	On-site	PHCs (F_1-F_4) PCBs	Soil
APEC 2 Resulting from the former waste production	Northern portion of the Phase I ESA Property	PCA other – Waste production	Off-site	VOCs	Soil and groundwater
APEC3[1] Resulting in the use of road salt	Across the Phase I ESA Property	PCA Other – Use of Road Salt for Deicing	On-site	EC SAR	Soil

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

Contaminants of Potential Concern

The contaminants of potential concern (CPCs) in soil and/or groundwater include benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs) and metals (including arsenic, antimony and selenium), as well as electrical conductivity (EC) and sodium adsorption ratio (SAR).

Existing Buildings and Structures

A concrete block pump is situated on the southeastern side of the Phase II ESA Property. Three (3) concrete pad-mounted transformer is present along the eastern property boundary of the Phase II ESA Property.

Subsurface Structures and Utilities

The Phase II ESA Property is situated in a municipally serviced area. Underground structures include stormwater and municipal water entering from Legget Drive and Terry Fox Drive, respectively.

Physical Setting

Site Stratigraphy

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is illustrated on Drawings PE5413-4A, 4B, 5A and 5B. The stratigraphy consists of:

- An asphaltic concrete structure of approximately 0.13 m thick, overlies the fill material consisting of silty sand and gravel with some crushed stone and traces clay was identified in all of the boreholes. The fill material extended to depths of approximately 0.76 to 2.62 mbgs. Groundwater was not encountered in this layer.
- Silty clay or silty sand was encountered in BH2-2 and BH5-21, extending to depths of approximately 2.21 to 2.67 mbgs. Groundwater was not encountered in this layer.
- Glacial till consisting of silty sand, gravel, cobles, boulders and rock fragments was encountered in BH4-21 and BH5-21, extending to depths of approximately 2.31 and 3.05 mbgs, respectively. BH4-21 was terminated in this layer. Groundwater was encountered in this layer in BH5-21.
- Sandstone interbedded with dolomite was encountered in BH1-21, BH2-21, BH3-21 and BH5-21 and terminated in this layer at depths ranging from approximately 5.51 to 7.01mbgs. Groundwater was encountered in this layer at BH1-21, BH2-21 and BH3-21.

Hydrogeological Characteristics

Groundwater at the Phase II ESA Property was encountered in the bedrock. During the most recent groundwater monitoring event, groundwater flow was measured in an easterly direction, with a hydraulic gradient of 0.04 m/m. Groundwater contours are shown on Drawing PE5413-3 – Test Hole Location Plan.

Approximate Depth to Bedrock

Bedrock was encountered during the drilling program at depths ranging from approximately 1.1 to 3.0 mbgs.

Approximate Depth to Water Table

The depth to the water table at the Phase II ESA Property varies between approximately 1.35 to 2.93 m below existing grade.

Sections 41 and 43.1 of the Regulation

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

Section 43.1 of the Regulation does apply to the Phase II ESA Property as bedrock is located less than 2 m below ground surface.

Fill Placement

The fill material consisted of silty sand or sand, crushed stone ang gravel with traces of clay, which extended to depths of 0.76 to 2.62 mbgs.

Existing Buildings and Structures

The Phase II ESA Property is situated in a municipally serviced area. Underground structures include stormwater and municipal water entering from Legget Drive and Terry Fox Drive, respectively.

Areas of Natural Significance

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

Water Bodies

Shirley's Brook is located approximately 30 m east of the Phase II ESA Property. No other natural water bodies were identified in the Phase I Study Area. Stormwater management ponds are present to the immediate east of the site.

Environmental Condition

Areas Where Contaminants are Present

Based on the analytical results for soil and groundwater, there are no contaminants present on the Phase II ESA Property. Elevated sodium adsorption ratio (SAR) and electrical conductivity (EC) were identified in the soil samples.

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

No exceedances of the applicable soil or groundwater standards were identified on the Phase II ESA property.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the subject site addressed Part of 525 Legget Drive and 359 Terry Fox Drive, in the Ottawa, Ontario. The purpose of the Phase II ESA was to address the Areas of Potential Environmental Concern identified on the Phase II ESA Property.

The subsurface investigation consisted of placing five (5) boreholes across the Phase II Property, four (4) which were instrumented with groundwater monitoring wells. The general soil profile encountered during the field program consisted of a pavement structure overlying fill material consisting of silty sand, crushed stone and/or silty clay, followed by interbedded sandstone and dolomite bedrock. Bedrock was encountered during the drilling program at depths ranging from approximately 1.1 to 3.0 mbgs. No deleterious or signs of contamination was identified during the field program.

Six (6) soil samples, including a duplicate sample, were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F_1-F_4), polychlorinated biphenyls (PBCs), volatile organic compounds (VOCs) and/or metals (including hydride forming compounds: arsenic (As), Antimony (Sb), Selenium (Se)). All of the soil results complied with MECP Table 7 Residential Standards.

The sodium adsorption ratio (SAR) and electrical conductivity (EC) on-site were identifed in excess of the selected standard, however, based on the O.Reg. 153/04, Section 49.1, any EC and SAR concentrations on the Phase II ESA Property that exceeded the MECP Table 7 Standards for a residential/institutional land use are deemed not to be exceeded for the purpose of Part XV.1 of the Act. This exemption is being relied upon and as such, the elevated values (EC/SAR) are deemed to meet the applicable site standards.

Groundwater samples from monitoring wells BH1-21, BH3-21 and BH5-21 were collected during the interim of December 15 to 22, 2021. No free product or petroleum hydrocarbon sheen was noted on the purge water during the groundwater sampling events.

Groundwater samples were analyzed for BTEX, PHCs and/or VOCs. With the exception of chloroform, all analyzed parameter concentrations complied with the MECP Table 7 Standards.

The chloroform concentration in excess of the standards is not considered a contaminant as the elevated concentration was due to the use of municipal water during bedrock coring and is expected that this concentration will dissipate over time.

Recommendations

It is our understanding that the Phase II ESA Property will be redeveloped with a 31-storey residential apartment building with two (2) levels of underground parking. Excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19 – On-site and Excess Soil Management. Additional information can be provided upon request.

Based on the findings of the Phase II ESA, all analyzed soil and groundwater samples comply with the MECP Table 7 Standards for a residential land use. No further environmental investigation is recommended at this time.

Monitoring Wells

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

7.0 STATEMENT OF LIMITATIONS

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

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

Should any conditions be encountered at the Phase II ESA 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 KRP Properties. Notification from KRP Properties and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

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

Michael Beaudoin, P.Eng., QP_{ESA}

Report Distribution:

- KRP Properties
- Paterson Group

FIGURES

Figure 1 - Key Plan

Drawing PE5413-3 – Test Hole Location Plan & Groundwater Contour Plan

Drawing PE5413-4 – Analytical Testing Plan – Soil

Drawing PE5413-4A – Cross-section A – A' – Soil

Drawing PE5413-4B – Cross-section B – B' – Soil

Drawing PE5413-5 – Analytical Testing Plan – Groundwater

Drawing PE5413-5A – Cross-section A – A' – Groundwater

Drawing PE5413-5B – Cross-section B – B' – Groundwater

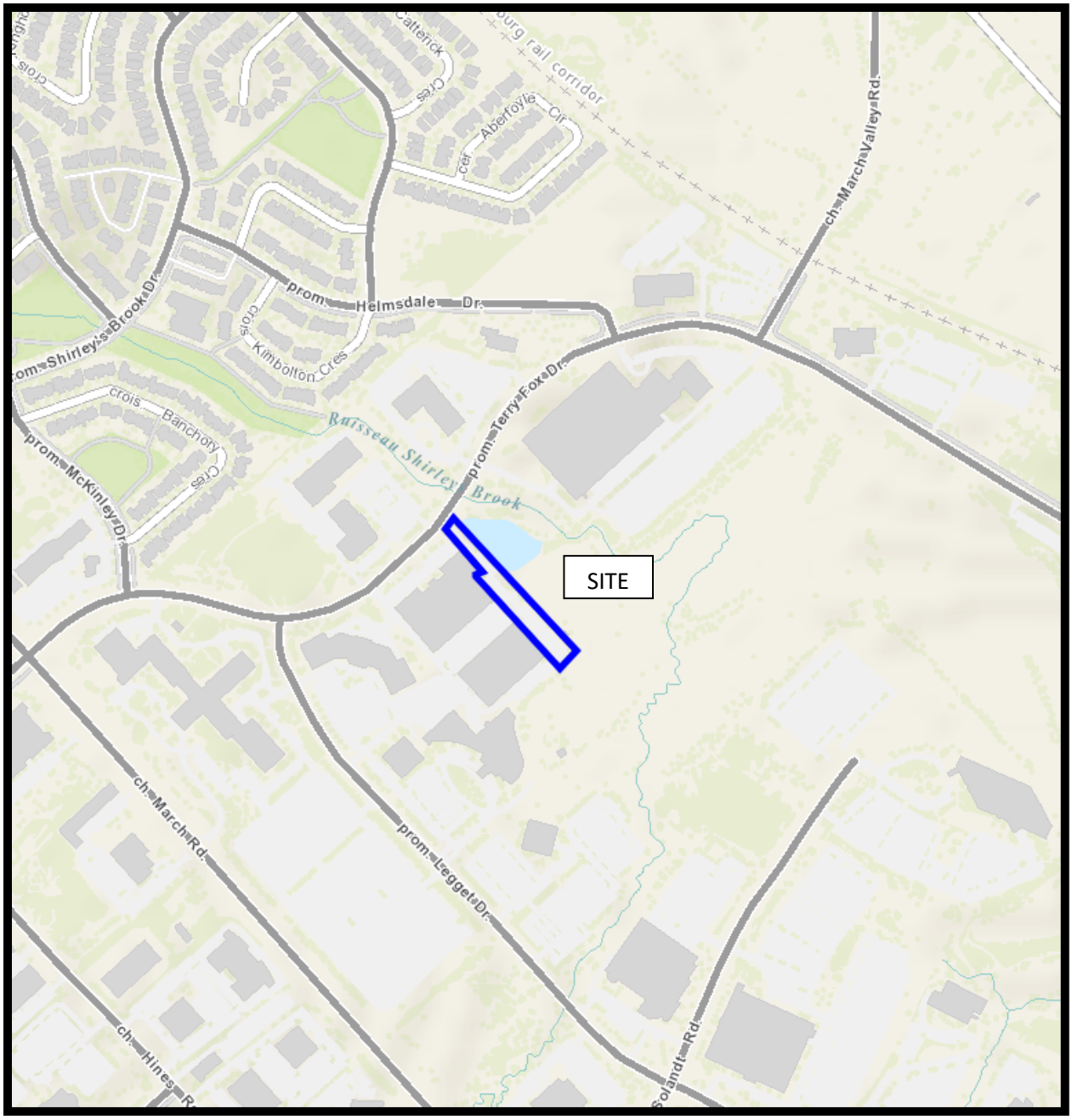
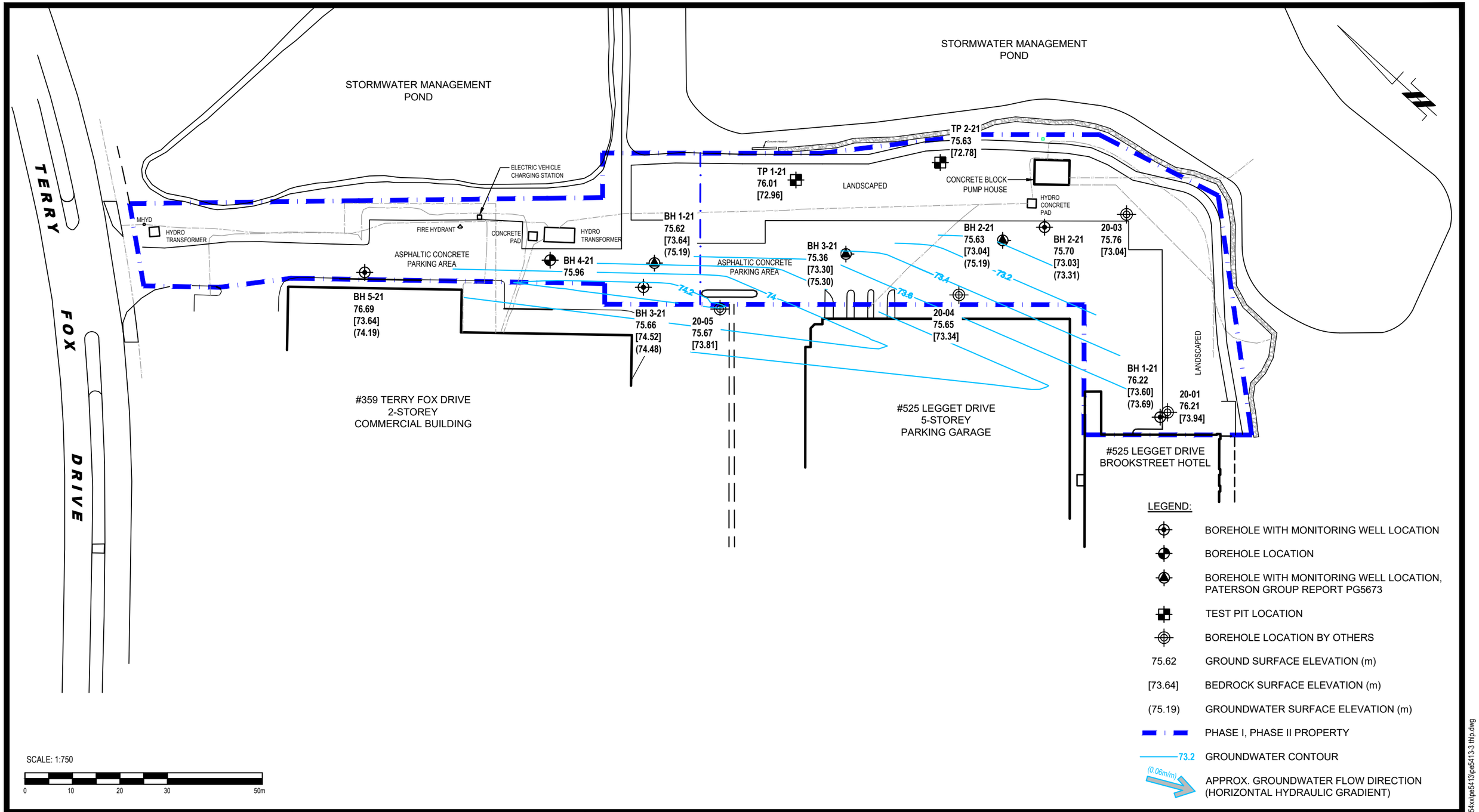


