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Phase II Environmental Site Assessment

100 Argyle Avenue
Ottawa, Ontario

Prepared For

100 Argyle Corporation

Jul 23, 2021

Report: PE4365-4

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TABLE OF CONTENTS

List of Figures

List of Appendices

EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the property addressed 100 Argyle Avenue, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) that were identified during the Phase I ESA and considered to result in areas of potential environmental concern (APECs) on the Phase II property. The subsurface investigation consisted of drilling 3 boreholes in 2018 and an additional 3 boreholes in 2021, two of which were constructed with groundwater monitoring wells.

Soil samples were obtained from the boreholes and screened using visual observations and organic vapour measurements. A total of 17 soil samples were submitted for laboratory analysis of a combination of benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F_1-F_4), polychlorinated biphenyls (PCBs) and metals (including Chrome VI and Mercury). Molybdenum concentrations exceeding the MECP Table 3 standards were identified in the fill material in the northern and southeastern portions of the Phase II property. Petroleum hydrocarbon fractions F_2 and F_3 were identified in the native soil in the northwestern and southeastern portions of the Phase II property, at concentrations exceeding the MECP Table 3 standards.

Groundwater samples were obtained during the 2018 assessment from monitoring wells installed in BH1-18, BH3-18, BH1 and a sample from BH5-21 was recovered during the 2021 assessment. The groundwater samples were analyzed for volatile organic compounds (VOCs), metals, PCBs and/or PHC parameters. All groundwater parameters analysed were in compliance with the MECP Table 3 standards.

Based on the findings of the Phase II ESA, fill material impacted with molybdenum and native soil impacted with PHC fractions F_2 and F_3 was identified on the Phase II property. It is our understanding that the Phase II property is to be redeveloped with a multi-storey residential building with several underground parking levels.

Recommendations

It is our recommendation that an environmental site remediation program, involving the removal of all impacted soil, be completed concurrently with the site redevelopment.

It is also recommended that Paterson personnel be onsite during construction activities to direct the excavation and segregation of impacted soil and to conduct confirmatory sampling as required to supplement a Record of Site Condition filing.

The removal of non-impacted soil from the Phase II ESA property will require supplemental testing, in accordance with O.Reg. 406/19. It is recommended at that supplemental testing be carried out prior to the start of excavation work.

It is expected that groundwater monitoring wells will be abandoned in accordance with O.Reg.903, at the time of construction excavation. It is recommended that the integrity of the monitoring wells be maintained, prior to future construction, for possible further groundwater monitoring purposes.

1.0 INTRODUCTION

At the request of 100 Argyle Corporation, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment of 100 Argyle Avenue, in the City of Ottawa, Ontario. The purpose of the Phase II ESA is to address the areas of potential environmental concern (APECs) identified on the Phase II Property, as part of the Phase I ESA conducted by Paterson in July 2021.

1.1 Site Description

Address:	100 Argyle Avenue, Ottawa, Ontario.
Legal Description:	Part of Lots 3 and 4, Argyle Avenue South, Plan 30, in the City of Ottawa.
Property Identification	
Number:	04123-0063
Location:	The Phase II Property is located on the south side of Argyle Avenue, approximately 60m east of Metcalfe Street, in Ottawa, Ontario.
Latitude and Longitude:	45° 24' 44" N, 75° 41' 13" W
Configuration:	Rectangular (approximate)
Site Area:	0.16 ha (approximate)

1.2 Property Ownership

Paterson was engaged to conduct this Phase I ESA by Mrs. Bonnie Martell of 100 Argyle Corporation. 100 Argyle Corporation's offices are located at 16 Concourse Gate, Suite 200, Ottawa, Ontario, K2E 7S8.

1.3 Current and Proposed Future Uses

The Phase II Property is currently occupied by a two and a half-storey commercial building with associated parking areas and small landscaped areas. The Phase II Property is proposed to be redeveloped with a multi-storey commercial and residential building with multiple levels of underground parking.

1.4 Applicable Site Condition Standard

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

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

The residential standards were selected based on the proposed future use of the subject site. Coarse grained soil standards were chosen as a conservative approach. Grain size analysis was not completed.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II property is located in an urban area surrounded by various sized residential, commercial, and institutional structures. Site topography slopes slightly down towards the south/southeast. The Phase II property is at a similar grade as the surrounding properties, with the exception of the adjacent property to the south and east which is approximately 1.5 m lower. A retaining wall is present along the south and east property boundaries. Site drainage consists primarily of sheet flow to catch basins located along Argyle Avenue and within the rear parking areas of the Phase II property. The Phase II property is situated within a municipally serviced area.

2.2 Past Investigations

- "Phase I Environmental Site Assessment, 100 Argyle Avenue, Ottawa, Ontario", prepared by Paterson Group and dated July 26, 2012.

Paterson Group Inc. (Paterson) completed a Phase I – ESA in 2012 that indicated the fuel oil spill that occurred on the adjacent property to the south (Ottawa Police Station) did not pose an immediate risk to the building tenants or operations. It was recommended that if certainty was required, that further work would be required to assess if the fuel oil spill had impacted the property.

Paterson also recommended that detailed drawings of the foundation drainage system and sump pit location at the Ottawa Police Headquarters be acquired to further assess the potential for impacts on the Phase I property.

- ❑ "Phase II Environmental Site Assessment, Commercial Office Building, 110 Argyle Avenue, Ottawa, Ontario", prepared by Paterson Group and dated May 7, 2013

Paterson Group Inc. has previously completed a Phase II ESA (2013) for the Phase II property. Two boreholes (BH1 and BH2) were placed on the southern property limits of the Phase II property, one of which was instrumented with a groundwater monitoring well. The monitoring well was installed at a depth of approximately 8.6 m. Historic groundwater levels were observed to be approximately 6.5 m below the existing grade.

Two soil samples, one from each borehole were collected and analysed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and petroleum hydrocarbons (PHCs, F_1 to F_4). Based on the analytical test results, the soil was in compliance with the MECP Table 3 standards. One groundwater sample was collected from the monitoring well installed in BH1 and tested for BTEX and PHCs. The groundwater sample was in compliance with the MECP Table 3 Standards.

- ❑ "Phase I Environmental Site Assessment, 100 Argyle Avenue, Ottawa, Ontario", prepared by Paterson Group and dated August 14, 2018.

Paterson Group Inc. also completed at Phase I – ESA for Phase II property in August of 2018. Five PCAs resulting in APECs on the Phase I – ESA property were identified in the form of a historical automotive service garage located 30 m to the east, a gasoline service station on the adjacent property to the south, a historical gasoline spill immediately south of the Phase I property, a pad mounted transformer and fill material of unknown quality. A Phase II – ESA was recommended and completed by Paterson in August of 2018.

- ❑ "Phase II Environmental Site Assessment, 100 Argyle Avenue, Ottawa, Ontario", prepared by Paterson Group and dated August 22, 2018

Paterson Group Inc. completed a Phase II – ESA in August of 2018 for the Phase II property. Three boreholes (BH1-18, 2-18 and 3-18), all of which were instrumented with groundwater monitoring wells were placed on the Phase II - property.

Six soil samples were collected and analysed for benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F_1 to F_4), polychlorinated biphenyls (PCBs) and metals. Based on the analytical test results, one metals exceedance in the form of molybdenum was identified in the fill material and PHC fractions F_2 and F_3 were identified in the overburden in the southwestern portion of the property.

Three groundwater samples were collected from the monitoring wells installed in BH1-18, Bh3-18 and BH1 and were analysed for volatile organic compounds (VOCs), metals, PCBs and/or PHCs. The groundwater samples were in compliance with the MECP Table 3 Standards.

- ❑ "Phase II Environmental Site Assessment, 100 Argyle Avenue, Ottawa, Ontario", prepared by Paterson Group and dated July, 2021.

Based on the July 2021 Phase I ESA conducted by Paterson for the Phase I property, several historical off-site potentially contaminating activities (PCAs) were considered to result in areas of potential environmental concern (APECs) on the Phase I and Phase II property, as presented in Table 1.

Table 1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern with respect to Phase I Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1 - Pad mounted transformer	Northeast corner of Phase I ESA property	Item 55 – Transformer Manufacturing, Processing, and Use	On-Site	PCBs, PHCs, BTEX	Soil and Groundwater
APEC 2 - Fill Material of unknown Quality	Southern limits of Phase I ESA property	Item 30 – Importation of Fill Material of Unknown Quality	On-Site	Metals, As, Se, Sb, Hg, CrVI	Soil and Groundwater
APEC 3 - Fuel Spill and Fuel Storage tanks	Southern Portion of Phase I ESA Property	Item 28 - Gasoline and Associated Products Storage in Fixed UST	Off-Site	PHCs, BTEX	Soil and groundwater
APEC 4 - Former Automotive Service Garage	Southern portion of Phase I ESA property.	Item 52 - Storage, maintenance, fuelling and repair of equipment, vehicles	Off-Site	PHCs, BTEX	Soil and groundwater
APEC 5 - Former Retail Fuel Outlet	Eastern portion of Phase I ESA property	Item 28 - Gasoline and Associated Products Storage in Fixed UST	Off-Site	PHCs, BTEX	Soil and groundwater
APEC 6 – Application of Road Salt[1]	Within the parking areas of the Phase I ESA property	NA	On-Site	EC, SAR	Soil

1 - – In accordance with Section 49.1 of Ontario Regulation 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 I ESA property.

A Phase II ESA was recommended to address the aforementioned APECs.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigations were conducted through the interim of April 6, 2013, July 26 and 27, 2018 and June 16, 2021. The field programs consisted of drilling six boreholes, four of which were instrumented with groundwater monitoring wells. Boreholes were drilled a maximum depth of 15.85 m.

3.2 Media Investigated

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

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

Based on the information from NRCAN, bedrock in the area of the site consists of shale of the Billings Formation. Based on the maps, the thickness of overburden ranges from 25 to 50 m. Overburden consists of offshore marine sediments (silts and clays). Based on the results of the previous subsurface investigations on the Phase II property, the groundwater is expected to be encountered in the overburden at depths ranging from 7.24 to 8.81 m below grade.

Existing Buildings and Structures

The Phase II Property is occupied by a two-storey office building constructed in 1955, with an addition built on the east side of the building in the early 1960s.

Underground Utilities

Underground utilities on the Phase I – ESA property are present in the form of natural gas, hydro and water lines.

Water Bodies

There are no waterbodies on the Phase I property and the closest water body is the Rideau Canal located 247 m to the east.

Areas of Natural Significance

There are no areas of natural and scientific interest on the subject property or within the Phase I ESA study area.

Drinking Water Wells

A search of the MECPs web site for all drilled well records within 250 m of the Phase I property was conducted on June 28, 2021. The search identified fifteen records, primarily for monitoring wells drilled on properties in the Phase I study area.

No well records were documented for the Phase I – ESA property however, based on the review of previously completed Phase II – ESAs, there are four monitoring wells on the Phase I property that were drilled in conjunction with the previous subsurface investigations.

Based on the previously completed borehole log reports, the site stratigraphy consists of brown silty sand fill material extending to depths ranging from 1.62 to 6.20 m underlain by stiff grey silty clay. Bedrock was inferred at a depth of 34.1 m through a dynamic cone penetration test (DCPT) and groundwater was intercepted at a maximum depth of 8.8 m.

Neighbouring Land Use

Neighbouring land use in the Phase I study area consists of commercial, residential, and institutional properties. Land use is shown on Drawing PE4365-2R Surrounding Land Use Plan.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 7.1 of the Phase I ESA, Potentially Contaminating Activities and Areas of Potential Environmental Concern were identified within the Phase I ESA study area. Three PCAs were identified on the Phase I property during the historical review and Phase I ESA site visit. Three additional off site PCAs representing APECs on the Phase I property were identified during the historical review.

- **Pad-mounted Transformer** - This APEC is located in the northeastern portion of the Phase I – ESA property.

- **Fill material of Unknown Quality** – This APEC is located along southern property limits.

- **Former Retail Fuel Outlet** -This APEC is located on the adjacent property to the east of the Phase I – ESA property

- **Former Automotive Service Station** – This APEC is located on the adjacent property to the south of the Phase I – ESA property.

- **Fuel Storage Tanks and Fuel Spill** – This APEC is located on the adjacent property to the south of the Phase I – ESA property.

- **Application of Road Salt** – This APEC is located within the parking areas of the Phase I – property.

Contaminants of Potential Concern

As per Section 7.1 of the Phase I ESA, identified CPCs identified on the Phase II property include Metals (including Hg, and CrVI), BTEX, PHCs and PCBs.

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 five APECs on the Phase I – ESA property. The presence of five APECs was confirmed by a variety of independent sources, and as such, the conclusions of this report are not affected by uncertainty which may be present with respect to the individual sources.

3.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan for this project is included in Appendix 1 of this report. There were no deviations from the Sampling and Analysis Plan.

3.5 Impediments

No physical impediments were encountered during the Phase II ESA program.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigations were conducted through the interim of April 6, 2013, July 26 and 27, 2018 and June 16, 2021.

The field programs consisted of drilling six boreholes, four of which were instrumented with groundwater monitoring wells. Boreholes were drilled a maximum depth of 15.85 m.

The boreholes were placed to address the aforementioned areas of potential environmental concern (APECs). The boreholes were drilled with a truck mounted auger drill. The truck mounted drill rig was provided by George Downing Estate Drilling of Hawkesbury, Ontario. Borehole locations are shown on Drawing PE4365-3R – Test Hole Location Plan, appended to this report.

4.2 Soil Sampling

A total of 26 soil samples were obtained from the boreholes by means of sampling from shallow auger flights and split spoon sampling. The depths at which auger samples and split spoon samples were obtained from the boreholes are shown as "**AU**" and "**SS**" on the Soil Profile and Test Data Sheets, appended to this report.

Site soils consist of asphaltic concrete underlain by fill material and native silty clay. Fill material present beneath the pavement structure extended to depths ranging from approximately 1.63 m in BH1-18 to 6.20 m in BH3-18 and 1.07 m in BH4-21 to 2.13 m in BH5-21 below the existing grade and generally consisted of silty sand with crushed stone, gravel, or clay.

4.3 Field Screening Measurements

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

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

The PID readings were found to range from 0 to 70 ppm in the soil samples obtained. The higher results are indicative of potential contamination from volatile contaminants. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

4.4 Groundwater Monitoring Well Installation

Two groundwater monitoring wells were installed on the Phase II Property as part of the current Phase II investigation. The monitoring wells consisted of 50 mm diameter Schedule 40 threaded PVC risers and screens. Monitoring well construction details are listed below in Table 2 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Table 2: Monitoring Well Construction Details

Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1-18	70.25	9.14	6.14-9.14	5.79-9.14	0.30-5.79	Flush mount
BH1	70.21	8.56	7.06-8.56	6.80-8.56	0.30-6.80	Flush mount
BH3-18	70.17	9.14	6.14-9.14	5.84-9.14	0.30-5.84	Flush mount
BH4-21	70.20	7.62	4.62-7.62	4.40-7.62	0 - 4.40	Flush mount
BH5-21	70.31	9.14	5.80-8.80	8.80-8.80	0 -5.60	Flush mount

4.5 Field Measurement of Water Quality Parameters

Groundwater sampling was conducted at BH1-18, BH3-18 and BH1 on August 7 and 9, 2018 and at BH4-21 and BH5-21 on June 16, 2021. Water quality parameters were measured in the field using a multi-parameter analyzer. Parameters measured in the field included temperature, pH, and electrical conductivity.

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

Table 3: Field Measurement of Water Quality Parameters

Parameter	BH1-18	BH3-18	BH4-21	BH5-21
Temperature (°C)	21.9	32	18.35	19.25
pH	7.96	8.18	8.05	8.50
Electrical Conductivity (µS)/(µS/cm)	72 µS/cm	110 µS/cm	12.08	11.82

4.6 Groundwater Sampling

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

4.7 Analytical Testing

Based on the guidelines outlined in the Sampling and Analysis Plan appended to this report, the following soil and groundwater samples were submitted for analysis:

Table 4: Soil Samples Submitted

Sample ID	Sample Depth / Stratigraphic Unit	Parameters Analyzed					Rationale
		VOCs	BTEX	PHCs (F_1-F_4)	PCBs	Metals [1]	
BH1-18-AU1	0-0.61m; Fill	X		X	X		Assess potential impacts of the fill material identified near the transformer.
BH1-18-SS2/3	0.76-2.13m, Fill					X	
BH1-18-SS5	3.05-3.66m, Native Silty Clay	X		X			Assess potential impacts of APEC 5, former retail fuel outlet on adjacent property to the east of the Phase II property.
BH1-SS10	5.33-5.94m, Native Silty Clay	X		X			Assess potential impacts APECs 3 and 4, the former automotive service station and fuel spill on the adjacent property to the south of the Phase II property.
BH2-18-SS4	2.28-2.90m, Fill					X	Assess potential impacts of APEC 2 fill material of unknown quality.
BH2-18-SS5	3.05-3.66m, Fill					X	Vertically delineate impacted soil identified in BH2-18-SS4
BH2-18-SS9	6.10-6.71m; Native Silty Clay	X		X			Assess potential impacts of APECs 3,4 and 5, fuel oil spill and former automotive service as well as a former retail fuel outlet on the adjacent properties to the south and east of the Phase II property, respectively.
BH2-18-SS11	7.62-8.23m, Native Silty Clay	X		X			Vertically delineate impacted soil identified in BH2-18-SS9

Table 4: Soil Samples Submitted							
BH2-SS4	6.85-7.46, Native Silty Clay		X	X			Assess potential impacts APECs 3 and 4, the former automotive service station and fuel spill on the adjacent property to the south of the Phase II property.
BH3-18-SS3	1.52-2.13m; Fill					X*	Assess fill material identified along the south property line.
BH3-18-SS9	6.10-6.71m; Native Silty Clay	X		X			Assess potential impacts APECs 3 and 4, the former automotive service station and fuel spill on the adjacent property to the south of the Phase II property.
BH4-21-SS2	0.76-1.37 m; Fill					X	Assess potential impacts of APEC 2 fill material of unknown quality.
BH4-21-SS5	3.04-3.66 m, Native Silty Clay			X			Assess potential impacts of APEC 5, former retail fuel outlet on adjacent property to the east of the Phase II property.
BH5-21-SS2	0.76-1.37 m; Fill					X	Assess potential impacts of APEC 2, fill material of unknown quality
BH5-21-SS7	4.57-5.18 m, Native Silty Clay			X			Assess potential impacts of APEC 5, former retail fuel outlet on adjacent property to the east of the Phase II property.
BH6-21—SS3	1.50-2.10 m, Fill			X	X		Assess potential impacts of APECs 1 and 5, on-site pad mounted transformer and former retail fuel outlet on adjacent property to the east of the Phase II property
DUP*	3.04-3.66 m, Native Silty Clay			X			Assess potential impacts of APEC 5, former retail fuel outlet on adjacent property to the east of the Phase II property.

1 – Metals including Chrome VI and Mercury
* - Duplicate sample of BH4-21-SS5

Table 5: Groundwater Samples Submitted								
Sample ID	**Screened Interval/ Stratigraphic Unit**	**Parameters Analyzed**						**Rationale**
		VOCs X	**BTEXX**	**PHCs (F_1-F_4)**	**PCBs**	**Metals[1]**	**Metals**	
BH1-18-GW1	6.14-9.14, Native Silty Clay			X	X			Assess potential impacts of APECs 1 and 5, on-site pad mounted transformer and former retail fuel outlet on adjacent property to the east
BH3-18-GW1	6.14-9.14, Native Silty Clay			X				Assess potential impacts of APEC 3 and 4, the former automotive service station and fuel spill to the south of the subject site.
BH1-GW	7.06-8.56, Native Silty Clay			X				Assess potential impacts relating to APECs 1 and 5, on-site pad mounted transformer and the former retail fuel outlet to the east
BH1-GW1	7.06-8.56, Native Silty Clay			X				Assess potential impacts of APECs 3,4 and 5, fuel oil spill and former automotive service as well as a former retail fuel outlet on the adjacent properties to the south and east of the Phase II property, respectively.
BH4-21-GW1	4.62-7.62 Native Silty Clay		X	X				Assess potential impacts of APEC 5, former retail fuel outlet on adjacent property to the east of the Phase II property.

Table 5: Groundwater Samples Submitted								
BH5-21-GW1	5.80-8.80, Native Silty Clay		X	X				Assess potential impacts of APEC 5, former retail fuel outlet on adjacent property to the east of the Phase II property.
DUP-1*	4.62-7.62 Native Silty Clay							Assess potential impacts of APEC 5, former retail fuel outlet on adjacent property to the east of the Phase II property.
1 – Metals including Chrome VI and Mercury * -Duplicate sample of BH4-21-GW1 (submitted for PHC fraction								

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

4.8 Residue Management

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

4.9 Elevation Surveying

Boreholes were surveyed to geodetic elevations by Paterson personnel.

4.10 Quality Assurance and Quality Control Measures

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

5.0 REVIEW AND EVALUATION

5.1 Geology

Site soils generally consist of a pavement structure over fill material, underlain by native silty clay. Site stratigraphy is shown on Drawings PE4365-4AR, 5AR, 6AR, 7AR – Cross-Section A-A' and Drawings PE4365-4BR, 5BR, 6BR and 7BR – Cross-Section B-B'.

Groundwater was encountered within the silty clay at depths ranging from approximately 6.38 m to 8.81 m below existing grade.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling events on August 7, 2018, and June 23, 2021, using an electronic water level meter. Groundwater levels are summarized below in Table 6. All borehole elevations are referenced to Geodetic datum.

Table 6: Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1-18	70.25	7.24	63.01	August 7, 2018
BH3-18	70.17	8.81	61.36	August 7, 2018
BH1	70.21	7.56	62.65	August 7, 2018
BH4-21	70.20	7.39	62.81	June 23,2021
BH5-21	70.31	6.38	63.93	June 23,2021

Based on the groundwater elevations measured during the August 2018 and June 2021 sampling events, groundwater contour mapping was completed. Groundwater contours are shown on Drawing PE4365-3R – Test Hole Location Plan. Based on the contour mapping, groundwater flow beneath the Phase II Property appears to flow towards the southeast A horizontal hydraulic gradient of approximately 0.04 m/m was calculated.

5.3 Fine-Coarse Soil Texture

No grain size analysis was completed for the Phase II property. Coarse grained standards were chosen as a conservative approach.

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in vapour readings ranging from 0 to 53.1 ppm. No visual or olfactory indications of potential contamination were identified in the soil samples at the time of the field program, except for BH1-18-SS5 where PHC odours were identified in the 2018 assessment. 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

Soil samples from the 2013, 2018 and 2021 subsurface investigations were submitted for analytical testing. The results of the analytical testing from the 2021 previous investigations (2013 and 2018) are presented in the Tables at the end of the report and the laboratory certificates of analysis are provided in Appendix 1. A discussion of the soil quality of the Phase II property, based on the 2013, 2018 and 2021 Phase II ESA is as follows.

PCBs

A total of two soil samples from the investigations were submitted for analysis of PCBs. No detectable PCB concentrations were identified in either of the soil samples submitted.