FIGURE 1

KEY PLAN



LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP REPORT PG5673
- TEST PIT LOCATION
- BOREHOLE LOCATION BY OTHERS
- 75.62 GROUND SURFACE ELEVATION (m)
- [73.64] BEDROCK SURFACE ELEVATION (m)
- (75.19) GROUNDWATER SURFACE ELEVATION (m)
- PHASE I, PHASE II PROPERTY
- 73.2 GROUNDWATER CONTOUR
- (0.06m/m) APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

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NO.	REVISIONS	DATE	INITIAL
0			

KRP PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
PART OF 525 LEGGET DRIVE AND PART OF 359 TERRY FOX DRIVE
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:750	Date: 12/2021
Drawn by: MPG	Report No.: PE5413-2
Checked by: MW	Dwg. No.: PE5413-3
Approved by: MB	Revision No.:

11x17

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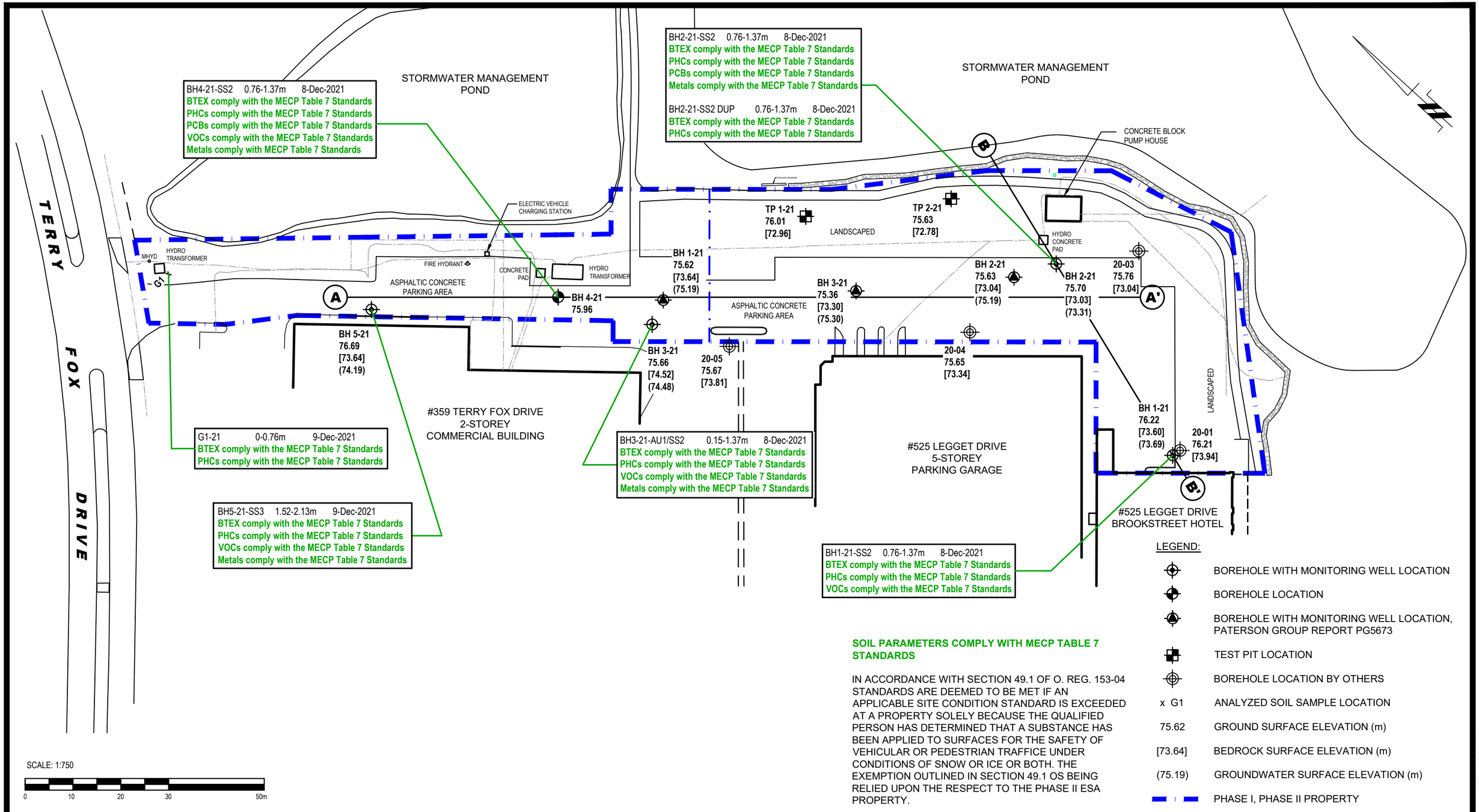

SOIL PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

IN ACCORDANCE WITH SECTION 49.1 OF O. REG. 153-04 STANDARDS ARE DEEMED TO BE MET IF AN APPLICABLE SITE CONDITION STANDARD IS EXCEEDED AT A PROPERTY SOLELY BECAUSE THE QUALIFIED PERSON HAS DETERMINED THAT A SUBSTANCE HAS BEEN APPLIED TO SURFACES FOR THE SAFETY OF VEHICULAR OR PEDESTRIAN TRAFFICE UNDER CONDITIONS OF SNOW OR ICE OR BOTH. THE EXEMPTION OUTLINED IN SECTION 49.1 OS BEING RELIED UPON THE RESPECT TO THE PHASE II ESA PROPERTY.

LEGEND:

⊕	BOREHOLE WITH MONITORING WELL LOCATION
⊕	BOREHOLE LOCATION
⊕	BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP REPORT PG5673
⊞	TEST PIT LOCATION
⊕	BOREHOLE LOCATION BY OTHERS
x G1	ANALYZED SOIL SAMPLE LOCATION
75.62	GROUND SURFACE ELEVATION (m)
[73.64]	BEDROCK SURFACE ELEVATION (m)
(75.19)	GROUNDWATER SURFACE ELEVATION (m)
▬ ▬	PHASE I, PHASE II PROPERTY

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NO.	REVISIONS	DATE	INITIAL
0			

KRP PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
PART OF 525 LEGGET DRIVE AND PART OF 359 TERRY FOX DRIVE
OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:750	Date: 12/2021
Drawn by: MPG	Report No.: PE5413-2
Checked by: MW	Dwg. No.: PE5413-4
Approved by: MB	Revision No.:

11x17

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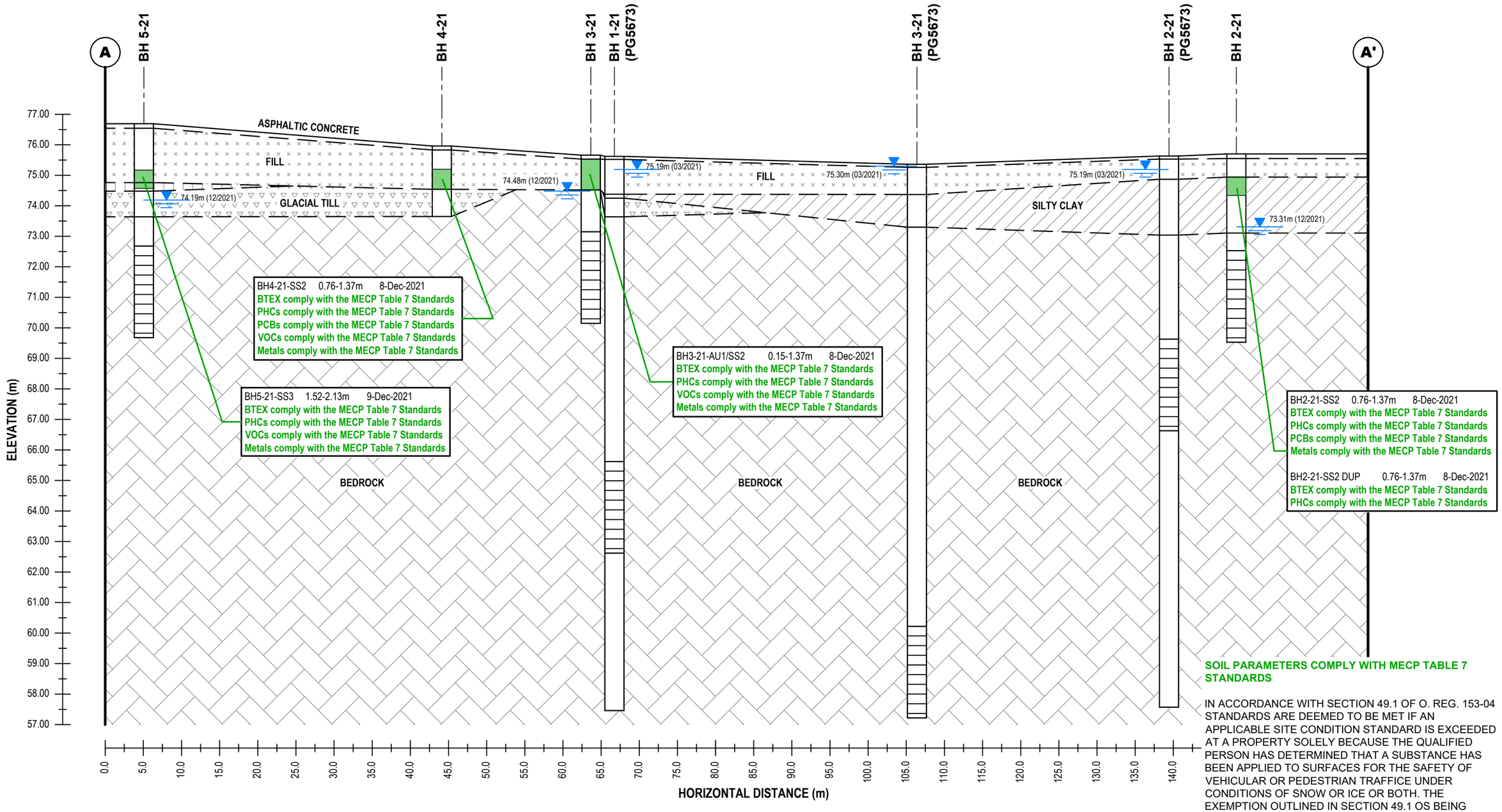