PHCs and BTEX

A total of eleven soil samples from the investigations were submitted for analysis of PHCs (F1-F4) and BTEX. Concentrations of PHC fractions F_2 and F_3 exceeding the MECP Table 3 standards were identified in the soil samples BH2-18-SS9, BH4-21-SS5 as well as the duplicate sample of BH4-21-SS4. Soil sample BH2-18-SS11 was analysed for vertical delineation purposes and all BTEX and PHC parameters were identified as being non-detect. The remaining PHC concentrations identified in the soil samples are in compliance with the MECP Table 3 standards.

Metals

A total of six soil samples from the investigations were submitted for analysis of metals, five of which included the analysis of CrVI and Hg. Metal parameters were identified in each of the soil samples submitted for analytical testing. The concentration of molybdenum identified in soil sample BH2-18-SS4 and BH5-21-SS2 exceeds the MECP Table 3 standards. Soil sample BH2-18-SS5 was submitted for vertical delineation purposes and no exceedance was identified. The remaining soil samples are in compliance with the MECP Table 3 standards.

The maximum concentrations of the analyzed parameters in the soil at the Phase II property are summarized below in Table 9.

Table 9: Maximum Concentrations – Soil			
Parameter	**Maximum Concentration (µg/g)**	**Borehole**	**Depth Interval (m BGS)**
PHC F1	31	BH1-18-SS5	3.05-3.66m
PHC F2	**949**	BH2-18-SS9	6.10-6.71m
PHC F3	**957**	BH2-18-SS9	6.10-6.71m
PHC F4	524	BH1-18-AU1	0-0.61m
Arsenic	8.6	BH5-21-SS2	0.76-1.37m
Barium	151	BH1-18-SS2-3	0.76-2.13m
Beryllium	0.5	BH2-18-SS5	3.05-3.66m
Boron	11.0	BH2-18-SS4	2.28-2.90m
Chromium	39.9	BH1-18-SS2-3	0.76-2.13m
Cobalt	10	BH1-18-SS2-3	0.76-2.13m
Cobalt	10	BH2-18-SS4	2.28-2.90m
Copper	28.1	BH1-18-SS2-3	0.76-2.13m
Lead	30.6	BH2-18-SS4	2.28-2.90m
Molybdenum	**9.0**	BH2-18-SS4	2.28-2.90m
Nickel	26.6	BH1-18-SS2-3	0.76-2.13m
Vanadium	53.3	BH1-18-SS2-3	0.76-2.13m
Zinc	26.5	BH1-18-SS2-3	0.76-2.13m

Notes:
- **Bold and Underlined** – Value exceeds MECP Table 3 standards

All other parameter concentrations were below laboratory detection limits.

5.6 Groundwater Quality

Groundwater samples from the 2013, 2018 and 2021 subsurface investigations were submitted for analytical testing. The results of the analytical testing from the 2021 and previous investigations (2013 and 2018) are presented in the Tables at the end of the report. The laboratory certificates of analysis are provided in Appendix 1. A discussion of the groundwater quality of the Phase II property, based on the 2013, 2018 and 2021 Phase II ESA is as follows.

PCBs

All of the analyzed PHC and BTEX parameters were identified as being non-detect and therefore in compliance with the applicable Table 3 standards.

PHCs and BTEX

All of the analyzed PHC and BTEX parameters were identified as being non-detect and therefore in compliance with the applicable Table 3 standards.

VOCs

All of the analyzed VOC parameters were identified as being non-detect and therefore in compliance with the applicable Table 3 standards.

Metals and Inorganics

No metals parameters were identified above the MECP Table 3 Standards. The groundwater is in compliance for metals.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of the 2018 and 2021 sampling events were handled in accordance with the Analytical Protocol with respect to preservation method, storage requirement, and container type. The holding time was exceeded for one delineation sample (BH2-18-SS11). Based on the results of the vapour survey and the non-detect soil results, the sample is considered to be representative of the soil quality.

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

As per the Sampling and Analysis Plan, a duplicate soil sample was obtained from sample BH4-21-SS5 and submitted for laboratory analysis of BTEX and PHC (F_1-F_4) parameters. Both the duplicate and the original sample yielded exceedances in PHC fractions F_2 and F_3.

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

5.8 Phase II Conceptual Site Model

Site Description

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Based on the findings of the Phase I ESA, two potentially contaminating activities (PCAs) were identified on the RSC property, resulting in APEC 1 and APEC 2. Four offsite PCAs resulted in APECs on the RSC property, APEC 3, APEC4 and APEC 5.

APEC 1- Pad-mounted Transformer – APEC 1 is related to an on-site pad mounted transformer that is located in the northeastern portion of the RSC property.

APEC 2 - Fill material of Unknown Quality –APEC 2 is related to fill material of unknown quality that was identified during the subsurface investigations and is located along southern property limits.

APEC 3 - Former Retail Fuel Outlet – APEC 3 is related to a former retail fuel outlet that was identified during the historical research conducted as part of the Phase I – ESA and is located on the adjacent property to the east of the RSC property.

APEC 4 - Former Automotive Service Station – APEC 4 is related to a former automotive service garage that was identified during the historical research conducted as part of the Phase I – ESA and is located on the adjacent property to the south of the RSC property.

APEC 5 - Fuel Storage Tanks and Fuel Spill – APEC 5 is related to a fuel oil spill resulting from fuel tanks that was identified during the historical research conducted as part of the Phase I – ESA and is located on the adjacent property to the south of the RSC property.

APEC 6 - Application of Road Salt – Based on the findings of the Phase I ESA it was considered likely that road salt was applied to the surface of the parking areas and access lanes for the safety of vehicular and pedestrian traffic under conditions of snow or ice. It was determined during the Phase I ESA that any application of a substance to the parking area was for the purpose of the safety of vehicular of pedestrian traffic under conditions of snow or ice or both, would result in conditions that result in the applicable standard to deemed not exceeded, the exemption in Section 49.1 of O.Reg. 153/04 was relied upon for APEC 6.

Contaminants of potential concern associated with the aforementioned PCAs include a combination of PHCs (F1-F4), VOCs, PCBs and/or metals, in the groundwater and/or soil.

Contaminants of Potential Concern

Based on the findings of the Phase I and Phase II ESA the following the Contaminants of Potential Concern (CPCs) were identified on the RSC Property:

Soil

- ❑ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX).
- ❑ PCBs
- ❑ Petroleum Hydrocarbons (PHC F1-F4).
- ❑ Metals (including CrVI and Hg)

Soil and Groundwater

- ❑ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX).
- ❑ PCBs
- ❑ Petroleum Hydrocarbons (PHC F1-F4).
- ❑ Metals (including CrVI and Hg)

Groundwater

- ❑ VOCs.

APECs 2 (Fill Material of Unknown Quality) and APEC 5 (Former Retail Fuel Outlet) are considered to have impacted the soil at the RSC property. Based on the concentrations of the contaminants identified in the soil, the vertical delineation of the impacts (occurring above the water table at the RSC property), and the low partition rate for parameters of concern, the groundwater is not considered to have been impacted.

Subsurface Structures and Utilities

Underground service locates were completed prior to the subsurface investigation. Underground utilities on the Phase II property include natural gas, electrical, communications, water, and septic services. No private wells or septic systems are present on the Phase II property or within the Phase I Study Area. Approximate locations of buried services are shown on Drawing PE4365-3R – Test Hole Location Plan appended to the Phase I ESA.

Physical Setting

Site Stratigraphy

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is illustrated on Drawings PE4368-4AR, 5AR, 6AR and 7AR - Cross-Section A-A' and 4BR, 5BR, 6BR and 7BR B-B'. The stratigraphy on the Phase II property consists of:

- ❒ Pavement structure consisting of approximately 0.06 to 0.08 m of asphaltic concrete over crushed stone.
- ❒ Fill material generally consisting of brown silty sand with crushed stone, gravel, and clay, was identified at each borehole location, beneath the pavement structure and extended to depths ranging from approximately 1.62 to 6.20 m below grade.
- ❒ Silty Clay was identified beneath the fill material. Silty clay extends to near the bedrock surface as inferred by the dynamic cone penetration test (DCPT) carried out for geotechnical purposes in the 2018 subsurface investigation.

Hydrogeological Characteristics

Groundwater at the Phase II Property was encountered within the silty clay. This unit is interpreted to function as a local aquifer at the Phase II - property.

Water levels were measured at the Phase II property on August 7, 2018, and June 23, 2021, at depths ranging from 6.38 to 8.81 m below grade.

Based on the groundwater elevations measured during this monitoring event, groundwater contour mapping was completed and the horizontal hydraulic gradient for the Phase II property was calculated. Groundwater flow below the Phase II - property was in a southwesterly direction, with a hydraulic gradient of approximately 0.045 m/m.

Approximate Depth to Bedrock

Bedrock was inferred at depths greater than 30 m based on the results of the DCPTs completed for the Phase II property.

Approximate Depth to Water Table

Depth to water table at the Phase II - property varies between approximately 6.38 to 8.81 m below existing grade.

Sections 41 and 43.1 of the Regulation

Section 35 of the Regulation applies to the RSC property as follows;

- ❑ The property, and all other properties located, in whole or in part, within 250m of the boundaries of the property, are supplied by the municipal drinking water system, as defined in the Safe Drinking Water Act, 2002.

- ❑ The RSC does not specify agricultural or other use as the type of property use for which the RSC is filed.

- ❑ The RSC property is not located in an area designated in the municipal official plan as a well-head protection area or other designation identified by the municipality for protection of groundwater.
- ❑ Neither the RSC property nor any of the properties in the phase one study area has a well used or intended for use as a source of water for human consumption or agriculture.

- ❑ The QP has given the clerk of the municipality written notice of intention to apply the standards in preparing a record of site condition for the property and the municipality has not given any written notice to the QP that objects to the application of the standards within 30 days after receiving the notice.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) does not apply to the Phase II Property. A search for areas of natural significance and features was completed on the Ontario Ministry of Natural Resources (MNR) website as part of the Phase I ESA within the Phase I ESA Study Area (250m Radius from site boundary) and did not reveal any areas of natural significance or environmentally sensitive areas within the Phase I ESA Study Area. Two soil samples (one surface sample and one subsurface sample) from the RSC Property were submitted for pH analysis. Based on these two soil samples, and the consistency of the site soil the Phase II ESA property is considered to have a pH between 7 and 9.

Section 43.1 of the Regulation does not apply to the RSC Property in that the Phase II property is not a shallow soil property and is not within 30 m of a water body or sensitive receptor.

Water Bodies

There are no waterbodies on the Phase I property and the closest water body is the Rideau Canal located 247 m to the east.

Fill Placement

Fill material was identified across the Phase II property beneath the pavement structure and extending to depths of 6.20 m below grade along the southern property boundary. The fill material is suspected to have been placed during the regrading of the site during the construction of the existing office building and the adjacent property to the south.

Proposed Buildings and Other Structures

It is our understanding that the Phase II property will be redeveloped with a multi-storey residential building with several underground parking levels and a building footprint that will cover the entire property.

Existing Buildings and Structures

The Phase II property is occupied by a two-storey office building with one basement level.

The building, constructed in 1955 (with an addition having been built in the early 1960s) is clad in brick and stone with a flat tar and gravel roof and poured concrete foundation. The building is heated by a natural gas fired boiler located in the basement.

No floor drains or sumps were observed within the subject building. The RSC property uses municipal services provided by the City of Ottawa. No potable wells are present on the RSC property or neighbouring properties as they are situated in a municipally serviced area.

Environmental Condition

Areas Where Contaminants are Present

Based on visual screening and analytical test results, metals impacted fill material is present in the area of BH2-18 and BH5-21. Concentrations of PHC fractions F_2 and F_3 exceeding the MECP Table 3 standards were identified in the native silty clay in BH2-18 and BH4-21. Groundwater was determined to be in compliance with the MECP Table 3 standards at all sampling locations. Analytical test results are shown on Drawings PE4365-5AR, BR, CR and PE4365-7AR, BR, CR – Analytical Testing Plans.

Types of Contaminants

Based on the PCAs resulting in APECs on the Phase II property and current analytical testing, contaminants of concern in the soil include the following: PHC fractions F_2 and F_3, and Metals (Molybdenum).

As noted previously, the groundwater at the Phase II property is in compliance with the selected MECP Table 3 standards.

Contaminated Media

Based on the results of the Phase II ESA, the fill material at BH2-18 and BH5-21 is impacted with molybdenum to a depth of approximately 3 m, while native soil at BH2-18 and BH4-21 is impacted with PHC fractions F_2 and F_3. All groundwater samples obtained from the Phase II property were in compliance with the selected MECP standards.

What Is Known About Areas Where Contaminants Are Present

Fill material is impacted with molybdenum in the northern and southeastern portions of the Phase II property, and the native soil is impacted with PHC fractions F_2 and F_3 in the northern and southeastern portions of the Phase II property. Analytical test results exceeding the MECP Table 3 standards are presented on Drawings PE4365 – 5R and 6R- Analytical Testing Plans (Soil).

Distribution and Migration of Contaminants

As previously noted, fill material impacted with molybdenum was identified in the and southeastern corner and northern portion of the Phase II property in the area of BH2-18 and BH5-21, respectively. Based on their low solubilities and low mobility, it is anticipated that the metal impacts are contained to the fill material.

The PHC (F_2 and F_3) impacts identified at BH2-18 and BH4-21 were identified near the water table. A vertical delineation sample shows the impacts to be contained to a narrow vertical band. The impacts are not considered to have horizontally migrated a significant distance and are considered to be minimal as the current and historical soil and groundwater testing results from BH1 (adjacent to BH2-18) show no impacts.

Discharge of Contaminants

Metal concentrations are considered to have been directly discharged to the fill material which was imported to the property for site grading purposes.

The PHC impacted soil is considered to have resulted from off-site fuel releases on the adjacent property to the south or southeast (Former retail fuel outlet and/or former automotive service garage).

Migration of Contaminants

The migration of contaminants on the subject site is considered to be low. Based on the analytical test results vertical migration does not appear to be a concern on the RSC property. The impacts were generally confined to the fill material.

Climatic and Meteorological Conditions

In general, climatic, and meteorological conditions have the potential to affect contaminant distribution.

Two ways by which climatic and meteorological conditions may affect contaminant distribution include the downward leaching of contaminants by means of the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally. Leaching is not considered to be an issue since the impacted fill material is considered to have been imported to the Phase II property for grading purposes prior to paving, and therefore has been covered with the pavement structure.

The fluctuation of groundwater levels is not considered to have significantly affected contaminant transport as the groundwater beneath the Phase II property is in compliance with MECP Table 3 standards.

Potential for Vapour Intrusion

The potential for vapour intrusion is considered to be low based on the non-volatile nature of the metals impacts and heavier PHC fractions, as well as the distance from the building to the areas of the PHC impacts.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the property addressed 100 Argyle Avenue, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) that were identified during the Phase I ESA and considered to result in areas of potential environmental concern (APECs) on the Phase II property. The subsurface investigation consisted of drilling 3 boreholes in 2018 and an additional 3 boreholes in 2021, two of which were constructed with groundwater monitoring wells.

Soil samples were obtained from the boreholes and screened using visual observations and organic vapour measurements. A total of 17 soil samples were submitted for laboratory analysis of a combination of benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs, F_1-F_4), polychlorinated biphenyls (PCBs) and metals (including Chrome VI and Mercury). Molybdenum concentrations exceeding the MECP Table 3 standards were identified in the fill material in the northern and southeastern portions of the Phase II property. Petroleum hydrocarbon fractions F_2 and F_3 were identified in the native soil in the northwestern and southeastern portions of the Phase II property, at concentrations exceeding the MECP Table 3 standards.

Groundwater samples were obtained during the 2018 assessment from monitoring wells installed in BH1-18, BH3-18, BH1 and a sample from BH5-21 was recovered during the 2021 assessment. The groundwater samples were analyzed for volatile organic compounds (VOCs), metals, PCBs and/or PHC parameters. All groundwater parameters analysed were in compliance with the MECP Table 3 standards.

Based on the findings of the Phase II ESA, fill material impacted with molybdenum and native soil impacted with PHC fractions F_2 and F_3 was identified on the Phase II property. It is our understanding that the Phase II property is to be redeveloped with a multi-storey residential building with several underground parking levels.

Recommendations

It is our recommendation that an environmental site remediation program, involving the removal of all impacted soil, be completed concurrently with the site redevelopment.

It is also recommended that Paterson personnel be onsite during construction activities to direct the excavation and segregation of impacted soil and to conduct confirmatory sampling as required to supplement a Record of Site Condition filing.

The removal of non-impacted soil from the Phase II ESA property will require supplemental testing, in accordance with O.Reg. 406/19. It is recommended at that supplemental testing be carried out prior to the start of excavation work.

It is expected that groundwater monitoring wells will be abandoned in accordance with O.Reg.903, at the time of construction excavation. It is recommended that the integrity of the monitoring wells be maintained, prior to future construction, for possible further groundwater monitoring purposes.

7.0 STATEMENT OF LIMITATIONS

This Phase II - Environmental Site Assessment report has been prepared in general accordance with O.Reg. 153/04 as amended by O.Reg. 269/11 and meets the requirements of CSA Z769-00. The conclusions presented herein are based on information gathered from a limited sampling and testing program. The test results represent conditions at specific test locations at the time of the field program.

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

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

This report was prepared for the sole use of 100 Argyle Corporation. Notification from 100 Argyle Corporation and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

Samuel Berube, B.Eng.

Michael Beaudoin, P.Eng., QPESA

Report Distribution:

- 100 Argyle Corporation
- Paterson Group

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE4365-3R – TEST HOLE LOCATION PLAN

DRAWING PE4365-4R – ANALYTICAL TESTING PLAN – SOIL (BTEX/PCB)

DRAWING PE4365-4AR – CROSS-SECTION A-A' – SOIL (BTEX/PCB)

DRAWING PE4365-4BR – CROSS-SECTION B-B' – SOIL (BTEX/PCB)

DRAWING PE4365-5R – ANALYTICAL TESTING PLAN – SOIL (PHC)

DRAWING PE4365-5AR – CROSS-SECTION A-A' – SOIL (PHC)

DRAWING PE4365-5BR – CROSS-SECTION B-B' – SOIL (PHC)

DRAWING PE4365-6R– ANALYTICAL TESTING PLAN – SOIL (METALS)

DRAWING PE4365-6AR – CROSS-SECTION A-A' – SOIL (METALS)

DRAWING PE4365-6BR – CROSS-SECTION B-B' – SOIL (METALS)

DRAWING PE4365-7R – ANALYTICAL TESTING PLAN – GROUNDWATER (BTEX, VOCs, METALS, PCBs, PHCs)

DRAWING PE4365-7AR– CROSS-SECTION A-A' – GROUNDWATER (BTEX, VOCs, METALS, PCBs, PHCs)

DRAWING PE4365-7BR – CROSS-SECTION B-B' – GROUNDWATER (BTEX, VOCs, METALS, PCBs, PHCs)

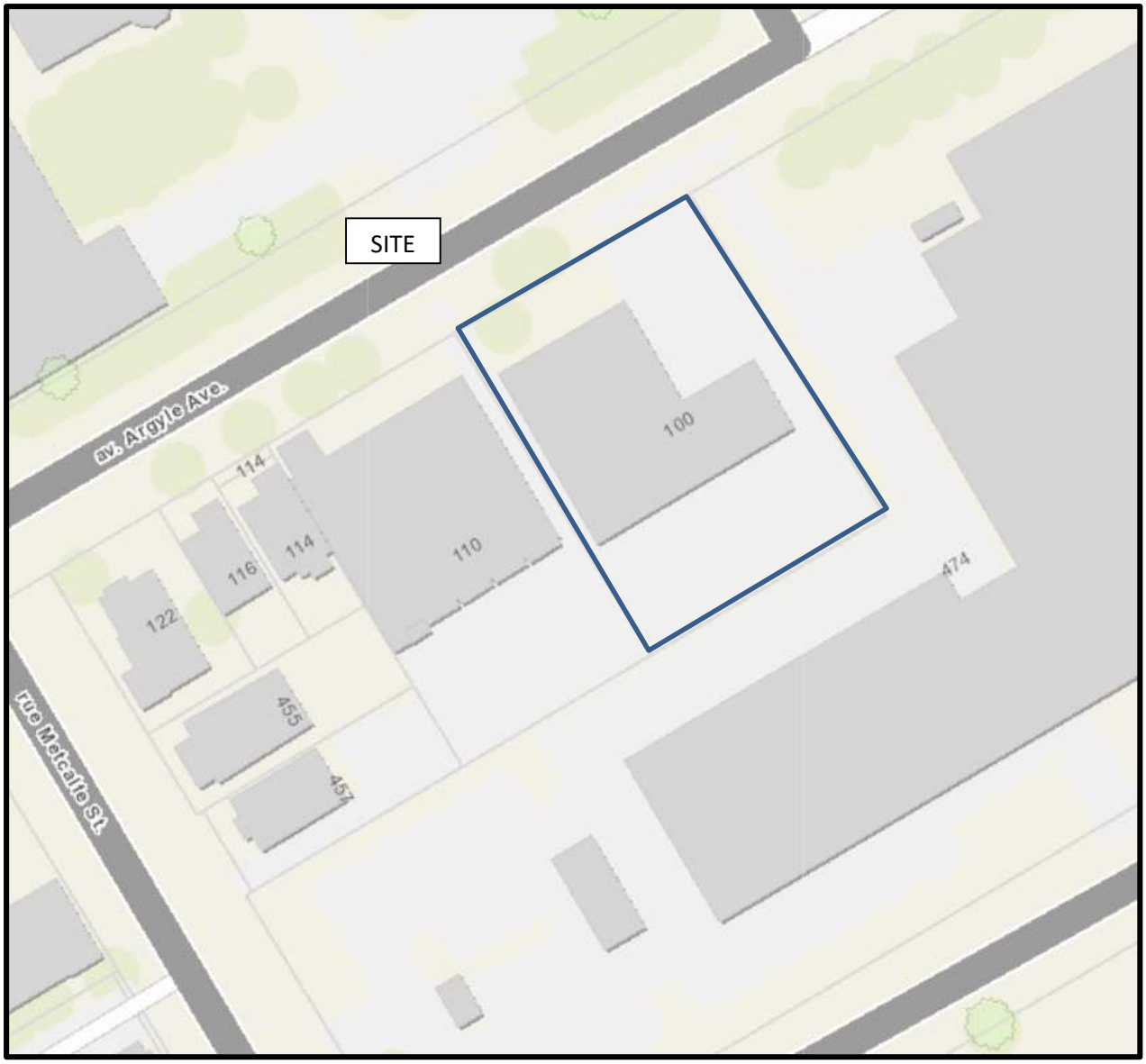
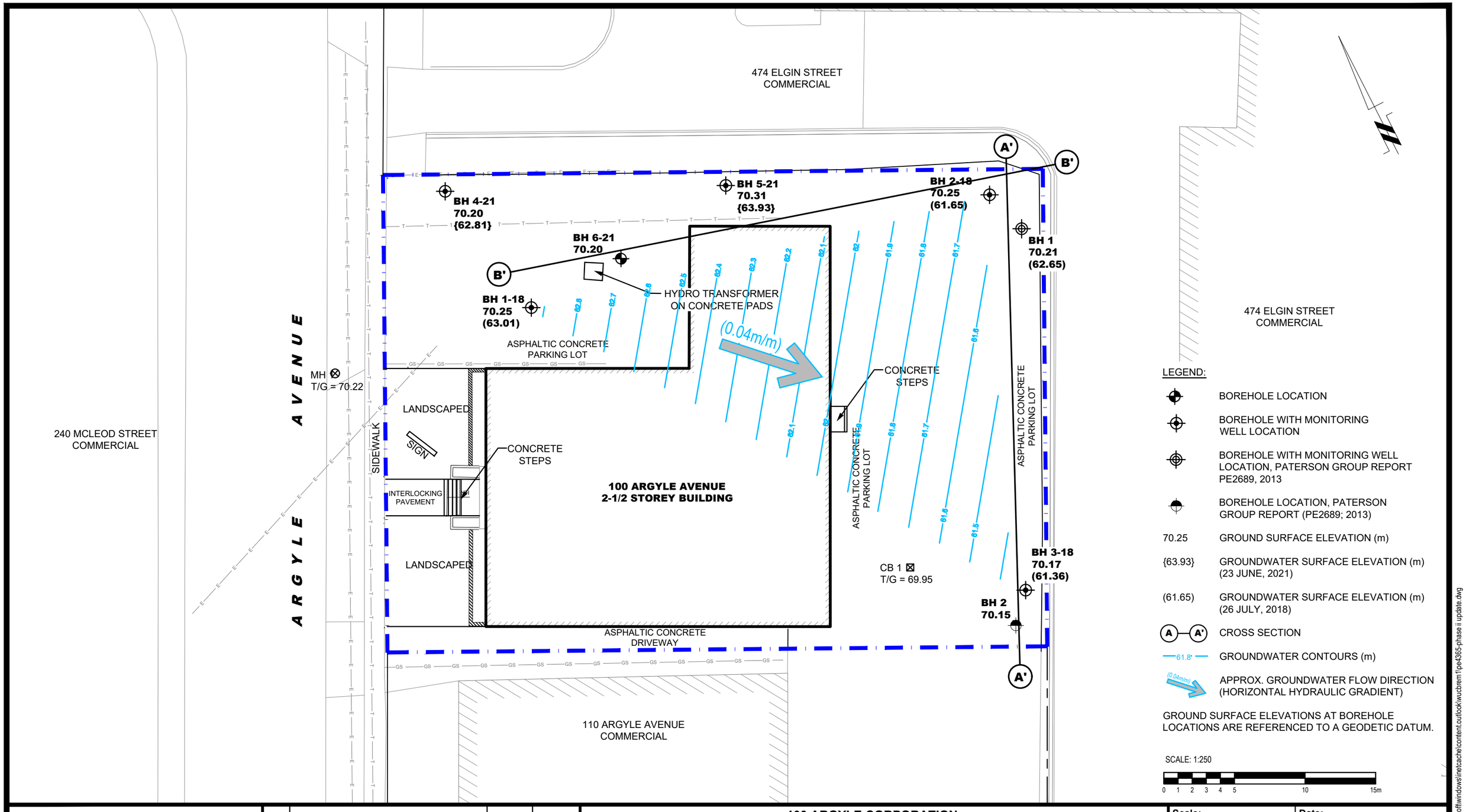


FIGURE 1

KEY PLAN



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NO.	REVISIONS	DATE	INITIAL

100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:250	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-3R
Approved by: MB	Revision No.:

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BH6-21-SS3 0.76-1.37m 16-JUNE-2021
BTEX comply with MECP Table 3 Standards

BH6-21-SS3 0.76-1.37m 16-JUNE-2021
PCBs comply with MECP Table 3 Standards

BH4-21-SS5 3.04 -3.66m 16-JUNE-2021
BTEX comply with MECP Table 3 Standards

DUP (BH4-21-SS5) 3.04 -3.66m 16-JUNE-2021
BTEX comply with MECP Table 3 Standards

BH1-18-AU1 0.0m-0.61m 26-JULY-2018
BTEX and PCBs comply with MECP Table 3 Standards

BH1-18-SS5 3.05m-3.66m 26-JULY-2018
BTEX comply with MECP Table 3 Standards

474 ELGIN STREET
COMMERCIAL

BH5-21-SS7 0.76-1.37m 16-JUNE-2021
BTEX comply with MECP Table 3 Standards

BH2-18-SS9 6.10m-6.71m 26-JULY-2018
BTEX comply with MECP Table 3 Standards

BH2-18-SS11 7.62m-8.23m 26-JULY-2018
BTEX comply with the MECP Table 3 Standards

BH1-SS10 5.33m-5.94m 9-APR-2013
BTEX comply with the MECP Table 3 Standards

BH 4-21
70.20
{62.81}

BH 5-21
70.31
{63.93}

BH 2-18
70.25
(61.65)

BH 1
70.21
(62.65)

BH 6-21
70.20

BH 1-18
70.25
(63.01)

HYDRO TRANSFORMER
ON CONCRETE PADS

A'

B'

B'

A V E N U E

A R G Y L E

240 MCLEOD STREET
COMMERCIAL

MH
T/G = 70.22

ASPHALTIC CONCRETE
PARKING LOT

LANDSCAPED

SIDEWALK

SIGN

CONCRETE
STEPS

INTERLOCKING
PAVEMENT

LANDSCAPED

100 ARGYLE AVENUE
2-1/2 STOREY BUILDING

CONCRETE
STEPS

ASPHALTIC CONCRETE
PARKING LOT

ASPHALTIC CONCRETE
PARKING LOT

474 ELGIN STREET
COMMERCIAL

CB 1
T/G = 69.95

BH 3-18
70.17
(61.36)

BH 2
70.15

A'

ASPHALTIC CONCRETE
DRIVEWAY

BH3-18-SS9 6.10m-6.71m 27-JULY-2018
BTEX comply with MECP Table 3 Standards

110 ARGYLE AVENUE
COMMERCIAL

BH2-SS4 6.85m-7.46m 6-APR-2013
BTEX comply with the MECP Table 3 Standards

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP REPORT PE2689, 2013
- BOREHOLE LOCATION, PATERSON GROUP REPORT (PE2689; 2013)

70.25 GROUND SURFACE ELEVATION (m)

{63.93} GROUNDWATER SURFACE ELEVATION (m) (23 JUNE, 2021)

(61.65) GROUNDWATER SURFACE ELEVATION (m) (26 JULY, 2018)

A — A' CROSS SECTION

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

SCALE: 1:250

0 1 2 3 4 5 10 15m

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

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

Scale: 1:250	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-4R
Approved by: MB	Revision No.:

11x17

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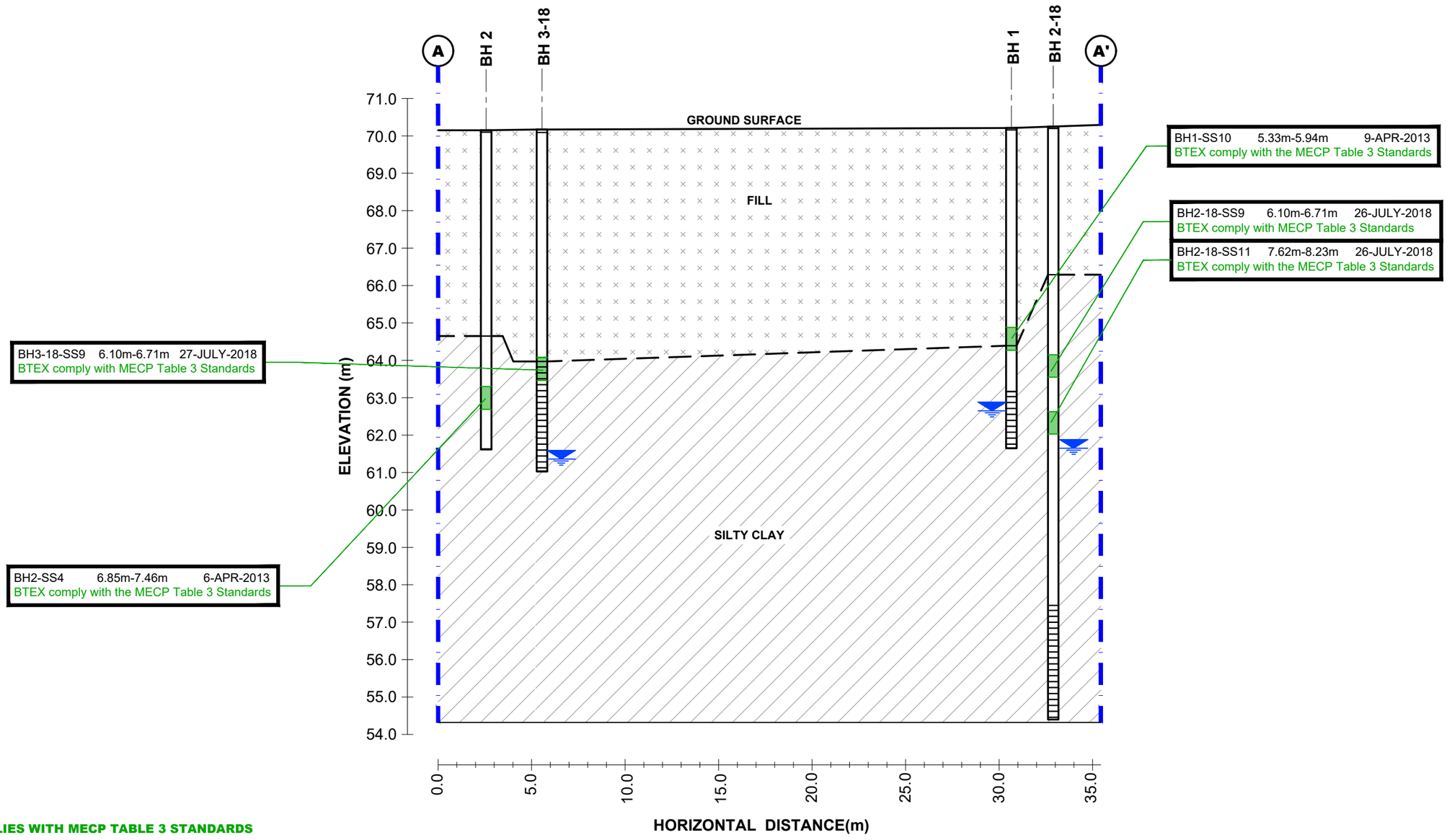

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (BTEX, PCBs)

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Checked by: SB	Dwg. No.: PE4365-4AR
Approved by: MB	Revision No.:

11x17

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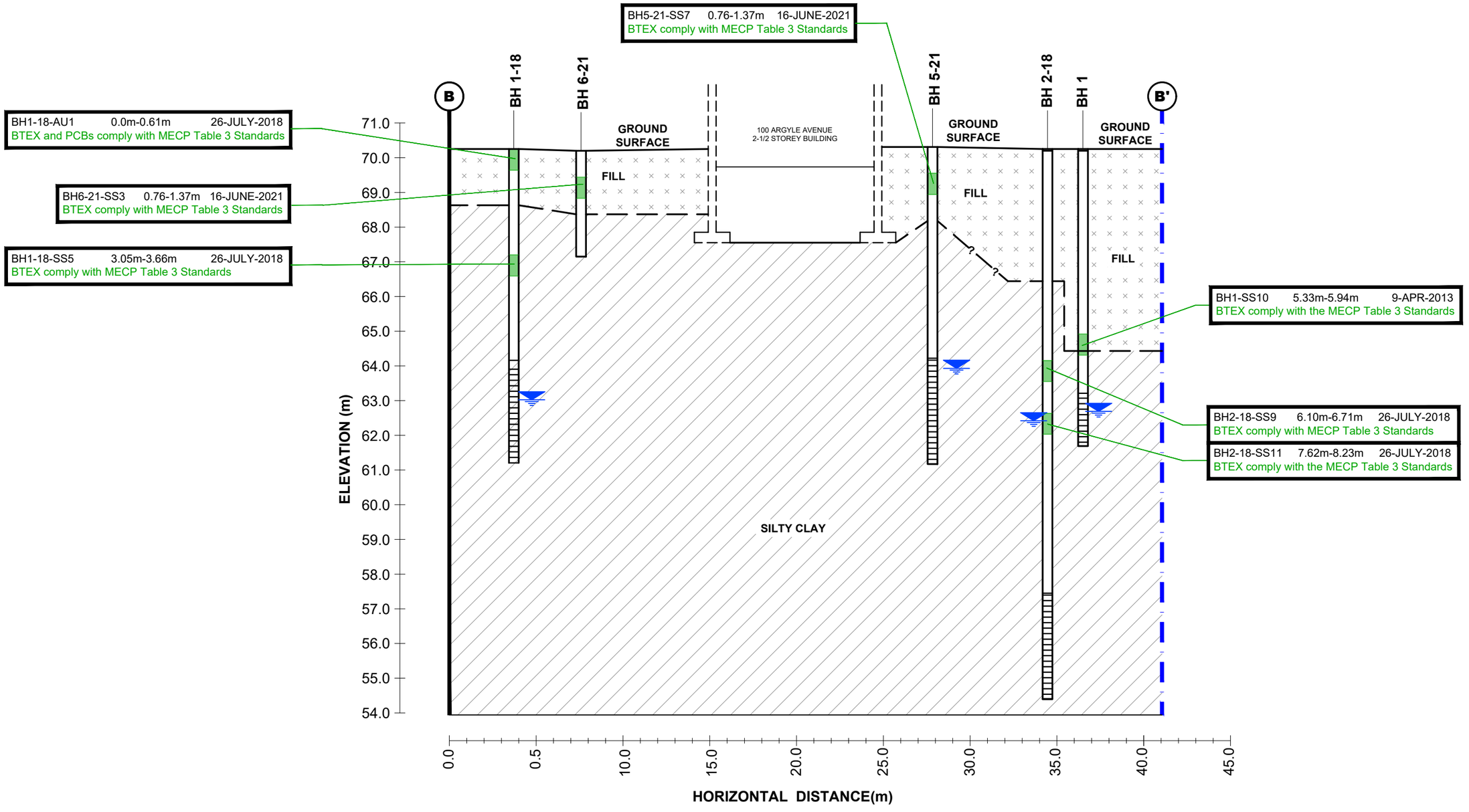

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (BTEX, PCBs)

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-4BR
Approved by: MB	Revision No.:

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BH4-21-SS5	3.04 -3.66m	16-JUNE-2021
Parameter	Result (µg/g)	Standard (µg/g)
F2	779	98
F3	733	300
Remaining PHCs comply with MECP Table 3 Standards		

DUP (BH4-21-SS5)	3.04 -3.66 m	16-JUNE-2021
Parameter	Result (µg/g)	Standard (µg/g)
F2	245	98
F3	303	300
Remaining PHCs comply with MECP Table 3 Standards		

BH5-21-SS7 4.57-5.18m 16-JUNE-2021
PHCs comply with MECP Table 3 Standards

BH2-18-SS9	6.10m-6.71m	26-JULY-2018
Parameter	Result (µg/g)	Standard (µg/g)
PHC F2	949	98
PHC F3	957	300

BH2-18-SS11 7.62m-8.23m 26-JULY-2018
PHCs comply with the MECP Table 3 Standards

BH1-SS10 5.33m-5.94m 9-APR-2013
PHCs comply with the MECP Table 3 Standards

BH6-21-SS3 0.76-1.37m 16-JUNE-2021
PHCs comply with MECP Table 3 Standards

BH1-18-AU1 0.0m-0.61m 26-JULY-2018
PHCs comply with MECP Table 3 Standards

BH1-18-SS5 3.05m-3.66m 26-JULY-2018
PHCs comply with MECP Table 3 Standards

BH3-18-SS9 6.10m-6.71m 27-JULY-2018
PHCs comply with MECP Table 3 Standards

BH2-SS4 6.85m-7.46m 6-APR-2013
PHCs comply with the MECP Table 3 Standards

474 ELGIN STREET
COMMERCIAL

240 MCLEOD STREET
COMMERCIAL

110 ARGYLE AVENUE
COMMERCIAL

BH 4-21
70.20
{62.81}

BH 5-21
70.31
{63.93}

BH 2-18
70.25
(61.65)

BH 6-21
70.20

BH 1-18
70.25
(63.01)

BH 1
70.21
(62.65)

BH 3-18
70.17
(61.36)

BH 2
70.15

HYDRO TRANSFORMER
ON CONCRETE PADS

ASPHALTIC CONCRETE
PARKING LOT

CONCRETE
STEPS

LANDSCAPED

SIDEWALK

SIGN

INTERLOCKING
PAVEMENT

MH
T/G = 70.22

CB 1
T/G = 69.95

100 ARGYLE AVENUE
2-1/2 STOREY BUILDING

ASPHALTIC CONCRETE
DRIVEWAY

ARGYLE AVENUE

A

A'

B

B'

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP REPORT PE2689, 2013
- BOREHOLE LOCATION, PATERSON GROUP REPORT (PE2689; 2013)
- 70.25 GROUND SURFACE ELEVATION (m)
- {63.93} GROUNDWATER SURFACE ELEVATION (m) (23 JUNE, 2021)
- (61.65) GROUNDWATER SURFACE ELEVATION (m) (26 JULY, 2018)
- A — A' CROSS SECTION

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

SCALE: 1:250

0 1 2 3 4 5 10 15m

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

patersongroup
consulting engineers

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

NO.	REVISIONS	DATE	INITIAL

100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (PHCs)

Scale: 1:250	**Date:** 07/2021
Drawn by: YA	**Report No.:** PE4365-4
Checked by: SB	**Dwg. No.:** PE4365-5R
Approved by: MB	**Revision No.:**

11x17

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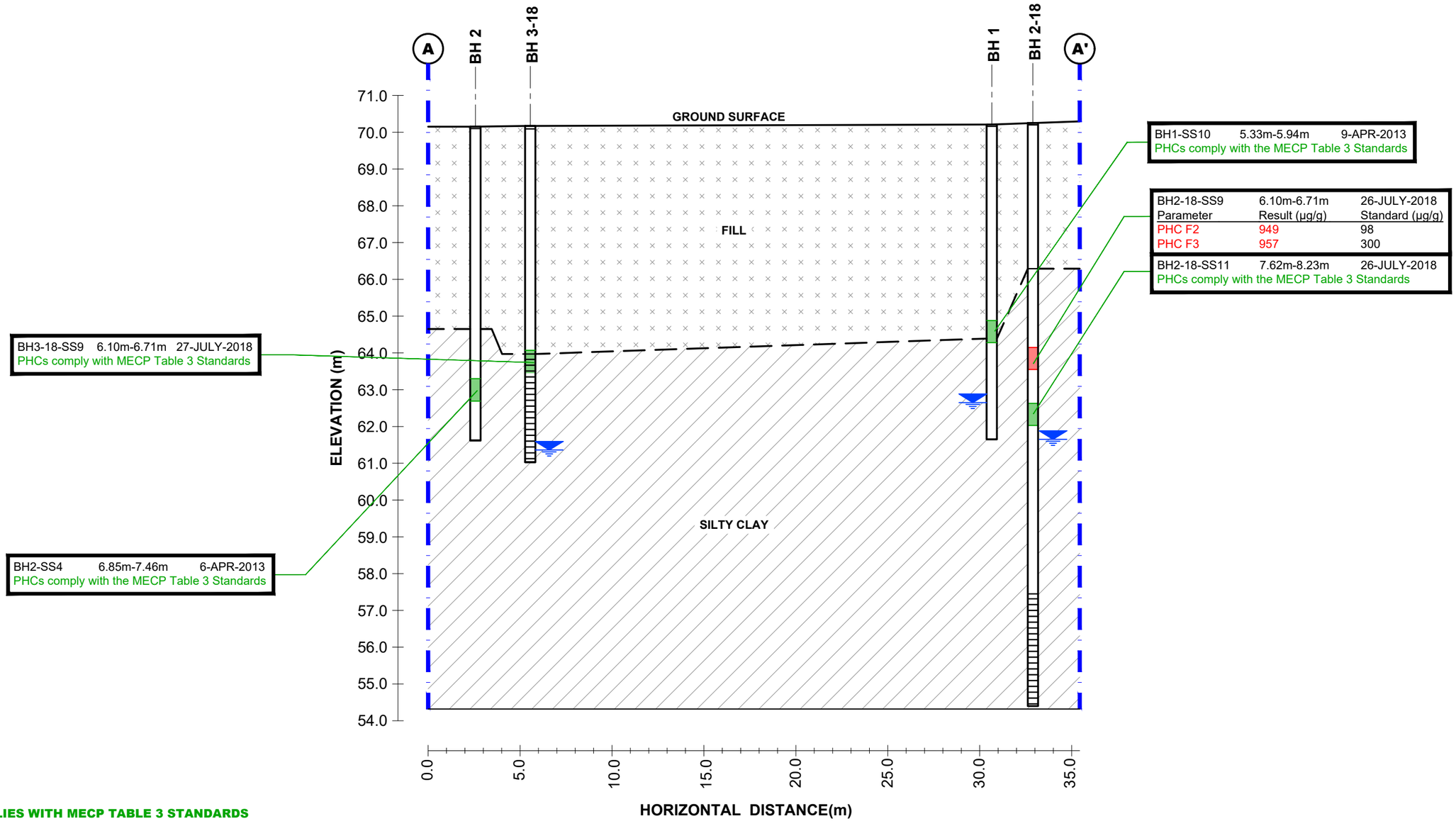

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (PHCs)

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-5AR
Approved by: MB	Revision No.:

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BH6-21-SS3 0.76-1.37m 16-JUNE-2021
PHCs comply with MECP Table 3 Standards