SOIL PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

IN ACCORDANCE WITH SECTION 49.1 OF O. REG. 153-04 STANDARDS ARE DEEMED TO BE MET IF AN APPLICABLE SITE CONDITION STANDARD IS EXCEEDED AT A PROPERTY SOLELY BECAUSE THE QUALIFIED PERSON HAS DETERMINED THAT A SUBSTANCE HAS BEEN APPLIED TO SURFACES FOR THE SAFETY OF VEHICULAR OR PEDESTRIAN TRAFFICE UNDER CONDITIONS OF SNOW OR ICE OR BOTH. THE EXEMPTION OUTLINED IN SECTION 49.1 OS BEING RELIED UPON THE RESPECT TO THE PHASE II ESA PROPERTY.

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NO.	REVISIONS	DATE	INITIAL
0			

KRP PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
PART OF 525 LEGGET DRIVE AND PART OF 359 TERRY FOX DRIVE
OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - SOIL

Scale: AS SHOWN	Date: 01/2022
Drawn by: MPG	Report No.: PE5413-2
Checked by: MW	Dwg. No.: PE5413-4A
Approved by: MB	Revision No.:

11x17

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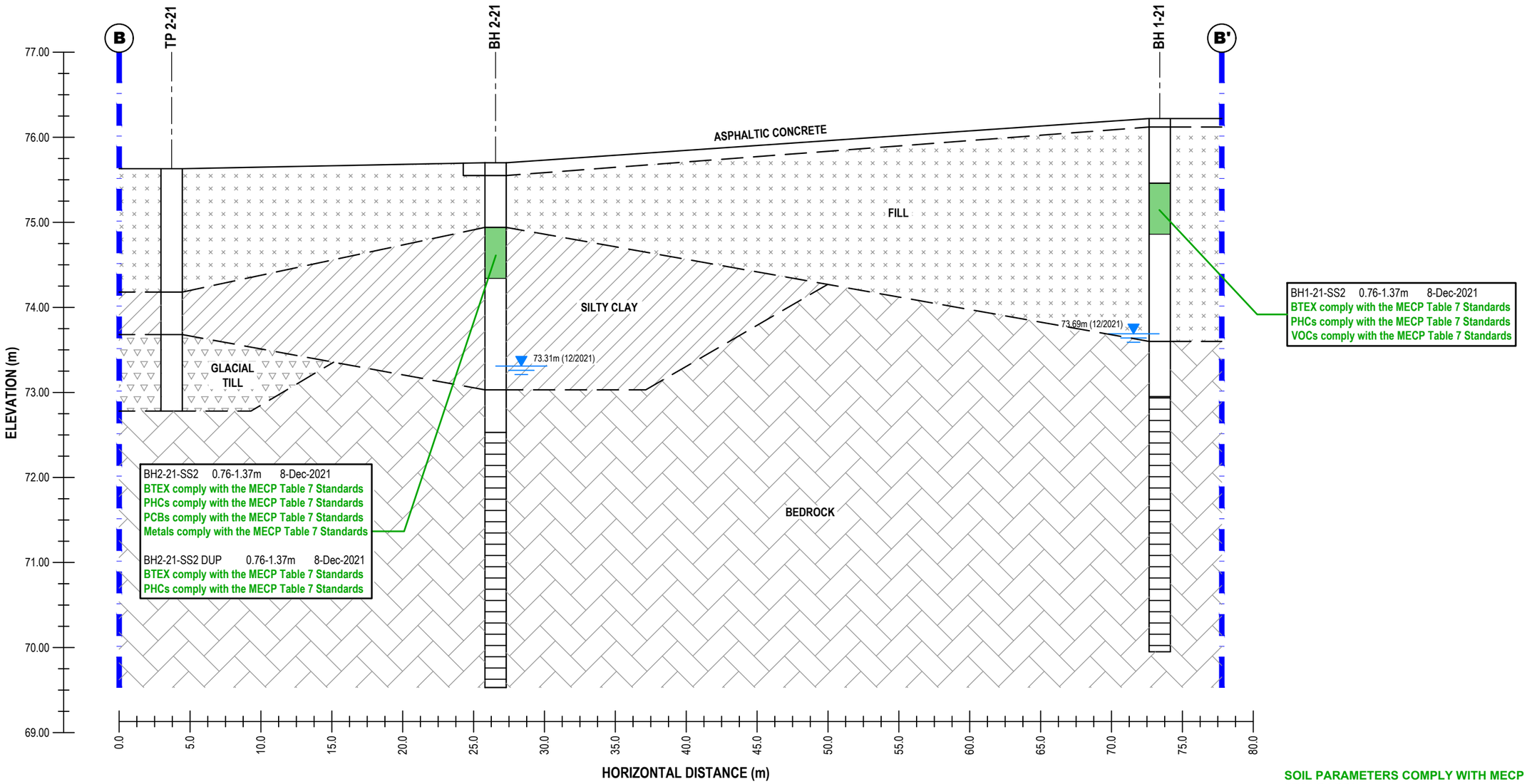

SOIL PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

PHASE I, PHASE II PROPERTY

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

KRP PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
PART OF 525 LEGGET DRIVE AND PART OF 359 TERRY FOX DRIVE
OTTAWA, ONTARIO

Title:

CROSS-SECTION B-B' - SOIL

Scale: AS SHOWN	Date: 01/2022
Drawn by: MPG	Report No.: PE5413-2
Checked by: MW	Dwg. No.: PE5413-4B
Approved by: MB	Revision No.:

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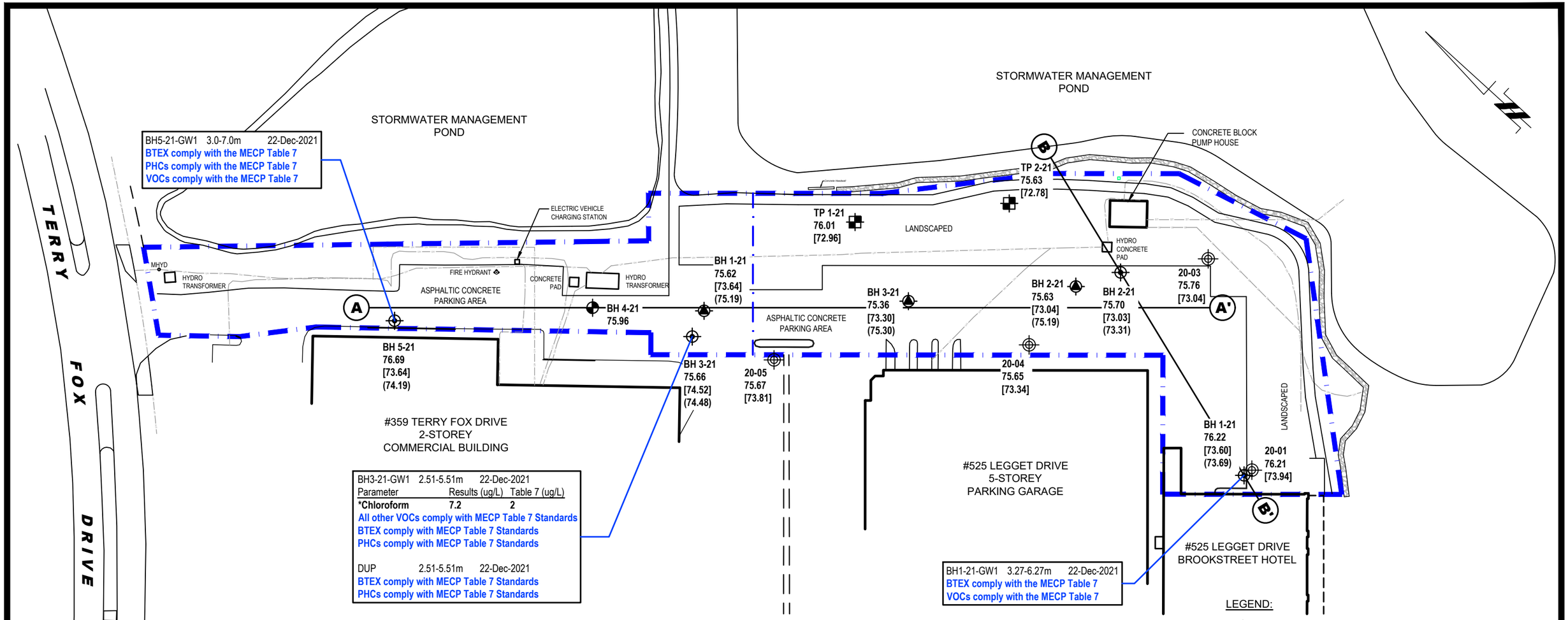
11x17



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Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

KRP PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
PART OF 525 LEGGET DRIVE AND PART OF 359 TERRY FOX DRIVE
OTTAWA, ONTARIO

Title:
ANALYTICAL TESTING PLAN - GROUNDWATER

Scale: 1:750	Date: 12/2021
Drawn by: MPG	Report No.: PE5413-2
Checked by: MW	Dwg. No.: PE5413-5
Approved by: MB	Revision No.:

11x17

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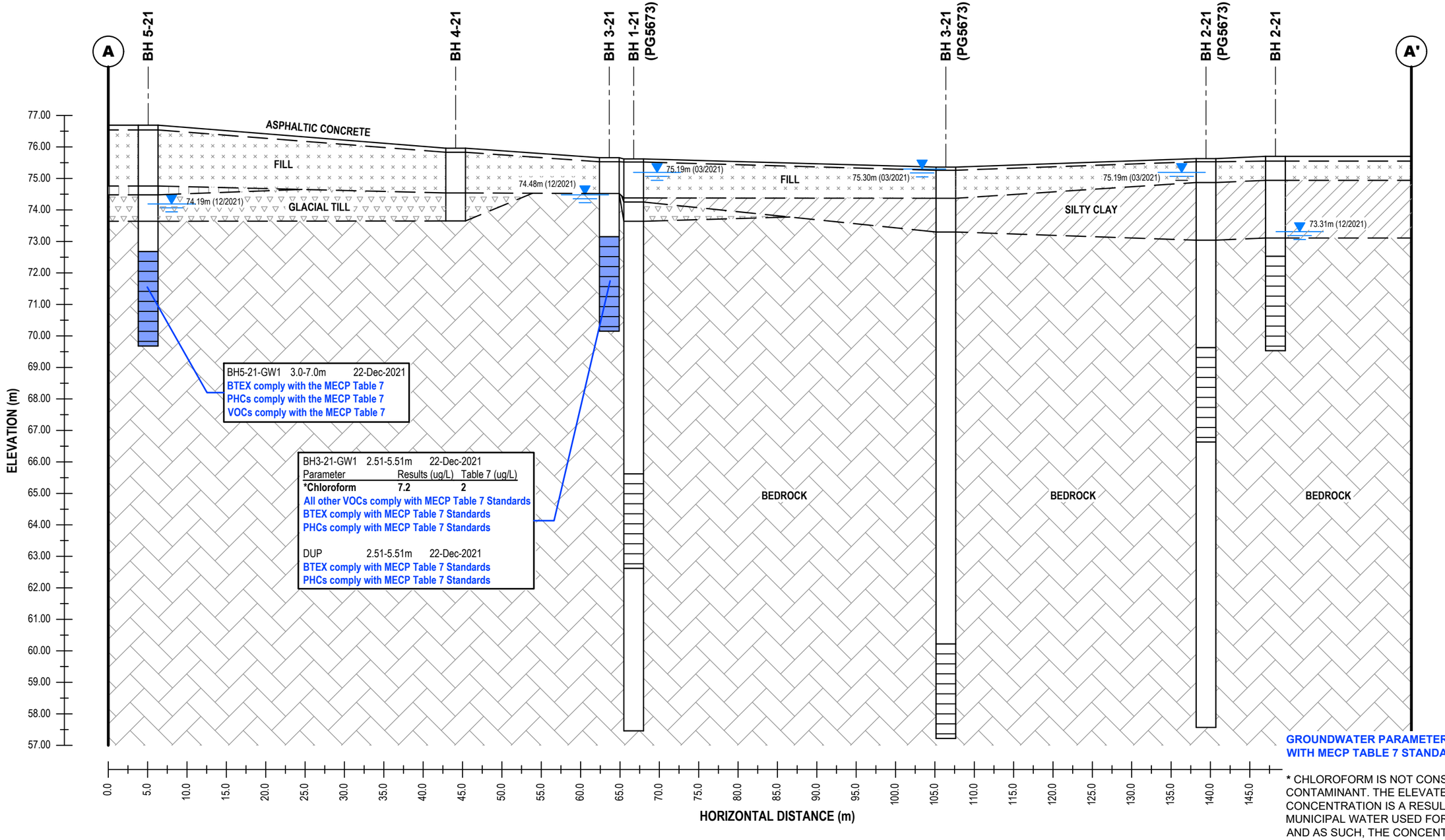

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

* CHLOROFORM IS NOT CONSIDERED A CONTAMINANT. THE ELEVATED CONCENTRATION IS A RESULT OF THE MUNICIPAL WATER USED FOR ROCK CORING AND AS SUCH, THE CONCENTRATION IS EXPECTED TO DISSIPATE OVER TIME.

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NO.	REVISIONS	DATE	INITIAL
0			

KRP PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
PART OF 525 LEGGET DRIVE AND PART OF 359 TERRY FOX DRIVE
OTTAWA, ONTARIO

Title:
CROSS-SECTION A-A' - GROUNDWATER

Scale: AS SHOWN	Date: 01/2022
Drawn by: MPG	Report No.: PE5413-2
Checked by: MW	Dwg. No.: PE5413-5A
Approved by: MB	Revision No.:

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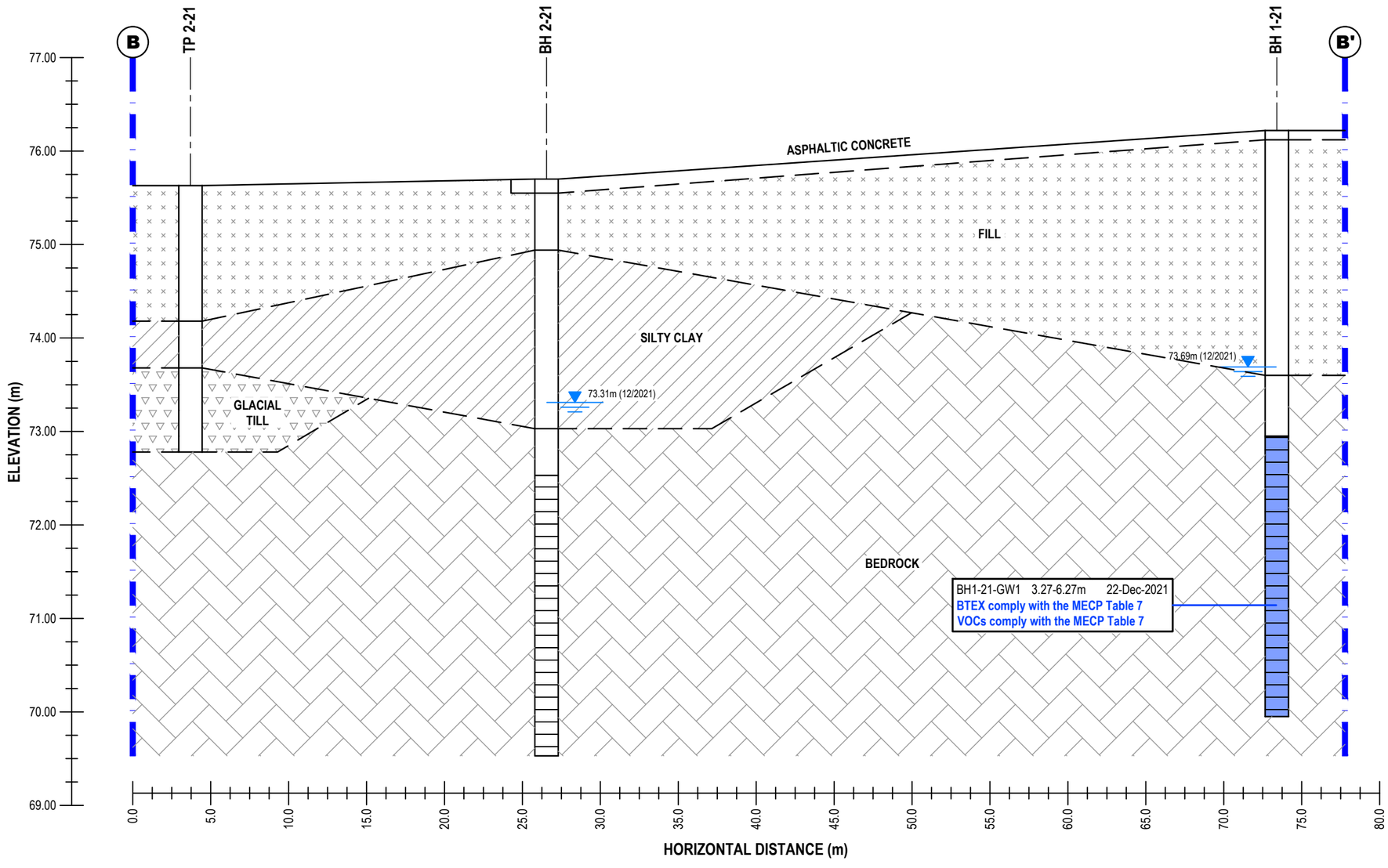

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 7 STANDARDS

PHASE I, PHASE II PROPERTY

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NO.	REVISIONS	DATE	INITIAL
0			

KRP PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
PART OF 525 LEGGET DRIVE AND PART OF 359 TERRY FOX DRIVE
OTTAWA, ONTARIO

Title:
CROSS-SECTION B-B' - GROUNDWATER

Scale: AS SHOWN	Date: 01/2022
Drawn by: MPG	Report No.: PE5413-2
Checked by: MW	Dwg. No.: PE5413-5B
Approved by: MB	Revision No.:

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11x17

APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

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Sampling & Analysis Plan

Phase II Environmental Site Assessment
Part of 525 Legget Drive and
Part of 359 Terry Fox Drive
Ottawa, Ontario

Prepared For

KRP Properties

December 2021

Report: PE5413-SAP

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Mr. Richard Goldstein of KRP Properties to conduct a Phase II Environmental Site Assessment (ESA) for the Phase II ESA Property addressed Part of 525 Legget Drive and Part of 359 Terry Fox Drive, Ottawa, Ontario.

The Phase II ESA was carried out to address the APECs identified in the Paterson Phase I ESA, dated November of 2021. The following subsurface investigation program was developed to identify and delineate potential environmental concerns.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-21	Assess soil and/or groundwater conditions on and beneath the Phase I Property due to the potential impact of fill material and off-site disposal of waste.	Boreholes to be advanced and cored into bedrock to approximately 5 to 6.0 mbgs to intercept water table to install groundwater monitoring wells.
BH2-21	Assess soil and/or groundwater conditions due to the presence of a transformer.	
BH3-21	Assess soil and/or groundwater conditions on and beneath the Phase I Property due to the potential impact of fill material and off-site disposal of waste.	
BH4-21	Assess soil condition due to the presence of a transformer.	Borehole to be advance to practical refusal to augering.
BH5-21	Assess soil and/or groundwater conditions on and beneath the Phase I Property due to the potential impact of fill material and off-site disposal of waste.	Borehole to be advanced and cored into bedrock to approximately 7.0 mbgs to intercept water table to install groundwater monitoring well.
G1-21	Assess the soil condition due to the presence of a transformer.	Grab sample in replacement of a borehole in the immediate area of the transformer next to Terry Fox Drive.

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

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

It should be noted that the subject site is situated in a shallow soil area, and as a result the precent recovery was rather lower than expected.

2.0 ANALYTICAL TESTING PROGRAM

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

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

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

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

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

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

Equipment

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

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

Determining Borehole Locations

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

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

Drilling Procedure

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

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

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

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

3.2 Monitoring Well Installation Procedure

Equipment

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

Procedure

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

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

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

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

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

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

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. BH 1-21

BORINGS BY CME-55 Low Clearance Drill **DATE** February 25, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.62
Asphaltic Concrete 0.10		AU	1				
FILL: Crushed stone, some sand		AU	2				
1.24		SS	3	50	17	1	74.62
Brown **SILTY CLAY,** trace sand and gravel 1.37		SS	4	72	+50	2	73.62
1.98		RC	1	100	100		
GLACIAL TILL: Brown silty clay with gravel, cobbles and boulders						3	72.62
		RC	2	100	92	4	71.62
		RC	3	100	98	5	70.62
						6	69.62
		RC	4	100	97	7	68.62
BEDROCK: Good to excellent, grey sandstone with interbedded dolostone		RC	5	100	100	8	67.62
						9	66.62
		RC	6	100	75	10	65.62
- approximately 15 to 25mm deep seam encountered at 10.2m depth		RC	7	100	98	11	64.62
						12	63.62
- vertical seam encountered from 12.5 to 12.8m depth		RC	8	100	83	13	62.62
		RC	9	100	100	14	61.62
						15	60.62
		RC	10	100	88	16	59.62
						17	58.62
		RC	11	100	100		
18.16						18	57.62
End of Borehole							
(GWL @ 0.43m - March 3, 2021)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. BH 2-21