BH5-21-SS7 4.57-5.18m 16-JUNE-2021
PHCs comply with MECP Table 3 Standards

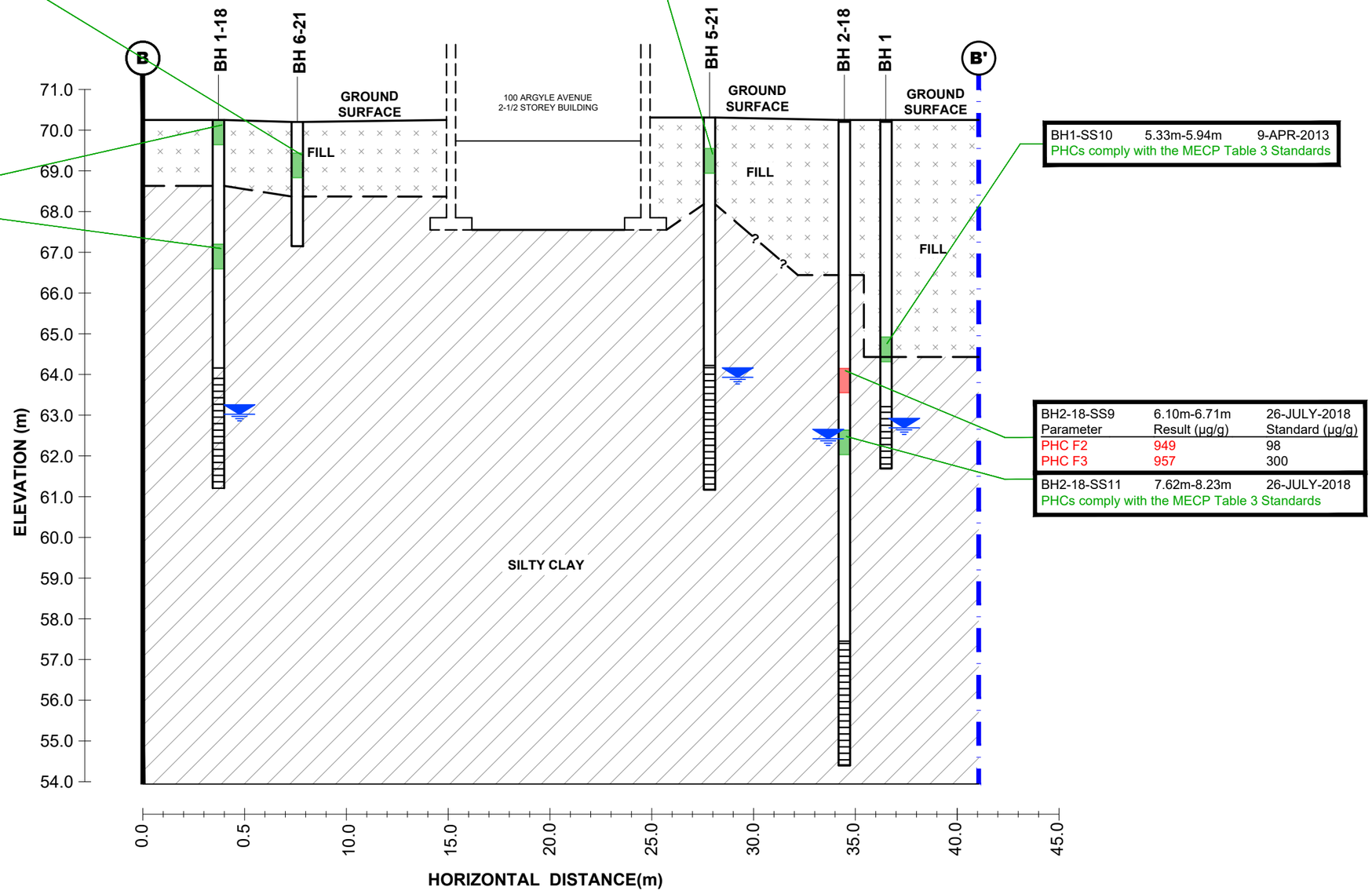
BH1-18-AU1 0.0m-0.61m 26-JULY-2018
PHCs comply with MECP Table 3 Standards

BH1-18-SS5 3.05m-3.66m 26-JULY-2018
PHCs comply with MECP Table 3 Standards

BH1-SS10 5.33m-5.94m 9-APR-2013
PHCs comply with the MECP Table 3 Standards

BH2-18-SS9	6.10m-6.71m	26-JULY-2018
Parameter	Result (µg/g)	Standard (µg/g)
PHC F2	949	98
PHC F3	957	300

BH2-18-SS11 7.62m-8.23m 26-JULY-2018
PHCs comply with the MECP Table 3 Standards



SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (PHCs)

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-5BR
Approved by: MB	Revision No.:

11x17

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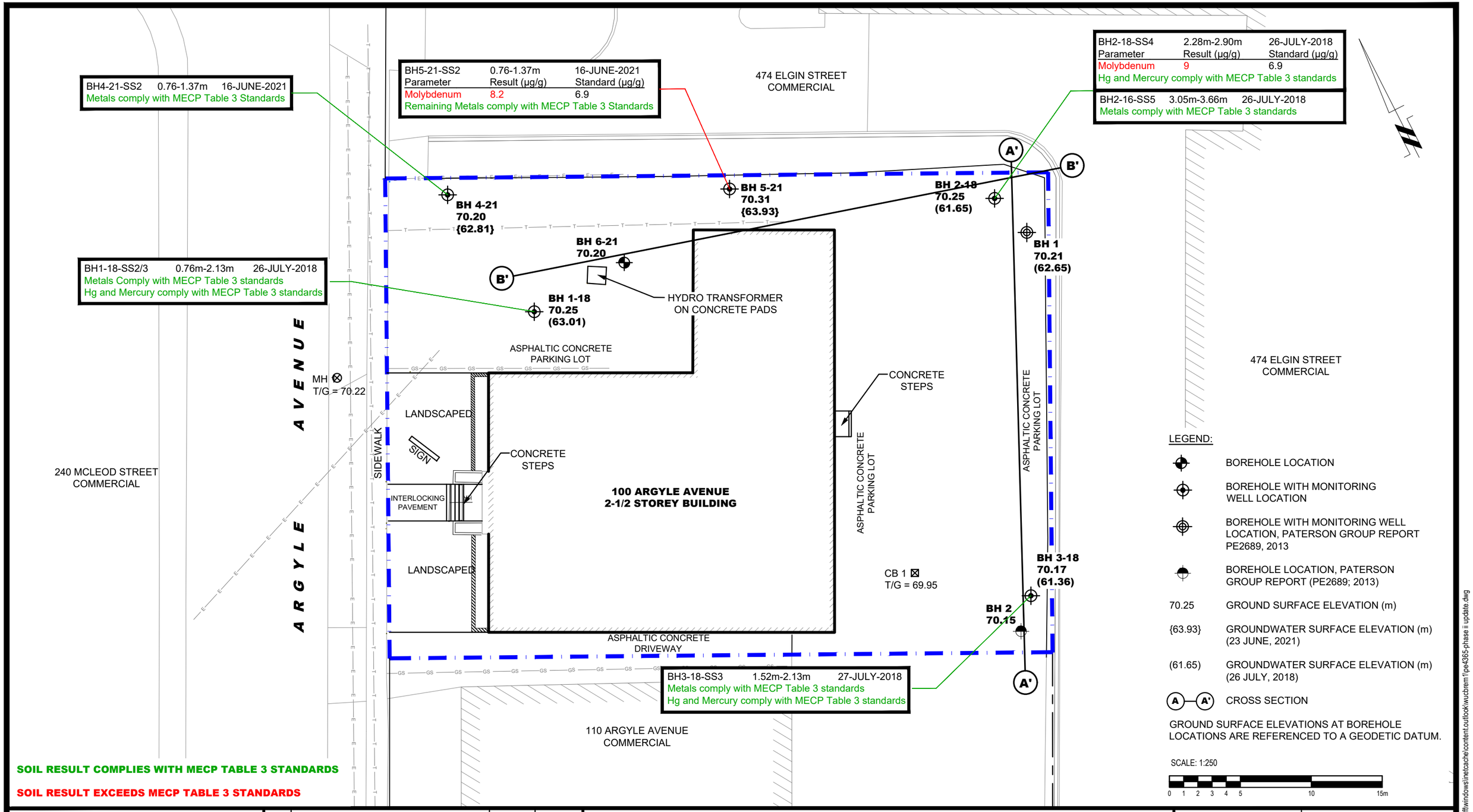

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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consulting engineers

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Ottawa, Ontario K2E 7J5
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NO.	REVISIONS	DATE	INITIAL

100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (METALS, INCLUDING Hg AND CrVI)

Scale: 1:250	**Date:** 07/2021
Drawn by: YA	**Report No.:** PE4365-4
Checked by: SB	**Dwg. No.:** PE4365-6R
Approved by: MB	**Revision No.:**

11x17

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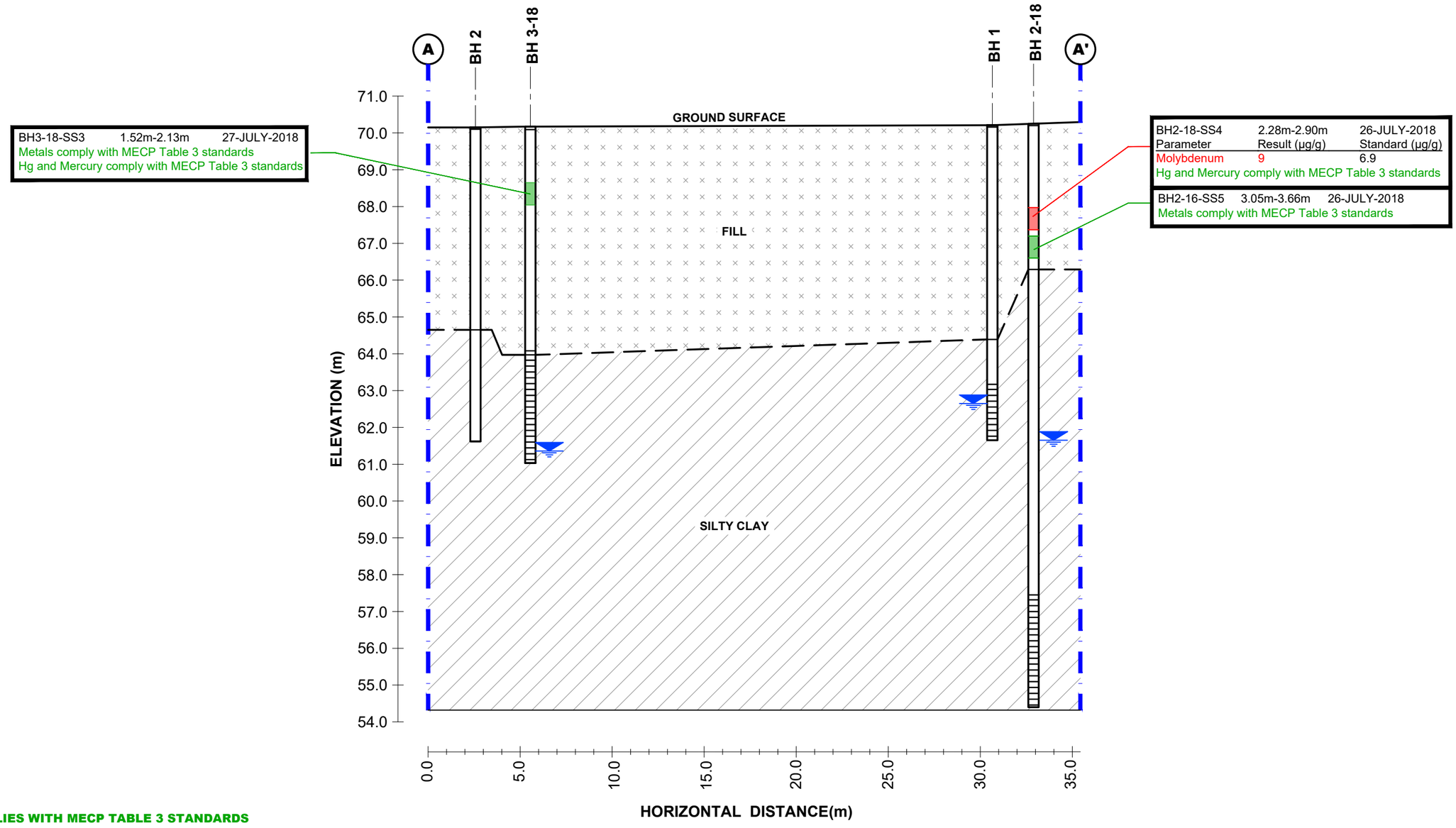

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title:
CROSS SECTION A-A' - SOIL (METALS, INCLUDING Hg AND CrVI)

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-6AR
Approved by: MB	Revision No.:

11x17

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BH5-21-SS2	0.76-1.37m	16-JUNE-2021
Parameter	Result (µg/g)	Standard (µg/g)
Molybdenum	8.2	6.9

Remaining Metals comply with MECP Table 3 Standards

BH1-18-SS2/3	0.76m-2.13m	26-JULY-2018

Metals Comply with MECP Table 3 standards

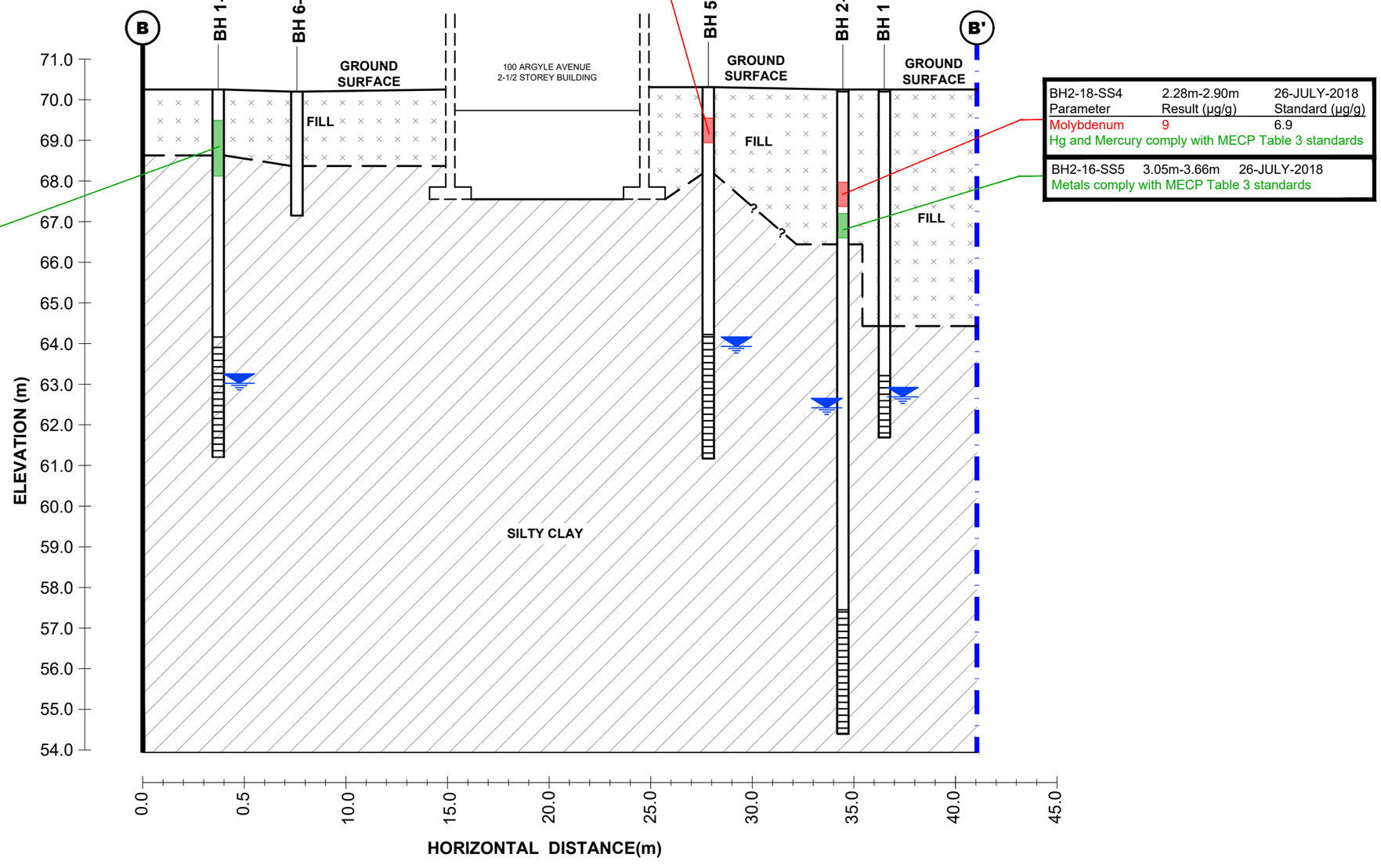
Hg and Mercury comply with MECP Table 3 standards

BH2-18-SS4	2.28m-2.90m	26-JULY-2018
Parameter	Result (µg/g)	Standard (µg/g)
Molybdenum	9	6.9

Hg and Mercury comply with MECP Table 3 standards

BH2-16-SS5	3.05m-3.66m	26-JULY-2018

Metals comply with MECP Table 3 standards



SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title:
CROSS SECTION B-B' - SOIL (METALS, INCLUDING Hg AND CrVI)

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-6BR
Approved by: MB	Revision No.:

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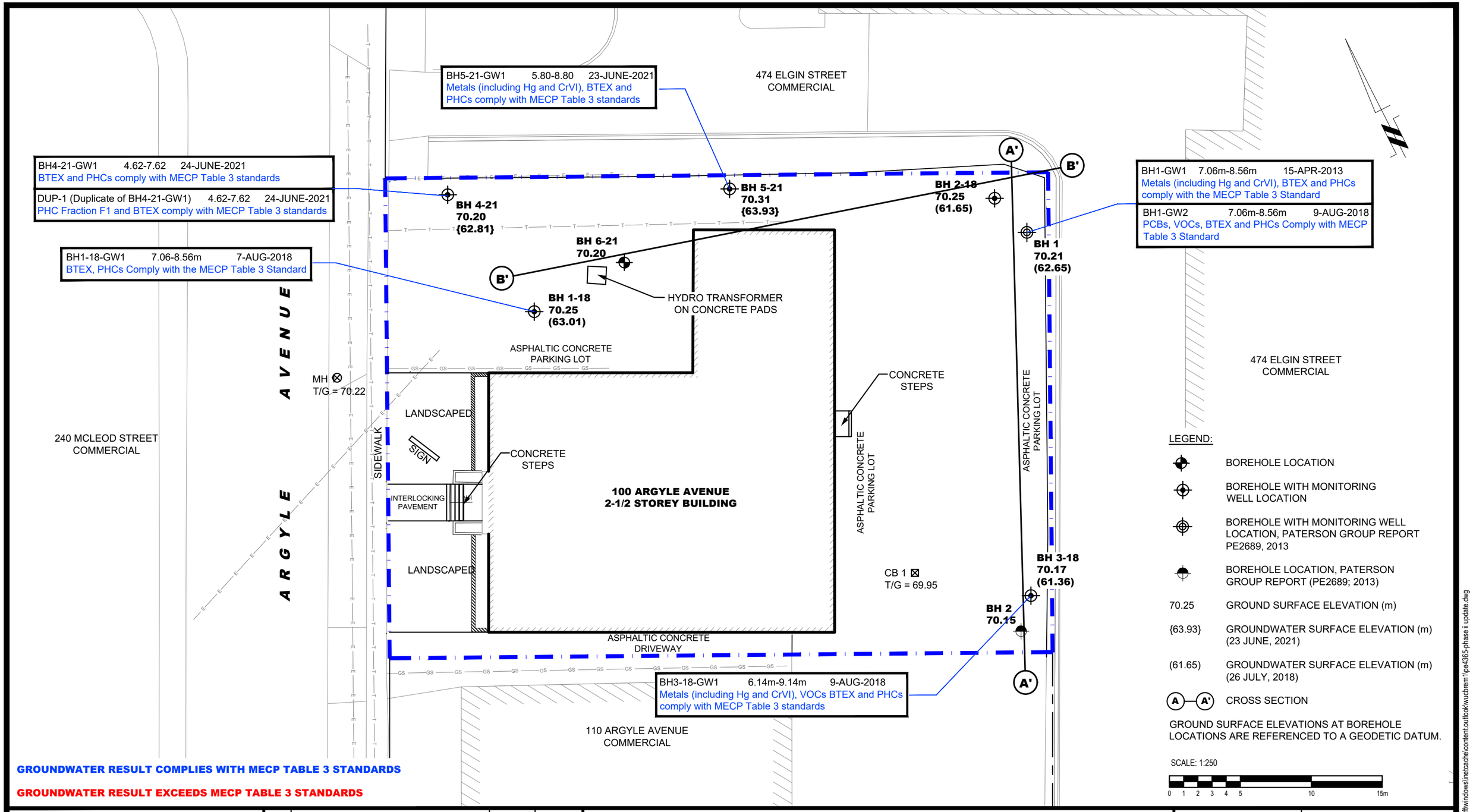

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 3 STANDARDS

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consulting engineers

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NO.	REVISIONS	DATE	INITIAL

100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title: ANALYTICAL TESTING PLAN - GROUNDWATER (BTEX, VOCs, METALS(including Hg and CrVI), PCBs, PHCs)

Scale: 1:250	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-7R
Approved by: MB	Revision No.:

11x17

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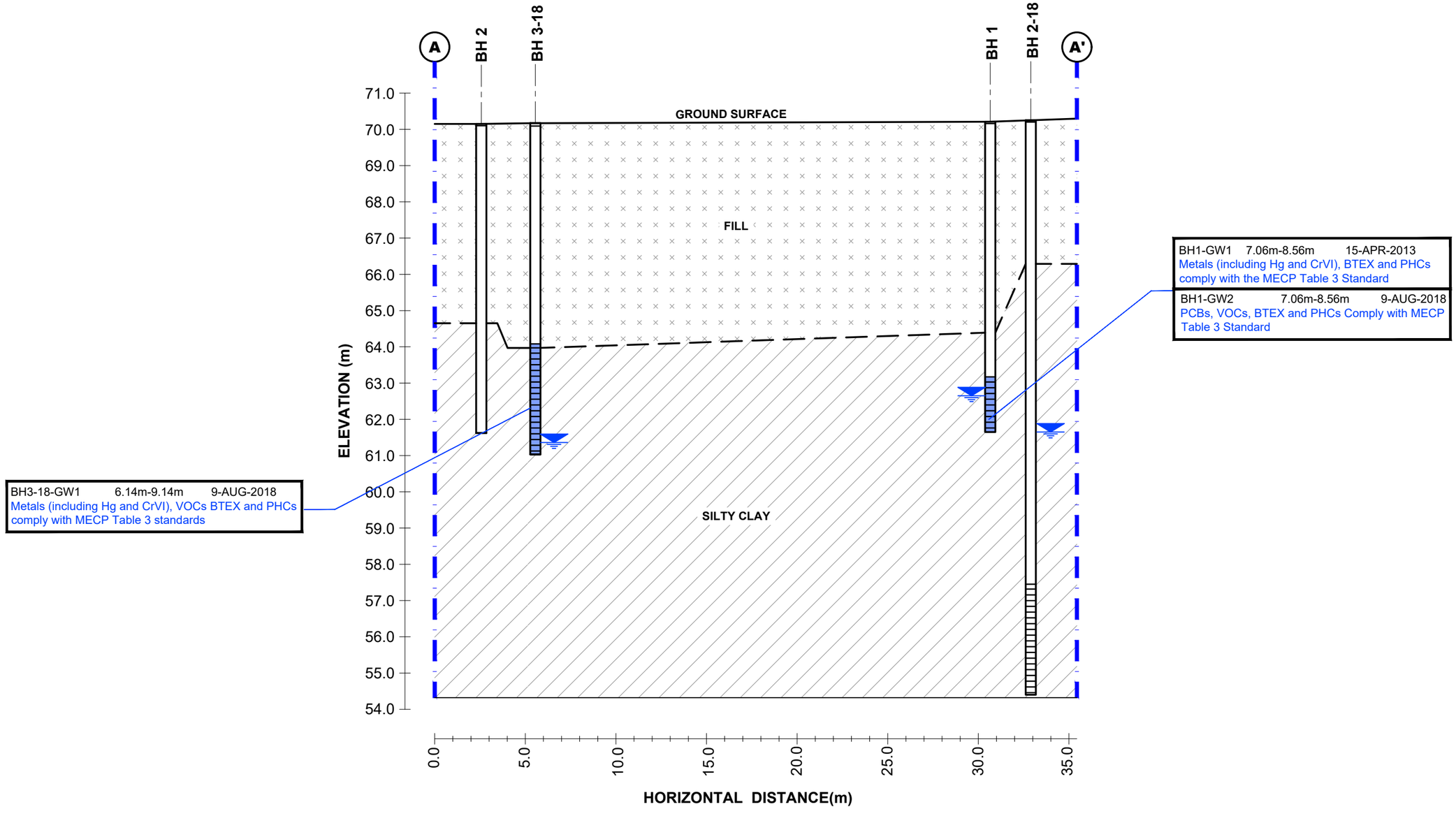

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

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100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

Title: CROSS SECTION A-A' - GROUNDWATER
(BTEX, VOCs, METALS(including Hg and CrVI, PCBs, PHCs)

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-7AR
Approved by: MB	Revision No.:

11x17

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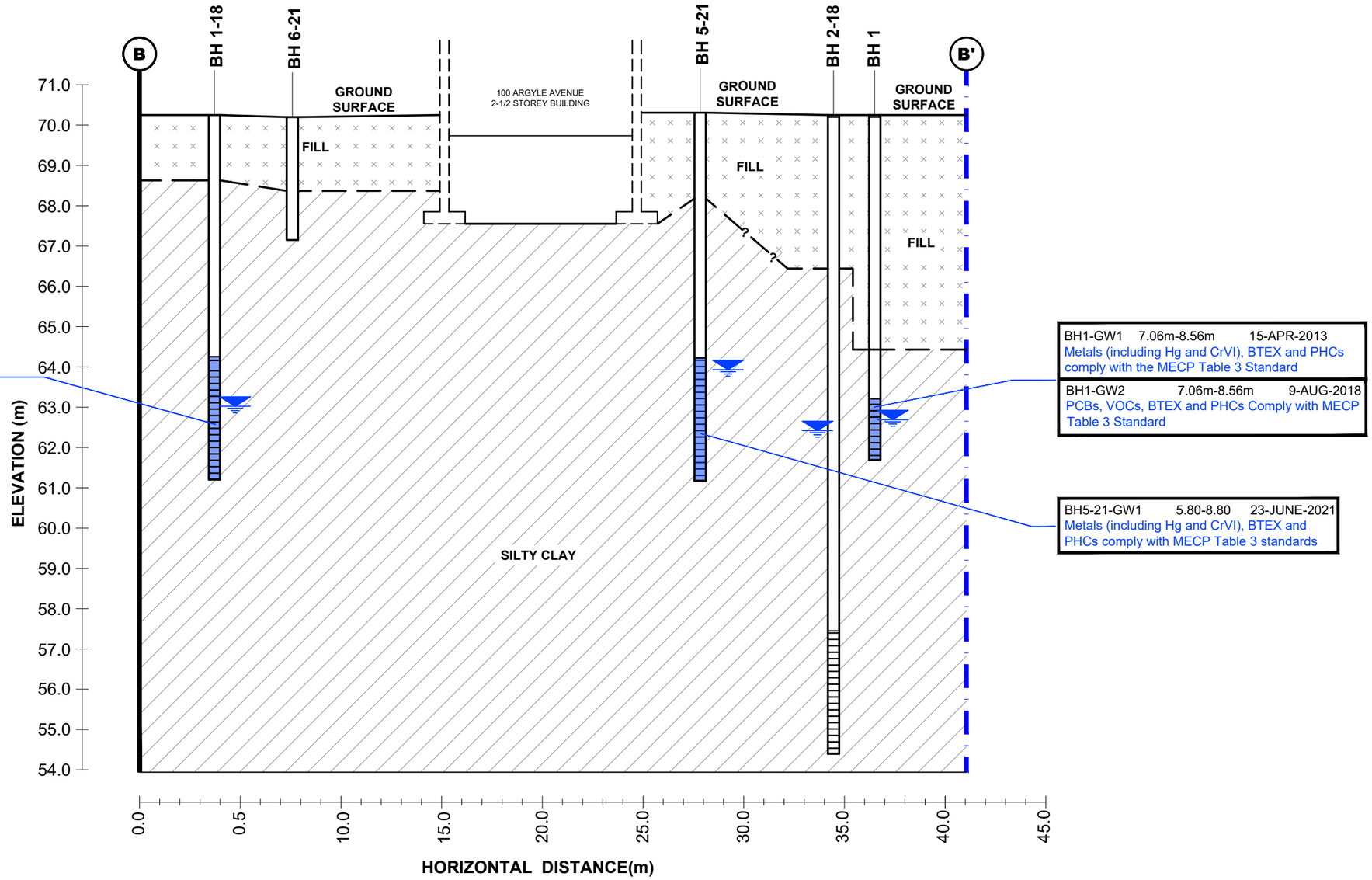

BH1-18-GW1 7.06-8.56m 7-AUG-2018
BTEX, PHCs Comply with the MECP Table 3 Standard

BH1-GW1 7.06m-8.56m 15-APR-2013
Metals (including Hg and CrVI), BTEX and PHCs comply with the MECP Table 3 Standard

BH1-GW2 7.06m-8.56m 9-AUG-2018
PCBs, VOCs, BTEX and PHCs Comply with MECP Table 3 Standard

BH5-21-GW1 5.80-8.80 23-JUNE-2021
Metals (including Hg and CrVI), BTEX and PHCs comply with MECP Table 3 standards

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 3 STANDARDS

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100 ARGYLE CORPORATION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
100 ARGYLE AVENUE

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 07/2021
Drawn by: YA	Report No.: PE4365-4
Checked by: SB	Dwg. No.: PE4365-7BR
Approved by: MB	Revision No.:

11x17

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

Paterson Group Inc.

Consulting Engineers
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Ottawa (Nepean), Ontario
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www.patersongroup.ca

patersongroup

Sampling & Analysis Plan

Phase II Environmental Site Assessment
100 Argyle Avenue
Ottawa, Ontario

Prepared For

100 Argyle Corporation

June 2021

Report: PE4365-SAP

Table of Contents

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Colonnade Bridgeport to conduct a Phase II Environmental Site Assessment (ESA) at 100 Argyle Avenue, in the City of Ottawa, Ontario. Based on a previous Phase I-II ESA (2013) and a more recent Phase I ESA (2018) completed by Paterson for the subject property, a subsurface investigation program, consisting of borehole drilling, was developed. A geotechnical investigation was conducted concurrently with the environmental subsurface investigation.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-18	Northwestern portion of the Phase II property to assess the potential impacts of APECs 1 and 5 (on-site pad mounted transformer and former retail fuel outlet on the adjacent property to the east).	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH1	Northeastern portion of the Phase II property to assess the potential impacts of APECs 3 and 4 (former automotive service station and fuel oil spill on the adjacent property to the south)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH2-18	Northeastern portion of the Phase II property to assess the potential impacts of APEC 2 (fill material of unknown quality)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH2	Southern portion of the Phase II property to assess the potential impacts of APECs 3 and 4 (former automotive service station and fuel oil spill on the adjacent property to the south)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH3-18	Southern portion of the Phase II property to assess the potential impacts of APECs 3 and 4 (former automotive service station and fuel oil spill on the adjacent property to the south)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH4-21	Northwestern portion of the Phase II property to assess the potential impacts of APECs 2 and 5 (fill material of unknown quality and former retail fuel outlet on the adjacent property to the east).	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH5-21	Northern portion of the Phase II property to assess the potential impacts of APEC 5 (former retail fuel outlet on the adjacent property to the east)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH6-21	Northwestern portion of the Phase II property to assess the potential impacts of APECs 1 and 5 (on-site pad mounted transformer and former retail fuel outlet on the adjacent property to the east).	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.

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

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

2.0 ANALYTICAL TESTING PROGRAM

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

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

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

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

- ❒ At least one groundwater monitoring well should be installed in a stratigraphic unit below the suspected contamination, where said stratigraphic unit is water-bearing.
- ❒ Parameters analyzed should be consistent with the Contaminants of Concern identified in the Phase I ESA and with the contaminants identified in the soil samples.

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

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

Equipment

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

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

Determining Borehole Locations

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

After drilling is completed a plan with the borehole locations must be provided. Distances and orientations of boreholes with respect to site features (buildings, roadways, etc.) must be provided. Distances should be measured using a measuring tape or wheel rather than paced off.

Ground surface elevations at each borehole should be surveyed relative to a fire hydrant located on south side of Lisgar Street (300 Lisgar Street), with geodetic elevation of 72.57m above sea level (asl).

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.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
100 Argyle Avenue
Ottawa, Ontario

DATUM BM - Top spindle of fire hydrant located across from subject site, north side of Argyle Avenue. Geodetic elevation = 71.09m.

FILE NO. PE2689

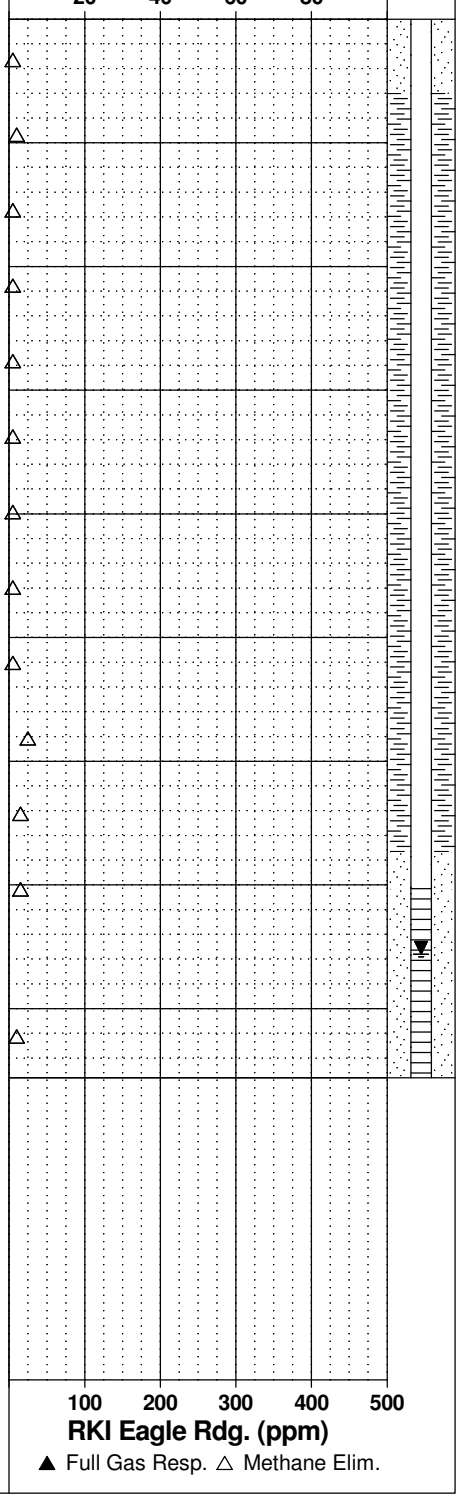
REMARKS

HOLE NO. BH 1

BORINGS BY Geo Probe **DATE** April 6, 2013

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	70.21
25mm Asphaltic concrete over crushed stone		SS	1	67	8		
0.63							
FILL: Crushed stone with sand		SS	2	50	5	1	69.21
		SS	3	54	14		
1.85						2	68.21
		SS	4	54	32		
		SS	5	83	28	3	67.21
FILL: Brown silty sand with gravel, trace clay		SS	6	62	24		
		SS	7	83	18	4	66.21
		SS	8	62	11		
		SS	9	71	16	5	65.21
5.82		SS	10	100	6		
		SS	11	100	1	6	64.21
Firm, brown **SILTY CLAY**		SS	12	100	W	7	63.21
						8	62.21
8.56		SS	13	100	W		
End of Borehole							
(GWL @ 7.56m - Aug. 9, 2018)							

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



Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
100 Argyle Avenue
Ottawa, Ontario

DATUM BM - Top spindle of fire hydrant located across from subject site, north side of Argyle Avenue. Geodetic elevation = 71.09m.

FILE NO. PE2689

REMARKS

HOLE NO. BH 2

BORINGS BY Geo Probe **DATE** April 6, 2013

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	70.15		
50mm Asphaltic concrete over crushed stone 0.30									
FILL: Brown silty sand with gravel and clay		SS	1	62	21	4	66.15		
		SS	2	50	10	5	65.15		
5.49						6	64.15		
Firm, brown **SILTY CLAY**		SS	3	100	1				
		SS	4	100	1	7	63.15		
		SS	5	100	1	8	62.15		
		SS	6	100	1				
8.53									
End of Borehole									

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.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
100 Argyle Avenue
Ottawa, Ontario

DATUM BM - Top spindle of fire hydrant located across from subject site, north side of Argyle Avenue. Geodetic elevation = 71.09m.

FILE NO. PE4365

REMARKS

HOLE NO. BH1-18

BORINGS BY CME 55 Power Auger **DATE** 26 July 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	70.25
FILL: Brown silty sand, some gravel, trace asphalt		AU	1				
		SS	2	33	4	1	69.25
1.62							
		SS	3	46	8	2	68.25
Very stiff to stiff, brown **CLAYEY SILT,** trace sand		SS	4	67	7	3	67.25
		SS	5	62	9		
		SS	6	96	4	4	66.25
4.57							
		SS	7		2	5	65.25
						6	64.25
		SS	8	96	1	7	63.25
						8	62.25
						9	61.25
Stiff, grey **SILTY CLAY**		SS	9	96			
						10	60.25
						11	59.25
						12	58.25
						13	57.25
						14	56.25
						15	55.25
15.85							
End of Borehole							
(GWL @ 7.24m - Aug. 7, 2018)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
100 Argyle Avenue
Ottawa, Ontario

DATUM BM - Top spindle of fire hydrant located across from subject site, north side of Argyle Avenue. Geodetic elevation = 71.09m.

FILE NO. PE4365

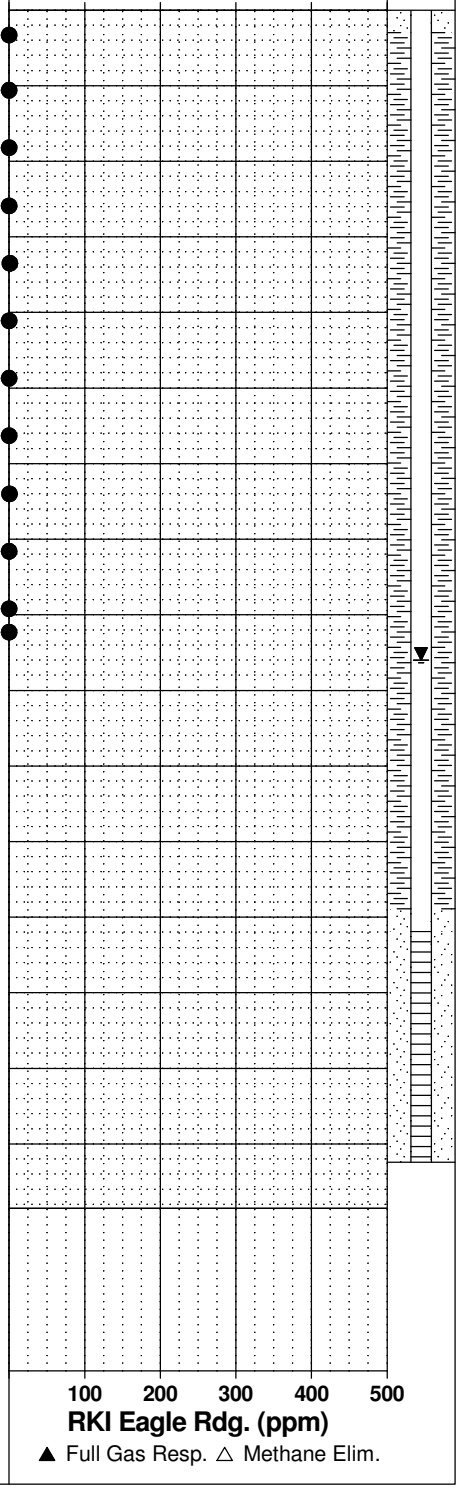
REMARKS

HOLE NO. BH2-18

BORINGS BY CME 55 Power Auger **DATE** 26 July 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	70.25
Asphaltic concrete 0.06		AU	1				
FILL: Brown silty sand with gravel		SS	2	33	15	1	69.25
		SS	3	8	4	2	68.25
2.29							
FILL: Brown gravelly sand, some silt		SS	4	67	34	3	67.25
		SS	5	100	8		
3.81						4	66.25
Very stiff, brown **CLAYEY SILT,** some sand, trace gravel		SS	6	96	8		
		SS	7	96	5	5	65.25
5.33							
Very stiff, brown **SILTY CLAY**		SS	8	96	3	6	64.25
6.10							
		SS	9	96	W		
		SS	10	96	W	7	63.25
		SS	11	96	W	8	62.25
		SS	12	96	W		
						9	61.25
Stiff, grey **SILTY CLAY**						10	60.25
						11	59.25
						12	58.25
						13	57.25
						14	56.25
						15	55.25
15.85							
Dynamic Cone Penetration Test commenced at5 15.85m depth. Practical DCPT refusal at 34.39m depth							
(GWL @ 8.60m - Aug. 7, 2018)							

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



Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
100 Argyle Avenue
Ottawa, Ontario

DATUM BM - Top spindle of fire hydrant located across from subject site, north side of Argyle Avenue. Geodetic elevation = 71.09m.

FILE NO. PE4365

REMARKS

HOLE NO. BH3-18

BORINGS BY CME 55 Power Auger **DATE** 27 July 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	70.17
Asphaltic concrete 0.08		AU	1				
		SS	2	46	26	1	69.17
		SS	3	62	60	2	68.17
FILL: Brown gravelly sand with silt		SS	4	75	40	3	67.17
		SS	5	67	20		
		SS	6	46	13	4	66.17
		SS	7	38	11	5	65.17
- some clay by 5.3m depth		SS	8	29	3		
6.20		SS	9		1	6	64.17
		SS	10	42		7	63.17
		SS	11	42		8	62.17
						9	61.17
Stiff, grey **SILTY CLAY**						10	60.17
						11	59.17
						12	58.17
						13	57.17
						14	56.17
						15	55.17
15.85							
Dynamic Cone Penetration Test commenced at5 15.85m depth. Practical DCPT refusal at 39.62m depth							
(GWL @ 8.81m - Aug. 7, 2018)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
100 Argyle Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4365

REMARKS

HOLE NO. BH 4-21

BORINGS BY CME-55 Low Clearance Drill **DATE** June 16, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08						0	70.20
FILL: Brown silty sand with crushed stone, trace gravel		AU	1				
1.07		SS	2	42	11	1	69.20
		SS	3	0	9	2	68.20
		SS	4	83	9		
Very stiff to stiff, brown **SILTY CLAY**		SS	5	100	8	3	67.20
		SS	6	100	3	4	66.20
- grey by 4.5m depth		SS	7	100	P	5	65.20
		SS	8	100	P		
		SS	9	100	P	6	64.20
		SS	10	100	P	7	63.20
7.62							
End of Borehole							
(GWL @ 7.39m - June 23, 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

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
100 Argyle Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4365

REMARKS

HOLE NO. BH 5-21

BORINGS BY CME-55 Low Clearance Drill **DATE** June 16, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08		AU	1			0	70.31
FILL: Brown silty sand with crushed stone, some gravel, trace clay		SS	2	46	24	1	69.31
2.13		SS	3	50	12	2	68.31
		SS	4	83	18	3	67.31
		SS	5	83	18		
Very stiff to stiff, brown **SILTY CLAY**		SS	6	100	9	4	66.31
- grey by 5.2m depth		SS	7	100	1	5	65.31
		SS	8	100	P		
		SS	9	100	P	6	64.31
		SS	10	100	P	7	63.31
		SS	11	100	P	8	62.31
		SS	12	100	P		
9.14						9	61.31
End of Borehole							
(GWL @ 6.38m - June 23, 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
100 Argyle Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4365

REMARKS

HOLE NO. BH 6-21

BORINGS BY CME-55 Low Clearance Drill **DATE** June 16, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08						0	70.20
FILL: Brown silty sand with crushed stone, some gravel		AU	1				
		SS	2	8	13	1	69.20
1.83		SS	3	50	13	2	68.20
Very stiff to stiff, brown **SILTY CLAY**		SS	4	83	20		
3.05						3	67.20
End of Borehole							

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

20 40 60 80

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

Monitoring Well Construction

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

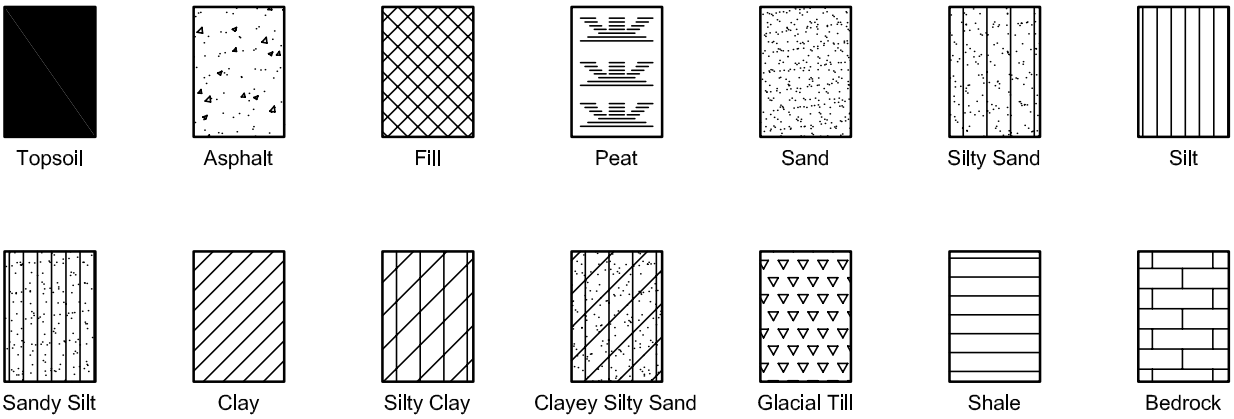
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

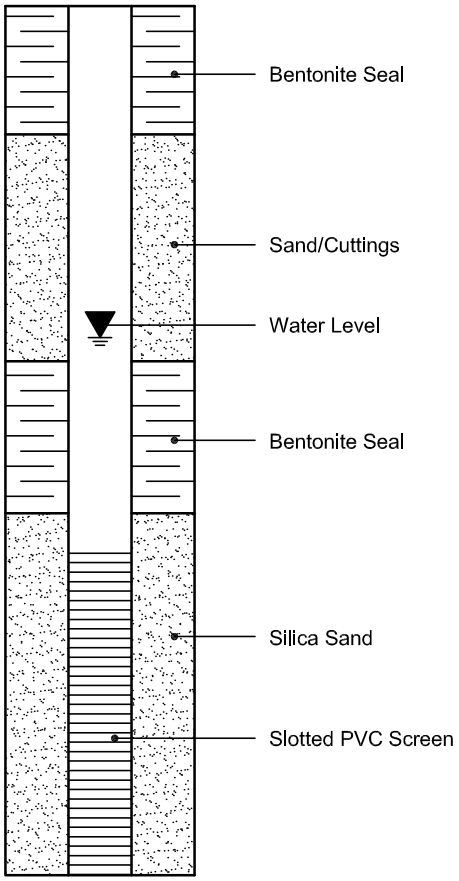
SYMBOLS AND TERMS (continued)

STRATA PLOT

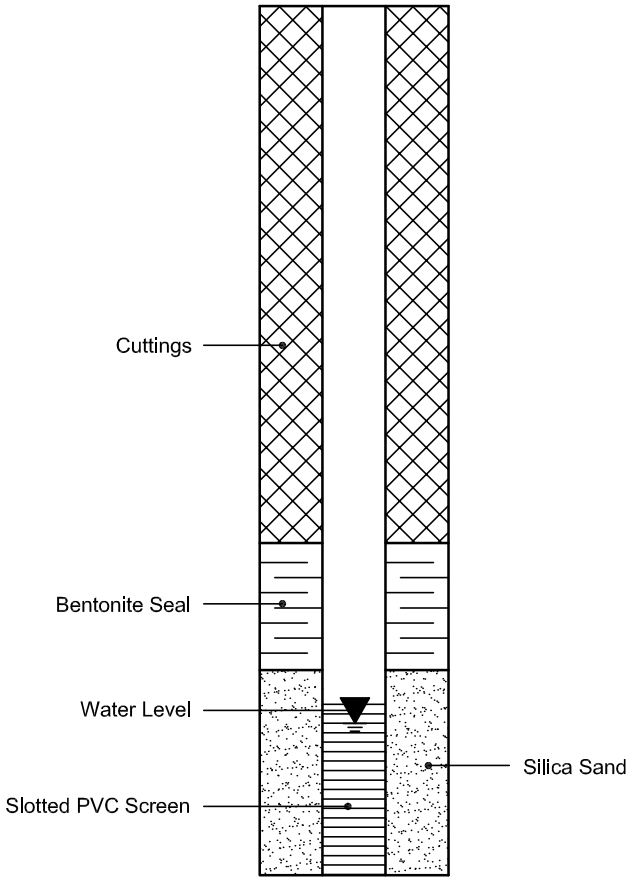


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



APPENDIX 2

SOIL QUALITY

GROUNDWATER QUALITY

LABORATORY CERTIFICATES OF ANALYSIS

paterson**group**

Ottawa North Bay

Table 1A: Analytical Test Results BTEX, PHCs (F1 - F4) and PCBs

Phase II - ESA

100 Argyle Avenue

Parameter	Units	MDL	Regulation	BH1-18-AU1	BH1-18-SS5	BH2-18-SS9	BH2-18-SS11	BH3-18-SS9	BH1-SS10	BH2-SS4	BH4-21-SS5	DUP	BH5-21-SS7	BH6-21-SS3
Sample Depth (m)			**MECP Table 3 Residential Coarse**	**0-0.61**	**3.05-3.66**	**6.10-6.71**	**7.62-8.23**	**6.10-6.71**	**5.33-5.94**	**6.85-7.46**	**3.04-3.66**	**3.04-3.66**	**4.57-5.18**	**0.76-1.37**
Sample Date				**07/26/2018**	**07/26/2018**	**07/26/2018**	**07/26/2018**	**07/27/2018**	**04/06/2013**	**06/16/2021**	**06/16/2021**	**06/16/2021**	**06/16/2021**	**06/16/2021**
Benzene	ug/g dry	0.02	0.21 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Ethylbenzene	ug/g dry	0.05	2 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Toluene	ug/g dry	0.05	2.3 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Xylenes (Total)	ug/g dry	0.05	3.1 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
F1 PHCs (C6-C10)	ug/g dry	7	55 ug/g dry	ND (7)	31	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	4	98 ug/g dry	9	ND (4)	949	ND (4)	ND (4)	ND (4)	ND (4)	779	245	ND (4)	ND (4)
F3 PHCs (C16-C34)	ug/g dry	8	300 ug/g dry	201	182	957	ND (8)	33	ND (8)	ND (8)	733	303	ND (8)	20
F4 PHCs (C34-C50)	ug/g dry	6	2800 ug/g dry	495	295	109	ND (6)	24	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	42
PCBs	ug/g dry	0.05	0.35 ug/g dry	ND (0.05)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND (0.05)

949	Sample exceeds MECP Table 3 Residential Coarse-Grained Standard
nd	No concentration identified above the MDL
MDL	Method Detection Limit for Samples Submitted during 2020 Field Program
N/A	Parameter Not Analyzed

paterson**group**

Ottawa North Bay

Table 2A: Soil Analytical Test Results Metals

Phase II - ESA

100 Argyle Avenue

Parameter	Units	MDL	Regulation	BH1-18-SS2-3	BH2-18-SS4	BH2-18-SS5	BH3-18-SS3	BH4-21-SS2	BH5-21-SS2
Sample Depth (m)			**MECP Table 3 Residential Coarse**	**0.76-2.13**	**2.28-2.90**	**3.05-3.66**	**0.40-0.70**	**0.76-1.37**	**0.76-1.37**
Sample Date				**07/26/2018**	**07/26/2018**	**07/26/2018**	**11/17/2020**	**06/16/2021**	**06/16/2021**
Chromium (VI)	ug/g dry	0.2	8 ug/g dry	ND (0.2)	ND (0.2)	N/A	ND (0.2)	ND (0.2)	ND (0.2)
Mercury	ug/g dry	0.1	0.27 ug/g dry	ND (0.1)	ND (0.1)	N/A	0.2	ND (0.1)	ND (0.1)
Antimony	ug/g dry	1	7.5 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Arsenic	ug/g dry	1	18 ug/g dry	2.0	8.2	6.3	6	7.7	8.6
Barium	ug/g dry	1	390 ug/g dry	151	18.3	35.6	13.7	23.5	29.4
Beryllium	ug/g dry	0.5	4 ug/g dry	ND (0.5)	ND (0.5)	0.5	nd	ND (0.5)	ND (0.5)
Boron	ug/g dry	5	120 ug/g dry	9.6	11.0	8.9	9.1	6.0	7.6
Cadmium	ug/g dry	0.5	1.2 ug/g dry	ND (0.5)	ND (0.5)	ND (0.5)	nd	ND (0.5)	ND (0.5)
Chromium	ug/g dry	5	160 ug/g dry	39.9	15.1	17.8	12.7	10.8	15.9
Cobalt	ug/g dry	1	22 ug/g dry	10.0	10.0	8.8	7.3	8.1	7.8
Copper	ug/g dry	5	140 ug/g dry	28.1	11.4	11.8	9.3	7.3	10.9
Lead	ug/g dry	1	120 ug/g dry	7.3	30.6	22.1	26	18.3	26.3
Molybdenum	ug/g dry	1	6.9 ug/g dry	ND (1.0)	9.0	6.4	6.9	6.2	8.2
Nickel	ug/g dry	5	100 ug/g dry	26.6	22.7	21.0	18.1	15.3	17.1
Selenium	ug/g dry	1	2.4 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	1.1	ND (1.0)	ND (1.0)
Silver	ug/g dry	0.3	20 ug/g dry	ND (0.3)	ND (0.3)	ND (0.3)	nd	ND (0.3)	ND (0.3)
Thallium	ug/g dry	1	1 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	nd	ND (1.0)	ND (1.0)
Uranium	ug/g dry	1	23 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	nd	ND (1.0)	ND (1.0)
Vanadium	ug/g dry	10	86 ug/g dry	53.3	13.9	16.3	11.7	10.5	15.0
Zinc	ug/g dry	20	340 ug/g dry	26.5	ND (20.0)	ND (20.0)	nd	ND (20.0)	ND (20.0)

9.0 Sample exceeds MOECC Table 3 Residential Coarse-Grained Standard

nd No concentration identified above the MDL

MDL Method Detection Limit for Samples Submitted during 2020 Field Program

N/A Parameter Not Analyzed

paterson**group**

Ottawa North Bay

Table 1B: Analytical Test Results Groundwater BTEX, PHCs (F1 - F4) and PCBs

Phase II - ESA
100 Argyle Avenue

Parameter	Units	MDL	Regulation	BH1-18-GW1	BH3-18-GW1	BH1-GW	BH1-GW1	BH4-21-GW1	BH5-21-GW1	DUP-1
Sample Depth (m)			**MECP Table 3 Non-Potable, Coarse**	**7.06-8.56**	**6.14-9.14**	**7.06-8.56**	**7.06-8.56**	**4.62-7.62**	**5.80-8.80**	**4.62-7.62**
Sample Date				**08/07/2018**	**08/09/2018**	**08/09/2018**	**04/15/2013**	**06/24/2021**	**06/23/2021**	**06/24/2021**
Benzene	ug/L	0.5	44 ug/L	N/A	N/A	N/A	N/A	ND (0.5)	ND (0.5)	ND (0.5)
Ethylbenzene	ug/L	0.5	2300 ug/L	N/A	N/A	N/A	N/A	ND (0.5)	ND (0.5)	ND (0.5)
Toluene	ug/L	0.5	18000 ug/L	N/A	N/A	N/A	N/A	ND (0.5)	ND (0.5)	ND (0.5)
Xylenes, total	ug/L	0.5	4200 ug/L	N/A	N/A	N/A	N/A	ND (0.5)	ND (0.5)	ND (0.5)
F1 PHCs (C6-C10)	ug/L	25	750 ug/L	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)
F2 PHCs (C10-C16)	ug/L	100	150 ug/L	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	N/A
F3 PHCs (C16-C34)	ug/L	100	500 ug/L	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	N/A
F4 PHCs (C34-C50)	ug/L	100	500 ug/L	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	N/A
PCBs	ug/L	0.05	0.35 ug/L	ND (0.05)	N/A	N/A	N/A	N/A	N/A	N/A

nd No concentration identified above the MDL
MDL Method Detection Limit for Samples Submitted during the Field Program
N/A Parameter Not Analyzed

paterson**group**

Ottawa North Bay

Table 2B: Groundwater Analytical Test Results Metals

Phase II - ESA

100 Argyle Avenue

Parameter	Units	MDL	Regulation	BH3-18-GW1	BH1-GW	BH5-21-GW1
Sample Depth (m)			MECP Table 3 Non-Potable, Coarse	6.14-9.14	7.06-8.56	5.80-8.80
Sample Date				08/09/2018	08/09/2018	06/23/2021
Chromium (VI)	ug/L	10	140 ug/L	ND (10)	ND (10)	ND (10)
Mercury	ug/L	0.1	0.29 ug/L	ND (0.1)	ND (0.1)	ND (0.1)
Antimony	ug/L	0.5	20000 ug/L	0.6	nd	ND (0.5)
Arsenic	ug/L	1	1900 ug/L	2	nd	ND (1)
Barium	ug/L	1	29000 ug/L	130	52	200
Beryllium	ug/L	0.5	67 ug/L	nd	nd	ND (0.5)
Boron	ug/L	10	45000 ug/L	141	75	64
Cadmium	ug/L	0.1	2.7 ug/L	nd	nd	ND (0.1)
Chromium	ug/L	1	810 ug/L	nd	nd	ND (1)
Cobalt	ug/L	0.5	66 ug/L	nd	nd	1.2
Copper	ug/L	0.5	87 ug/L	5.2	nd	1.9
Lead	ug/L	0.1	25 ug/L	0.2	52	0.1
Molybdenum	ug/L	0.5	9200 ug/L	28.9	75	7.7
Nickel	ug/L	1	490 ug/L	1	nd	3
Selenium	ug/L	1	63 ug/L	nd	nd	ND (1)
Silver	ug/L	0.1	1.5 ug/L	nd	nd	ND (0.1)
Sodium	ug/L	200	2300000 ug/L	135,000	nd	245000
Thallium	ug/L	0.1	510 ug/L	nd	52	0.1
Uranium	ug/L	0.1	420 ug/L	4.5	nd	6.6
Vanadium	ug/L	0.5	250 ug/L	1.4	75	1.6
Zinc	ug/L	5	1100 ug/L	6	nd	ND (5)

nd No concentration identified above the MDL

MDL Method Detection Limit for Samples Submitted during the Field Program

N/A Parameter Not Analyzed

patersongroup

Ottawa North Bay

Table 2C: Groundwater Analytical Test Results VOCs

Phase II - ESA

100 Argyle Avenue

Parameter	Units	MDL	Regulation	BH1-18-GW1	BH3-18-GW1	BH1-GW	BH1-GW1
Sample Depth (m)			**MECP Table 3 Non-Potable, Coarse**	**7.06-8.56**	**6.14-9.14**	**7.06-8.56**	**7.06-8.56**
Sample Date				**08/07/2018**	**08/09/2018**	**08/09/2018**	**04/15/2013**
Acetone	ug/L	0.2	130000 ug/L	ND (5.0)	ND (5.0)	ND (5.0)	N/A
Benzene	ug/L	0.1	44 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Bromodichloromethane	ug/L	1	85000 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Bromoform	ug/L	1	380 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Bromomethane	ug/L	1	5.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Carbon Tetrachloride	ug/L	0.5	0.79 ug/L	ND (0.2)	ND (0.2)	ND (0.2)	N/A
Chlorobenzene	ug/L	5	630 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Chloroform	ug/L	0.5	2.4 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Dibromochloromethane	ug/L	5	82000 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Dichlorodifluoromethane	ug/L	1	4400 ug/L	ND (1.0)	ND (1.0)	ND (1.0)	N/A
1,2-Dichlorobenzene	ug/L	5	4600 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,3-Dichlorobenzene	ug/L	1	9600 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,4-Dichlorobenzene	ug/L	1	8 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,1-Dichloroethane	ug/L	5	320 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,2-Dichloroethane	ug/L	1	1.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,1-Dichloroethylene	ug/L	0.3	1.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
cis-1,2-Dichloroethylene	ug/L	1	1.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
trans-1,2-Dichloroethylene	ug/L	1	1.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,2-Dichloropropane	ug/L	10	16 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
cis-1,3-Dichloropropylene	ug/L	20		ND (0.5)	ND (0.5)	ND (0.5)	N/A
trans-1,3-Dichloropropylene	ug/L	1		ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,3-Dichloropropene, total	ug/L	1	5.2 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Ethylbenzene	ug/L	1	2300 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylene dibromide (dibromoethane, 1,2-)	ug/L	1	0.25 ug/L	ND (0.2)	ND (0.2)	ND (0.2)	N/A
Hexane	ug/L	1	51 ug/L	ND (1.0)	ND (1.0)	ND (1.0)	N/A
Methyl Ethyl Ketone (2-Butanone)	ug/L	1	470000 ug/L	ND (5.0)	ND (5.0)	ND (5.0)	N/A
Methyl Isobutyl Ketone	ug/L	1	140000 ug/L	ND (5.0)	ND (5.0)	ND (5.0)	N/A
Methyl tert-butyl ether	ug/L	1	190 ug/L	ND (2.0)	ND (2.0)	ND (2.0)	N/A
Methylene Chloride	ug/L	1	610 ug/L	ND (5.0)	ND (5.0)	ND (5.0)	N/A
Styrene	ug/L	1	1300 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,1,1,2-Tetrachloroethane	ug/L	1	3.3 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,1,2,2-Tetrachloroethane	ug/L	1	3.2 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Tetrachloroethylene	ug/L	1	1.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Toluene	ug/L	1	18000 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1,1-Trichloroethane	ug/L	1	640 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
1,1,2-Trichloroethane	ug/L	1	4.7 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Trichloroethylene	ug/L	1	1.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
Trichlorofluoromethane	ug/L	1	2500 ug/L	ND (1.0)	ND (1.0)	ND (1.0)	N/A
Vinyl Chloride	ug/L	1	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	N/A
m/p-Xylene	ug/L	1		ND (0.5)	ND (0.5)	ND (0.5)	N/A
o-Xylene	ug/L	1		ND (0.5)	ND (0.5)	ND (0.5)	N/A
Xylenes, total	ug/L	1	4200 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)

nd No concentration identified above the MDL

MDL Method Detection Limit for Samples Submitted during the Field Program

N/A Parameter Not Analyzed

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Certificate of Analysis

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Phone: (613) 226-7381
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Client PO: 14342
Project: PE2689
Custody: 97196

Report Date: 18-Apr-2013
Order Date: 8-Apr-2013
Revised Report **Order #: 1315031**

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

Paracel ID	Client ID
1315031-01	BH1-SS10
1315031-02	BH2-SS4

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising shall be limited to the amount paid by you for this work, and that our employees or agents shall not under circumstances be liable to you in connection with this work

Certificate of Analysis

Report Date: 18-Apr-2013
Order Date:8-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14342 Project Description: PE2689

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	9-Apr-13	12-Apr-13
PHC F1	CWS Tier 1 - P&T GC-FID	9-Apr-13	12-Apr-13
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	9-Apr-13	10-Apr-13
Solids, %	Gravimetric, calculation	9-Apr-13	9-Apr-13

Certificate of Analysis

Report Date: 18-Apr-2013
Order Date:8-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14342

Project Description: PE2689

	Client ID:	BH1-SS10	BH2-SS4	-	-
	Sample Date:	06-Apr-13	06-Apr-13	-	-
	Sample ID:	1315031-01	1315031-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	58.7	62.0	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	-	-
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	106%	105%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	-	-

Certificate of Analysis

Report Date: 18-Apr-2013
Order Date:8-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14342 Project Description: PE2689

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.53*		*ug/g*		*107*	*50-140*			

Certificate of Analysis

Report Date: 18-Apr-2013
Order Date:8-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14342 Project Description: PE2689

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	19	8	ug/g dry	19			0.0	30	
F4 PHCs (C34-C50)	36	6	ug/g dry	46			25.6	30	
Physical Characteristics									
% Solids	76.3	0.1	% by Wt.	77.0			0.9	25	

Certificate of Analysis

Report Date: 18-Apr-2013
Order Date:8-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14342 Project Description: PE2689

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	200	7	ug/g	ND	100	80-120			
F2 PHCs (C10-C16)	63	4	ug/g	ND	66.7	60-140			
F3 PHCs (C16-C34)	182	8	ug/g	19	83.9	60-140			
F4 PHCs (C34-C50)	148	6	ug/g	46	79.0	60-140			
Volatiles									
Benzene	3.82	0.02	ug/g	ND	95.6	60-130			
Ethylbenzene	3.31	0.05	ug/g	ND	82.8	60-130			
Toluene	3.44	0.05	ug/g	ND	85.9	60-130			
m,p-Xylenes	5.72	0.05	ug/g	ND	71.4	60-130			
o-Xylene	3.10	0.05	ug/g	ND	77.5	60-130			
Surrogate: Toluene-d8	*7.07*		*ug/g*		*88.3*	*50-140*			

Certificate of Analysis

Report Date: 18-Apr-2013
Order Date:8-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14342 Project Description: PE2689

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision 1 - this report includes an updated Sample list.

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.

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.

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Nº 97196

Page ___ of ___

Client Name: PATERSON GROUP	Project Reference: PE2689	TAT:	~~4~~ Regular [ ] 3 Day
Contact Name: ERIC LEVEQUE	Quote #		[ ] 2 Day [ ] 1 Day
Address: 154 COLONNADE RD SOUTH OTTAWA K2E 7J5	PO # 14342	Date Required:	
Telephone: 226-7381	Email Address: elevequee@patersongroup.ca		

Criteria: [ ] O. Reg. 153/04 Table __ [✓] O. Reg. 153/11 (Current) Table 3 [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality:_____ [ ] Other: _____

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

Required Analyses

Paracel Order Number: 131503

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP/MS	Hg	CrVI	B (HWS)						
1	BH1-SS10	S		2	APR 6/13		✓								120 ml	+vial			
2	BH2-SS4	S		2	APR 6/13		✓									↓			
3	BH2-12 SS13	S		2	APR 6/13		✓												
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Paracel

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
	T. Bouse	MJ	MJ
	Date/Time: 08/04/13 1:10 PM	Date/Time: Apr 8/13 1:50	Date/Time: Apr 8/13 2:19
Date/Time:	Temperature: ___°C	Temperature: 14.4°C	pH Verified [ ] By: NH

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mike Beaudoin

Client PO: 24794
Project: PE4365
Custody: 118617

Report Date: 2-Aug-2018
Order Date: 27-Jul-2018

Order #: 1830673

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

Paracel ID	Client ID
1830673-01	BH1-18-AU1
1830673-02	BH1-18-SS2-3
1830673-03	BH1-18-SS5
1830673-04	BH2-18-SS4
1830673-05	BH2-18-SS9

Approved By:

Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24794

Report Date: 02-Aug-2018
Order Date: 27-Jul-2018
Project Description: PE4365

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	31-Jul-18	1-Aug-18
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	30-Jul-18	1-Aug-18
Mercury by CVAA	EPA 7471B - CVAA, digestion	2-Aug-18	2-Aug-18
PCBs, total	SW846 8082A - GC-ECD	30-Jul-18	31-Jul-18
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	30-Jul-18	31-Jul-18
PHC F1	CWS Tier 1 - P&T GC-FID	31-Jul-18	1-Aug-18
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	2-Aug-18	2-Aug-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	30-Jul-18	1-Aug-18
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	31-Jul-18	1-Aug-18
Solids, %	Gravimetric, calculation	31-Jul-18	31-Jul-18

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24794

Report Date: 02-Aug-2018
Order Date: 27-Jul-2018
Project Description: PE4365

	Client ID:	BH1-18-AU1	BH1-18-SS2-3	BH1-18-SS5	BH2-18-SS4
	Sample Date:	07/26/2018 09:00	07/26/2018 09:00	07/26/2018 09:00	07/26/2018 09:00
	Sample ID:	1830673-01	1830673-02	1830673-03	1830673-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	87.8	89.9	69.4	95.8
Metals					
Antimony	1.0 ug/g dry	-	<1.0	-	<1.0
Arsenic	1.0 ug/g dry	-	2.0	-	8.2
Barium	1.0 ug/g dry	-	151	-	18.3
Beryllium	0.5 ug/g dry	-	<0.5	-	<0.5
Boron	5.0 ug/g dry	-	9.6	-	11.0
Cadmium	0.5 ug/g dry	-	<0.5	-	<0.5
Chromium	5.0 ug/g dry	-	39.9	-	15.1
Chromium (VI)	0.2 ug/g dry	-	<0.2	-	<0.2
Cobalt	1.0 ug/g dry	-	10.0	-	10.0
Copper	5.0 ug/g dry	-	28.1	-	11.4
Lead	1.0 ug/g dry	-	7.3	-	30.6
Mercury	0.1 ug/g dry	-	<0.1	-	<0.1
Molybdenum	1.0 ug/g dry	-	<1.0	-	9.0
Nickel	5.0 ug/g dry	-	26.6	-	22.7
Selenium	1.0 ug/g dry	-	<1.0	-	<1.0
Silver	0.3 ug/g dry	-	<0.3	-	<0.3
Thallium	1.0 ug/g dry	-	<1.0	-	<1.0
Uranium	1.0 ug/g dry	-	<1.0	-	<1.0
Vanadium	10.0 ug/g dry	-	53.3	-	13.9
Zinc	20.0 ug/g dry	-	26.5	-	<20.0
Volatiles					
Benzene	0.02 ug/g dry	<0.02	-	<0.02	-
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	60.9%	-	60.0%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	31	-
F2 PHCs (C10-C16)	4 ug/g dry	9	-	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	201	-	182	-
F4 PHCs (C34-C50)	6 ug/g dry	495 [2]	-	295	-

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24794

Report Date: 02-Aug-2018
Order Date: 27-Jul-2018
Project Description: PE4365

	Client ID:	BH1-18-AU1	BH1-18-SS2-3	BH1-18-SS5	BH2-18-SS4
	Sample Date:	07/26/2018 09:00	07/26/2018 09:00	07/26/2018 09:00	07/26/2018 09:00
	Sample ID:	1830673-01	1830673-02	1830673-03	1830673-04
	MDL/Units	Soil	Soil	Soil	Soil
F4G PHCs (gravimetric)	50 ug/g dry	524	-	-	-
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	-	-	-
Decachlorobiphenyl	Surrogate	120%	-	-	-
	Client ID:	BH2-18-SS9	-	-	-
	Sample Date:	07/26/2018 09:00	-	-	-
	Sample ID:	1830673-05	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	61.4	-	-	-
General Inorganics					
pH	0.05 pH Units	8.33	-	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	62.3%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	-	-
F2 PHCs (C10-C16)	4 ug/g dry	949	-	-	-
F3 PHCs (C16-C34)	8 ug/g dry	957	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	109	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
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 (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.137*		*ug/g*		*137*	*60-140*			
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*2.92*		*ug/g*		*91.1*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	7.79	0.05	pH Units	7.79			0.0	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	110	8	ug/g dry	89			21.2	30	
F4 PHCs (C34-C50)	32	6	ug/g dry	26			20.4	30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			0.0	30	
Arsenic	1.4	1.0	ug/g dry	1.3			9.4	30	
Barium	44.5	1.0	ug/g dry	44.6			0.2	30	
Beryllium	ND	0.5	ug/g dry	ND			0.0	30	
Boron	11.5	5.0	ug/g dry	10.0			14.3	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium (VI)	ND	0.2	ug/g dry	ND				35	
Chromium	14.3	5.0	ug/g dry	14.1			1.2	30	
Cobalt	5.8	1.0	ug/g dry	5.6			2.6	30	
Copper	11.4	5.0	ug/g dry	23.4			68.8	30	QR-01
Lead	5.3	1.0	ug/g dry	6.0			12.6	30	
Mercury	ND	0.1	ug/g dry	ND			0.0	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	13.8	5.0	ug/g dry	13.3			3.4	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.3	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND			0.0	30	
Vanadium	24.4	10.0	ug/g dry	24.8			1.4	30	
Zinc	ND	20.0	ug/g dry	ND			0.0	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND			0.0	40	
Surrogate: Decachlorobiphenyl	*0.145*		*ug/g dry*		*125*	*60-140*			
Physical Characteristics									
% Solids	90.4	0.1	% by Wt.	92.0			1.8	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*3.36*		*ug/g dry*		*75.0*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	198	7	ug/g		99.2	80-120			
F2 PHCs (C10-C16)	98	4	ug/g	ND	105	60-140			
F3 PHCs (C16-C34)	326	8	ug/g	89	103	60-140			
F4 PHCs (C34-C50)	205	6	ug/g	26	123	60-140			
F4G PHCs (gravimetric)	830	50	ug/g		83.0	80-120			
Metals									
Antimony	48.1		ug/L	ND	96.0	70-130			
Arsenic	49.5		ug/L	ND	97.9	70-130			
Barium	70.3		ug/L	17.8	105	70-130			
Beryllium	56.6		ug/L	ND	113	70-130			
Boron	56.2		ug/L	ND	104	70-130			
Cadmium	49.2		ug/L	ND	98.2	70-130			
Chromium (VI)	5.0	0.2	ug/g	ND	88.5	70-130			
Chromium	56.6		ug/L	5.6	102	70-130			
Cobalt	53.1		ug/L	2.2	102	70-130			
Copper	56.0		ug/L	9.4	93.3	70-130			
Lead	55.8		ug/L	2.4	107	70-130			
Mercury	1.38	0.1	ug/g	ND	92.2	70-130			
Molybdenum	47.7		ug/L	ND	95.4	70-130			
Nickel	56.6		ug/L	5.3	102	70-130			
Selenium	48.3		ug/L	ND	96.5	70-130			
Silver	48.4		ug/L	ND	96.8	70-130			
Thallium	52.5		ug/L	ND	105	70-130			
Uranium	52.2		ug/L	ND	104	70-130			
Vanadium	60.8		ug/L	ND	102	70-130			
Zinc	56.2		ug/L	ND	99.5	70-130			
PCBs									
PCBs, total	0.388	0.05	ug/g	ND	83.9	60-140			
Surrogate: Decachlorobiphenyl	*0.146*		*ug/g*		*127*	*60-140*			
Volatiles									
Benzene	4.78	0.02	ug/g		120	60-130			
Ethylbenzene	4.95	0.05	ug/g		124	60-130			
Toluene	4.61	0.05	ug/g		115	60-130			
m,p-Xylenes	9.23	0.05	ug/g		115	60-130			
o-Xylene	4.64	0.05	ug/g		116	60-130			

Qualifier Notes:

Login Qualifiers :

Container(s) - Bottle and COC sample ID don't match - Jar Reads BH1-18-SS2-3
Applies to samples: BH1-18-SS2-3

Sample Qualifiers :

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

QC Qualifiers :

QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

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.

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.

PARACEL LABORATORIES LTD.

Paracel ID: 1830673

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e: paracel@paracellabs.com

Chain of Custody (Lab Use Only)
№ 118617

Page 1 of 1

Client Name: Paterson	Project Reference: PE4365		**Turnaround Time:**
Contact Name: Mike Beaudoin	Quote #		☐ 1 Day ☐ 3 Day
Address: 154 Colonnade Rd	PO # 24794		☐ 2 Day ☑ Regular
Telephone: 613-226-7381	Email Address: mbeaudoin@patersongroup.ca		Date Required:

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

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

Paracel Order Number: 1830673

#	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Date	Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	H₂O CP	PCB's	pH				
1	~~BH1-AU1~~ BH1-18-AU1	S		2	July 27/18		X								X		- 250ml + 1 vial -			
2	BH1-18-AU2-3 ✓	S		1	↓					X	X	X					- 250ml -			
3	BH1-18-SS5	S		2	↓		X										250ml + 1 vial -			
4	BH1-18-SS6 ✓	S		2	↓									X			120ml + 1 vial -			
5	BH2-18-SS4	S		1	↓					X	X	X					- 250ml -			
6	BH2-18-SS9	S		2	↓		X									X	- 120ml + 1 vial -			
7																				
8																				
9																				
10																				

Comments: No. 1 to 6 - Sample date on Jars + vials read = Jul 26, 2018. Report as Jul 26.
→ No. 2 - Sample ID on Jar read = BH1-18-SS2-3. Report as SS2-3

Method of Delivery: Paracel

Relinquished By (Sign): [signature]	Received by Driver/Depot: [signature]	Received at Lab: Sunpeporn Dokmai	Verified By: [signature]
Relinquished By (Print):	Date/Time: 27/07/18 4:10 PM	Date/Time: Jul 27, 2018 05:00	Date/Time: July 27/18 6:20
Date/Time:	Temperature: °C	Temperature: 20.1 °C	pH Verified [ ] By:

→ No. 4 - Sample ID on vial read = BH2-18-SS6. Report as per COC.

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mike Beaudoin

Client PO: 24869
Project: PE4365
Custody: 118615

Report Date: 14-Aug-2018
Order Date: 9-Aug-2018

Order #: 1832357

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

Paracel ID	Client ID
1832357-01	BH2-SS5

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24869

Report Date: 14-Aug-2018
Order Date: 9-Aug-2018
Project Description: PE4365

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	13-Aug-18	13-Aug-18
Solids, %	Gravimetric, calculation	13-Aug-18	13-Aug-18

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24869

Report Date: 14-Aug-2018
Order Date: 9-Aug-2018
Project Description: PE4365

	Client ID:	BH2-SS5	-	-	-
	Sample Date:	07/26/2018 09:00	-	-	-
	Sample ID:	1832357-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	93.7	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	6.3	-	-	-
Barium	1.0 ug/g dry	35.6	-	-	-
Beryllium	0.5 ug/g dry	0.5	-	-	-
Boron	5.0 ug/g dry	8.9	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	17.8	-	-	-
Cobalt	1.0 ug/g dry	8.8	-	-	-
Copper	5.0 ug/g dry	11.8	-	-	-
Lead	1.0 ug/g dry	22.1	-	-	-
Molybdenum	1.0 ug/g dry	6.4	-	-	-
Nickel	5.0 ug/g dry	21.0	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	<1.0	-	-	-
Vanadium	10.0 ug/g dry	16.3	-	-	-
Zinc	20.0 ug/g dry	<20.0	-	-	-

Method Quality Control: Blank

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

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	1.4	1.0	ug/g dry	ND			0.0	30	
Arsenic	2.5	1.0	ug/g dry	2.7			7.3	30	
Barium	50.6	1.0	ug/g dry	51.8			2.2	30	
Beryllium	0.5	0.5	ug/g dry	ND			0.0	30	
Boron	9.0	5.0	ug/g dry	5.8			43.2	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	15.3	5.0	ug/g dry	15.4			0.5	30	
Cobalt	6.2	1.0	ug/g dry	6.5			3.6	30	
Copper	22.3	5.0	ug/g dry	22.8			2.2	30	
Lead	9.2	1.0	ug/g dry	10.0			8.2	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	14.2	5.0	ug/g dry	14.4			1.4	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.3	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND			0.0	30	
Vanadium	24.8	10.0	ug/g dry	25.2			1.4	30	
Zinc	33.6	20.0	ug/g dry	35.6			5.8	30	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	41.4		ug/L	ND	82.8	70-130			
Arsenic	41.8		ug/L	1.1	81.5	70-130			
Barium	68.5		ug/L	20.7	95.5	70-130			
Beryllium	47.7		ug/L	ND	95.1	70-130			
Boron	49.3		ug/L	ND	93.9	70-130			
Cadmium	41.5		ug/L	ND	82.9	70-130			
Chromium	54.7		ug/L	6.2	97.1	70-130			
Cobalt	50.1		ug/L	2.6	94.9	70-130			
Copper	56.4		ug/L	9.1	94.7	70-130			
Lead	52.5		ug/L	4.0	97.0	70-130			
Molybdenum	41.4		ug/L	ND	82.5	70-130			
Nickel	52.9		ug/L	5.8	94.3	70-130			
Selenium	41.0		ug/L	ND	81.8	70-130			
Silver	41.7		ug/L	ND	83.4	70-130			
Thallium	48.6		ug/L	ND	97.1	70-130			
Uranium	47.9		ug/L	ND	95.4	70-130			
Vanadium	57.4		ug/L	10.1	94.6	70-130			
Zinc	55.1		ug/L	ND	81.8	70-130			

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.

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.

Paracel ID: 1832357

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Chain of Custody (Lab Use Only) № 118615

Page 1 of 1

Client Name: Paterson	Project Reference: PE4365	**Turnaround Time:**
Contact Name: Mike Beaudoin	Quote #	☐ 1 Day ☐ 3 Day
Address: 154 Colonnade Rd S	PO # 24969	☐ 2 Day ☒ Regular
Telephone: 613-226-7361	Email Address: mbeaudoin@patersongroup.ca	Date Required:

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

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

Required Analyses

Paracel Order Number: 1832357

	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)	HOLD						
1	BH2-SS5	S		1	July 26/18					/							120mL jar			
2	BH2-SS6	S		1	↓									/			↓			
3	BH2-SS11	S		2	↓		/										↓	+	vial	
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments: Proceed regardless of any hold time exceedences PBZ

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print):	Date/Time: 09/08/18 3:00 pm	Date/Time: 9/8/18 4:34	Date/Time: 08/09/18 4:44
Date/Time:	Temperature: °C	Temperature: 14.3 °C	pH Verified [ ] By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mark D'Arcy

Client PO: 32318
Project: PE4365
Custody: 132457

Report Date: 23-Jun-2021
Order Date: 17-Jun-2021

Order #: 2125570

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

Paracel ID	Client ID
2125570-01	BH6-21-SS3
2125570-02	BH5-21-SS2
2125570-03	BH5-21-SS7
2125570-04	BH4-21-SS2
2125570-05	BH4-21-SS5
2125570-06	DUP

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Report Date: 23-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 17-Jun-2021

Client PO: 32318

Project Description: PE4365

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	22-Jun-21	23-Jun-21
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	18-Jun-21	21-Jun-21
Mercury by CVAA	EPA 7471B - CVAA, digestion	21-Jun-21	23-Jun-21
PCBs, total	SW846 8082A - GC-ECD	21-Jun-21	22-Jun-21
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	22-Jun-21	22-Jun-21
PHC F1	CWS Tier 1 - P&T GC-FID	22-Jun-21	23-Jun-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	18-Jun-21	22-Jun-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	23-Jun-21	23-Jun-21
Solids, %	Gravimetric, calculation	22-Jun-21	22-Jun-21

Certificate of Analysis

Report Date: 23-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 17-Jun-2021

Client PO: 32318

Project Description: PE4365

	Client ID:	BH6-21-SS3	BH5-21-SS2	BH5-21-SS7	BH4-21-SS2
	Sample Date:	16-Jun-21 00:00	16-Jun-21 00:00	16-Jun-21 00:00	16-Jun-21 00:00
	Sample ID:	2125570-01	2125570-02	2125570-03	2125570-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	82.4	95.2	58.4	96.0
General Inorganics					
pH	0.05 pH Units	-	-	7.44	8.16
Metals					
Antimony	1.0 ug/g dry	-	<1.0	-	<1.0
Arsenic	1.0 ug/g dry	-	8.6	-	7.7
Barium	1.0 ug/g dry	-	29.4	-	23.5
Beryllium	0.5 ug/g dry	-	<0.5	-	<0.5
Boron	5.0 ug/g dry	-	7.6	-	6.0
Cadmium	0.5 ug/g dry	-	<0.5	-	<0.5
Chromium	5.0 ug/g dry	-	15.9	-	10.8
Chromium (VI)	0.2 ug/g dry	-	<0.2	-	<0.2
Cobalt	1.0 ug/g dry	-	7.8	-	8.1
Copper	5.0 ug/g dry	-	10.9	-	7.3
Lead	1.0 ug/g dry	-	26.3	-	18.3
Mercury	0.1 ug/g dry	-	<0.1	-	<0.1
Molybdenum	1.0 ug/g dry	-	8.2	-	6.2
Nickel	5.0 ug/g dry	-	17.1	-	15.3
Selenium	1.0 ug/g dry	-	<1.0	-	<1.0
Silver	0.3 ug/g dry	-	<0.3	-	<0.3
Thallium	1.0 ug/g dry	-	<1.0	-	<1.0
Uranium	1.0 ug/g dry	-	<1.0	-	<1.0
Vanadium	10.0 ug/g dry	-	15.0	-	10.5
Zinc	20.0 ug/g dry	-	<20.0	-	<20.0
Volatiles					
Benzene	0.02 ug/g dry	<0.02	-	<0.02	-
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	79.8%	-	82.2%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	<4	-

Certificate of Analysis

Report Date: 23-Jun-2021

Client: **Paterson Group Consulting Engineers**

Order Date: 17-Jun-2021

Client PO: **32318**

Project Description: PE4365

	Client ID:	BH6-21-SS3	BH5-21-SS2	BH5-21-SS7	BH4-21-SS2
	Sample Date:	16-Jun-21 00:00	16-Jun-21 00:00	16-Jun-21 00:00	16-Jun-21 00:00
	Sample ID:	2125570-01	2125570-02	2125570-03	2125570-04
	MDL/Units	Soil	Soil	Soil	Soil
F3 PHCs (C16-C34)	8 ug/g dry	20	-	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	42	-	<6	-
PCBs					
PCBs, total	0.05 ug/g dry	<0.05	-	-	-
Decachlorobiphenyl	Surrogate	131%	-	-	-
	Client ID:	BH4-21-SS5	DUP	-	-
	Sample Date:	16-Jun-21 00:00	16-Jun-21 00:00	-	-
	Sample ID:	2125570-05	2125570-06	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	65.5	64.0	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	-	-
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	71.9%	74.4%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	779	245	-	-
F3 PHCs (C16-C34)	8 ug/g dry	733	303	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	*0.126*		*ug/g*		*126*	*60-140*			
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.57*		*ug/g*		*112*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	6.99	0.05	pH Units	6.98			0.1	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g wet	ND			NC	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	4.7	1.0	ug/g dry	4.6			3.2	30	
Barium	46.7	1.0	ug/g dry	46.6			0.2	30	
Beryllium	0.5	0.5	ug/g dry	0.5			5.8	30	
Boron	6.0	5.0	ug/g dry	6.0			0.0	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	15.3	5.0	ug/g dry	14.9			3.1	30	
Cobalt	5.2	1.0	ug/g dry	5.1			2.4	30	
Copper	13.2	5.0	ug/g dry	12.8			3.2	30	
Lead	13.6	1.0	ug/g dry	12.7			6.9	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	10.1	5.0	ug/g dry	9.9			1.9	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	27.5	10.0	ug/g dry	26.9			2.0	30	
Zinc	54.9	20.0	ug/g dry	54.2			1.3	30	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND			NC	40	
Surrogate: Decachlorobiphenyl	*0.136*		*ug/g dry*		*121*	*60-140*			
Physical Characteristics									
% Solids	93.4	0.1	% by Wt.	93.2			0.2	25	
Volatiles									
Benzene	ND	0.02	ug/g wet	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g wet	ND			NC	50	
Toluene	ND	0.05	ug/g wet	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g wet	ND			NC	50	
o-Xylene	ND	0.05	ug/g wet	ND			NC	50	
Surrogate: Toluene-d8	*2.62*		*ug/g wet*		*81.8*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	225	7	ug/g	ND	112	80-120			
F2 PHCs (C10-C16)	95	4	ug/g	ND	105	60-140			
F3 PHCs (C16-C34)	240	8	ug/g	ND	108	60-140			
F4 PHCs (C34-C50)	141	6	ug/g	ND	100	60-140			
Metals									
Antimony	50.5	1.0	ug/g	ND	100	70-130			
Arsenic	55.0	1.0	ug/g	1.8	106	70-130			
Barium	71.9	1.0	ug/g	18.7	106	70-130			
Beryllium	51.4	0.5	ug/g	ND	102	70-130			
Boron	49.2	5.0	ug/g	ND	93.6	70-130			
Cadmium	52.6	0.5	ug/g	ND	105	70-130			
Chromium (VI)	0.2	0.2	ug/g	ND	77.0	70-130			
Chromium	60.0	5.0	ug/g	5.9	108	70-130			
Cobalt	54.9	1.0	ug/g	2.0	106	70-130			
Copper	56.2	5.0	ug/g	5.1	102	70-130			
Lead	54.9	1.0	ug/g	5.1	99.6	70-130			
Mercury	1.61	0.1	ug/g	ND	108	70-130			
Molybdenum	52.1	1.0	ug/g	ND	104	70-130			
Nickel	55.8	5.0	ug/g	ND	104	70-130			
Selenium	49.1	1.0	ug/g	ND	97.7	70-130			
Silver	43.1	0.3	ug/g	ND	86.1	70-130			
Thallium	51.7	1.0	ug/g	ND	103	70-130			
Uranium	51.2	1.0	ug/g	ND	102	70-130			
Vanadium	66.0	10.0	ug/g	10.8	110	70-130			
Zinc	73.4	20.0	ug/g	21.7	103	70-130			
PCBs									
PCBs, total	0.454	0.05	ug/g	ND	100	60-140			
Surrogate: Decachlorobiphenyl	*0.155*		*ug/g*		*137*	*60-140*			
Volatiles									
Benzene	4.52	0.02	ug/g	ND	113	60-130			
Ethylbenzene	3.30	0.05	ug/g	ND	82.6	60-130			
Toluene	3.51	0.05	ug/g	ND	87.8	60-130			
m,p-Xylenes	6.85	0.05	ug/g	ND	85.7	60-130			
o-Xylene	3.69	0.05	ug/g	ND	92.3	60-130			
Surrogate: Toluene-d8	*2.26*		*ug/g*		*70.7*	*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

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.

PARACE LABORATORIES LT

Paracel ID: 2125570

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2125570	№ 132457

Client Name: PATERSON	Project Ref: PE 4365	Page __ of __
Contact Name: MARK D'ARCY	Quote #:	Turnaround Time
Address: 154 COLONNADE RD	PO #: 32318	☐ 1 day ☐ 3 day
Telephone:	E-mail: MDARCY@PATERSONGROUP.CA	☐ 2 day ☒ Regular
		Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	RSC	pH					
1	BH6-21-SS3	S		2	June 16/2021	/	X							X						
2	BH5-21-SS2	S		1	June 16/2021	/				X	X	X								
3	BH5-21-SS7	S		2	"	"	X								X					
4	BH4-21-SS2	S		1	"	"				X	X	X			X					
5	BH4-21-SS5	S		2	"	"	X													
6	DUP	S		2	"	"	X													
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: A. LOUSE	Received at Lab:	Verified By:
Relinquished By (Print): KAT LINSCOTT	Date/Time: 17/06/21 3:10	Date/Time: June 17/21 4:20p	Date/Time: June 18/21 11:55a
Date/Time: Jun 17/2021	Temperature: °C PM	Temperature: 11.1 °C	pH Verified: ☐ By: NIA

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Eric Leveque

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

Client PO: 14279
Project: PE2689
Custody: 5696

Report Date: 22-Apr-2013
Order Date: 16-Apr-2013

Order #: 1316090

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

Paracel ID	Client ID
1316090-03	BH1-GW1

Approved By:

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising shall be limited to the amount paid by you for this work, and that our employees or agents shall not under circumstances be liable to you in connection with this work

Certificate of Analysis

Report Date: 22-Apr-2013
Order Date:16-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14279 Project Description: PE2689

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	17-Apr-13	18-Apr-13
PHC F1	CWS Tier 1 - P&T GC-FID	17-Apr-13	18-Apr-13
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	17-Apr-13	18-Apr-13

Certificate of Analysis

Report Date: 22-Apr-2013
Order Date:16-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14279

Project Description: PE2689

	Client ID:	BH1-GW1	-	-	-
	Sample Date:	15-Apr-13	-	-	-
	Sample ID:	1316090-03	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
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	96.1%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-
F1 + F2 PHCs	125 ug/L	<125	-	-	-
F3 + F4 PHCs	200 ug/L	<200	-	-	-

Certificate of Analysis

Report Date: 22-Apr-2013
Order Date:16-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14279 Project Description: PE2689

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									
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	*33.5*		*ug/L*		*105*	*50-140*			

Certificate of Analysis

Report Date: 22-Apr-2013
Order Date:16-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14279 Project Description: PE2689

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				30	
Volatiles									
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	*32.9*		*ug/L*	*ND*	*103*	*50-140*			

Certificate of Analysis

Report Date: 22-Apr-2013
Order Date:16-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14279 Project Description: PE2689

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1700	25	ug/L	ND	84.8	68-117			
F2 PHCs (C10-C16)	1680	100	ug/L	ND	93.1	60-140			
F3 PHCs (C16-C34)	3710	100	ug/L	ND	99.7	60-140			
F4 PHCs (C34-C50)	3030	100	ug/L	ND	122	60-140			
Volatiles									
Benzene	50.8	0.5	ug/L	ND	127	50-140			
Ethylbenzene	42.2	0.5	ug/L	ND	105	50-140			
Toluene	44.0	0.5	ug/L	ND	110	50-140			
m,p-Xylenes	101	0.5	ug/L	ND	127	50-140			
o-Xylene	52.4	0.5	ug/L	ND	131	50-140			
Surrogate: Toluene-d8	*31.2*		*ug/L*		*97.3*	*50-140*			

Certificate of Analysis

Report Date: 22-Apr-2013
Order Date:16-Apr-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14279 Project Description: PE2689

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.

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.

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Page 1 of 1

Client Name: PATERSON GROUP	Project Reference: PE 2689	TAT: [✓] Regular [ ] 3 Day
Contact Name: ERIC LEVEQUE	Quote #	[ ] 2 Day [ ] 1 Day
Address: 154 COLONNADE RD. S.	PO # 14279	Date Required:
Telephone: 613-226-7381	Email Address: elevegue@patersongroup.ca	

Criteria: [ ] O. Reg. 153/04 Table __ [✓] O. Reg. 153/11 (Current) Table 3 [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

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

Paracel Order Number: 1316090

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	BTEX	PHC F1-F4				Required Analyses					
1	BH1-12-GW1	GW		3	APR 15 '13	6:30 pm	✓	✓		→		MJ bottle	VOC vial				
2	BH2-12-GW1	GW		3	"	7:00 pm	✓	✓				MJ					
3	BH1-GW1	GW		3	"	7:30 pm	✓	✓									
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: Sample 1: Sub-sampled from 500mL AG for Dup vial SC.

Method of Delivery: Walk-in

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
	Date/Time:	Date/Time: Apr 16/13 4:41	Date/Time: Apr 17/13
Date/Time: APR 16 2013	Temperature: ____ °C	Temperature: 10.0 °C	pH Verified [ ] By: N/A

7:40a

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mike Beaudoin

Client PO: 24869
Project: PE4365
Custody: 118616

Report Date: 15-Aug-2018
Order Date: 9-Aug-2018

Order #: 1832358

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

Paracel ID	Client ID
1832358-01	BH1-18-GW1
1832358-02	BH3-18-GW1
1832358-03	BH1-GW1

Approved By:

Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24869

Report Date: 15-Aug-2018
Order Date: 9-Aug-2018
Project Description: PE4365

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - water	MOE E3056 - colourimetric	14-Aug-18	14-Aug-18
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	14-Aug-18	14-Aug-18
Metals, ICP-MS	EPA 200.8 - ICP-MS	14-Aug-18	14-Aug-18
PCBs, total	EPA 608 - GC-ECD	14-Aug-18	15-Aug-18
PHC F1	CWS Tier 1 - P&T GC-FID	10-Aug-18	11-Aug-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	13-Aug-18	13-Aug-18
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	10-Aug-18	11-Aug-18

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24869

Report Date: 15-Aug-2018
Order Date: 9-Aug-2018
Project Description: PE4365

	Client ID:	BH1-18-GW1	BH3-18-GW1	BH1-GW1	-
	Sample Date:	08/07/2018 09:00	08/09/2018 09:00	08/09/2018 09:00	-
	Sample ID:	1832358-01	1832358-02	1832358-03	-
	MDL/Units	Water	Water	Water	-
Metals					
Mercury	0.1 ug/L	-	<0.1	<0.1	-
Antimony	0.5 ug/L	-	0.6	<0.5	-
Arsenic	1 ug/L	-	2	<1	-
Barium	1 ug/L	-	130	52	-
Beryllium	0.5 ug/L	-	<0.5	<0.5	-
Boron	10 ug/L	-	141	75	-
Cadmium	0.1 ug/L	-	<0.1	<0.1	-
Chromium	1 ug/L	-	<1	<1	-
Chromium (VI)	10 ug/L	-	<10	<10	-
Cobalt	0.5 ug/L	-	<0.5	<0.5	-
Copper	0.5 ug/L	-	5.2	5.1	-
Lead	0.1 ug/L	-	0.2	0.2	-
Molybdenum	0.5 ug/L	-	28.9	5.2	-
Nickel	1 ug/L	-	1	3	-
Selenium	1 ug/L	-	<1	<1	-
Silver	0.1 ug/L	-	<0.1	<0.1	-
Sodium	200 ug/L	-	135000	967000	-
Thallium	0.1 ug/L	-	<0.1	<0.1	-
Uranium	0.1 ug/L	-	4.5	12.3	-
Vanadium	0.5 ug/L	-	1.4	3.6	-
Zinc	5 ug/L	-	6	6	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	-
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24869

Report Date: 15-Aug-2018
Order Date: 9-Aug-2018
Project Description: PE4365

	Client ID:	BH1-18-GW1	BH3-18-GW1	BH1-GW1	-
	Sample Date:	08/07/2018 09:00	08/09/2018 09:00	08/09/2018 09:00	-
	Sample ID:	1832358-01	1832358-02	1832358-03	-
	MDL/Units	Water	Water	Water	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylene dibromide (dibromoethan	0.2 ug/L	<0.2	<0.2	<0.2	-
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
4-Bromofluorobenzene	Surrogate	91.4%	91.1%	91.8%	-
Dibromofluoromethane	Surrogate	88.1%	85.2%	91.1%	-
Toluene-d8	Surrogate	91.1%	89.4%	89.3%	-
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	-

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24869

Report Date: 15-Aug-2018
Order Date: 9-Aug-2018
Project Description: PE4365

	Client ID:	BH1-18-GW1	BH3-18-GW1	BH1-GW1	-
	Sample Date:	08/07/2018 09:00	08/09/2018 09:00	08/09/2018 09:00	-
	Sample ID:	1832358-01	1832358-02	1832358-03	-
	MDL/Units	Water	Water	Water	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-
PCBs					
PCBs, total	0.05 ug/L	<0.05	-	-	-
Decachlorobiphenyl	Surrogate	80.1%	-	-	-

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						
Metals									
Mercury	ND	0.1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Chromium (VI)	ND	10	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Lead	ND	0.1	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Thallium	ND	0.1	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
PCBs									
PCBs, total	ND	0.05	ug/L						
Surrogate: Decachlorobiphenyl	*0.489*		*ug/L*		*97.9*	*60-140*			
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane	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						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*81.8*		*ug/L*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*83.8*		*ug/L*		*105*	*50-140*			
Surrogate: Toluene-d8	*78.6*		*ug/L*		*98.3*	*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				30	
Metals									
Mercury	ND	0.1	ug/L	ND			0.0	20	
Antimony	ND	0.5	ug/L	ND			0.0	20	
Arsenic	ND	1	ug/L	ND			0.0	20	
Barium	21.6	1	ug/L	21.6			0.0	20	
Beryllium	ND	0.5	ug/L	ND			0.0	20	
Boron	19	10	ug/L	20			1.4	20	
Cadmium	ND	0.1	ug/L	ND			0.0	20	
Chromium (VI)	ND	10	ug/L	ND				20	
Chromium	ND	1	ug/L	ND			0.0	20	
Cobalt	ND	0.5	ug/L	ND			0.0	20	
Copper	0.82	0.5	ug/L	0.78			4.6	20	
Lead	ND	0.1	ug/L	ND			0.0	20	
Molybdenum	1.13	0.5	ug/L	1.14			1.4	20	
Nickel	ND	1	ug/L	ND			0.0	20	
Selenium	ND	1	ug/L	ND			0.0	20	
Silver	ND	0.1	ug/L	ND			0.0	20	
Sodium	17500	200	ug/L	16900			3.5	20	
Thallium	ND	0.1	ug/L	ND			0.0	20	
Uranium	ND	0.1	ug/L	ND			0.0	20	
Vanadium	ND	0.5	ug/L	ND			0.0	20	
Zinc	11	5	ug/L	9			12.3	20	
Volatiles									
Acetone	7.14	5.0	ug/L	7.64			6.8	30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	1.45	0.5	ug/L	1.43			1.4	30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroform	3.33	0.5	ug/L	3.25			2.4	30	
Dibromochloromethane	0.88	0.5	ug/L	0.87			1.1	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Ethylene dibromide (dibromoethane	ND	0.2	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			0.0	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	135	0.5	ug/L	130			3.6	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*96.4*		*ug/L*		*120*	*50-140*			
Surrogate: Dibromofluoromethane	*97.7*		*ug/L*		*122*	*50-140*			
Surrogate: Toluene-d8	*79.5*		*ug/L*		*99.3*	*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)	1820	25	ug/L		91.0	68-117			
F2 PHCs (C10-C16)	1430	100	ug/L		89.4	60-140			
F3 PHCs (C16-C34)	3660	100	ug/L		93.4	60-140			
F4 PHCs (C34-C50)	2300	100	ug/L		92.7	60-140			
Metals									
Mercury	2.49	0.1	ug/L	ND	83.1	70-130			
Antimony	45.0		ug/L	ND	89.8	80-120			
Arsenic	46.0		ug/L	ND	91.0	80-120			
Barium	65.5		ug/L	21.6	87.9	80-120			
Beryllium	43.0		ug/L	ND	86.0	80-120			
Boron	64		ug/L	20	89.3	80-120			
Cadmium	45.6		ug/L	ND	91.2	80-120			
Chromium (VI)	200	10	ug/L	ND	100	70-130			
Chromium	46.7		ug/L	ND	92.7	80-120			
Cobalt	44.7		ug/L	ND	89.4	80-120			
Copper	44.7		ug/L	0.78	87.8	80-120			
Lead	43.3		ug/L	ND	86.5	80-120			
Molybdenum	43.2		ug/L	1.14	84.1	80-120			
Nickel	44.6		ug/L	ND	88.5	80-120			
Selenium	46.7		ug/L	ND	93.1	80-120			
Silver	45.9		ug/L	ND	91.7	80-120			
Sodium	960		ug/L		96.0	80-120			
Thallium	43.7		ug/L	ND	87.4	80-120			
Uranium	43.8		ug/L	ND	87.5	80-120			
Vanadium	47.1		ug/L	ND	93.8	80-120			
Zinc	51		ug/L	9	83.4	80-120			
PCBs									
PCBs, total	0.744	0.05	ug/L		74.4	60-140			
Surrogate: Decachlorobiphenyl	*0.497*		*ug/L*		*99.4*	*60-140*			
Volatiles									
Acetone	96.5	5.0	ug/L	7.64	88.8	50-140			
Benzene	51.8	0.5	ug/L	ND	130	50-140			
Bromodichloromethane	49.0	0.5	ug/L	1.43	119	50-140			
Bromoform	49.7	0.5	ug/L	ND	124	50-140			
Bromomethane	49.2	0.5	ug/L	ND	123	50-140			
Carbon Tetrachloride	48.8	0.2	ug/L	ND	122	50-140			
Chlorobenzene	41.6	0.5	ug/L	ND	104	50-140			
Chloroform	46.8	0.5	ug/L	3.25	109	50-140			
Dibromochloromethane	51.0	0.5	ug/L	0.87	125	50-140			
Dichlorodifluoromethane	50.4	1.0	ug/L	ND	126	50-140			
1,2-Dichlorobenzene	46.8	0.5	ug/L	ND	117	50-140			
1,3-Dichlorobenzene	46.7	0.5	ug/L	ND	117	50-140			
1,4-Dichlorobenzene	46.8	0.5	ug/L	ND	117	50-140			
1,1-Dichloroethane	51.5	0.5	ug/L	ND	129	50-140			
1,2-Dichloroethane	42.9	0.5	ug/L	ND	107	50-140			
1,1-Dichloroethylene	40.7	0.5	ug/L	ND	102	50-140			
cis-1,2-Dichloroethylene	50.5	0.5	ug/L	ND	126	50-140			
trans-1,2-Dichloroethylene	43.1	0.5	ug/L	ND	108	50-140			
1,2-Dichloropropane	50.1	0.5	ug/L	ND	125	50-140			
cis-1,3-Dichloropropylene	46.0	0.5	ug/L	ND	115	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
trans-1,3-Dichloropropylene	47.7	0.5	ug/L	ND	119	50-140			
Ethylbenzene	44.1	0.5	ug/L	ND	110	50-140			
Ethylene dibromide (dibromoethane	47.4	0.2	ug/L	ND	119	50-140			
Hexane	43.1	1.0	ug/L	ND	108	50-140			
Methyl Ethyl Ketone (2-Butanone)	135	5.0	ug/L	ND	135	50-140			
Methyl Isobutyl Ketone	134	5.0	ug/L	ND	134	50-140			
Methyl tert-butyl ether	99.2	2.0	ug/L	ND	99.2	50-140			
Methylene Chloride	42.4	5.0	ug/L	ND	106	50-140			
Styrene	167	0.5	ug/L	130	92.0	50-140			
1,1,1,2-Tetrachloroethane	50.5	0.5	ug/L	ND	126	50-140			
1,1,2,2-Tetrachloroethane	45.2	0.5	ug/L	ND	113	50-140			
Tetrachloroethylene	46.0	0.5	ug/L	ND	115	50-140			
Toluene	42.1	0.5	ug/L	ND	105	50-140			
1,1,1-Trichloroethane	41.7	0.5	ug/L	ND	104	50-140			
1,1,2-Trichloroethane	48.0	0.5	ug/L	ND	120	50-140			
Trichloroethylene	46.8	0.5	ug/L	ND	117	50-140			
Trichlorofluoromethane	45.0	1.0	ug/L	ND	112	50-140			
Vinyl chloride	50.5	0.5	ug/L	ND	126	50-140			
m,p-Xylenes	95.9	0.5	ug/L	ND	120	50-140			
o-Xylene	48.8	0.5	ug/L	ND	122	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.

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.

Paracel ID: 1832358

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Chain of Custody (Lab Use Only) № 118616

Page 1 of 1

Client Name: Paterson	Project Reference: PE4365		**Turnaround Time:**
Contact Name: Mike Beaudoin	Quote #		☐ 1 Day ☐ 3 Day
Address: 154 Colonnade Rd S.	PO # 24869		☐ 2 Day ☑ Regular
Telephone: 613-226-7381	Email Address: mbeaudoin@patersongroup.ca		Date Required:

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

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

Paracel Order Number: 1832358

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Pb							
1	BH1-18-GW1	GW		4	Aug 7/18		X	X						X							
2	BH3-18-GW1	GW		6	Aug 7/18		X	X		X	X	X									
3	BH1-GW2	GW		6	Aug 7/18		X	X		X	X	X									
4																					
5	→ Reads Aug 9 on bottles. KW																				
6																					
7	↓ Report as Aug 9th per Mike. OBL																				
8																					
9																					
10																					

Comments:

Method of Delivery: Paracel

Relinquished By (Sign): [signature]	Received by Driver/Depot: T. Crouse	Received at Lab: [signature]	Verified By: [signature]
Relinquished By (Print):	Date/Time: 09/08/18 300	Date/Time: 9/8/18 4:37	Date/Time: 08/09/18 4:44
Date/Time:	Temperature: / °C PH	Temperature: 21.0 °C	pH Verified [ ] By: KW

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mike Beaudoin

Client PO: 32365
Project: PE4365
Custody: 132483

Report Date: 2-Jul-2021
Order Date: 24-Jun-2021

Order #: 2126566

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

Paracel ID	Client ID
2126566-01	BH4-21-GW1
2126566-02	BH5-21-GW1
2126566-03	DUP-1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Report Date: 02-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 24-Jun-2021

Client PO: 32365

Project Description: PE4365

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	28-Jun-21	28-Jun-21
PHC F1	CWS Tier 1 - P&T GC-FID	25-Jun-21	28-Jun-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	30-Jun-21	2-Jul-21

Certificate of Analysis

Report Date: 02-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 24-Jun-2021

Client PO: 32365

Project Description: PE4365

	Client ID:	BH4-21-GW1	BH5-21-GW1	DUP-1	-
	Sample Date:	24-Jun-21 09:00	23-Jun-21 09:00	24-Jun-21 09:00	-
	Sample ID:	2126566-01	2126566-02	2126566-03	-
	MDL/Units	Ground Water	Ground Water	Ground Water	-
Volatiles					
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene-d8	Surrogate	101%	102%	103%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	-	-
F4 PHCs (C34-C50)	100 ug/L	<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									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*82.8*		*ug/L*		*103*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*81.7*		*ug/L*		*102*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2070	25	ug/L	ND	104	68-117			
F2 PHCs (C10-C16)	1100	100	ug/L	ND	68.5	60-140			
F3 PHCs (C16-C34)	5180	100	ug/L	ND	132	60-140			
F4 PHCs (C34-C50)	2760	100	ug/L	ND	111	60-140			
Volatiles									
Benzene	36.0	0.5	ug/L	ND	89.9	60-130			
Ethylbenzene	35.9	0.5	ug/L	ND	89.8	60-130			
Toluene	38.9	0.5	ug/L	ND	97.3	60-130			
m,p-Xylenes	75.7	0.5	ug/L	ND	94.6	60-130			
o-Xylene	37.7	0.5	ug/L	ND	94.2	60-130			
Surrogate: Toluene-d8	*80.7*		*ug/L*		*101*	*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: 2126566

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2126566	№ 132483

Client Name: Paterson Group	Project Ref: PE4365	Page __ of __
Contact Name: Michael Beardon	Quote #:	Turnaround Time
Address: ~~Address~~ 154 Colonnade Rd	PO #: 32365	☐ 1 day ☐ 3 day
	E-mail: MBEAUDOIN@PATERSONGROUP.CA	☐ 2 day ☒ Regular
Telephone:		Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)						
1	BH4-21-GW1	GW		3	June 24	✓	X												✓
2	BH5-21-GW1	GW		3	June 23	✓	X												✓
3	DUP-1	GW		2	June 24	✓	X												✓
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Drop Box

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print):	Date/Time:	Date/Time: June 24, 2021 17:07	Date/Time: June 25/21 11:09a
Date/Time: June 24/2021	Temperature: °C	Temperature: 16.4 °C	pH Verified: ☐ By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mark D'Arcy

Client PO: 32362
Project: PE4365
Custody: 131481

Report Date: 30-Jun-2021
Order Date: 24-Jun-2021

Order #: 2126506

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

Paracel ID	Client ID
2126506-01	BH5-21-GW1

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 32362

Report Date: 30-Jun-2021

Order Date: 24-Jun-2021

Project Description: PE4365

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - water	MOE E3056 - colourimetric	25-Jun-21	25-Jun-21
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	29-Jun-21	30-Jun-21
Metals, ICP-MS	EPA 200.8 - ICP-MS	25-Jun-21	25-Jun-21

Certificate of Analysis

Report Date: 30-Jun-2021

Client: **Paterson Group Consulting Engineers**

Order Date: 24-Jun-2021

Client PO: **32362**

Project Description: PE4365

	Client ID:	BH5-21-GW1	-	-	-
	Sample Date:	23-Jun-21 09:00	-	-	-
	Sample ID:	2126506-01	-	-	-
	MDL/Units	Water	-	-	-
Metals					
Mercury	0.1 ug/L	<0.1	-	-	-
Antimony	0.5 ug/L	<0.5	-	-	-
Arsenic	1 ug/L	<1	-	-	-
Barium	1 ug/L	200	-	-	-
Beryllium	0.5 ug/L	<0.5	-	-	-
Boron	10 ug/L	64	-	-	-
Cadmium	0.1 ug/L	<0.1	-	-	-
Chromium	1 ug/L	<1	-	-	-
Chromium (VI)	10 ug/L	<10	-	-	-
Cobalt	0.5 ug/L	1.2	-	-	-
Copper	0.5 ug/L	1.9	-	-	-
Lead	0.1 ug/L	0.1	-	-	-
Molybdenum	0.5 ug/L	7.7	-	-	-
Nickel	1 ug/L	3	-	-	-
Selenium	1 ug/L	<1	-	-	-
Silver	0.1 ug/L	<0.1	-	-	-
Sodium	200 ug/L	245000	-	-	-
Thallium	0.1 ug/L	0.1	-	-	-
Uranium	0.1 ug/L	6.6	-	-	-
Vanadium	0.5 ug/L	1.6	-	-	-
Zinc	5 ug/L	<5	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 32362

Report Date: 30-Jun-2021

Order Date: 24-Jun-2021

Project Description: PE4365

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Mercury	ND	0.1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Chromium (VI)	ND	10	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Lead	ND	0.1	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Thallium	ND	0.1	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Mercury	ND	0.1	ug/L	ND			NC	20	
Antimony	ND	0.5	ug/L	ND			NC	20	
Arsenic	ND	1	ug/L	ND			NC	20	
Barium	23.0	1	ug/L	24.1			4.5	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	21	10	ug/L	20			4.9	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Chromium (VI)	ND	10	ug/L	ND			NC	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	ND	0.5	ug/L	ND			NC	20	
Copper	1.15	0.5	ug/L	1.08			6.1	20	
Lead	ND	0.1	ug/L	ND			NC	20	
Molybdenum	2.23	0.5	ug/L	2.02			10.2	20	
Nickel	ND	1	ug/L	ND			NC	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	16400	200	ug/L	14300			13.7	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Uranium	ND	0.1	ug/L	ND			NC	20	
Vanadium	ND	0.5	ug/L	ND			NC	20	
Zinc	9	5	ug/L	10			12.2	20	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Mercury	3.49	0.1	ug/L	ND	116	70-130			
Antimony	51.4	0.5	ug/L	ND	103	80-120			
Arsenic	53.4	1	ug/L	ND	106	80-120			
Barium	74.9	1	ug/L	24.1	102	80-120			
Beryllium	52.8	0.5	ug/L	ND	106	80-120			
Boron	71	10	ug/L	20	104	80-120			
Cadmium	51.8	0.1	ug/L	ND	104	80-120			
Chromium (VI)	185	10	ug/L	ND	92.5	70-130			
Chromium	52.3	1	ug/L	ND	104	80-120			
Cobalt	52.4	0.5	ug/L	ND	105	80-120			
Copper	50.1	0.5	ug/L	1.08	98.1	80-120			
Lead	44.4	0.1	ug/L	ND	88.7	80-120			
Molybdenum	49.9	0.5	ug/L	2.02	95.8	80-120			
Nickel	50.4	1	ug/L	ND	100	80-120			
Selenium	50.5	1	ug/L	ND	101	80-120			
Silver	50.2	0.1	ug/L	ND	100	80-120			
Sodium	26600	200	ug/L	14300	123	80-120			QM-07
Thallium	48.3	0.1	ug/L	ND	96.5	80-120			
Uranium	43.1	0.1	ug/L	ND	86.1	80-120			
Vanadium	53.1	0.5	ug/L	ND	106	80-120			
Zinc	57	5	ug/L	10	94.2	80-120			

Qualifier Notes:

QC Qualifiers :

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2126506

Paracel Order Number (Lab Use Only): 2126506

Chain Of Custody (Lab Use Only) № 132481

Client Name:	Paterson Group Inc.
Contact Name:	
Address:	154 Colonnade Rd South
Telephone:	613-226-7381
Project Ref:	~~PE5367~~ PE4365
Quote #:	
PO #:	32362
E-mail:	sberube@patersongroup.ca mdarcy@patersongroup.ca

Page 1 of 1

Turnaround Time

☐ 1 day ☐ 3 day
☐ 2 day ☑ Regular

Date Required:

Regulation 153/04

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

Other Regulation

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

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)						
1	BHS-21-GW1	GW		3	June 23/21					✓	✓	✓							
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): [signature]	Received By Driver/Depot: [signature]	Received at Lab: Suneeporn Dolmai	Verified By: [signature]
Relinquished By (Print): Samuel Berube	Date/Time: 24/06/21 2:45	Date/Time: June 24, 2021 03.15	Date/Time: June 24, 2021 16:23
Date/Time:	Temperature: °C PH	Temperature: 17.9 °C	pH Verified: ☑ By: BS