BORINGS BY CME-55 Low Clearance Drill **DATE** February 26, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic Concrete 0.10		AU	1			0	75.63
FILL: Brown silty sand with crushed stone 0.76		AU	2				
- with asphalt by 0.5m depth		SS	3	100	8	1	74.63
Very stiff to stiff brown **SILTY CLAY**, some sand 2.59		SS	4	100	5	2	73.63
		SS	5	67	+50		
		RC	1	100	82	3	72.63
		RC	2	100	87	4	71.63
		RC	3	100	97	5	70.63
		RC	4	100	97	6	69.63
BEDROCK: Good to excellent quality, grey sandstone with interbedded dolostone		RC	5	100	98	7	68.63
		RC	6	100	98	8	67.63
- approximately 15 to 25mm deep seam encountered at 11.1m depth		RC	7	98	95	9	66.63
		RC	8	100	91	10	65.63
		RC	9	100	100	11	64.63
		RC	10	100	95	12	63.63
		RC	11	100	93	13	62.63
18.06						14	61.63
End of Borehole						15	60.63
(GWL @ 0.44m - March 3, 2021)						16	59.63
						17	58.63
						18	57.63

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
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. BH 3-21

BORINGS BY CME-55 Low Clearance Drill **DATE** March 1, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.36
Asphaltic Concrete 0.08		AU	1				
FILL: Brown silty sand with crushed stone and gravel 0.99		AU	2				
- trace sand, topsoil by 0.8m depth		SS	3	71	7	1	74.36
Very stiff to stiff brown **SILTY CLAY** 2.06		SS	4	37	+50	2	73.36
some sand		RC	1	100	87	3	72.36
		RC	2	100	100	4	71.36
		RC	3	100	100	5	70.36
						6	69.36
BEDROCK: Good to excellent quality, grey sandstone with interbedded dolostone		RC	4	100	100	7	68.36
		RC	5	100	92	8	67.36
		RC	6	100	100	9	66.36
						10	65.36
- approximately 15 to 25mm deep seam encountered at 10.5m depth		RC	7	100	95	11	64.36
		RC	8	100	100	12	63.36
						13	62.36
		RC	9	100	98	14	61.36
		RC	10	100	100	15	60.36
						16	59.36
		RC	11	100	100	17	58.36
18.14						18	57.36
End of Borehole							
(GWL @ 0.06m - March 3, 2021)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. TP 1-21

BORINGS BY Backhoe **DATE** February 26, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	76.01		
		G	1						
		G	2			1	75.01		
FILL: Brown silty clay to clayey silt, some organics, trace sand and crushed stone		G	3						
		G	4			2	74.01		
2.45		G	5						
GLACIAL TILL: Brown silty clay, some sand, gravel, cobbles and boulders									
3.05		G	6			3	73.01		
End of Test Pit Refusal to excavation on bedrock surface at 3.05 m depth									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. TP 2-21

BORINGS BY Backhoe **DATE** February 26, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	75.63		
FILL: Brown silty clay, some sand and crushed stone		G	1						
						1	74.63		
1.45									
Very stiff brown **SILTY CLAY**		G	2						
1.95									
GLACIAL TILL: Brown silty clay, some sand, gravel, cobbles and boulders		G	3			2	73.63		
2.85									
End of Test Pit Refusal to excavation on bedrock surface 2.85m depth									

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.

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. BH 1-21

BORINGS BY CME-55 Low Clearance Drill **DATE** December 8, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.10		AU	1			0	76.22
FILL: Brown silty sand with gravel, trace clay		SS	2	50	28	1	75.22
1.42							
FILL: Brown silty sand with crushed stone		SS	3	33	14	2	74.22
2.62							
		RC	1	100	79	3	73.22
		RC	2	100	85	4	72.22
BEDROCK: Good, grey sandstone with interbedded dolostone						5	71.22
		RC	3	100	88	6	70.22
6.27							
End of Borehole							
(GWL @ 2.53m - Dec. 22, 2021)							

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
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. BH 2-21

BORINGS BY CME-55 Low Clearance Drill **DATE** December 8, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.70
Asphaltic concrete 0.15		AU	1				
FILL: Brown silty sand with gravel		SS	4	100	50+		
0.76		SS	2	75	9	1	74.70
Brown **SILTY CLAY**		SS	3	88	7	2	73.70
2.67		RC	1	100	100	3	72.70
		RC	2	100	80	4	71.70
BEDROCK: Good to excellent, grey sandstone with interbedded dolostone						5	70.70
		RC	3	100	93	6	69.70
6.17							
End of Borehole							
(GWL @ 2.39m - Dec. 22, 2021)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. BH 3-21

BORINGS BY CME-55 Low Clearance Drill **DATE** December 8, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.66
Asphaltic concrete 0.13		AU	1				
FILL: Brown silty sand with gravel and crushed stone		SS	2	80	50+	1	74.66
1.14		RC	1	100	50		
		RC	2	100	85	2	73.66
BEDROCK: Fair to excellent, grey sandstone with interbedded dolostone		RC	3	100	92	3	72.66
		RC	4	100	100	4	71.66
						5	70.66
5.51							
End of Borehole							
(GWL @ 1.18m - Dec. 22, 2021)							

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
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. BH 4-21

BORINGS BY CME-55 Low Clearance Drill **DATE** December 8, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.96
Asphaltic concrete 0.13		AU	1				
FILL: Brown silty sand with crushed stone and gravel		SS	2	33	38	1	74.96
1.42							
GLACIAL TILL: Dense, brown silty sand with gravel, cobbles and boulders		SS	3	17	33	2	73.96
2.31							
End of Borehole							
Practical refusal to augering at 2.31m depth.							

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
Part of 525 Legget Drive
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5413

REMARKS

HOLE NO. BH 5-21

BORINGS BY CME-55 Low Clearance Drill **DATE** December 9, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.15		AU	1			0	76.69
FILL: Brown silty sand with crushed stone and gravel 0.97		SS	2	58	32	1	75.69
FILL: Brown silty clay with gravel and crushed stone 1.42		SS	3	58	25	2	74.69
FILL: Brown silty sand with crushed stone 1.93		SS	4	42	50	3	73.69
Compact, brown **SILTY SAND** 2.21		RC	1	100	88	4	72.69
GLACIAL TILL: Dense, brown silty sand with gravel, cobbles and boulders 3.05		RC	2	100	95	5	71.69
BEDROCK: Good to excellent quality, grey sandstone with interbedded dolostone		RC	3	100	94	6	70.69
7.01						7	69.69
End of Borehole							
(GWL @ 2.50m - Dec. 22, 2021)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**
20 40 60 80

Monitoring Well Construction

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

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

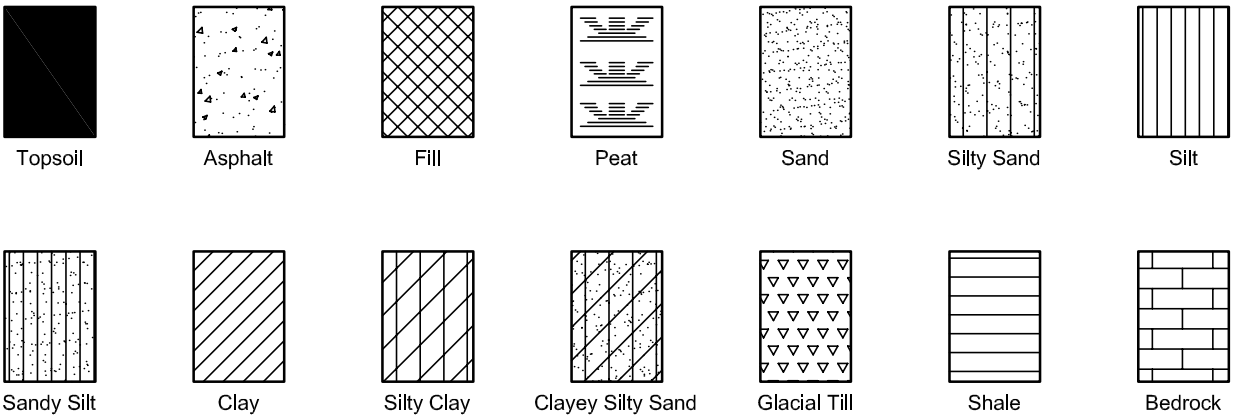
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

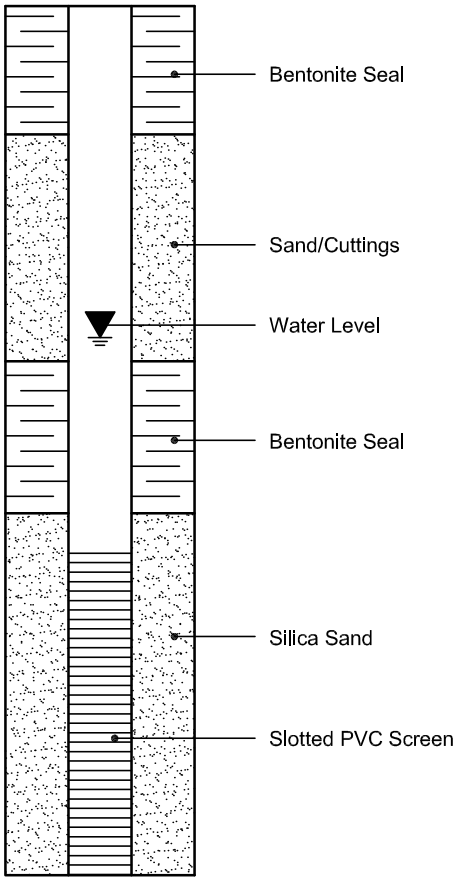
SYMBOLS AND TERMS (continued)

STRATA PLOT

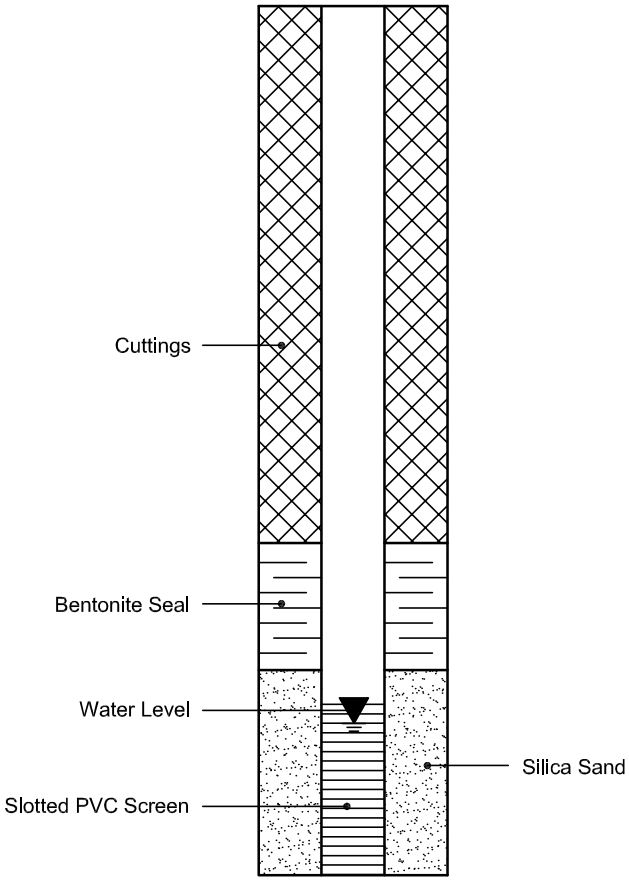


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 33498
Project: PE5413
Custody:

Report Date: 16-Dec-2021
Order Date: 10-Dec-2021

Order #: 2150549

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

Paracel ID	Client ID
2150549-01	BH1-21-SS2
2150549-02	BH2-21-SS2
2150549-03	BH3-21-AU1/SS2
2150549-04	BH4-21-SS2
2150549-05	BH5-21-SS3
2150549-06	G1-21
2150549-07	DUP

Approved By:

Dale Robertson, BSc
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	14-Dec-21	14-Dec-21
Conductivity	MOE E3138 - probe @25 °C, water ext	15-Dec-21	15-Dec-21
PCBs, total	SW846 8082A - GC-ECD	10-Dec-21	13-Dec-21
PHC F1	CWS Tier 1 - P&T GC-FID	14-Dec-21	14-Dec-21
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	15-Dec-21	16-Dec-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	10-Dec-21	14-Dec-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	14-Dec-21	14-Dec-21
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	14-Dec-21	14-Dec-21
SAR	Calculated	14-Dec-21	15-Dec-21
Solids, %	Gravimetric, calculation	11-Dec-21	13-Dec-21

Certificate of Analysis

Report Date: 16-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 10-Dec-2021

Client PO: 33498

Project Description: PE5413

	Client ID:	BH1-21-SS2	BH2-21-SS2	BH3-21-AU1/SS2	BH4-21-SS2
	Sample Date:	08-Dec-21 09:00	08-Dec-21 09:00	08-Dec-21 09:00	08-Dec-21 09:00
	Sample ID:	2150549-01	2150549-02	2150549-03	2150549-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	96.1	73.6	96.7	98.7
General Inorganics					
SAR	0.01 N/A	0.68	15.7	10.4	5.88
Conductivity	5 uS/cm	234	2210	1210	2370
Metals					
Antimony	1.0 ug/g dry	<1.0	-	<1.0	<1.0
Arsenic	1.0 ug/g dry	1.1	-	1.9	1.8
Barium	1.0 ug/g dry	29.9	-	88.4	85.8
Beryllium	0.5 ug/g dry	<0.5	-	<0.5	<0.5
Boron	5.0 ug/g dry	5.7	-	17.8	<5.0
Cadmium	0.5 ug/g dry	<0.5	-	<0.5	<0.5
Chromium	5.0 ug/g dry	8.0	-	14.1	22.4
Cobalt	1.0 ug/g dry	1.6	-	4.6	4.9
Copper	5.0 ug/g dry	<5.0	-	9.1	9.7
Lead	1.0 ug/g dry	3.9	-	7.6	4.0
Molybdenum	1.0 ug/g dry	<1.0	-	<1.0	<1.0
Nickel	5.0 ug/g dry	<5.0	-	10.9	12.4
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	<1.0	-	<1.0	<1.0
Vanadium	10.0 ug/g dry	<10.0	-	13.9	27.4
Zinc	20.0 ug/g dry	<20.0	-	<20.0	<20.0
Volatiles					
Acetone	0.50 ug/g dry	<0.50	-	<0.50	<0.50
Benzene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Bromodichloromethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Bromoform	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Bromomethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Carbon Tetrachloride	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Chlorobenzene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Chloroform	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Dibromochloromethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	-	<0.05	<0.05

Certificate of Analysis

Report Date: 16-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 10-Dec-2021

Client PO: 33498

Project Description: PE5413

	Client ID:	BH1-21-SS2	BH2-21-SS2	BH3-21-AU1/SS2	BH4-21-SS2
	Sample Date:	08-Dec-21 09:00	08-Dec-21 09:00	08-Dec-21 09:00	08-Dec-21 09:00
	Sample ID:	2150549-01	2150549-02	2150549-03	2150549-04
	MDL/Units	Soil	Soil	Soil	Soil
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,1-Dichloroethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,2-Dichloroethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,2-Dichloropropane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Ethylbenzene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Hexane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	-	<0.50	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	-	<0.50	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Methylene Chloride	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Styrene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Tetrachloroethylene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Trichloroethylene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Trichlorofluoromethane	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Vinyl chloride	0.02 ug/g dry	<0.02	-	<0.02	<0.02
m,p-Xylenes	0.05 ug/g dry	0.19	-	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	-	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	0.19	-	<0.05	<0.05
4-Bromofluorobenzene	Surrogate	81.9%	-	86.7%	83.5%
Dibromofluoromethane	Surrogate	104%	-	107%	103%
Toluene-d8	Surrogate	86.0%	-	85.6%	85.7%
Benzene	0.02 ug/g dry	-	<0.02	-	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	-	-

Certificate of Analysis

Report Date: 16-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 10-Dec-2021

Client PO: 33498

Project Description: PE5413

	Client ID:	BH1-21-SS2	BH2-21-SS2	BH3-21-AU1/SS2	BH4-21-SS2
	Sample Date:	08-Dec-21 09:00	08-Dec-21 09:00	08-Dec-21 09:00	08-Dec-21 09:00
	Sample ID:	2150549-01	2150549-02	2150549-03	2150549-04
	MDL/Units	Soil	Soil	Soil	Soil
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	-	94.8%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	12	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	23	<4	<4	8
F3 PHCs (C16-C34)	8 ug/g dry	271	<8	282	88
F4 PHCs (C34-C50)	6 ug/g dry	556 [1]	<6	587 [1]	149 [1]
F4G PHCs (gravimetric)	50 ug/g dry	801	-	1060	334
PCBs					
PCBs, total	0.05 ug/g dry	-	<0.05	-	<0.05
Decachlorobiphenyl	Surrogate	-	124%	-	118%

Certificate of Analysis

Report Date: 16-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 10-Dec-2021

Client PO: 33498

Project Description: PE5413

	Client ID:	BH5-21-SS3	G1-21	DUP	-
	Sample Date:	09-Dec-21 09:00	09-Dec-21 09:00	08-Dec-21 09:00	-
	Sample ID:	2150549-05	2150549-06	2150549-07	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	90.1	84.0	79.7	-
General Inorganics					
SAR	0.01 N/A	6.22	3.81	-	-
Conductivity	5 uS/cm	2380	473	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	1.7	-	-	-
Barium	1.0 ug/g dry	220	-	-	-
Beryllium	0.5 ug/g dry	<0.5	-	-	-
Boron	5.0 ug/g dry	12.0	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	7.2	-	-	-
Cobalt	1.0 ug/g dry	2.6	-	-	-
Copper	5.0 ug/g dry	<5.0	-	-	-
Lead	1.0 ug/g dry	9.9	-	-	-
Molybdenum	1.0 ug/g dry	<1.0	-	-	-
Nickel	5.0 ug/g dry	7.8	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	<1.0	-	-	-
Vanadium	10.0 ug/g dry	<10.0	-	-	-
Zinc	20.0 ug/g dry	<20.0	-	-	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	-	-	-
Benzene	0.02 ug/g dry	<0.02	-	-	-
Bromodichloromethane	0.05 ug/g dry	<0.05	-	-	-
Bromoform	0.05 ug/g dry	<0.05	-	-	-
Bromomethane	0.05 ug/g dry	<0.05	-	-	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	-	-	-
Chlorobenzene	0.05 ug/g dry	<0.05	-	-	-
Chloroform	0.05 ug/g dry	<0.05	-	-	-
Dibromochloromethane	0.05 ug/g dry	<0.05	-	-	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-

Certificate of Analysis

Report Date: 16-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 10-Dec-2021

Client PO: 33498

Project Description: PE5413

	Client ID:	BH5-21-SS3	G1-21	DUP	-
	Sample Date:	09-Dec-21 09:00	09-Dec-21 09:00	08-Dec-21 09:00	-
	Sample ID:	2150549-05	2150549-06	2150549-07	-
	MDL/Units	Soil	Soil	Soil	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	-	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Ethylene dibromide (dibromoethane, 1	0.05 ug/g dry	<0.05	-	-	-
Hexane	0.05 ug/g dry	<0.05	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	-	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	-	-	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	-	-	-
Methylene Chloride	0.05 ug/g dry	<0.05	-	-	-
Styrene	0.05 ug/g dry	<0.05	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
Trichloroethylene	0.05 ug/g dry	<0.05	-	-	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	-	-	-
Vinyl chloride	0.02 ug/g dry	<0.02	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
4-Bromofluorobenzene	Surrogate	82.5%	-	-	-
Dibromofluoromethane	Surrogate	107%	-	-	-
Toluene-d8	Surrogate	86.5%	-	-	-
Benzene	0.02 ug/g dry	-	<0.02	<0.02	-

Certificate of Analysis

Report Date: 16-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 10-Dec-2021

Client PO: 33498

Project Description: PE5413

	Client ID:	BH5-21-SS3	G1-21	DUP	-
	Sample Date:	09-Dec-21 09:00	09-Dec-21 09:00	08-Dec-21 09:00	-
	Sample ID:	2150549-05	2150549-06	2150549-07	-
	MDL/Units	Soil	Soil	Soil	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	<0.05	-
Toluene	0.05 ug/g dry	-	<0.05	<0.05	-
m,p-Xylenes	0.05 ug/g dry	-	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	-	<0.05	<0.05	-
Xylenes, total	0.05 ug/g dry	-	<0.05	<0.05	-
Toluene-d8	Surrogate	-	90.8%	92.2%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	28	9	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	51	34	<6	-
PCBs					
PCBs, total	0.05 ug/g dry	-	<0.05	-	-
Decachlorobiphenyl	Surrogate	-	117%	-	-

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						
F4G PHCs (gravimetric)	ND	50	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.127*		*ug/g*		*127*	*60-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*8.95*		*ug/g*		*112*	*50-140*			
Surrogate: Dibromofluoromethane	*8.36*		*ug/g*		*105*	*50-140*			
Surrogate: Toluene-d8	*6.88*		*ug/g*		*86.0*	*50-140*			
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*6.88*		*ug/g*		*86.0*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	1.67	0.01	N/A	1.70			1.8	30	
Conductivity	212	5	uS/cm	211			0.5	5	
Hydrocarbons									
F1 PHCs (C6-C10)	9	7	ug/g dry	12			26.7	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			NC	30	
Arsenic	5.2	1.0	ug/g dry	4.9			5.9	30	
Barium	63.8	1.0	ug/g dry	58.9			7.9	30	
Beryllium	0.6	0.5	ug/g dry	0.6			4.9	30	
Boron	11.0	5.0	ug/g dry	11.1			0.8	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium	20.3	5.0	ug/g dry	19.4			4.7	30	
Cobalt	9.2	1.0	ug/g dry	8.9			2.7	30	
Copper	18.2	5.0	ug/g dry	17.7			3.0	30	
Lead	9.5	1.0	ug/g dry	8.6			10.2	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	20.6	5.0	ug/g dry	19.5			5.2	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	30.1	10.0	ug/g dry	29.3			2.9	30	
Zinc	44.5	20.0	ug/g dry	43.6			1.9	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND			NC	40	
Surrogate: Decachlorobiphenyl	*0.208*		*ug/g dry*		*132*	*60-140*			
Physical Characteristics									
% Solids	84.6	0.1	% by Wt.	83.8			1.0	25	
Volatiles									
Acetone	ND	0.50	ug/g dry	ND			NC	50	
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g dry	ND			NC	50	
Bromoform	ND	0.05	ug/g dry	ND			NC	50	
Bromomethane	ND	0.05	ug/g dry	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
Chloroform	ND	0.05	ug/g dry	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g dry	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g dry	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hexane	ND	0.05	ug/g dry	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g dry	ND			NC	50	
Styrene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g dry	ND			NC	50	
m,p-Xylenes	0.119	0.05	ug/g dry	0.193			47.5	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	*6.92*		*ug/g dry*		*83.1*	*50-140*			
Surrogate: Dibromofluoromethane	*8.67*		*ug/g dry*		*104*	*50-140*			
Surrogate: Toluene-d8	*7.29*		*ug/g dry*		*87.5*	*50-140*			
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
m,p-Xylenes	0.119	0.05	ug/g dry	0.193			47.5	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	*7.29*		*ug/g dry*		*87.5*	*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)	189	7	ug/g	ND	94.3	80-120			
F2 PHCs (C10-C16)	102	4	ug/g	ND	94.9	60-140			
F3 PHCs (C16-C34)	289	8	ug/g	ND	110	60-140			
F4 PHCs (C34-C50)	237	6	ug/g	ND	143	60-140			
F4G PHCs (gravimetric)	1020	50	ug/g	ND	102	80-120			
Metals									
Antimony	46.6	1.0	ug/g	ND	92.5	70-130			
Arsenic	56.6	1.0	ug/g	1.9	109	70-130			
Barium	76.1	1.0	ug/g	23.6	105	70-130			
Beryllium	52.7	0.5	ug/g	ND	105	70-130			
Boron	54.3	5.0	ug/g	ND	99.8	70-130			
Cadmium	47.4	0.5	ug/g	ND	94.7	70-130			
Chromium	63.1	5.0	ug/g	7.8	111	70-130			
Cobalt	56.2	1.0	ug/g	3.6	105	70-130			
Copper	59.2	5.0	ug/g	7.1	104	70-130			
Lead	54.6	1.0	ug/g	3.4	102	70-130			
Molybdenum	52.1	1.0	ug/g	ND	104	70-130			
Nickel	61.8	5.0	ug/g	7.8	108	70-130			
Selenium	51.5	1.0	ug/g	ND	103	70-130			
Silver	47.3	0.3	ug/g	ND	94.6	70-130			
Thallium	46.7	1.0	ug/g	ND	93.2	70-130			
Uranium	52.0	1.0	ug/g	ND	104	70-130			
Vanadium	68.2	10.0	ug/g	11.7	113	70-130			
Zinc	67.8	20.0	ug/g	ND	101	70-130			
PCBs									
PCBs, total	0.646	0.05	ug/g	ND	102	60-140			
Surrogate: Decachlorobiphenyl	*0.205*		*ug/g*		*130*	*60-140*			
Volatiles									
Acetone	13.3	0.50	ug/g	ND	133	50-140			
Benzene	3.24	0.02	ug/g	ND	81.1	60-130			
Bromodichloromethane	2.70	0.05	ug/g	ND	67.5	60-130			
Bromoform	3.01	0.05	ug/g	ND	75.2	60-130			
Bromomethane	4.74	0.05	ug/g	ND	118	50-140			
Carbon Tetrachloride	2.98	0.05	ug/g	ND	74.5	60-130			
Chlorobenzene	3.01	0.05	ug/g	ND	75.2	60-130			
Chloroform	2.96	0.05	ug/g	ND	73.9	60-130			
Dibromochloromethane	3.11	0.05	ug/g	ND	77.8	60-130			
Dichlorodifluoromethane	4.53	0.05	ug/g	ND	113	50-140			
1,2-Dichlorobenzene	2.65	0.05	ug/g	ND	66.1	60-130			
1,3-Dichlorobenzene	2.71	0.05	ug/g	ND	67.7	60-130			
1,4-Dichlorobenzene	2.83	0.05	ug/g	ND	70.8	60-130			
1,1-Dichloroethane	3.15	0.05	ug/g	ND	78.8	60-130			
1,2-Dichloroethane	2.68	0.05	ug/g	ND	66.9	60-130			
1,1-Dichloroethylene	3.75	0.05	ug/g	ND	93.7	60-130			
cis-1,2-Dichloroethylene	3.00	0.05	ug/g	ND	75.0	60-130			
trans-1,2-Dichloroethylene	3.16	0.05	ug/g	ND	78.9	60-130			
1,2-Dichloropropane	3.13	0.05	ug/g	ND	78.4	60-130			
cis-1,3-Dichloropropylene	2.82	0.05	ug/g	ND	70.6	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
trans-1,3-Dichloropropylene	2.85	0.05	ug/g	ND	71.3	60-130			
Ethylbenzene	3.28	0.05	ug/g	ND	82.0	60-130			
Ethylene dibromide (dibromoethane, 1,2-	3.30	0.05	ug/g	ND	82.6	60-130			
Hexane	3.93	0.05	ug/g	ND	98.2	60-130			
Methyl Ethyl Ketone (2-Butanone)	7.20	0.50	ug/g	ND	72.0	50-140			
Methyl Isobutyl Ketone	7.46	0.50	ug/g	ND	74.6	50-140			
Methyl tert-butyl ether	7.95	0.05	ug/g	ND	79.5	50-140			
Methylene Chloride	4.20	0.05	ug/g	ND	105	60-130			
Styrene	3.45	0.05	ug/g	ND	86.2	60-130			
1,1,1,2-Tetrachloroethane	3.03	0.05	ug/g	ND	75.7	60-130			
1,1,2,2-Tetrachloroethane	3.41	0.05	ug/g	ND	85.3	60-130			
Tetrachloroethylene	3.04	0.05	ug/g	ND	75.9	60-130			
Toluene	3.14	0.05	ug/g	ND	78.6	60-130			
1,1,1-Trichloroethane	2.89	0.05	ug/g	ND	72.3	60-130			
1,1,2-Trichloroethane	3.10	0.05	ug/g	ND	77.6	60-130			
Trichloroethylene	3.12	0.05	ug/g	ND	78.0	60-130			
Trichlorofluoromethane	3.42	0.05	ug/g	ND	85.6	50-140			
Vinyl chloride	4.45	0.02	ug/g	ND	111	50-140			
m,p-Xylenes	6.05	0.05	ug/g	ND	75.6	60-130			
o-Xylene	2.89	0.05	ug/g	ND	72.3	60-130			
Surrogate: 4-Bromofluorobenzene	*7.15*		*ug/g*		*89.4*	*50-140*			
Surrogate: Dibromofluoromethane	*8.46*		*ug/g*		*106*	*50-140*			
Surrogate: Toluene-d8	*5.79*		*ug/g*		*72.4*	*50-140*			
Benzene	3.24	0.02	ug/g	ND	81.1	60-130			
Ethylbenzene	3.28	0.05	ug/g	ND	82.0	60-130			
Toluene	3.14	0.05	ug/g	ND	78.6	60-130			
m,p-Xylenes	6.05	0.05	ug/g	ND	75.6	60-130			
o-Xylene	2.89	0.05	ug/g	ND	72.3	60-130			
Surrogate: Toluene-d8	*5.79*		*ug/g*		*72.4*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

1 : GC-FID signal did not return to baseline by C50

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.

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2150549	

Client Name: Paterson Group	Project Ref: PE5413
Contact Name: Mandy Witteman	Quote #:
Address: 154 Colonnade Rd S	PO #: 33498
Telephone: (613) 226-7381	E-mail: mwitteman@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)

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR	PCBs			
1	BH1-21-SS2	S		3	Dec 8/21		X	X		X				X				
2	BH2-21-SS2	S		2	↓		X							X	X			
3	BH3-21-AU1/SS2	S		2	↓		X	X		X				X				
4	BH4-21-SS2	S		2	Dec		X	X		X				X	X			
5	BH5-21-SS3	S		2	Dec 9/21		X	X		X				X				
6	G1-21	S		3	↓		X							X	X			
7	DUP	S		2	Dec 8/21		X											
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): [signature]	Received By Driver/Depot: M. Dcouse	Received at Lab: Sumegorm Dohman	Verified By: [signature]
Relinquished By (Print): Mandy Witteman	Date/Time: 10/12/21 3:34	Date/Time: DEC 10, 2021 04:38	Date/Time: Dec 10 2021 5:51
Date/Time: Dec 10/21	Temperature: °C PH.	Temperature: 13.9 °C	pH Verified: ☐ By:

Chain of Custody (Blank).xlsx

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Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 33507
Project: PE5413
Custody:

Report Date: 21-Dec-2021
Order Date: 15-Dec-2021

Order #: 2151417

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

Paracel ID	Client ID
2151417-02	BH3-21-GW1
2151417-03	BH5-21-GW1
2151417-04	DUP

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 21-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 15-Dec-2021

Client PO: 33507

Project Description: PE5413

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	18-Dec-21	18-Dec-21
PHC F1	CWS Tier 1 - P&T GC-FID	17-Dec-21	20-Dec-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	20-Dec-21	21-Dec-21
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	17-Dec-21	20-Dec-21

Certificate of Analysis

Report Date: 21-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 15-Dec-2021

Client PO: 33507

Project Description: PE5413

	Client ID:	BH3-21-GW1	BH5-21-GW1	DUP	-
	Sample Date:	14-Dec-21 09:00	14-Dec-21 09:00	14-Dec-21 09:00	-
	Sample ID:	2151417-02	2151417-03	2151417-04	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	226	<5.0	-	-
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroform	0.5 ug/L	7.2	<0.5	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	-	-
Hexane	1.0 ug/L	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-

Certificate of Analysis

Report Date: 21-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 15-Dec-2021

Client PO: 33507

Project Description: PE5413

	Client ID:	BH3-21-GW1	BH5-21-GW1	DUP	-
	Sample Date:	14-Dec-21 09:00	14-Dec-21 09:00	14-Dec-21 09:00	-
	Sample ID:	2151417-02	2151417-03	2151417-04	-
	MDL/Units	Water	Water	Water	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	-	-
4-Bromofluorobenzene	Surrogate	86.1%	90.2%	-	-
Dibromofluoromethane	Surrogate	101%	113%	-	-
Toluene-d8	Surrogate	79.7%	85.3%	-	-
Benzene	0.5 ug/L	-	-	<0.5	-
Ethylbenzene	0.5 ug/L	-	-	<0.5	-
Toluene	0.5 ug/L	-	-	<0.5	-
m,p-Xylenes	0.5 ug/L	-	-	<0.5	-
o-Xylene	0.5 ug/L	-	-	<0.5	-
Xylenes, total	0.5 ug/L	-	-	<0.5	-
Toluene-d8	Surrogate	-	-	85.3%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*70.8*		*ug/L*		*88.6*	*50-140*			
Surrogate: Dibromofluoromethane	*76.9*		*ug/L*		*96.1*	*50-140*			
Surrogate: Toluene-d8	*72.0*		*ug/L*		*90.0*	*50-140*			
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	*72.0*		*ug/L*		*90.0*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	2.35	0.5	ug/L	2.02			15.1	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	4.03	0.5	ug/L	3.45			15.5	30	
Dibromochloromethane	0.73	0.5	ug/L	0.77			5.3	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*73.1*		*ug/L*		*91.4*	*50-140*			
Surrogate: Dibromofluoromethane	*90.3*		*ug/L*		*113*	*50-140*			
Surrogate: Toluene-d8	*70.8*		*ug/L*		*88.5*	*50-140*			
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	*70.8*		*ug/L*		*88.5*	*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)	1920	25	ug/L	ND	95.9	68-117			
F2 PHCs (C10-C16)	1260	100	ug/L	ND	78.9	60-140			
F3 PHCs (C16-C34)	3410	100	ug/L	ND	87.1	60-140			
F4 PHCs (C34-C50)	2960	100	ug/L	ND	119	60-140			
Volatiles									
Acetone	91.7	5.0	ug/L	ND	91.7	50-140			
Benzene	32.4	0.5	ug/L	ND	81.1	60-130			
Bromodichloromethane	36.8	0.5	ug/L	ND	92.0	60-130			
Bromoform	29.3	0.5	ug/L	ND	73.2	60-130			
Bromomethane	40.9	0.5	ug/L	ND	102	50-140			
Carbon Tetrachloride	34.7	0.2	ug/L	ND	86.8	60-130			
Chlorobenzene	26.4	0.5	ug/L	ND	66.0	60-130			
Chloroform	33.0	0.5	ug/L	ND	82.6	60-130			
Dibromochloromethane	37.7	0.5	ug/L	ND	94.4	60-130			
Dichlorodifluoromethane	29.8	1.0	ug/L	ND	74.6	50-140			
1,2-Dichlorobenzene	40.6	0.5	ug/L	ND	101	60-130			
1,3-Dichlorobenzene	38.7	0.5	ug/L	ND	96.8	60-130			
1,4-Dichlorobenzene	39.6	0.5	ug/L	ND	99.0	60-130			
1,1-Dichloroethane	33.8	0.5	ug/L	ND	84.5	60-130			
1,2-Dichloroethane	36.1	0.5	ug/L	ND	90.2	60-130			
1,1-Dichloroethylene	28.5	0.5	ug/L	ND	71.2	60-130			
cis-1,2-Dichloroethylene	33.5	0.5	ug/L	ND	83.8	60-130			
trans-1,2-Dichloroethylene	29.8	0.5	ug/L	ND	74.5	60-130			
1,2-Dichloropropane	30.3	0.5	ug/L	ND	75.6	60-130			
cis-1,3-Dichloropropylene	31.0	0.5	ug/L	ND	77.4	60-130			
trans-1,3-Dichloropropylene	34.4	0.5	ug/L	ND	85.9	60-130			
Ethylbenzene	30.7	0.5	ug/L	ND	76.8	60-130			
Ethylene dibromide (dibromoethane, 1,2-	35.7	0.2	ug/L	ND	89.2	60-130			
Hexane	38.8	1.0	ug/L	ND	96.9	60-130			
Methyl Ethyl Ketone (2-Butanone)	98.9	5.0	ug/L	ND	98.9	50-140			
Methyl Isobutyl Ketone	85.7	5.0	ug/L	ND	85.7	50-140			
Methyl tert-butyl ether	109	2.0	ug/L	ND	109	50-140			
Methylene Chloride	31.7	5.0	ug/L	ND	79.3	60-130			
Styrene	30.6	0.5	ug/L	ND	76.5	60-130			
1,1,1,2-Tetrachloroethane	31.2	0.5	ug/L	ND	78.0	60-130			
1,1,2,2-Tetrachloroethane	33.8	0.5	ug/L	ND	84.4	60-130			
Tetrachloroethylene	41.5	0.5	ug/L	ND	104	60-130			
Toluene	33.3	0.5	ug/L	ND	83.3	60-130			
1,1,1-Trichloroethane	32.7	0.5	ug/L	ND	81.7	60-130			
1,1,2-Trichloroethane	32.2	0.5	ug/L	ND	80.6	60-130			
Trichloroethylene	30.9	0.5	ug/L	ND	77.2	60-130			
Trichlorofluoromethane	29.9	1.0	ug/L	ND	74.6	60-130			
Vinyl chloride	28.8	0.5	ug/L	ND	72.0	50-140			
m,p-Xylenes	61.1	0.5	ug/L	ND	76.3	60-130			
o-Xylene	36.3	0.5	ug/L	ND	90.6	60-130			
Surrogate: 4-Bromofluorobenzene	*84.2*		*ug/L*		*105*	*50-140*			
Surrogate: Dibromofluoromethane	*95.8*		*ug/L*		*120*	*50-140*			
Surrogate: Toluene-d8	*70.8*		*ug/L*		*88.5*	*50-140*			

Certificate of Analysis

Report Date: 21-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 15-Dec-2021

Client PO: 33507

Project Description: PE5413

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	32.4	0.5	ug/L	ND	81.1	60-130			
Ethylbenzene	30.7	0.5	ug/L	ND	76.8	60-130			
Toluene	33.3	0.5	ug/L	ND	83.3	60-130			
m,p-Xylenes	61.1	0.5	ug/L	ND	76.3	60-130			
o-Xylene	36.3	0.5	ug/L	ND	90.6	60-130			
Surrogate: Toluene-d8	*70.8*		*ug/L*		*88.5*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2151417

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2151417	

Client Name: Paterson Group	Project Ref: PE5413	Page 1 of 1
Contact Name: Mandy Witteman	Quote #:	Turnaround Time
Address: 154 Colonnade Rd S.	PO #: 33507	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone:	E-mail: mwitteman@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)					
1	~~BH1-21-GW1~~	~~GW~~			~~Dec 15/21~~			~~X~~										
2	BH2-21-GW1	GW		1	Dec 14/21					X				HOLD				
3	BH3-21-GW1	GW		3	Dec 14/21		X	X										
4	BH5-21-GW1	GW		3	Dec 14/21		X	X										
5	DUP	GW		3	Dec 14/21		X											
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Drop Box

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: Shreeparn Dhamal	Verified By:
Relinquished By (Print): Mandy Witteman	Date/Time:	Date/Time: Dec 15, 2021 04:50	Date/Time: Dec 10 2021 11:10
Date/Time: Dec 14 + 15 /21	Temperature: °C	Temperature: 15.9	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 33595
Project: PE5413
Custody:

Report Date: 30-Dec-2021
Order Date: 23-Dec-2021

Order #: 2152470

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

Paracel ID	Client ID
2152470-01	BH1-21-GW1
2152470-02	Trip Blank

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 30-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Dec-2021

Client PO: 33595

Project Description: PE5413

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	24-Dec-21	30-Dec-21

Certificate of Analysis

Report Date: 30-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Dec-2021

Client PO: 33595

Project Description: PE5413

	Client ID:	BH1-21-GW1	Trip Blank	-	-
	Sample Date:	22-Dec-21 09:00	21-Dec-21 09:00	-	-
	Sample ID:	2152470-01	2152470-02	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	-	-
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroform	0.5 ug/L	<0.5	<0.5	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	-	-
Hexane	1.0 ug/L	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-

Certificate of Analysis

Report Date: 30-Dec-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Dec-2021

Client PO: 33595

Project Description: PE5413

	Client ID:	BH1-21-GW1	Trip Blank	-	-
	Sample Date:	22-Dec-21 09:00	21-Dec-21 09:00	-	-
	Sample ID:	2152470-01	2152470-02	-	-
	MDL/Units	Water	Water	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	-	-
4-Bromofluorobenzene	Surrogate	93.8%	94.2%	-	-
Dibromofluoromethane	Surrogate	114%	110%	-	-
Toluene-d8	Surrogate	78.8%	79.3%	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*75.0*		*ug/L*		*93.7*	*50-140*			
Surrogate: Dibromofluoromethane	*66.8*		*ug/L*		*83.6*	*50-140*			
Surrogate: Toluene-d8	*69.0*		*ug/L*		*86.2*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	3.36	0.5	ug/L	2.23			40.4	30	QR-07
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*73.0*		*ug/L*		*91.3*	*50-140*			
Surrogate: Dibromofluoromethane	*70.8*		*ug/L*		*88.5*	*50-140*			
Surrogate: Toluene-d8	*68.3*		*ug/L*		*85.4*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	101	5.0	ug/L	ND	101	50-140			
Benzene	30.7	0.5	ug/L	ND	76.8	60-130			
Bromodichloromethane	24.5	0.5	ug/L	ND	61.2	60-130			
Bromoform	26.8	0.5	ug/L	ND	67.0	60-130			
Bromomethane	40.8	0.5	ug/L	ND	102	50-140			
Carbon Tetrachloride	40.5	0.2	ug/L	ND	101	60-130			
Chlorobenzene	27.6	0.5	ug/L	ND	69.0	60-130			
Chloroform	24.0	0.5	ug/L	ND	60.0	60-130			
Dibromochloromethane	27.2	0.5	ug/L	ND	68.0	60-130			
Dichlorodifluoromethane	37.6	1.0	ug/L	ND	94.0	50-140			
1,2-Dichlorobenzene	40.4	0.5	ug/L	ND	101	60-130			
1,3-Dichlorobenzene	36.0	0.5	ug/L	ND	89.9	60-130			
1,4-Dichlorobenzene	35.2	0.5	ug/L	ND	87.9	60-130			
1,1-Dichloroethane	27.6	0.5	ug/L	ND	68.9	60-130			
1,2-Dichloroethane	27.2	0.5	ug/L	ND	68.0	60-130			
1,1-Dichloroethylene	36.1	0.5	ug/L	ND	90.2	60-130			
cis-1,2-Dichloroethylene	27.3	0.5	ug/L	ND	68.3	60-130			
trans-1,2-Dichloroethylene	27.2	0.5	ug/L	ND	68.1	60-130			
1,2-Dichloropropane	26.0	0.5	ug/L	ND	64.9	60-130			
cis-1,3-Dichloropropylene	28.0	0.5	ug/L	ND	70.1	60-130			
trans-1,3-Dichloropropylene	27.5	0.5	ug/L	ND	68.8	60-130			
Ethylbenzene	24.0	0.5	ug/L	ND	60.1	60-130			
Ethylene dibromide (dibromoethane, 1,2	25.6	0.2	ug/L	ND	64.1	60-130			
Hexane	41.8	1.0	ug/L	ND	104	60-130			
Methyl Ethyl Ketone (2-Butanone)	79.2	5.0	ug/L	ND	79.2	50-140			
Methyl Isobutyl Ketone	70.6	5.0	ug/L	ND	70.6	50-140			
Methyl tert-butyl ether	78.6	2.0	ug/L	ND	78.6	50-140			
Methylene Chloride	35.1	5.0	ug/L	ND	87.7	60-130			
Styrene	24.7	0.5	ug/L	ND	61.8	60-130			
1,1,1,2-Tetrachloroethane	43.0	0.5	ug/L	ND	108	60-130			
1,1,2,2-Tetrachloroethane	45.7	0.5	ug/L	ND	114	60-130			
Tetrachloroethylene	37.9	0.5	ug/L	ND	94.7	60-130			
Toluene	24.5	0.5	ug/L	ND	61.3	60-130			
1,1,1-Trichloroethane	26.6	0.5	ug/L	ND	66.4	60-130			
1,1,2-Trichloroethane	24.6	0.5	ug/L	ND	61.4	60-130			
Trichloroethylene	26.7	0.5	ug/L	ND	66.8	60-130			
Trichlorofluoromethane	34.3	1.0	ug/L	ND	85.8	60-130			
Vinyl chloride	35.4	0.5	ug/L	ND	88.5	50-140			
m,p-Xylenes	62.7	0.5	ug/L	ND	78.3	60-130			
o-Xylene	31.4	0.5	ug/L	ND	78.6	60-130			
Surrogate: 4-Bromofluorobenzene	*79.8*		*ug/L*		*99.7*	*50-140*			
Surrogate: Dibromofluoromethane	*81.6*		*ug/L*		*102*	*50-140*			
Surrogate: Toluene-d8	*75.6*		*ug/L*		*94.6*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QR-07 : Duplicate result exceeds RPD limits due to non-homogeneity between multiple sample vials. Remainder of QA/QC is acceptable.

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

PARACEL LABORATORIES LTD.

Paracel ID: 2152470

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2152470	

Client Name: Paterson Group Inc.	Project Ref: PE5413
Contact Name: Mandy Witteman	Quote #:
Address: 154 Colonnade Rd. S.	PO #: 33595
Telephone: (613) 226-7381	E-mail: mwitteman@patersongroup.ca

Page 1 of 1

Turnaround Time

☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular

Date Required:

☒ REG 153/04 ☐ REG 406/19	Other Regulation
☐ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA
☐ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm
☒ Table 7	Mun:
For RSC: ☐ Yes ☐ No	☐ Other:

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
	Required Analysis																	
1	BH1-21-GW1	GW		2	Dec. 22/21			X										
2	TRIP BLANK			1	Dec. 21, 2021			X										
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Mandy Witteman	A. Flouse	Juneepavn Dolumal	
Relinquished By (Print): Mandy Witteman	Date/Time: 23/12/21 4:00	Date/Time: DEC 23, 2021 04.50	Date/Time: DEC 23 2021 8:24
Date/Time: Dec. 23/21	Temperature: °C FR	Temperature: 11.8C	pH Verified: ☐ By: