PATERSON GROUP

Phase II – Environmental Site Assessment

50 Bayswater Avenue and 1088 Somerset Street West

Ottawa, Ontario

Prepared for Manor Park Management

Report: PE5971-2
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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the properties addressed 50 Bayswater Avenue and 1088 Somerset Street West, 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 Phase II ESA subsurface investigation consisted of drilling 6 boreholes across the Phase II Property, all of which were constructed with groundwater monitoring wells. The general soil profile encountered for the 1088 Somerset Street West portion of the Phase II Property during the field program consisted of a layer of asphaltic concrete, followed fill material and silty sand. Bedrock was inferred by way of auger refusal at depths ranging from 5.28 to 6.73 mbgs on the 1088 Somerset Street West portion of the Phase II Property. The general soil profile encountered for the 50 Bayswater Avenue portion of the Phase II Property during the field program consisted of a layer of asphaltic concrete, followed engineered fill material and glacial till. Limestone Bedrock was encountered in BH4-23 and BH6-23 at depths ranging from 3.22 to 4.11 mbgs on the 50 Bayswater Avenue portion of the Phase II Property.

A total of 13 soil samples (including one duplicate) were submitted for analysis of metals (including As, Sb, Se, Hg and/or CrVI), benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbons (PHCs F1-F4), polycyclic aromatic hydrocarbons (PAHs), pH, conductivity (EC) and/or sodium absorption ratio (SAR). Cobalt concentrations in samples BH4-22-SS3 and DUP (BH6-23-SS3) exceed the selected MECP Table 3 Standard. The cobalt concentrations identified are consistent with naturally occurring levels present in post-glacial Champlain Sea clay deposits, which characterize much of the Ottawa region. These elevated levels are considered to be of geological origin and not the result of anthropogenic sources. As such the cobalt concentrations are not considered to be a contaminant of concern. EC and/or SAR concentrations in soil samples BH1-23-SS2, BH2-23-SS2 and BH3-23-SS4 exceed the selected MECP Table 3 Standards. However, EC and SAR standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined, based on a phase two environmental site assessment, that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both. All remaining parameter concentrations analyzed in the soil samples comply with MECP Table 3 Standards.

A total of eight groundwater samples (including two duplicates) from monitoring wells installed in BH1-23 through BH6-23 were submitted for laboratory analysis of metals (including As, Sb and Se), PHCs (F1-F4) and/or Volatile organic compounds (VOCs). All detected VOC parameter concentrations in the groundwater samples analysed comply with the selected MECP Table 3 Standards, with the exception of chloroform in groundwater sample DUP (BH4-23-GW1). It is our opinion that this exceedance is due to the use of municipal water during the coring of the borehole. All remaining parameter concentrations analyzed in the groundwater samples comply with MECP Table 3 Standards.

Recommendations

Groundwater

It is recommended that the monitoring wells installed on the Phase II Property be maintained for future monitoring. Prior to site redevelopment, the monitoring wells must be decommissioned in accordance with O.Reg 903.

1.0 INTRODUCTION

At the request of Manor Park Management, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment for the properties addressed 50 Bayswater Avenue and 1088 Somerset Street West, in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address areas of potential environmental concern (APECs) identified on the Phase II Property, during the Phase I ESA conducted by Paterson Group.

1.1 Site Description

Address:	50 Bayswater Avenue and 1088 Somerset Street West, Ottawa, Ontario
Legal Description:	Part of Lots 1 and 2 in Block Q, Registered Plan 73, in the City of Ottawa, Ontario.
Location:	The Phase I Property is located on the southwest corner of the intersection of Somerset Street West and Bayswater Avenue, in the City of Ottawa, Ontario. For the purposes of this report, Somerset Steet West is assuming to run east-west. Refer to Figure 1 - Key Plan in the Figures section following the text.
Latitude and Longitude:	45° 24’ 22" N, 75° 43' 16" W

Site Description:

Configuration:	Irregular
Area:	0.12 ha (approximate)
Zoning:	TM11 – Traditional Mainstreet Zone

1.2 Property Ownership

Paterson was engaged to conduct this Phase I-ESA by Mr. Lalit Aggarwal with Manor Park Management. Mr. Aggarwal can be reached by telephone at (613)-746-1647.

1.3 Current and Proposed Future Uses

The Phase II Property is currently occupied by a one-storey commercial office building and a three-storey mixed use commercial art gallery and residential dwelling. It is our understanding that the Phase II Property is intended to be potentially redeveloped with two multi-storey residential/commercial towers.

1.4 Applicable Site Condition Standard

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

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

Section 35 of O.Reg. 153/04 does not apply to the Phase II Property in that the property relies upon municipal drinking water.

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

Section 43.1 of O.Reg. 153/04 does not apply to the Phase II Property in that the property is not a Shallow Soil property and the property is not within 30m of a water body.

Coarse-grained soil standards were chosen as a conservative approach. Grain size analysis was not completed. The intended use of the Phase II Property is residential/commercial; therefore, the Residential Standards have been selected for the purpose of this Phase II ESA.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is located on the southwest corner of the intersection of Somerset Street West and Bayswater Avenue, in the City of Ottawa, Ontario. The Phase II Property is situated in a general mixed-use zone consisting of residential and commercial land use.

At the time of the Phase II ESA, the portion of the Phase II Property addressed 50 Bayswater Avenue is occupied by a one-storey office building and the portion of the Phase II Property addressed 1088 Somerset Street West is occupied by a three-storey (with one basement level) mixed used commercial art gallery and residential dwelling.

Site topography slopes slightly downward toward Somerset Street West, whereas the reginal topography slopes downward to the north towards the Ottawa River. Site drainage consists of sheet flow to catch basins located along adjacent roadways.

Underground utility services on the Phase II Property include natural gas, electricity, cable, water and sewer services. An underground parking structures is present beneath the west portion of the 50 Bayswater Avenue property.

2.2 Past Investigations

Paterson completed a Phase I ESA for the Phase II Property. Based on the findings of the Phase I ESA, several on and off-site potentially contaminating activities (PCAs) were identified within the Phase I Study Area. Five of which have resulted in the following APECs on the Phase II Property:

- ❒ APEC 1: Former automotive service garage;
- ❒ APEC 2: Fill material of unknown quality;
- ❒ APEC 3: Existing aboveground storage tank (AST); APEC 4: Former retail fuel outlet and existing automotive service garage;
- ❒ APEC 5: Application of road salt on the Phase II Property.

The APECs were identified based on fire insurance plans, city directories, aerial photographs, field observations, and personal interviews. A Phase II ESA was recommended to address the aforementioned APECs.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted on February 13, 2023 and during the interim of March 15 through March 16, 2023 in conjunction with a Geotechnical Investigation. The field program consisted of drilling six boreholes to address the APECs identified on the Phase II Property.

The aboveground storage tank (and concrete floor beneath) in the basement of the main complex was noted to be in good condition with no signs of leaks or stains. As a result, the aboveground storage tank located in the basement of the main complex was not addressed as part of this assessment, as it was not considered to represent an immediate concern to the Phase II Property.

The boreholes (BH1-23, BH2-23 and BH3-22) were instrumented with groundwater monitoring wells. Boreholes were drilled to a maximum depth of 6.73 m below the ground surface (mbgs).

3.2 Media Investigated

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

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

- Petroleum Hydrocarbons Fractions 1 through 4 (PHCs F_1-F_4)
- Benzene, Toluene, Ethylbenzene, Xylene (BTEX)
- Metals (including arsenic (As), antimony (Sb) and selenium (Se))
- Mercury (Hg)
- Chromium VI (CrVI)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Electrical Conductivity (EC)
- Sodium Adsorption Ratio (SAR)

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

The Geological Survey of Canada website on the Urban Geology of the National Capital Area was consulted as part of this assessment. Based on the information from NRCAN, bedrock in the area of the site consists of interbedded limestone and shale of the Verulam Formation. Based on the maps, the surficial geology consists of paleozoic rocks with an overburden thickness ranging from 0 to 1 m.

The topographic maps indicate that the regional topography in the general area of the site slopes down in a northerly direction. An illustration of the referenced topographic map is presented on Figure 2 – Topographic Map, appended to this report.

Existing Buildings and Structures

The portion of the Phase I Property addressed 50 Bayswater Avenue is occupied by a one-storey office building. The portion of the Phase I Property addressed 50 Bayswater Avenue is occupied by a one-storey office building. The building is constructed above one underground parking level and is finished on the exterior with brick, parging and a flat, tar and gravel roof. The building, constructed circa 1968, is currently heated via in-unit electric baseboard heaters.

The portion of the Phase I Property addressed 1088 Somerset Street West is currently occupied by a three-storey (with one basement level) mixed used commercial art gallery and residential dwelling. The building is constructed with a stone foundation and is finished on the exterior with brick and vinyl siding in addition to a sloped and shingled roof. The building, constructed sometime prior to 1888, is currently heated via natural gas furnace located in the basement.

No other buildings or permanent structures are present on the Phase I Property.

Subsurface Structures and Utilities

The Phase I Property is situated in a municipally serviced area. Underground utility services on the Phase I Property include natural gas, electricity, cable, water and sewer services. An underground parking structure is present beneath the west portion of the 50 Bayswater Avenue property.

Water Bodies and Areas of Natural Significance

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

Drinking Water Wells

There are no potable water wells on the Phase I Property. Given the introduction of municipal water services in the area of the Phase I Property, it is our opinion that are no longer any drinking water wells in service within the Phase I Study Area.

Monitoring Well Records

A total 70 well records were identified for properties within the Phase I Study Area. Records for two monitoring wells were identified for 969 Wellington Street, to the west of the Phase I Property, installed in March of 2013 and April of 2013. The presence of these well records is assumed to be associated with the existing auto service shop located at 973 Wellington Street which is 75 meters west of the Phase I Property. However, due to the separation distance and cross-gradient orientation with respect to the Phase I Property the auto service shop is not considered to represent an environmental concern on the Phase I Property. The remaining records correspond to properties a minimum of 100 m from the Phase I Property and are not considered to be representative of a potential environmental concern to the Phase I Property.

Based on the well records, the general stratigraphy in the area of the Phase I Property consists of sand over top of clay underlain by native limestone bedrock. Bedrock was reportedly encountered at depths ranging from approximately 0.61 to 6.5 m below grade. Static water levels were not recorded on the well records.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area consists of primarily commercial and residential land use. The property addressed 1 Spadina Avenue, approximately 20 m north of the Phase I Property is currently occupied by an automotive service garage that is considered to represent an APEC on the Phase I Property. Land use within the Phase I Study Area is a mix of residential and commercial. Current land use and PCAs identified in the Phase I Study Area are presented on Drawing PE5971-2 – Surrounding Land Use Plan.

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

A total of five on and off-site PCAs (existing and historical) were identified within the Phase I Study Area that are considered to result in APECs on the Phase I Property. The Areas of Potential Environmental Concern identified in this Phase I ESA area summarized in Table 1 below.

Table 1 – Areas of Potential Environmental Concern

Area of potential environmental concern	Location of area of potential environmental concern on phase one property	Potentially contaminating activity	Location of PCA (on-site or off-site)	Contaminants of potential concern	Media potentially Impacted (Ground water, soil and/or sediment)
Former Automotive Service Garage APEC 1	Southwest portion of Phase I Property	*"Item 52: Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems"*	On-Site	PHCs (F_1-F_4), BTEX	Soil, Groundwater
Fill Material of Unknown Quality APEC 2	West portion of Phase I Property	*"Item 30 - Importation of Fill Material of Unknown Quality"*	On-site	PHCs (F_1-F_4), BTEX, Metals, As, Sb, Se, Hg, CrVI, PAHs	Soil
Existing Aboveground Storage Tank APEC 3	East portion of Phase I Property	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"*	On-site	PHCs (F_1-F_4), BTEX	Soil, Groundwater
Former Retail Fuel Outlet & Existing Automotive Service Garage APEC 4	North portion of 1088 Somerset Street West	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"* *"Item 52: Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems"*	Off-site	PHCs (F_1-F_4), BTEX	Soil, Groundwater
Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice APEC 5[1]	Within parking areas of the Phase I Property	*"Item N/A: Application of road salt for the safety of vehicular or pedestrian traffic under condition of snow or ice"*	On-site	Electrical Conductivity (EC) Sodium Adsorption Ratio (SAR)	Soil

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

An additional 55 PCAs identified within the Phase I Study Area as shown on Drawing PE5971-1 – Surrounding Land Use Plan. The remaining PCAs identified within the Phase I Study Area are not considered to represent an environmental concern on the Phase I Property due to their respective separation distances and/or cross/down gradient orientations with respect to the Phase I Property.

Contaminants of Potential Concern

Based on the past uses of the Phase I Property and the surrounding potentially contaminating activities, the following Contaminants of Potential Concern (CPCs) have been identified:

- ❑ Petroleum Hydrocarbons Fractions 1 through 4 (PHCs F_1-F_4)
- ❑ Benzene, Toluene, Ethylbenzene, Xylene (BTEX)
- ❑ Metals (including arsenic (As), antimony (Sb) and selenium (Se))
- ❑ Mercury (Hg)
- ❑ Chromium VI (CrVI)
- ❑ Polycyclic Aromatic Hydrocarbons (PAHs)

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of the Phase I-ESA is considered to be sufficient to conclude that there are historical/existing on-site and off-site PCAs that have resulted in APECs on the Phase I Property. Additional off-site PCAs identified within the study area are not considered to represent APECs on the Phase I Property based on their separation distances and/or orientations relative to the subject land.

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

3.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan for this project is included in Appendix 1 of this report.

3.5 Impediments

Physical impediments encountered during the Phase II ESA program include underground utilities, boulders in the glacial till and tree cover on the 1088 Somerset Street West property limiting the location of certain boreholes.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation conducted or this Phase II ESA consisted of drilling six boreholes (BH1-23 through BH6-23) across the Phase II property. The boreholes were drilled to a maximum depth of 6.73 m below ground surface (mbgs) to intercept groundwater.

Boreholes BH1-23 through BH3-23 were placed to address the APECs on the 1088 Somerset Street West portion of the Phase II Property using a low clearance drill rig operated by George Downing Estate Drilling of Hawkesbury, Ontario, under full-time supervision of Paterson personnel.

Boreholes BH4-23 through BH6-23 were placed in the underground parking structure on the 50 Bayswater Avenue portion of the Phase I Property using a portable drill rig operated by CCC Drilling of Ottawa, Ontario, under full-time supervision of Paterson personnel. The borehole locations are indicated on the attached Drawing PE5971-3 - Test Hole Location Plan.

4.2 Soil Sampling

A total of 41 soil samples were obtained from the boreholes by means of grab sampling from auger flights/auger samples and split spoon sampling. Interior borehole soil samples were taken continuously while split spoon samples from exterior boreholes were taken at approximate 0.76 m intervals. Rock core samples were collected with the use of coring equipment. Interior borehole soil samples were taken continuously while split spoon samples from exterior boreholes were taken at approximate 0.76 m intervals.

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

The borehole profiles for the 1088 Somerset Street West portion of the Phase II Property generally consist of a layer asphaltic concrete (from 0-0.08 mbgs), followed by fill material (ranging from 0.05-2.21 mbgs) consisting of brown silty sand with gravel and crushed stone and/or trace topsoil. The fill material was underlain by brown to grey silty sand with some gravel (0.69-6.73 mbgs). Fill material was encountered in BH1-23 and BH2-23 from 0.05-2.21 mbgs and in BH3-23 from 0.08-0.69 mbgs. Bedrock was inferred by way of auger refusal at depths ranging from 5.28 to 6.73 mbgs on the 1088 Somerset Street West portion of the Phase II Property.

The borehole profiles for the 50 Bayswater Avenue portion of the Phase II Property generally consist of a layer asphaltic concrete (from 0-0.23 mbgs), followed by a thin layer of engineered fill material (ranging from 0.13-0.41 mbgs) consisting of crushed stone and gravel. The fill material was underlain by native glacial till consisting of brown to grey silty sand to sandy silt with gravel, cobbles, and boulders (0.30-3.53 mbgs). Limestone Bedrock was encountered in BH4-23 and BH6-23 at depths ranging from 3.22 to 4.11 mbgs on the 50 Bayswater Avenue portion of the Phase II Property.

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 organic vapour readings for soil samples BH2-23-SS4 and BH3-23-SS4 were elevated and considered to be indicative of potential levels of petroleum hydrocarbon (PHC) concentrations. The remaining BH soil samples organic vapour readings were below 5ppm and not considered to be indicative of potential contamination.

A faint hydrocarbon odour was noted in soil samples BH2-23-SS4 and BH3-23-SS4. No visual or olfactory indications of potential contamination were identified in the remaining soil samples. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

4.4 Groundwater Monitoring Well Installation

Six groundwater monitoring wells were installed on the Phase II Property as part of the subsurface investigation. The monitoring wells consisted of 32mm (50 Bayswater Avenue) or 50 mm diameter (1088 Somerset Street West) Schedule 40 threaded PVC risers and screens. Monitoring well construction details are listed in Table 2 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Borehole locations and elevations were surveyed geodetically by Paterson personnel.

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
BH1-23	61.85	5.28	2.24-5.28	1.83-5.28	1.22-1.83	Flushmount
BH2-23	61.75	6.27	3.23-6.27	2.69-6.27	1.83-2.69	Flushmount
BH3-23	62.33	6.73	3.68-6.73	3.05-6.73	2.43-3.05	Flushmount
BH4-23	58.78	4.11	2.13-3.65	1.52-3.65	0.30-1.52	Flushmount
BH5-23	58.74	3.43	1.91-3.42	0.91-3.42	0.00-0.91	Flushmount
BH6-23	58.73	3.71	1.83-3.35	1.22-3.35	0.00-1.22	Flushmount

4.5 Field Measurement of Water Quality Parameters

Groundwater sampling was conducted on February 22, 2023 (BH1-23 through BH3-23) and on March 24, 2023 (BH4-23-BH6-23). 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, the field parameters were relatively stable or the well was dry.

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, as well as analyzed parameters are presented in Tables 3 and 4.

Table 3 - Testing Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed							Rationale
		Metals[1]	BTEX	PHCs F_1-F_4	PAHs	EC	SAR	pH	
February 13, 2023									
BH1-23-SS2	0.76 – 1.37 m Silty Sand (Fill Material)	X[2]	X	X	X	X	X		Assess fill material of unknown quality
BH1-23-SS7	4.57 – 5.18 m Silty Sand	X[2]	X	X		X	X		Assess potential soil impacts resulting from the former off-site retail fuel outlet, existing off-site automotive service garage and on-site application of road salt
BH2-23-SS2	0.76 – 1.37 m Silty Sand (Fill Material)	X[2]	X	X	X	X	X		Assess fill material of unknown quality
BH2-23-SS4	2.29 – 2.90 m Silty Sand	X[2]	X	X	X	X	X		Assess potential soil impacts resulting from the former off-site retail fuel outlet, existing off-site automotive service garage and on-site application of road salt

Notes:
- 1 – including arsenic (As), antimony (Sb) and selenium (Se)
- 2 – including hexavalent chromium (CrVI) and mercury (Hg)

Table 3 - Testing Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed							Rationale
		Metals[1]	BTEX	PHCs F_1-F_4	PAHs	EC	SAR	pH	
BH3-23-SS4	2.29 – 2.90 m Silty Sand	X[2]	X	X	X	X	X		Assess potential soil impacts resulting from the former on-site automotive service garage and on-site application of road salt
BH3-23-SS6	3.81 – 4.42 m Silty Sand	X[2]	X	X		X	X		Assess potential soil impacts resulting from the former on-site automotive service garage and on-site application of road salt
March 15, 2023									
BH4-23-SS3	1.47 – 1.68 m Glacial Till	X	X	X					Assess soil for potential off-site disposal purposes
BH4-23-SS5	2.57 – 3.18 m Glacial Till	X	X	X					Assess soil for potential off-site disposal purposes
March 16, 2023									
BH5-23-SS1	0.36 – 0.97 m Glacial Till	X	X	X				X	Assess soil for potential off-site disposal purposes
BH5-23-SS4	2.29 – 2.90 m Glacial Till	X	X	X				X	Assess soil for potential off-site disposal purposes
BH6-23-SS1	0.30 – 0.91 m Glacial Till	X	X	X					Assess potential soil impacts resulting from the existing on-site diesel aboveground storage tank
BH6-23-SS3	1.42 – 2.03 m Glacial Till	X	X	X					Assess potential soil impacts resulting from the existing on-site diesel aboveground storage tank
DUP (BH6-23-SS3)	1.42 – 2.03 m Glacial Till	X	X	X					Duplicate sample (BH6-23-SS3) for QA/QC purposes

Notes:
- 1 – including arsenic (As), antimony (Sb) and selenium (Se)
- 2 – including hexavalent chromium (CrVI) and mercury (Hg)

TABLE 4 - Testing Parameters for Submitted Groundwater Samples

Sample ID	Screened Interval	Parameters Analyzed			Rationale
		Metals[1]	PHCs F_1-F_4	VOCs	
February 22, 2023					
BH1C-23-GW1	2.23 – 5.28 m Silty Sand		X	X	Assess potential groundwater impacts resulting from the former on-site automotive service garage, former off-site landfill site, former off-site retail fuel outlet and existing off-site automotive service garage
BH2-23-GW1	3.22 – 6.27 m Silty Sand		X	X	Assess potential groundwater impacts resulting from the former off-site landfill site, former off-site retail fuel outlet and existing off-site automotive service garage
BH3-23-GW1	3.68 – 6.73 m Silty Sand		X	X	Assess potential groundwater impacts resulting from the former on-site automotive service garage
DUP (BH3-23-GW1)	3.68 – 6.73 m Silty Sand		X	X	Duplicate sample (BH3-23-GW1) for QA/QC purposes
March 24, 2023					
BH4-23-GW1	2.13 – 3.65 m Glacial Till	X	X	X	Assess groundwater quality for construction purposes
BH5-23-GW1	1.91 – 3.42 m Glacial Till		X	X	Assess groundwater quality for construction purposes
BH6-23-GW1	1.83 – 3.35 m Glacial Till		X	X	Assess potential groundwater impacts resulting from the existing on-site diesel aboveground storage tank
DUP (BH4-23-GW1)	2.13 – 3.65 m Glacial Till		X	X	Duplicate sample (BH4-23-GW1) for QA/QC purposes

Notes:
- 1 – including arsenic (As), antimony (Sb) and selenium (Se)

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

4.8 Residue Management

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

4.9 Elevation Surveying

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

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

The borehole profiles for the 1088 Somerset Street West portion of the Phase II Property generally consist of a layer asphaltic concrete (from 0-0.08 mbgs), followed by fill material (ranging from 0.05-2.21 mbgs) consisting of brown silty sand with gravel and crushed stone and/or trace topsoil. The fill material was underlain by brown to grey silty sand with some gravel (0.69-6.73 mbgs). Fill material was encountered in BH1-23 and BH2-23 from 0.05-2.21 mbgs and in BH3-23 from 0.08-0.69 mbgs. Bedrock was inferred by way of auger refusal at depths ranging from 5.28 to 6.73 mbgs on the Phase II Property.

The borehole profiles for the 50 Bayswater Avenue portion of the Phase II Property generally consist of a layer asphaltic concrete (from 0-0.23 mbgs), followed by a thin layer of engineered fill material (ranging from 0.13-0.41 mbgs) consisting of crushed stone and gravel. The fill material was underlain by native glacial till consisting of brown to grey silty sand to sandy silt with gravel, cobbles, and boulders (0.30-3.53 mbgs). Limestone Bedrock was encountered in BH4-23 and BH6-23 at depths ranging from 3.22 to 4.11 mbgs on the 50 Bayswater Avenue portion of the Phase II Property.

Groundwater was inferred within the overburden of BH3-23 at a depth of 4.00 mbgs, BH5-23 at a depth of 1.80 mbgs and BH6-23 at a depth of 2.40 mbgs.

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

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling events on February 22, 2023 (BH1-23 to BH3-23) and on March 24, 2023 (BH4-23 to BH6-23) using an electronic water level meter. Groundwater levels are summarized in Table 5.

TABLE 5 - Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1-23	61.85	4.61	57.24	February 22, 2023
BH2-23	61.75	4.49	57.26	February 22, 2023
BH3-23	62.33	5.14	57.19	February 22, 2023
BH4-23	58.78	1.53	57.25	March 24, 2023
BH5-23	58.74	1.17	57.57	March 24, 2023
BH6-23	58.73	1.53	57.20	March 24, 2023

Based on the groundwater elevations measured during the sampling events, groundwater contour mapping was completed. Groundwater contours are shown on Drawing PE5971-3 – Test Hole Location Plan. Based on the contour mapping, groundwater flow at the Phase II Property is in an easterly direction, although these levels likely had not stabilized. It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations.

A horizontal hydraulic gradient of approximately 0.012 m/m was calculated.

5.3 Fine-Coarse Soil Texture

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

5.4 Soil: Field Screening

The organic vapour readings for soil samples BH2-23-SS4 and BH3-23-SS4 were slightly elevated relative to the samples collected nearby, however are not necessarily indicative of significant impacted material. Both elevated samples were submitted for analytical testing. The remaining BH soil samples organic vapour readings were below 5ppm and not considered to be indicative of potential contamination. Fill material was encountered in BH1-23 and BH2-23, however no deleterious material was identified. A faint hydrocarbon odour was noted in soil samples BH2-23-SS4 and BH3-23-SS4.

No visual or olfactory indications of potential contamination were identified in the remaining soil samples. The field screening results of each individual soil sample are provided on the Soil Profile and Test Data Sheets appended to this report.

5.5 Soil Quality

Based on the findings of the field screening in combination with sample depth and location, 13 soil samples (including one duplicate) were submitted for analysis of metals (including As, Sb, Se, Hg and/or CrVI), BTEX, PHCs (F1-F4), PAHs, pH, EC and/or SAR. The results of the soil analytical testing are appended to this report. The laboratory Certificates of Analysis are provided in Appendix 1.

Cobalt concentrations in samples BH4-22-SS3 and DUP (BH6-23-SS3) exceed the selected MECP Table 3 Standard. The cobalt concentrations identified are consistent with naturally occurring levels present in post-glacial Champlain Sea clay deposits, which characterize much of the Ottawa region. These elevated levels are considered to be of geological origin and not the result of anthropogenic sources. As such the cobalt concentrations are not considered to be a contaminant of concern. The remaining metal concentrations in the soil samples analysed are in compliance with the selected MECP Table 3 standards. The analytical results for metals tested in soil are shown on Drawing PE5971-4 – Analytical Testing Plan – Soil.

No BTEX or PHC F1 parameter concentrations were detected in the soil samples analysed and therefore the results comply with the selected MECP Table 3 Standards. All detected PHC (F2-F4) concentrations in the soil samples analysed comply with the selected MECP Table 3 Standards. The analytical results for BTEX and PHCs tested in soil are shown on Drawing PE5971-4 – Analytical Testing Plan – Soil.

All detected PAH concentrations in the soil samples analysed comply with the selected MECP Table 3 Standards. The analytical results for PAHs tested in soil are shown on Drawing PE5971-4 – Analytical Testing Plan – Soil.

All soil samples analyzed for pH comply with the MECP Table 3 Standards. EC and/or SAR concentrations in soil samples BH1-23-SS2, BH2-23-SS2 and BH3-23-SS4 exceed the selected MECP Table 3 Standards. However, as previously mentioned, EC and SAR standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined, based on a phase two environmental site assessment, that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both. The remaining soil samples analysed for EC and SAR comply with the selected MECP Table 3 Standards. The analytical results for pH, EC and SAR tested in soil are not shown on the drawings appended to this report as they have been deemed to meet the standard based on Section 49.1 of O.Reg.153/04.

5.6 Groundwater Quality

Eight groundwater samples (including two duplicates) from monitoring wells installed in BH1-23 through BH6-23 were submitted for laboratory analysis of metals, PHCs (F1-F4) and/or VOCs. The groundwater samples were obtained from the screened intervals noted in Table 2. The results of the groundwater analytical testing are appended to this report. The laboratory Certificates of Analysis are provided in Appendix 1.

All detected metal parameter concentrations in the groundwater samples analysed comply with the selected MECP Table 3 Standards. The analytical results for metals tested in groundwater are shown on Drawing PE5971-5 – Analytical Testing Plan – Groundwater.

No detectable PHC concentrations were identified in the groundwater samples analysed, therefore the results comply with the selected MECP Table 3 Standards. The analytical results for PHCs tested in groundwater tested are shown on Drawing PE5971-5– Analytical Testing Plan – Groundwater.

All detected BTEX and VOC parameter concentrations in the groundwater samples analysed comply with the selected MECP Table 3 Standards, with the exception of chloroform in groundwater sample DUP (BH4-23-GW1). It is our opinion that this exceedance is due to the use of municipal water during the coring of the borehole. The analytical results for BTEX and VOCs tested in groundwater are shown on Drawing PE5971-5 – Analytical Testing Plan – Groundwater.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of the February and March 2023 sampling events were handled in accordance with the Analytical Protocol with respect to preservation method, storage requirement, and container type. As per Subsection 47(3) of O.Reg. 153/04, as amended, under the Environmental Protection Act, a Certificate of Analysis has been received for each sample submitted for analysis and all Certificates of Analysis are appended to this report.

Duplicate soil and groundwater samples from BH6-23-SS3, BH3-23-GW1 and BH4-23-GW1 were submitted for laboratory analysis of metals, VOCs, BTEX and/or PHCs (F1-F4). The duplicates were collected with the intent of calculating the relative percent difference (RPD) between duplicate sample values, as a way of assessing the quality of the analytical test results.

The RPD calculations for the original soil and duplicate sample are provided in Table 6.

Table 6 - QA/QC Calculations – Soil

Parameter	MDL (µg/g)	BH6-23-SS3	DUP (BH6-23-SS3)	RPD (%)	QA/QC Result
Arsenic	1.0	1.3	1.4	7.4	Meets Target
Barium	1.0	41.0	39.3	4.2	Meets Target
Chromium	5.0	9.8	10.9	10.6	Meets Target
Cobalt	1.0	18.0	23.2	25.2	Does Not Meet Target
Copper	5.0	22.2	27.3	20.6	Does Not Meet Target
Lead	1.0	1.5	1.5	0	Meets Target
Nickel	5.0	11.2	12.4	10.2	Meets Target
Vanadium	10.0	18.7	20.9	11.1	Meets Target

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

The remaining parameter concentrations were not detected in either or both the original sample and duplicate, therefore, the RPD values cannot be calculated.

Typically, RPD values below 20% are considered to be of satisfactory quality. The relative percent difference (RPD) results calculated for two soil parameters (cobalt and copper) fell outside of the acceptable range of 20%, and thus do not meet the data quality objectives outlined in the Sampling and Analysis Plan, appended to this report.

Despite the exceeded RPD values calculated for sample BH6-23-SS3 between the original and duplicate samples, it should be noted that the copper concentrations were well within the selected MECP Table 3 Standards in both samples by a large margin. The cobalt concentrations identified are consistent with naturally occurring levels present in post-glacial Champlain Sea clay deposits, which characterize much of the Ottawa region. These elevated levels are considered to be of geological origin and not the result of anthropogenic sources. As such the cobalt concentrations are not considered to be a contaminant of concern. As a result, it is our opinion that the decision-making usefulness of the samples is not considered to be impaired, and thus the quality of the field data collected during this remediation is considered to be sufficient to meet the overall objectives of this assessment.

Duplicate groundwater sample were obtained from the monitoring well installed in BH3-23 and BH6-23 and submitted for laboratory analysis of VOC and PHC parameters. All parameters measured in both the original and duplicate samples for BH3-23 were identified as being non-detect. Based on the non-detect concentrations in both the original and duplicate samples, the results are considered to be acceptable.

The RPD calculations for the original groundwater and duplicate sample are provided in Table 7.

Table 7 - QA/QC Calculations – Groundwater

Parameter	MDL (µg/L)	BH6-23-GW1	DUP (BH6-23-GW1)	RPD (%)	QA/QC Result
Chloroform	0.5	0.6	2.7	127	Does Not Meet Target

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

The remaining parameter concentrations were not detected in either or both the original sample and duplicate, therefore, the RPD values cannot be calculated.

Despite the exceeded RPD value calculated for sample BH6-23-GW1 between the original and duplicate samples, it is our opinion that this exceedance is due to the use of municipal water during the coring of the borehole. As a result, it is our opinion that the decision-making usefulness of the samples is not considered to be impaired, and thus the quality of the field data collected during this remediation is considered to be sufficient to meet the overall objectives of this assessment.

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

5.8 Phase II Conceptual Site Model

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

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

Based on the results of the Phase I ESA completed for the subject property, five on and off-site PCAs (existing and historical) were identified within the Phase I Study Area that are considered to result in APECs on the Phase II Property. The Areas of Potential Environmental Concern identified in this Phase I ESA area summarized in Table 8.

Table 8 – Areas of Potential Environmental Concern

Area of potential environmental concern	Location of area of potential environmental concern on phase one property	Potentially contaminating activity	Location of PCA (on-site or off-site)	Contaminants of potential concern	Media potentially Impacted (Ground water, soil and/or sediment)
Former Automotive Service Garage APEC 1	Southwest portion of Phase I Property	*"Item 52: Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems"*	On-Site	PHCs (F_1-F_4), BTEX	Soil, Groundwater
Fill Material of Unknown Quality APEC 2	West portion of Phase I Property	*"Item 30 - Importation of Fill Material of Unknown Quality"*	On-site	PHCs (F_1-F_4), BTEX, Metals, As, Sb, Se, Hg, CrVI, PAHs	Soil
Existing Aboveground Storage Tank APEC 3	East portion of Phase I Property	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"*	On-site	PHCs (F_1-F_4), BTEX	Soil, Groundwater

Table 8 – Areas of Potential Environmental Concern

Area of potential environmental concern	Location of area of potential environmental concern on phase one property	Potentially contaminating activity	Location of PCA (on-site or off-site)	Contaminants of potential concern	Media potentially Impacted (Ground water, soil and/or sediment)
Former Retail Fuel Outlet & Existing Automotive Service Garage APEC 4	North portion of 1088 Somerset Street West	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"* *"Item 52: Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems"*	Off-site	PHCs (F_1-F_4), BTEX	Soil, Groundwater
Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice APEC 5[1]	Within parking areas of the Phase I Property	*"Item N/A: Application of road salt for the safety of vehicular or pedestrian traffic under condition of snow or ice"*	On-site	Electrical Conductivity (EC) Sodium Adsorption Ratio (SAR)	Soil

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

An additional 55 PCAs identified within the Phase I Study Area as shown on Drawing PE5971-1 – Surrounding Land Use Plan. The remaining PCAs identified within the Phase I Study Area are not considered to represent an environmental concern on the Phase II Property due to their respective separation distances and/or cross/down gradient orientations with respect to the Phase II Property.

Contaminants of Potential Concern

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

- ❑ Petroleum Hydrocarbons Fractions 1 through 4 (PHCs F_1-F_4)
- ❑ Benzene, Toluene, Ethylbenzene, Xylene (BTEX)
- ❑ Metals (including arsenic (As), antimony (Sb) and selenium (Se))
- ❑ Mercury (Hg)

- ❑ Chromium VI (CrVI)
- ❑ Polycyclic Aromatic Hydrocarbons (PAHs)

Subsurface Structures and Utilities

The Phase II Property is situated in a municipally serviced area. Underground utility services on the Phase II Property include natural gas, electricity, cable, water and sewer services. An underground parking structure is present beneath the west portion of the 50 Bayswater Avenue property.

Physical Setting

Site Stratigraphy

The stratigraphy for the 1088 Somerset Street West portion of the Phase II Property generally consists of:

- ❒ Asphaltic concrete; encountered at depths ranging from approximately 0 to 0.08 m below ground surface.
- ❒ Fill material of brown silty sand with gravel and crushed stone and/or trace amounts of topsoil; encountered at depths ranging from approximately 0.05 to 2.21 m below ground surface.
- ❒ Brown to grey silty sand with some gravel; encountered at depths ranging from approximately 0.69-6.73 m below ground surface.
- ❒ Inferred bedrock; encountered at depths ranging from approximately 5.28-6.73 m below ground surface.

The stratigraphy for the 50 Bayswater Avenue portion of the Phase II Property generally consists of:

- ❒ Asphaltic concrete; encountered at depths ranging from approximately 0 to 0.23 m below ground surface.
- ❒ Engineered fill material consisting of crushed stone and gravel; encountered at depths ranging from approximately 0.13 to 0.41 m below ground surface.
- ❒ Glacial till consisting of brown to grey silty sand to sandy silt with gravel, cobbles and boulders; encountered at depths ranging from approximately 0.30-3.53 m below ground surface.

- Limestone bedrock; encountered at depths ranging from approximately 3.22-4.11 m below ground surface.

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

Hydrogeological Characteristics

Groundwater was encountered within the overburden at depths ranging from 4.28 to 5.14 mbgs. Based on the groundwater monitoring event, groundwater flow was measured in an easterly direction with a hydraulic gradient of 0.012 m/m, although these levels likely had not stabilized. It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations. Groundwater contours are shown on Drawing PE5971-1 – Test Hole Location Plan.

Approximate Depth to Bedrock

Bedrock was inferred by way of auger refusal at depths ranging from 5.28 to 6.73 mbgs on the 1088 Somerset Street West portion of the Phase II Property. Limestone Bedrock was encountered in BH4-23 and BH6-23 at depths ranging from 3.22 to 4.11 mbgs on the 50 Bayswater Avenue portion of the Phase II Property.

Approximate Depth to Water Table

The suspected depth to the water table at the Phase II Property varies between approximately 4.28 to 5.14 m below existing grade.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation does not apply to the Phase II Property, in that the subject property is not within 30m of an environmentally sensitive area, the pH of surface soil is between 5 and 9 and the pH of subsurface soil is between 5 and 11.

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

Fill Placement

Fill material, consisting of brown silty sand with gravel and crushed stone and/or trace amounts of topsoil was identified in BH1-23, BH2-23 and BH3-23. No deleterious material was identified in the fill material. The fill material of unknown quality identified on the Phase II Property is concerned to represent an APEC.

Existing Buildings and Structures

The portion of the Phase II Property addressed 50 Bayswater Avenue is occupied by a one-storey office building. The portion of the Phase II Property addressed 50 Bayswater Avenue is occupied by a one-storey office building. The building is constructed above one underground parking level and is finished on the exterior with brick, parging and a flat, tar and gravel roof. The building, constructed circa 1968, is currently heated via in-unit electric baseboard heaters.

The portion of the Phase II Property addressed 1088 Somerset Street West is currently occupied by a three-storey (with one basement level) mixed used commercial art gallery and residential dwelling. The building is constructed with a stone foundation and is finished on the exterior with brick and vinyl siding in addition to a sloped and shingled roof. The building, constructed sometime prior to 1888, is currently heated via natural gas furnace located in the basement.

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

Proposed Buildings and Other Structures

The proposed site redevelopment for the Phase II Property will consist of an 11-storey residential high rise building with multiple levels of underground parking. Associated access lanes, walkways and hardscaped areas are also anticipated as part of the development. It is expected that the proposed buildings will be municipally serviced.

Areas of Natural Scientific Interest and Water Bodies

No areas of natural significance or water bodies were identified on the Phase II Property or within the Phase I Study Area.

Environmental Condition

Areas Where Contaminants are Present

Based on the findings of this Phase II ESA, no contaminant concentrations exceeding MECP Table 3 Residential Standards were identified within the soil on the Phase II Property, with the exception of cobalt in the native silty clay soils in BH4-23 and BH6-23. These parameters are considered to be naturally occurring and are not considered to be contamination of concern on the Phase II Property.

Based on the findings of this Phase II ESA, no contaminant concentrations exceeding MECP Table 3 Residential Standards were identified within the groundwater on the Phase II Property, with the exception of chloroform in BH6-23. However, it is our opinion that this exceedance is due to the use of municipal water during the coring of the borehole, as a result VOCs are not considered to be contamination of concern on the Phase II Property.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the properties addressed 50 Bayswater Avenue and 1088 Somerset Street West, 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 Phase II ESA subsurface investigation consisted of drilling 6 boreholes across the Phase II Property, all of which were constructed with groundwater monitoring wells. The general soil profile encountered for the 1088 Somerset Street West portion of the Phase II Property during the field program consisted of a layer of asphaltic concrete, followed fill material and silty sand. Bedrock was inferred by way of auger refusal at depths ranging from 5.28 to 6.73 mbgs on the 1088 Somerset Street West portion of the Phase II Property. The general soil profile encountered for the 50 Bayswater Avenue portion of the Phase II Property during the field program consisted of a layer of asphaltic concrete, followed engineered fill material and glacial till. Limestone Bedrock was encountered in BH4-23 and BH6-23 at depths ranging from 3.22 to 4.11 mbgs on the 50 Bayswater Avenue portion of the Phase II Property.

A total of 13 soil samples (including one duplicate) were submitted for analysis of metals (including As, Sb, Se, Hg and/or CrVI), benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbons (PHCs F1-F4), polycyclic aromatic hydrocarbons (PAHs), pH, conductivity (EC) and/or sodium absorption ratio (SAR). Cobalt concentrations in samples BH4-22-SS3 and DUP (BH6-23-SS3) exceed the selected MECP Table 3 Standard. The cobalt concentrations identified are consistent with naturally occurring levels present in post-glacial Champlain Sea clay deposits, which characterize much of the Ottawa region. These elevated levels are considered to be of geological origin and not the result of anthropogenic sources. As such the cobalt concentrations are not considered to be a contaminant of concern. EC and/or SAR concentrations in soil samples BH1-23-SS2, BH2-23-SS2 and BH3-23-SS4 exceed the selected MECP Table 3 Standards. However, EC and SAR standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined, based on a phase two environmental site assessment, that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both. All

remaining parameter concentrations analyzed in the soil samples comply with MECP Table 3 Standards.

A total of eight groundwater samples (including two duplicates) from monitoring wells installed in BH1-23 through BH6-23 were submitted for laboratory analysis of metals (including As, Sb and Se), PHCs (F1-F4) and/or Volatile organic compounds (VOCs). All detected VOC parameter concentrations in the groundwater samples analysed comply with the selected MECP Table 3 Standards, with the exception of chloroform in groundwater sample DUP (BH4-23-GW1). It is our opinion that this exceedance is due to the use of municipal water during the coring of the borehole. All remaining parameter concentrations analyzed in the groundwater samples comply with MECP Table 3 Standards.

Recommendations

Groundwater

It is recommended that the monitoring wells installed on the Phase II Property be maintained for future monitoring. Prior to site redevelopment, the monitoring wells must be decommissioned in accordance with O.Reg 903.

7.0 STATEMENT OF LIMITATIONS

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

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

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

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

Paterson Group Inc.

Jeremy Camposarcone, B. Eng.

Michael Beaudoin, P.Eng., Q.P.$_{ESA}$

Report Distribution:

- ❒ Manor Park Management
- ❒ Paterson Group

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE5971-1 – SITE PLAN

DRAWING PE5971-2 – SURROUNDING LAND USE PLAN

DRAWING PE5971-3 – TEST HOLE LOCATION PLAN

DRAWING PE5971-4 – ANALYTICAL TESTING PLAN – SOIL

DRAWING PE5971-5 – ANALYTICAL TESTING PLAN – GROUNDWATER

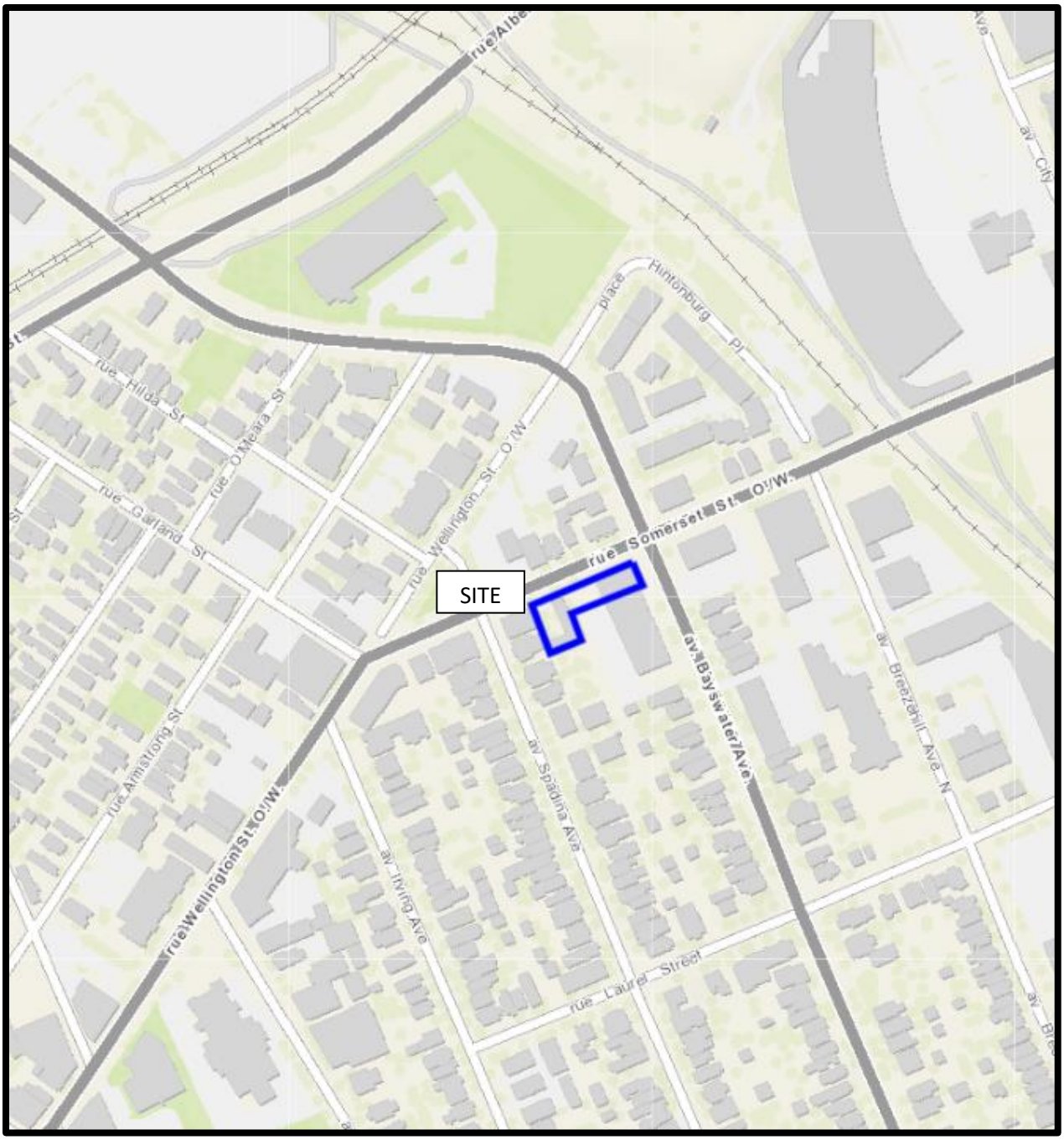
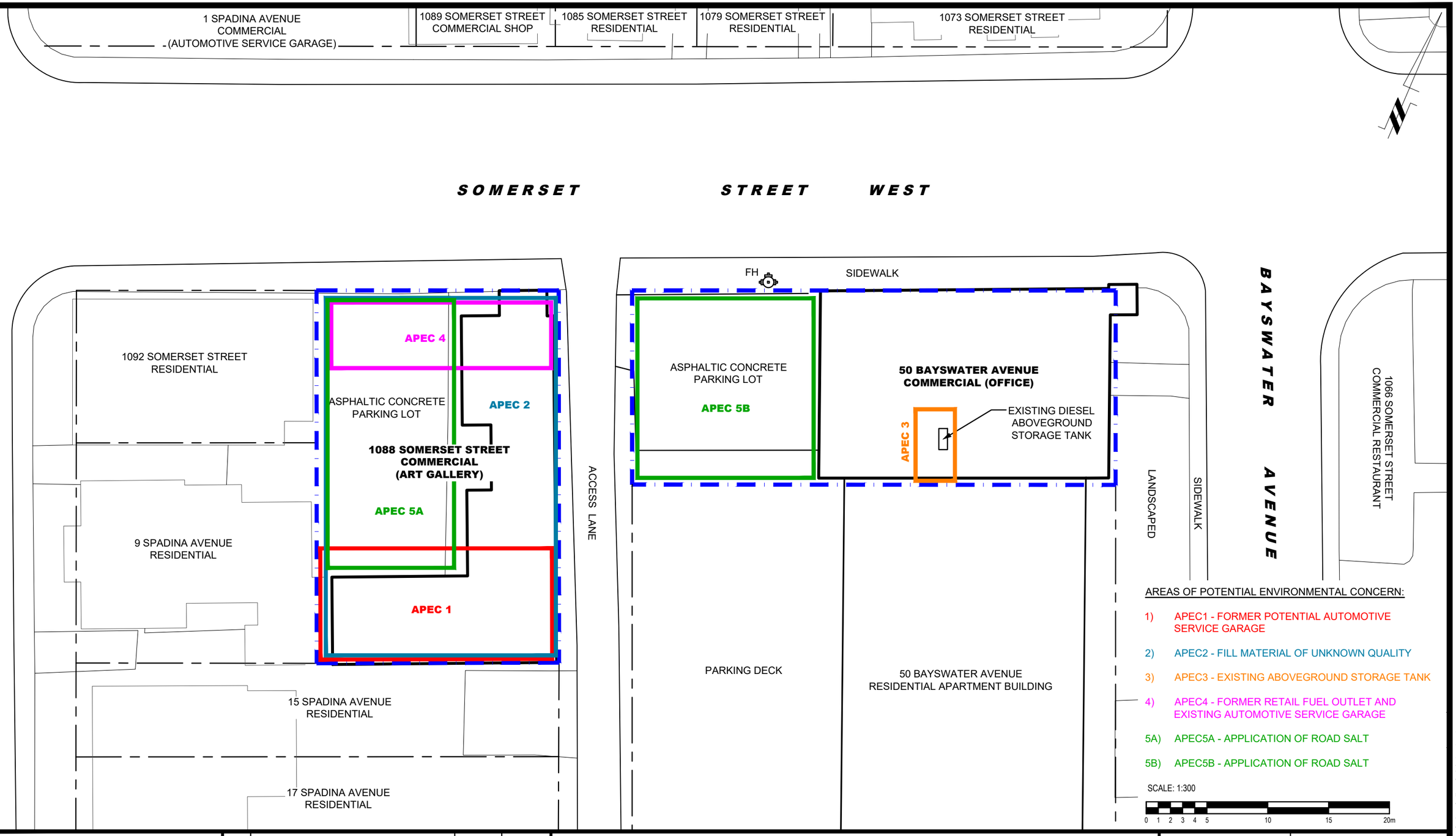


FIGURE 1

KEY PLAN



AREAS OF POTENTIAL ENVIRONMENTAL CONCERN:

1) APEC1 - FORMER POTENTIAL AUTOMOTIVE SERVICE GARAGE
2) APEC2 - FILL MATERIAL OF UNKNOWN QUALITY
3) APEC3 - EXISTING ABOVEGROUND STORAGE TANK
4) APEC4 - FORMER RETAIL FUEL OUTLET AND EXISTING AUTOMOTIVE SERVICE GARAGE

5A) APEC5A - APPLICATION OF ROAD SALT

5B) APEC5B - APPLICATION OF ROAD SALT

SCALE: 1:300

0 1 2 3 4 5 10 15 20m

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

NO.	REVISIONS	DATE	INITIAL

MANOR PARK MANAGEMENT

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
50 BAYSWATER AVENUE & 1088 SOMERSET STREET

OTTAWA, ONTARIO

Title: **SITE PLAN**

Scale: 1:300	Date: 02/2023
Drawn by: YA	Report No.: PE5971-1
Checked by: JC	Dwg. No.: PE5971-1
Approved by: MB	Revision No.:

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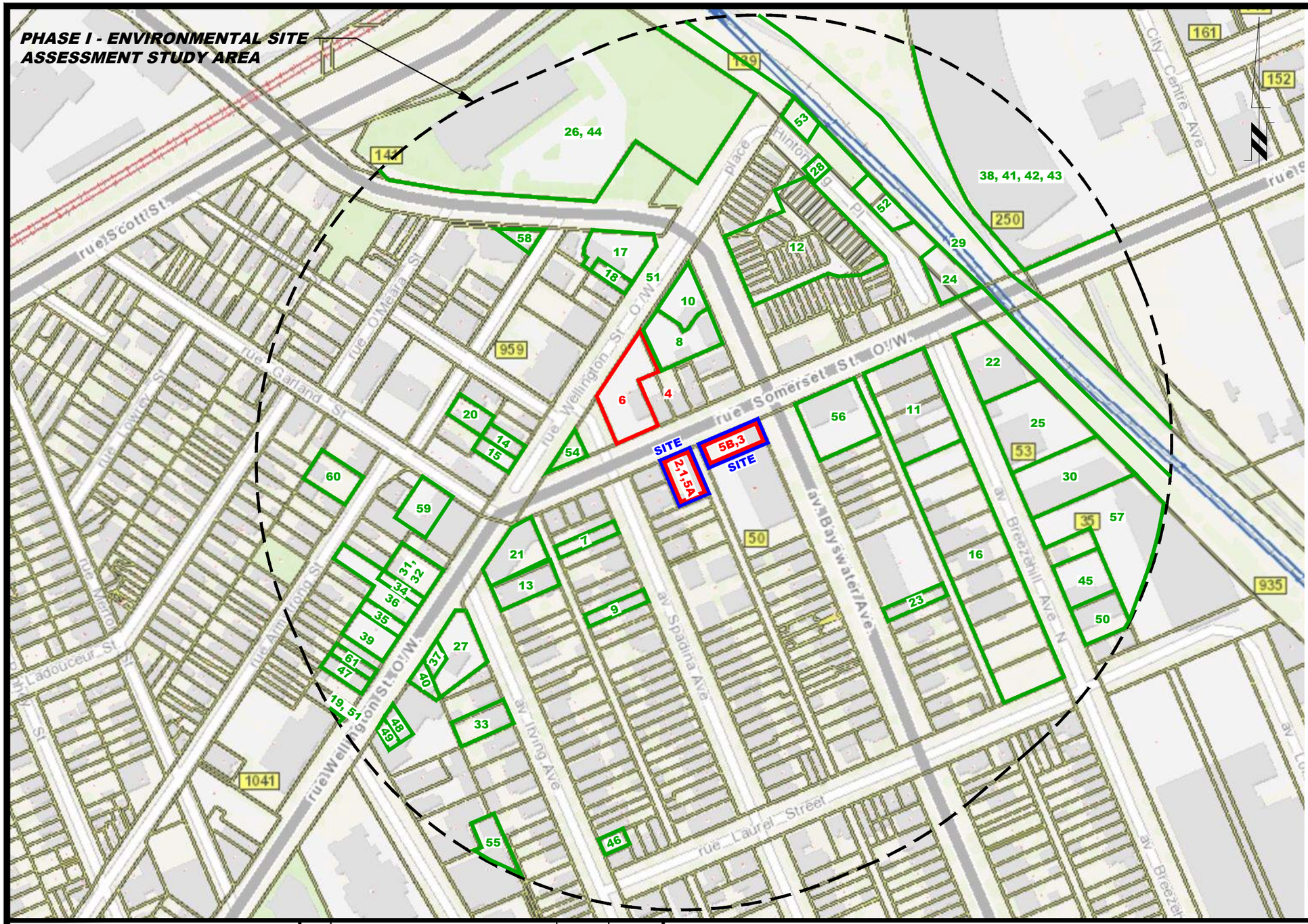

POTENTIALLY CONTAMINATING ACTIVITIES :

ID #	PCA ID	ADDRESS	DESCRIPTION
1)	52	318 UNNAMED ST.	FORMER AUTOMOTIVE SERVICE GARAGE
2)	30	1088 SOMERSET ST. WEST	FILL MATERIAL OF UNKNOWN QUALITY
3)	28	50 BAYSWATER AVE.	EXISTING ABOVEGROUND STORAGE TANK
4)	28/52	179 SPADINA AVE. 1 SPADINA AVE.	FORMER RETAIL FUEL OUTLET (THREE UNDERGROUND STORAGE TANKS) & EXISTING AUTOMOTIVE SERVICE GARAGE
5A)		ON SITE	APPLICATION OF ROAD SALT
5B)		ON SITE	APPLICATION OF ROAD SALT
6)	37	14 SPADINA AVE.	FORMER DRY CLEANERS
7)	28	10-14 BAYSWATER AVE.	FORMER / EXISTING DIESEL UNDERGROUND STORAGE TANK
8)	28	26 SPADINA AVE.	FURNACE OIL SPILL
9)	52/28	930 WELLINGTON ST. WEST	EXISTING AUTOMOTIVE SERVICE GARAGE & FORMER RETAIL FUEL OUTLET
10)	52	1050 SOMERSET ST. WEST	FORMER AUTOMOTIVE SERVICE GARAGE
11)	59	13-23 BAYSWATER AVE., 14-38 HINTONBURG AVE.	FORMER PLANTING MILL
12)	28/52/N/A	1112 SOMERSET ST.WEST	FORMER CONTRACTOR, FORMER AUTOMOTIVE SERVICE GARAGE, FORMER PRINTERS
13)	52	969 WELLINGTON ST. WEST	FORMER AUTOMOTIVE SERVICE GARAGE
14)	52	973 WELLINGTON ST. WEST	EXISTING AUTOMOTIVE SERVICE GARAGE
15)	N/A	100 BREEZEHILL AVE.	VARIOUS ASSOCIATED WASTE GENERATOR RECORDS
16)	28	160 BAYVIEW RD.	FORMER RETAIL FUEL OUTLET & FORMER AUTOMOTIVE SERVICE GARAGE
17)	N/A	935 WELLINGTON ST. WEST	FORMER PRINTERS
18)	28	1035 SOMERSET ST.	DIESEL SPILL
19)	52	34 ARMSTRONG ST.	FORMER AUTOMOTIVE SERVICE GARAGE
20)	37	992 WELLINGTON ST. WEST	FORMER DRY CLEANERS
21)	N/A/52	1040 SOMERSET ST. WEST	FORMER COAL SHED / FORMER AUTOMOTIVE SERVICE GARAGE
22)	28	69 BAYSWATER AVE.	HISTORIC FURNACE OIL SPILL
23)	52	47 HINTONBURG PLACE	EXISTING AUTOMOTIVE SERVICE GARAGE
24)	52	55 BREEZEHILL AVE.	EXISTING AUTOMOTIVE SERVICE GARAGE
25)	46	141 BAYVIEW STATION RD.	FORMER RAILWAY ROUND HOUSE
26)	28/52	1000 WELLINGTON ST. WEST	FORMER RETAIL FUEL OUTLET & FORMER AUTOMOTIVE SERVICE GARAGE
27)	N/A	CHAMPAGNE CORRIDOR	KNOWN PHCs & METALS CONTAMINATION
28)	46	N/A	EXISTING O-TRAIN LINE & FORMER CANADA ATLANTIC RAILWAY LINES
29)	N/A	73 BREEZEHILL AVE. NORTH	FORMER COAL SHED
30)	52	995 WELLINGTON ST. WEST	FORMER AUTOMOTIVE SERVICE GARAGE
31)	37	991 WELLINGTON ST. WEST	FORMER DRY CLEANERS
32)	N/A	22 IRVING AVE.	EXISTING MACHINE SHOP
33)	N/A	997 WELLINGTON ST. WEST	FORMER LAUNDRY
34)	37	1003 WELLINGTON ST. WEST	FORMER DRY CLEANERS
35)	52	999 WELLINGTON ST. WEST	FORMER AUTOMOTIVE SERVICE GARAGE
36)	37	1006 WELLINGTON	FORMER DRY CLEANERS
37)	46	250 CITY CENTRE AVE.	FORMER SPARKS ESTATE RAIL YARD
38)	52	1005 WELLINGTON ST. WEST	FORMER AUTOMOTIVE SERVICE GARAGE
39)	N/A	1004 WELLINGTON ST. WEST	FORMER LAUNDRY
40)	59	PART OF 250 CITY CENTRE AVE.	FORMER LUMBER YARD
41)	N/A	PART OF 250 CITY CENTRE AVE.	FORMER COMMERCIAL PRINTERS
42)	37	250 CITY CENTRE AVE.	FORMER DRY CLEANERS
43)	52	132 BAYVIEW RD. (PART OF 141 BAYVIEW STATION RD.)	FORMER RAILWAY MACHINE SHOP
44)	N/A	109 BREEZEHILL AVE.	FORMER MACHINE SHOP
45)	28	61 IRVING ST.	HISTORIC FURNACE OIL SPILL
46)	N/A	1017 WELLINGTON ST. WEST	FORMER LAUNDRY
47)	N/A	1020 WELLINGTON ST. WEST	FORMER LAUNDRY
48)	N/A	1022 WELLINGTON ST. WEST	FORMER LAUNDRY
49)	52	111 BREEZEHILL AVE. NORTH	EXISTING AUTOMOTIVE SERVICE GARAGE
50)	37	1025 WELLINGTON ST. WEST	FORMER DRY CLEANERS
51)	28	PART OF 1 HINTONBURG PLACE	FORMER OIL STORAGE WAREHOUSE
52)	52	3 HINTONBURG PLACE PART OF 1 HINTONBURG PLACE	FORMER AUTOMOTIVE SERVICE GARAGE
53)	28	2 SPADINA AVENUE	FORMER RETAIL FUEL OUTLET
54)	28	19 FAIRMONT AVENUE	FORMER FUEL OIL STORAGE TANK
55)	28	1066 WELLINGTON ST. WEST	FORMER GASOLINE STORAGE TANK
56)	28	35 LAUREL STREET	FORMER GASOLINE STORAGE TANK
57)	28	3 ARMSTRONG STREET	FORMER GASOLINE STORAGE TANK
58)	52	987 WELLINGTON ST. WEST	FORMER AUTOMOTIVE SERVICE GARAGE
59)	52	53 ARMSTRONG STREET	FORMER AUTOMOTIVE SERVICE GARAGE
60)	37	1015 WELLINGTON ST. WEST	FORMER DRY CLEANERS

SCALE: 1:2500

0 25 50 75 100 125 150 175m

PATERSON GROUP
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NO.	REVISIONS	DATE	INITIAL

MANOR PARK MANAGEMENT

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
50 BAYSWATER AVENUE & 1088 SOMERSET STREET

OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

Scale: 1:2500	Date: 02/2023
Drawn by: YA	Report No.: PE5971-1
Checked by: JC	Dwg. No.: PE5971-2
Approved by: MB	Revision No.:

11x17

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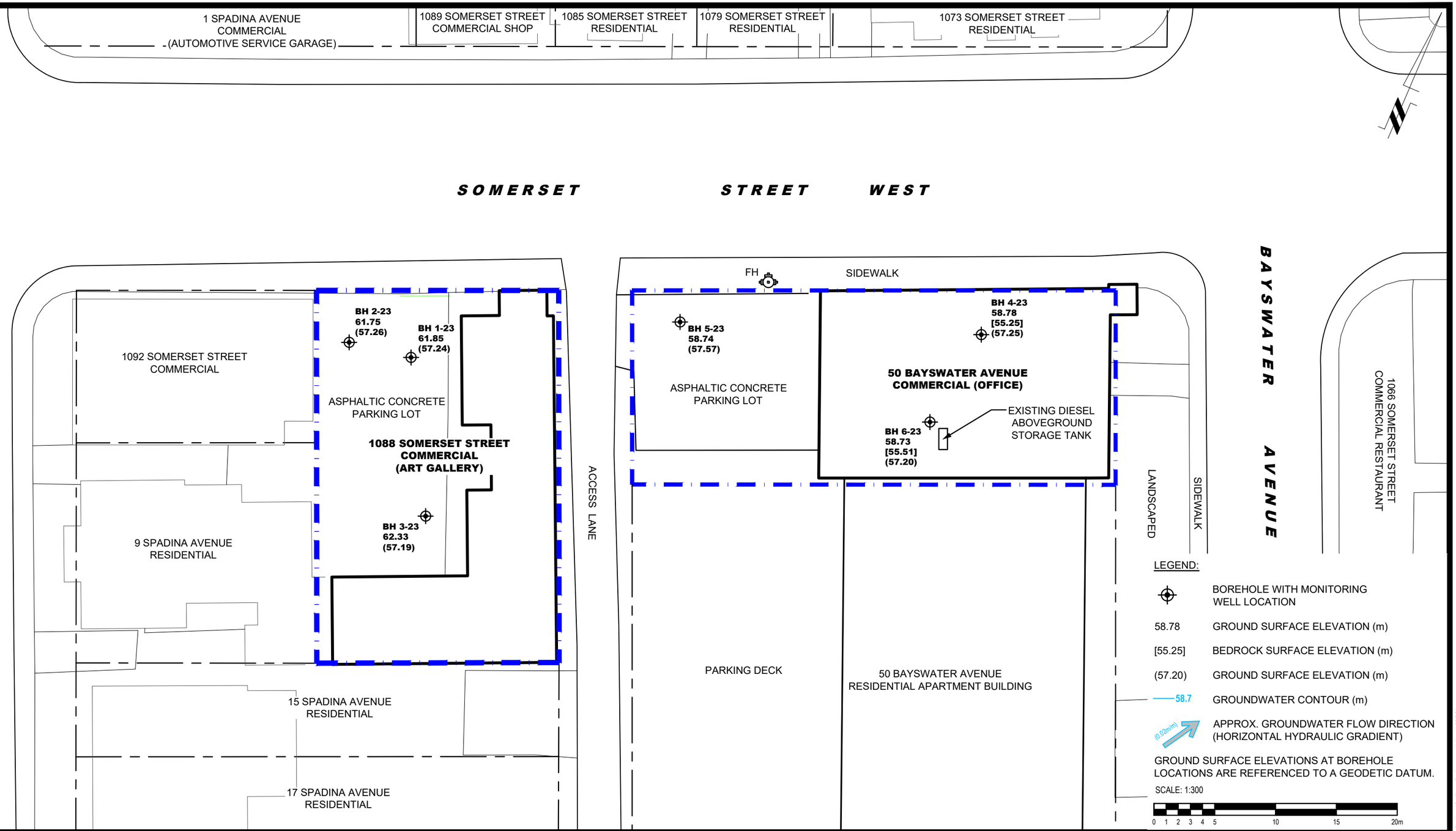

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NO.	REVISIONS	DATE	INITIAL

MANOR PARK MANAGEMENT

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
50 BAYSWATER AVENUE & 1088 SOMERSET STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:300	**Date:** 04/2023
Drawn by: YA	**Report No.:** PE5971-2
Checked by: JC	**Dwg. No.:** PE5971-3
Approved by: MB	**Revision No.:**

11x17

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1 SPADINA AVENUE
COMMERCIAL
(AUTOMOTIVE SERVICE GARAGE)

1089 SOMERSET STREET
COMMERCIAL SHOP

1085 SOMERSET STREET
RESIDENTIAL

1079 SOMERSET STREET
RESIDENTIAL

1073 SOMERSET STREET
RESIDENTIAL

BH2-23-SS2 0.76-1.37m 13-Feb-23
Metals including As, Sb, Se, Hg and CrVI comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards
PAHs comply with the MECP Table 3 Standards

BH2-23-SS4 2.29-2.90m 13-Feb-23
Metals including As, Sb, Se, Hg and CrVI comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards
PAHs comply with the MECP Table 3 Standards

BH5-23-SS1 0.36-0.97m 16-Mar-23
Metals including As, Sb and Se comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

BH5-23-SS4 2.29-2.90m 16-Mar-23
Metals including As, Sb and Se comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

BH4-23-SS3 1.47-1.68m 15-Mar-23

Parameter	Result(µg/g)	Standard(µg/g)
Cobalt	58.0	22

Remaining Metals comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

BH4-23-SS5 2.57-3.18m 15-Mar-23
Metals including As, Sb and Se comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

SOMERSET STREET WEST

BAYSWATER AVENUE

SPADINA AVENUE

BH 2-23
61.75
(57.26)

BH 1-23
61.85
(57.24)

1092 SOMERSET STREET
COMMERCIAL

ASPHALTIC CONCRETE
PARKING LOT

1088 SOMERSET STREET
COMMERCIAL
(ART GALLERY)

BH 3-23
62.33
(57.19)

BH1-23-SS2 0.76-1.37m 13-Feb-23
Metals including As, Sb, Se, Hg and CrVI comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards
PAHs comply with the MECP Table 3 Standards

BH1-23-SS7 4.57-5.18m 1 3-Feb-23
Metals including As, Sb, Se, Hg and CrVI comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

9 SPADINA AVENUE
RESIDENTIAL

BH3-23-SS4 2.29-2.90m 13-Feb-23
Metals including As, Sb, Se, Hg and CrVI comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards
PAHs comply with the MECP Table 3 Standards

BH3-23-SS6 3.81-4.42m 13-Feb-23
Metals including As, Sb, Se, Hg and CrVI comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

15 SPADINA AVENUE
RESIDENTIAL

17 SPADINA AVENUE
RESIDENTIAL

ACCESS LANE

FH

SIDEWALK

BH 5-23
58.74
(57.57)

ASPHALTIC CONCRETE
PARKING LOT

BH 4-23
58.78
[55.25]
(57.25)

50 BAYSWATER AVENUE
COMMERCIAL (OFFICE)

BH 6-23
58.73
[55.51]
(57.20)

EXISTING DIESEL
ABOVEGROUND
STORAGE TANK

LANDSCAPED

SIDEWALK

1066 SOMERSET STREET
COMMERCIAL RESTAURANT

BH6-23-SS1 0.30-0.91m 16-Mar-23
Metals including As, Sb and Se comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

BH6-23-SS3 1.42-2.03m 16-Mar-23
Metals including As, Sb and Se comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

DUP(BH6-23-SS3) 1.42-2.03m 16-Mar-23

Parameter	Result(µg/g)	Standard(µg/g)
Cobalt	23.2	22

Remaining Metals comply with the MECP Table 3 Standards
BTEX comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

50 BAYSWATER AVENUE
RESIDENTIAL APARTMENT BUILDING

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

⊕ BOREHOLE WITH MONITORING WELL LOCATION

58.78 GROUND SURFACE ELEVATION (m)

[55.25] BEDROCK SURFACE ELEVATION (m)

(57.20) GROUND SURFACE ELEVATIONS (m)

A—A' CROSS SECTION

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

SCALE: 1:300

0 1 2 3 4 5 10 15 20m

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NO.	REVISIONS	DATE	INITIAL

MANOR PARK MANAGEMENT

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
50 BAYSWATER AVENUE & 1088 SOMERSET STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:300	Date: 04/2023
Drawn by: YA	Report No.: PE5971-2
Checked by: JC	Dwg. No.: PE5971-4
Approved by: MB	Revision No.:

11x17

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1 SPADINA AVENUE
COMMERCIAL
(AUTOMOTIVE SERVICE GARAGE)

1089 SOMERSET STREET
COMMERCIAL SHOP

1085 SOMERSET STREET
RESIDENTIAL

1079 SOMERSET STREET
RESIDENTIAL

1073 SOMERSET STREET
RESIDENTIAL

BH4-23-GW1 2.13-3.65m 24-Mar-23
Metals including As, Sb and Se comply with the MECP Table 3 Standards
VOCs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

DUP(BH4-23-GW1) 2.13-3.65m 24-Mar-23

Parameter	Result(µg/g)	Standard(µg/g)
Chloroform	2.7	2.4

Remaining VOC parameters comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

BH5-23-GW1 1.91-3.42m 24-Mar-23
VOCs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

BH1C-23-GW1 2.24-5.28m 22-Feb-23
VOCs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

BH2-23-GW1 3.23-6.27m 22-Feb-23
VOCs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

SOMERSET STREET WEST

BAYSWATER AVENUE

SPADINA AVENUE

1092 SOMERSET STREET
COMMERCIAL

BH 2-23
61.75
(57.26)

BH 1-23
61.85
(57.24)

ASPHALTIC CONCRETE
PARKING LOT

1088 SOMERSET STREET
COMMERCIAL
(ART GALLERY)

BH 3-23
62.33
(57.19)

9 SPADINA AVENUE
RESIDENTIAL

BH3-23-GW1 3.68-6.73m 22-Feb-23
VOCs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

DUP(BH3-23-GW1) 3.68-6.73m 22-Feb-23
VOCs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

15 SPADINA AVENUE
RESIDENTIAL

17 SPADINA AVENUE
RESIDENTIAL

ACCESS LANE

FH

SIDEWALK

BH 5-23
58.74
(57.57)

ASPHALTIC CONCRETE
PARKING LOT

BH 4-23
58.78
[55.25]
(57.25)

50 BAYSWATER AVENUE
COMMERCIAL (OFFICE)

BH 6-23
58.73
[55.51]
(57.20)

EXISTING DIESEL
ABOVEGROUND
STORAGE TANK

LANDSCAPED

SIDEWALK

BH6-23-GW1 1.83-3.35m 24-Mar-23
VOCs comply with the MECP Table 3 Standards
PHCs comply with the MECP Table 3 Standards

PARKING DECK

50 BAYSWATER AVENUE
RESIDENTIAL APARTMENT BUILDING

1066 SOMERSET STREET
COMMERCIAL RESTAURANT

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

GROUNDWATER RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

⊕ BOREHOLE WITH MONITORING WELL LOCATION

58.78 GROUND SURFACE ELEVATION (m)

[55.25] BEDROCK SURFACE ELEVATION (m)

(57.20) GROUND SURFACE ELEVATION (m)

A—A' CROSS SECTION

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

SCALE: 1:300

0 1 2 3 4 5 10 15 20m

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NO.	REVISIONS	DATE	INITIAL

MANOR PARK MANAGEMENT

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
50 BAYSWATER AVENUE & 1088 SOMERSET STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - GRONDWATER

Scale: 1:300	Date: 04/2023
Drawn by: YA	Report No.: PE5971-2
Checked by: JC	Dwg. No.: PE5971-5
Approved by: MB	Revision No.:

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

PATERSON GROUP

Sampling and Analysis Plan

50 Bayswater Avenue and 1088 Somerset Street West
Ottawa, Ontario

Prepared for Manor Park Management

Report: PE5971-SAP
Date: February 9, 2023

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Manor Park Management, to conduct a Phase II – Environmental Site Assessment (Phase II ESA) at 50 Bayswater Avenue mad 1088 Somerset Street West, in the City of Ottawa, Ontario.

Based on the findings of the Phase I ESA, the following subsurface investigation program was developed. The Phase II ESA was carried out in conjunction with a geotechnical investigation.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-23	Placed on the north portion of the 1088 Somerset Street West portion of the Phase II Property to assess for potential soil and groundwater impacts resulting from the presence of fill material of unknown quality, former off-site retail fuel outlet, existing off-site automotive service garage and on-site application of road salt.	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH2-23	Placed on the north portion of the 1088 Somerset Street West portion of the Phase II Property to assess for potential soil and groundwater impacts resulting from the presence of fill material of unknown quality, former off-site retail fuel outlet, existing off-site automotive service garage and on-site application of road salt.	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH3-23	Placed on the central portion of the 1088 Somerset Street West portion of the Phase II Property to assess for potential soil and groundwater impacts resulting from the presence of fill material of unknown quality, former potential automotive service garage and on-site application of road salt.	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH4-23	Placed on the northeast portion of the 50 Bayswater Avenue portion of the Phase II Property to assess for potential off-site disposal.	3-5 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH5-23	Placed on the northwest portion of the 50 Bayswater Avenue portion of the Phase II Property to assess for potential off-site disposal.	3-5 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH6-23	Placed on the south-central portion of the 50 Bayswater Avenue portion of the Phase II Property to assess for potential soil and groundwater impacts resulting from the presence of existing aboveground diesel storage tank.	3-5 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.

Borehole locations are shown on Drawing PE5971-1 – Test Hole Location Plan, appended to the main report.

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

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

2.0 ANALYTICAL TESTING PROGRAM

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

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

The analytical testing program for soil at the 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 geodetic benchmark, if one is available, or a temporary site benchmark which can be tied in at a later date if necessary.

Drilling Procedure

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

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

Spoon Washing Procedure

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

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

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

Screening Procedure

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

Vapour results obtained from the RKI Eagle and the PID are relative and must be interpreted.

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

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

3.2 Monitoring Well Installation Procedure

Equipment

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

Procedure

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

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

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

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

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

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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
50 Bayswater Drive and 1088 Somerset Street W.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** February 10, 2023

FILE NO. PE5971

HOLE NO. BH 1-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.05		AU	1			0	61.85
FILL: Brown silty sand with gravel and crushed stone		SS	2	75	50+	1	60.85
		SS	3	67	50+	2	59.85
2.21							
GLACIAL T ILL: Dense to very dense, brown silty sand, some gravel		SS	4	75	44	3	58.85
		SS	5	67	42		
		SS	6	67	50+	4	57.85
		SS	7	67	50+	5	56.85
5.28							
End of Borehole Practical refusal to augering at 5.28m depth. (GWL @ 4.61m - Feb. 22, 2013)							

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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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
50 Bayswater Drive and 1088 Somerset Street W.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** February 13, 2023

FILE NO. PE5971

HOLE NO. BH 2-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.05		AU	1			0	61.75
FILL: Brown silty sand with gravel and crushed stone		SS	2	58	49	1	60.75
		SS	3	25	41	2	59.75
2.21							
		SS	4	75	50+	3	58.75
		SS	5	92	50+		
GLACIAL T ILL: Dense to very dense, brown silty sand, some gravel		SS	6	92	50+	4	57.75
		SS	7	67	50+	5	56.75
		SS	8	58	26		
6.27		SS	9	40	50+	6	55.75
End of Borehole							
Practical refusal to augering at 6.27m depth.							
(GWL @ 4.49m - Feb. 22, 2013)							

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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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
50 Bayswater Drive and 1088 Somerset Street W.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** February 13, 2023

FILE NO. PE5971

HOLE NO. BH 3-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	62.33
Asphaltic concrete 0.08							
FILL: Brown silty sand with topsoil, trace gravel		AU	1				
0.69							
		SS	2	55	50+	1	61.33
		SS	3	60	50+	2	60.33
		SS	4	75	50+		
GLACIAL T ILL: Dense to very dense, brown silty sand with gravel		SS	5	80	50+	3	59.33
- grey by 4.0m depth		SS	6	75	41	4	58.33
		SS	7	50	37	5	57.33
		SS	8	33	27		
		SS	9	93	50+	6	56.33
6.73							
End of Borehole							
Practical refusal to augering at 6.73m depth.							
(GWL @ 5.14m - Feb. 22, 2013)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
50 Bayswater Drive and 1088 Somerset Street W.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** March 15, 2023

FILE NO. PE5971

HOLE NO. BH 4-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	58.78
Concrete 0.23							
FILL: Crushed stone and gravel 0.41		SS	1	100			
		SS	2	33		1	57.78
GLACIAL TILL: Brown silty sand to sandy silt with gravel, cobbles and boulders, trace clay		SS	3	100			
		SS	4	0		2	56.78
		SS	5	58			
3.53		SS	6	58		3	55.78
BEDROCK: Poor quality, grey limestone		RC	1	100	35		
4.11						4	54.78
End of Borehole							
(GWL @ 1.53m - March 24, 2023)							

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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9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
50 Bayswater Drive and 1088 Somerset Street W.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** March 16, 2023

FILE NO. PE5971

HOLE NO. BH 5-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Concrete 0.18							
FILL: Gravel and crushed stone 0.36							
		SS	1	42		0	58.74
		SS	2	0		1	57.74
GLACIAL TILL: Brown silty sand to sand silt with gravel and cobbles		SS	3	25		2	56.74
- grey by 1.8m depth		SS	4	33			
		SS	5	33		3	55.74
3.43							
End of Borehole							
(GWL @ 1.17m - March 24, 2023)							

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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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
50 Bayswater Drive and 1088 Somerset Street W.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** March 16, 2023

FILE NO. PE5971

HOLE NO. BH 6-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Concrete 0.13							
FILL: Gravel and crushed stone 0.30		SS	1	50		0	58.73
		SS	2	50		1	57.73
GLACIAL TILL: Grey silty sand to sandy silt with gravel, cobbles and boulders		SS	3	42		2	56.73
- grey by 2.4m depth		SS	4	8			
3.22		SS	5	9		3	55.73
BEDROCK: Fair quality, grey limestone		RC	1	100	68		
3.71							
End of Borehole							
(GWL @ 1.53m - March 24, 2023)							

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

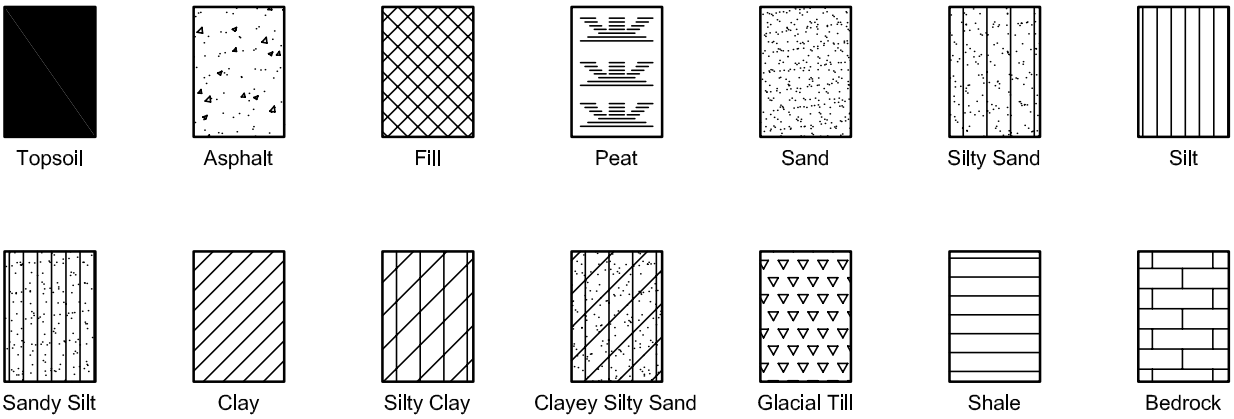
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void 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.

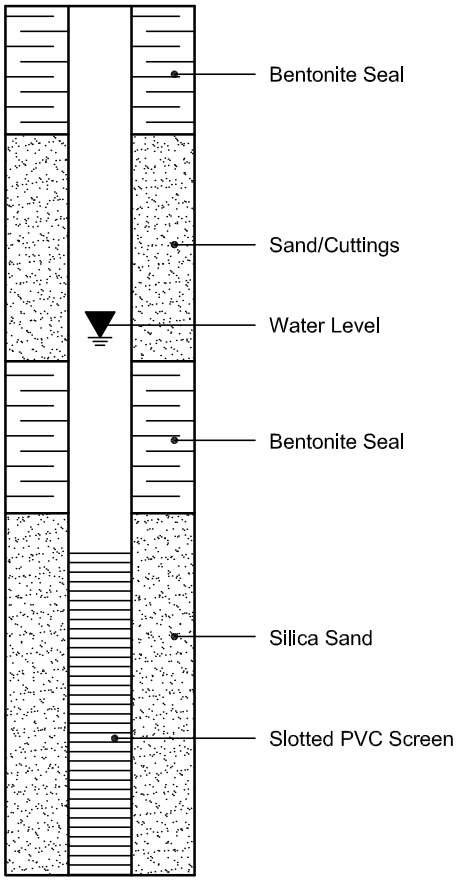
SYMBOLS AND TERMS (continued)

STRATA PLOT

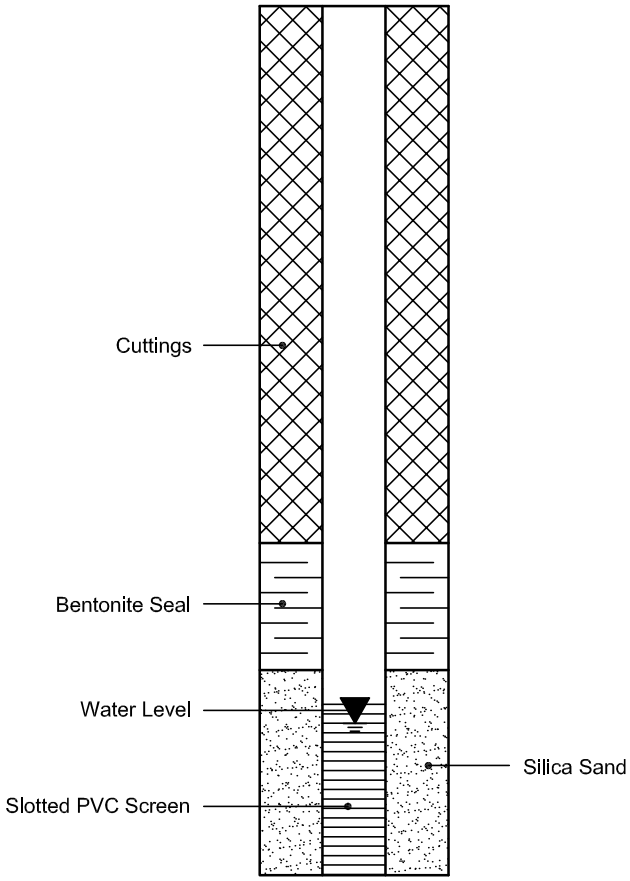


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mike Beaudoin

Client PO: 56818
Project: PE5971
Custody:

Report Date: 27-Feb-2023
Order Date: 14-Feb-2023

Revised Report

Order #: 2307150

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

Paracel ID	Client ID
2307150-01	BH1-23-SS2
2307150-02	BH1-23-SS7
2307150-03	BH2-23-SS2
2307150-04	BH2-23-SS4
2307150-05	BH3-23-SS4
2307150-06	BH3-23-SS6

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 27-Feb-2023

Client: Paterson Group Consulting Engineers

Order Date: 14-Feb-2023

Client PO: 56818

Project Description: PE5971

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	15-Feb-23	15-Feb-23
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	15-Feb-23	16-Feb-23
Conductivity	MOE E3138 - probe @25 °C, water ext	17-Feb-23	17-Feb-23
Mercury by CVAA	EPA 7471B - CVAA, digestion	16-Feb-23	16-Feb-23
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	27-Feb-23	27-Feb-23
PHC F1	CWS Tier 1 - P&T GC-FID	15-Feb-23	15-Feb-23
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	16-Feb-23	17-Feb-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	15-Feb-23	16-Feb-23
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	16-Feb-23	17-Feb-23
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	15-Feb-23	18-Feb-23
SAR	Calculated	16-Feb-23	16-Feb-23
Solids, %	CWS Tier 1 - Gravimetric	15-Feb-23	15-Feb-23

Certificate of Analysis

Report Date: 27-Feb-2023

Client: Paterson Group Consulting Engineers

Order Date: 14-Feb-2023

Client PO: 56818

Project Description: PE5971

	Client ID:	BH1-23-SS2	BH1-23-SS7	BH2-23-SS2	BH2-23-SS4
	Sample Date:	13-Feb-23 09:00	13-Feb-23 09:00	13-Feb-23 09:00	13-Feb-23 09:00
	Sample ID:	2307150-01	2307150-02	2307150-03	2307150-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	94.4	93.1	91.9	95.7
General Inorganics					
SAR	0.01 N/A	16.6	1.80	7.39	3.69
Conductivity	5 uS/cm	1070	230	1130	597
pH	0.05 pH Units	7.73	7.86	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	3.7	1.7	3.3	1.7
Barium	1.0 ug/g dry	95.1	37.5	69.3	30.3
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Boron	5.0 ug/g dry	7.3	<5.0	6.2	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	22.7	12.1	29.1	9.7
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	7.4	4.7	8.2	3.4
Copper	5.0 ug/g dry	21.1	8.1	22.2	6.8
Lead	1.0 ug/g dry	6.1	2.0	8.6	1.7
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Molybdenum	1.0 ug/g dry	1.1	<1.0	1.1	<1.0
Nickel	5.0 ug/g dry	14.2	8.0	13.9	5.4
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	1.1	<1.0
Vanadium	10.0 ug/g dry	38.9	23.9	39.1	22.5
Zinc	20.0 ug/g dry	31.7	<20.0	28.4	<20.0
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	112%	114%	114%	111%
Hydrocarbons					

Certificate of Analysis

Report Date: 27-Feb-2023

Client: Paterson Group Consulting Engineers

Order Date: 14-Feb-2023

Client PO: 56818

Project Description: PE5971

	Client ID:	BH1-23-SS2	BH1-23-SS7	BH2-23-SS2	BH2-23-SS4
	Sample Date:	13-Feb-23 09:00	13-Feb-23 09:00	13-Feb-23 09:00	13-Feb-23 09:00
	Sample ID:	2307150-01	2307150-02	2307150-03	2307150-04
	MDL/Units	Soil	Soil	Soil	Soil
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	48	29	82	52
F4 PHCs (C34-C50)	6 ug/g dry	66 [1]	55	99	29
F4G PHCs (gravimetric)	50 ug/g dry	222	-	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	-	0.03	<0.02
Fluorene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	-	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	-	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	-	0.03	<0.02
2-Fluorobiphenyl	Surrogate	104%	-	96.3%	87.4%
Terphenyl-d14	Surrogate	121%	-	109%	100%

Certificate of Analysis

Report Date: 27-Feb-2023

Client: Paterson Group Consulting Engineers

Order Date: 14-Feb-2023

Client PO: 56818

Project Description: PE5971

	Client ID:	BH3-23-SS4	BH3-23-SS6	-	-
	Sample Date:	13-Feb-23 09:00	13-Feb-23 09:00	-	-
	Sample ID:	2307150-05	2307150-06	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	95.3	92.7	-	-
General Inorganics					
SAR	0.01 N/A	5.15	1.45	-	-
Conductivity	5 uS/cm	527	233	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	1.8	1.7	-	-
Barium	1.0 ug/g dry	34.3	31.1	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	<5.0	<5.0	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	9.1	8.9	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	-	-
Cobalt	1.0 ug/g dry	4.0	3.7	-	-
Copper	5.0 ug/g dry	7.4	6.5	-	-
Lead	1.0 ug/g dry	2.2	1.6	-	-
Mercury	0.1 ug/g dry	<0.1	<0.1	-	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	-	-
Nickel	5.0 ug/g dry	7.0	<5.0	-	-
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	21.2	22.6	-	-
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	111%	113%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-

Certificate of Analysis

Report Date: 27-Feb-2023

Client: Paterson Group Consulting Engineers

Order Date: 14-Feb-2023

Client PO: 56818

Project Description: PE5971

		Client ID:	BH3-23-SS4	BH3-23-SS6	-	-
		Sample Date:	13-Feb-23 09:00	13-Feb-23 09:00	-	-
		Sample ID:	2307150-05	2307150-06	-	-
	MDL/Units		Soil	Soil	-	-
F2 PHCs (C10-C16)	4 ug/g dry		10	<4	-	-
F3 PHCs (C16-C34)	8 ug/g dry		63	16	-	-
F4 PHCs (C34-C50)	6 ug/g dry		28	<6	-	-
Semi-Volatiles						
Acenaphthene	0.02 ug/g dry		<0.02	-	-	-
Acenaphthylene	0.02 ug/g dry		<0.02	-	-	-
Anthracene	0.02 ug/g dry		<0.02	-	-	-
Benzo [a] anthracene	0.02 ug/g dry		<0.02	-	-	-
Benzo [a] pyrene	0.02 ug/g dry		<0.02	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry		<0.02	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry		<0.02	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry		<0.02	-	-	-
Chrysene	0.02 ug/g dry		<0.02	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry		<0.02	-	-	-
Fluoranthene	0.02 ug/g dry		<0.02	-	-	-
Fluorene	0.02 ug/g dry		<0.02	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry		<0.02	-	-	-
1-Methylnaphthalene	0.02 ug/g dry		<0.02	-	-	-
2-Methylnaphthalene	0.02 ug/g dry		<0.02	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry		<0.04	-	-	-
Naphthalene	0.01 ug/g dry		<0.01	-	-	-
Phenanthrene	0.02 ug/g dry		<0.02	-	-	-
Pyrene	0.02 ug/g dry		<0.02	-	-	-
2-Fluorobiphenyl	Surrogate		91.0%	-	-	-
Terphenyl-d14	Surrogate		109%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
F4G PHCs (gravimetric)	ND	50	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (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						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.43*		*ug/g*		*107*	*50-140*			
Surrogate: Terphenyl-d14	*1.65*		*ug/g*		*124*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 56818

Report Date: 27-Feb-2023

Order Date: 14-Feb-2023

Project Description: PE5971

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Surrogate: Toluene-d8	*8.85*		*ug/g*		*111*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	4.71	0.01	N/A	4.81			2.1	30	
Conductivity	728	5	uS/cm	732			0.6	5	
pH	7.27	0.05	pH Units	7.30			0.4	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	41	8	ug/g	48			15.9	30	
F4 PHCs (C34-C50)	50	6	ug/g	66			28.9	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	2.8	1.0	ug/g	2.4			16.7	30	
Barium	139	1.0	ug/g	120			14.9	30	
Beryllium	0.8	0.5	ug/g	0.8			4.9	30	
Boron	7.0	5.0	ug/g	5.6			21.3	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	32.4	5.0	ug/g	29.4			9.7	30	
Cobalt	11.4	1.0	ug/g	10.3			10.5	30	
Copper	19.7	5.0	ug/g	22.5			13.4	30	
Lead	11.7	1.0	ug/g	10.1			15.3	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	17.5	5.0	ug/g	16.3			7.2	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	52.1	10.0	ug/g	47.4			9.4	30	
Zinc	59.5	20.0	ug/g	53.9			9.9	30	
Physical Characteristics									
% Solids	95.5	0.1	% by Wt.	95.8			0.3	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	ND	0.02	ug/g	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	ND	0.02	ug/g	ND			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	ND	0.02	ug/g	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	*1.55*		*ug/g*		*110*	*50-140*			
Surrogate: Terphenyl-d14	*1.67*		*ug/g*		*118*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	

Certificate of Analysis

Report Date: 27-Feb-2023

Client: Paterson Group Consulting Engineers

Order Date: 14-Feb-2023

Client PO: 56818

Project Description: PE5971

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*9.90*		*ug/g*		*113*	*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)	220	7	ug/g	ND	110	80-120			
F2 PHCs (C10-C16)	100	4	ug/g	ND	117	60-140			
F3 PHCs (C16-C34)	299	8	ug/g	48	121	60-140			
F4 PHCs (C34-C50)	190	6	ug/g	66	93.9	60-140			
F4G PHCs (gravimetric)	960	50	ug/g	ND	96.0	80-120			
Metals									
Antimony	35.6	1.0	ug/g	ND	70.6	70-130			
Arsenic	50.5	1.0	ug/g	1.0	99.1	70-130			
Barium	97.6	1.0	ug/g	47.8	99.6	70-130			
Beryllium	45.8	0.5	ug/g	ND	91.0	70-130			
Boron	45.9	5.0	ug/g	ND	87.2	70-130			
Cadmium	46.2	0.5	ug/g	ND	92.3	70-130			
Chromium (VI)	4.4	0.2	ug/g	ND	82.5	70-130			
Chromium	62.9	5.0	ug/g	11.8	102	70-130			
Cobalt	53.2	1.0	ug/g	4.1	98.2	70-130			
Copper	54.2	5.0	ug/g	9.0	90.4	70-130			
Lead	49.0	1.0	ug/g	4.0	90.0	70-130			
Mercury	1.27	0.1	ug/g	ND	84.5	70-130			
Molybdenum	47.8	1.0	ug/g	ND	94.9	70-130			
Nickel	54.2	5.0	ug/g	6.5	95.3	70-130			
Selenium	44.5	1.0	ug/g	ND	88.6	70-130			
Silver	42.7	0.3	ug/g	ND	85.4	70-130			
Thallium	45.2	1.0	ug/g	ND	90.3	70-130			
Uranium	47.3	1.0	ug/g	ND	94.2	70-130			
Vanadium	70.8	10.0	ug/g	19.0	104	70-130			
Zinc	66.8	20.0	ug/g	21.5	90.6	70-130			
Semi-Volatiles									
Acenaphthene	0.156	0.02	ug/g	ND	88.4	50-140			
Acenaphthylene	0.133	0.02	ug/g	ND	75.2	50-140			
Anthracene	0.131	0.02	ug/g	ND	74.3	50-140			
Benzo [a] anthracene	0.132	0.02	ug/g	ND	74.8	50-140			
Benzo [a] pyrene	0.131	0.02	ug/g	ND	74.0	50-140			
Benzo [b] fluoranthene	0.193	0.02	ug/g	ND	109	50-140			
Benzo [g,h,i] perylene	0.133	0.02	ug/g	ND	75.4	50-140			
Benzo [k] fluoranthene	0.168	0.02	ug/g	ND	94.9	50-140			
Chrysene	0.164	0.02	ug/g	ND	92.9	50-140			
Dibenzo [a,h] anthracene	0.124	0.02	ug/g	ND	70.5	50-140			
Fluoranthene	0.132	0.02	ug/g	ND	75.0	50-140			
Fluorene	0.139	0.02	ug/g	ND	79.0	50-140			
Indeno [1,2,3-cd] pyrene	0.131	0.02	ug/g	ND	74.4	50-140			
1-Methylnaphthalene	0.163	0.02	ug/g	ND	92.1	50-140			
2-Methylnaphthalene	0.175	0.02	ug/g	ND	99.4	50-140			
Naphthalene	0.172	0.01	ug/g	ND	97.2	50-140			
Phenanthrene	0.151	0.02	ug/g	ND	85.5	50-140			
Pyrene	0.141	0.02	ug/g	ND	79.7	50-140			
Surrogate: 2-Fluorobiphenyl	*1.10*		*ug/g*		*77.8*	*50-140*			
Surrogate: Terphenyl-d14	*1.29*		*ug/g*		*91.6*	*50-140*			
Volatiles									

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	4.79	0.02	ug/g	ND	120	60-130			
Ethylbenzene	4.82	0.05	ug/g	ND	120	60-130			
Toluene	4.79	0.05	ug/g	ND	120	60-130			
m,p-Xylenes	9.16	0.05	ug/g	ND	114	60-130			
o-Xylene	4.68	0.05	ug/g	ND	117	60-130			
Surrogate: Toluene-d8	*8.32*		*ug/g*		*104*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision 1-Revised report includes additional pH data.

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2307150

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2307150	

Client Name: Paterson Group
Contact Name: Mike Beaudoin
Address: 9 Auriga Drive
Telephone: 613-226-7381

Project Ref: PE5971
Quote #:
PO #: 56818
E-mail: mbeaudoin@patersongroup.ca

Page 1 of 1

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

☒ REG 153/04 ☐ REG 406/19

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

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR				
1	BH1-23-SS2						X		X	X	X	X		X				
2	BH1-23-SS7																	
3	BH2-23-SS2								X									
4	BH2-23-SS4								X									
5	BH3-23-SS4								X									
6	BH3-23-SS6																	
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Joshua Dempsey	Date/Time: 14/02/23 1410	Date/Time: Feb 14/23 3:58pm	Date/Time: Feb 14 3:58
Date/Time: Feb 14/2023	Temperature: °C	Temperature: 10.2	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mike Beaudoin

Client PO: 56872
Project: PE5971
Custody:

Report Date: 1-Mar-2023
Order Date: 23-Feb-2023

Order #: 2308302

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

Paracel ID	Client ID
2308302-01	BH1C-23-GW1
2308302-02	BH2-23-GW1
2308302-03	BH3-23-GW1
2308302-04	DUP

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 56872

Report Date: 01-Mar-2023

Order Date: 23-Feb-2023

Project Description: PE5971

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	24-Feb-23	27-Feb-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	28-Feb-23	1-Mar-23
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	24-Feb-23	27-Feb-23

Certificate of Analysis

Report Date: 01-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 23-Feb-2023

Client PO: 56872

Project Description: PE5971

	Client ID:	BH1C-23-GW1	BH2-23-GW1	BH3-23-GW1	DUP
	Sample Date:	22-Feb-23 09:00	22-Feb-23 09:00	22-Feb-23 09:00	22-Feb-23 09:00
	Sample ID:	2308302-01	2308302-02	2308302-03	2308302-04
	MDL/Units	Ground Water	Ground Water	Ground Water	Ground Water
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	0.9	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	1.3	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Report Date: 01-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 23-Feb-2023

Client PO: 56872

Project Description: PE5971

	Client ID:	BH1C-23-GW1	BH2-23-GW1	BH3-23-GW1	DUP
	Sample Date:	22-Feb-23 09:00	22-Feb-23 09:00	22-Feb-23 09:00	22-Feb-23 09:00
	Sample ID:	2308302-01	2308302-02	2308302-03	2308302-04
	MDL/Units	Ground Water	Ground Water	Ground Water	Ground Water
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	0.7	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	0.7	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	108%	104%	107%	107%
Dibromofluoromethane	Surrogate	94.6%	96.8%	96.6%	96.4%
Toluene-d8	Surrogate	108%	108%	107%	107%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*88.3*		*ug/L*		*110*	*50-140*			
Surrogate: Dibromofluoromethane	*77.2*		*ug/L*		*96.6*	*50-140*			
Surrogate: Toluene-d8	*88.2*		*ug/L*		*110*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	2.59	0.5	ug/L	2.47			4.7	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	16.6	0.5	ug/L	15.8			5.4	30	
1,3-Dichlorobenzene	2.46	0.5	ug/L	2.28			7.6	30	
1,4-Dichlorobenzene	3.33	0.5	ug/L	3.17			4.9	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*80.1*		*ug/L*		*100*	*50-140*			
Surrogate: Dibromofluoromethane	*77.0*		*ug/L*		*96.2*	*50-140*			
Surrogate: Toluene-d8	*85.9*		*ug/L*		*107*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1920	25	ug/L	ND	95.8	68-117			
F2 PHCs (C10-C16)	1470	100	ug/L	ND	91.8	60-140			
F3 PHCs (C16-C34)	3990	100	ug/L	ND	102	60-140			
F4 PHCs (C34-C50)	2780	100	ug/L	ND	112	60-140			
Volatiles									
Acetone	96.5	5.0	ug/L	ND	96.5	50-140			
Benzene	41.1	0.5	ug/L	ND	103	60-130			
Bromodichloromethane	41.4	0.5	ug/L	ND	104	60-130			
Bromoform	36.8	0.5	ug/L	ND	92.1	60-130			
Bromomethane	47.5	0.5	ug/L	ND	119	50-140			
Carbon Tetrachloride	36.2	0.2	ug/L	ND	90.4	60-130			
Chlorobenzene	37.7	0.5	ug/L	ND	94.3	60-130			
Chloroform	39.1	0.5	ug/L	ND	97.8	60-130			
Dibromochloromethane	34.5	0.5	ug/L	ND	86.2	60-130			
Dichlorodifluoromethane	34.4	1.0	ug/L	ND	86.1	50-140			
1,2-Dichlorobenzene	35.1	0.5	ug/L	ND	87.7	60-130			
1,3-Dichlorobenzene	34.0	0.5	ug/L	ND	85.1	60-130			
1,4-Dichlorobenzene	32.7	0.5	ug/L	ND	81.8	60-130			
1,1-Dichloroethane	34.6	0.5	ug/L	ND	86.4	60-130			
1,2-Dichloroethane	41.2	0.5	ug/L	ND	103	60-130			
1,1-Dichloroethylene	46.5	0.5	ug/L	ND	116	60-130			
cis-1,2-Dichloroethylene	45.9	0.5	ug/L	ND	115	60-130			
trans-1,2-Dichloroethylene	33.6	0.5	ug/L	ND	83.9	60-130			
1,2-Dichloropropane	41.1	0.5	ug/L	ND	103	60-130			
cis-1,3-Dichloropropylene	35.1	0.5	ug/L	ND	87.6	60-130			
trans-1,3-Dichloropropylene	32.6	0.5	ug/L	ND	81.5	60-130			
Ethylbenzene	40.4	0.5	ug/L	ND	101	60-130			
Ethylene dibromide (dibromoethane, 1,2-	37.5	0.2	ug/L	ND	93.7	60-130			
Hexane	44.8	1.0	ug/L	ND	112	60-130			
Methyl Ethyl Ketone (2-Butanone)	102	5.0	ug/L	ND	102	50-140			
Methyl Isobutyl Ketone	105	5.0	ug/L	ND	105	50-140			
Methyl tert-butyl ether	79.5	2.0	ug/L	ND	79.5	50-140			
Methylene Chloride	42.8	5.0	ug/L	ND	107	60-130			
Styrene	33.6	0.5	ug/L	ND	84.1	60-130			
1,1,1,2-Tetrachloroethane	35.5	0.5	ug/L	ND	88.7	60-130			
1,1,2,2-Tetrachloroethane	34.0	0.5	ug/L	ND	84.9	60-130			
Tetrachloroethylene	36.0	0.5	ug/L	ND	90.0	60-130			
Toluene	40.2	0.5	ug/L	ND	101	60-130			
1,1,1-Trichloroethane	42.6	0.5	ug/L	ND	106	60-130			
1,1,2-Trichloroethane	37.2	0.5	ug/L	ND	93.0	60-130			
Trichloroethylene	35.4	0.5	ug/L	ND	88.6	60-130			
Trichlorofluoromethane	46.8	1.0	ug/L	ND	117	60-130			
Vinyl chloride	43.0	0.5	ug/L	ND	108	50-140			
m,p-Xylenes	75.5	0.5	ug/L	ND	94.4	60-130			
o-Xylene	38.5	0.5	ug/L	ND	96.2	60-130			
Surrogate: 4-Bromofluorobenzene	*84.4*		*ug/L*		*106*	*50-140*			
Surrogate: Dibromofluoromethane	*91.0*		*ug/L*		*114*	*50-140*			
Surrogate: Toluene-d8	*84.7*		*ug/L*		*106*	*50-140*			

Qualifier Notes:

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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. | T R R

Paracel ID: 2308302

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2308302	

Client Name: Paterson
Contact Name: Mike Gaudin
Address: 9 Auriga
Telephone: 613 226 7381

Project Ref: PE5971
Quote #:
PO #: 56872
E-mail: MGaudin@Patersongroup.ca
GPaterson@Patersongroup.ca

Page __ of __

Turnaround Time

☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular
Date Required: _____

☒ REG 153/04 ☐ REG 406/19

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

Other Regulation

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
		Required Analysis																
1	BH16-23-GW1	GW		3	FEB 22 2023		X	X										
2	BH2-23-GW1	↓		↓	↓		X	X										
3	BH3-23-GW1						X	X										
4	DUP						X	X										
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
G Pat	A. LOUISE		
Relinquished By (Print): Grant Paterson	Date/Time: 23/02/23 1607	Date/Time: 23/02/23 16:45	Date/Time: 23/02/23
Date/Time: FEB 23 2023	Temperature: °C	Temperature: 3.2	pH Verified: ☐ By: NA

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mike Beaudoin

Client PO: 57042
Project: PE5971
Custody:

Report Date: 22-Mar-2023
Order Date: 20-Mar-2023

Order #: 2312082

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

Paracel ID	Client ID
2312082-01	BH4-23-SS3
2312082-02	BH4-23-SS5
2312082-03	BH5-23-SS1
2312082-04	BH5-23-SS4
2312082-05	BH6-23-SS1
2312082-06	BH6-23-SS3
2312082-07	DUP

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 22-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 20-Mar-2023

Client PO: 57042

Project Description: PE5971

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	21-Mar-23	21-Mar-23
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	22-Mar-23	22-Mar-23
PHC F1	CWS Tier 1 - P&T GC-FID	21-Mar-23	21-Mar-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	21-Mar-23	21-Mar-23
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	22-Mar-23	22-Mar-23
Solids, %	CWS Tier 1 - Gravimetric	21-Mar-23	21-Mar-23

PARACEL LABORATORIES LTD.

Order #: 2312082

Certificate of Analysis

Report Date: 22-Mar-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 20-Mar-2023

Client PO: **57042**

Project Description: PE5971

	Client ID:	BH4-23-SS3	BH4-23-SS5	BH5-23-SS1	BH5-23-SS4
	Sample Date:	15-Mar-23 00:00	15-Mar-23 00:00	16-Mar-23 00:00	16-Mar-23 00:00
	Sample ID:	2312082-01	2312082-02	2312082-03	2312082-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	86.9	86.1	91.7	88.6
General Inorganics					
pH	0.05 pH Units	-	-	8.00	7.77
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	1.5	1.3	2.0	1.6
Barium	1.0 ug/g dry	40.3	36.5	38.9	57.0
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Boron	5.0 ug/g dry	<5.0	<5.0	<5.0	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	15.3	10.4	12.8	8.9
Cobalt	1.0 ug/g dry	58.0	6.1	5.1	3.4
Copper	5.0 ug/g dry	21.7	9.8	8.3	7.5
Lead	1.0 ug/g dry	2.0	1.6	2.7	1.6
Molybdenum	1.0 ug/g dry	1.2	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	9.3	6.0	8.4	5.9
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	25.3	19.2	23.2	19.4
Zinc	20.0 ug/g dry	<20.0	<20.0	<20.0	<20.0
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	95.5%	91.0%	96.5%	94.7%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	52	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	39	<6	<6	<6

Certificate of Analysis

Report Date: 22-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 20-Mar-2023

Client PO: 57042

Project Description: PE5971

	Client ID:	BH6-23-SS1	BH6-23-SS3	DUP	-
	Sample Date:	16-Mar-23 00:00	16-Mar-23 00:00	16-Mar-23 00:00	-
	Sample ID:	2312082-05	2312082-06	2312082-07	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	92.7	81.8	82.9	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Arsenic	1.0 ug/g dry	2.0	1.3	1.4	-
Barium	1.0 ug/g dry	61.5	41.0	39.3	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Boron	5.0 ug/g dry	6.8	<5.0	<5.0	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Chromium	5.0 ug/g dry	15.4	9.8	10.9	-
Cobalt	1.0 ug/g dry	6.1	18.0	23.2	-
Copper	5.0 ug/g dry	11.0	22.2	27.3	-
Lead	1.0 ug/g dry	10.6	1.5	1.5	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Nickel	5.0 ug/g dry	9.8	11.2	12.4	-
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	-
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Vanadium	10.0 ug/g dry	28.6	18.7	20.9	-
Zinc	20.0 ug/g dry	21.1	<20.0	<20.0	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Toluene-d8	Surrogate	91.3%	99.6%	92.0%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	15	<8	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<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	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						
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	*3.40*		*ug/g*		*106*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	7.98	0.05	pH Units	8.00			0.3	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	1.9	1.0	ug/g	1.8			5.5	30	
Barium	88.5	1.0	ug/g	87.6			1.1	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	6.8	5.0	ug/g	7.5			9.1	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	22.8	5.0	ug/g	22.7			0.8	30	
Cobalt	7.2	1.0	ug/g	7.1			0.5	30	
Copper	14.2	5.0	ug/g	15.2			6.8	30	
Lead	3.9	1.0	ug/g	4.1			4.0	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	13.5	5.0	ug/g	13.9			2.6	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	35.7	10.0	ug/g	35.8			0.4	30	
Zinc	30.2	20.0	ug/g	29.9			0.9	30	
Physical Characteristics									
% Solids	84.8	0.1	% by Wt.	84.8			0.0	25	
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*4.14*		*ug/g*		*107*	*50-140*			

Certificate of Analysis

Report Date: 22-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 20-Mar-2023

Client PO: 57042

Project Description: PE5971

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	174	7	ug/g	ND	87.0	80-120			
F2 PHCs (C10-C16)	86	4	ug/g	ND	105	60-140			
F3 PHCs (C16-C34)	212	8	ug/g	ND	105	60-140			
F4 PHCs (C34-C50)	122	6	ug/g	ND	95.7	60-140			
Metals									
Antimony	36.1	1.0	ug/g	ND	71.9	70-130			
Arsenic	57.6	1.0	ug/g	ND	114	70-130			
Barium	95.3	1.0	ug/g	35.0	121	70-130			
Beryllium	58.3	0.5	ug/g	ND	116	70-130			
Boron	55.3	5.0	ug/g	ND	105	70-130			
Cadmium	53.9	0.5	ug/g	ND	108	70-130			
Chromium	71.2	5.0	ug/g	9.1	124	70-130			
Cobalt	61.3	1.0	ug/g	2.9	117	70-130			
Copper	62.1	5.0	ug/g	6.1	112	70-130			
Lead	53.1	1.0	ug/g	1.6	103	70-130			
Molybdenum	56.3	1.0	ug/g	ND	112	70-130			
Nickel	63.6	5.0	ug/g	5.6	116	70-130			
Selenium	50.6	1.0	ug/g	ND	101	70-130			
Silver	46.3	0.3	ug/g	ND	92.6	70-130			
Thallium	53.4	1.0	ug/g	ND	107	70-130			
Uranium	54.1	1.0	ug/g	ND	108	70-130			
Vanadium	78.2	10.0	ug/g	14.3	128	70-130			
Zinc	64.8	20.0	ug/g	ND	106	70-130			
Volatiles									
Benzene	4.11	0.02	ug/g	ND	103	60-130			
Ethylbenzene	4.07	0.05	ug/g	ND	102	60-130			
Toluene	4.39	0.05	ug/g	ND	110	60-130			
m,p-Xylenes	8.30	0.05	ug/g	ND	104	60-130			
o-Xylene	4.48	0.05	ug/g	ND	112	60-130			
Surrogate: Toluene-d8	*3.28*		*ug/g*		*102*	*50-140*			

Qualifier Notes:

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2312082

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

Client Name: Paterson	Project Ref: PE 5971	Page 1 of 1
Contact Name: Michael Beaudoin	Quote #:	Turnaround Time
Address: 9 Auriga Drive	PO #: 57042	☐ 1 day ☐ 3 day
	E-mail: MBeaudoin@patersongroup.ca	☐ 2 day ☑ Regular
Telephone: 613 226 7381		Date Required:

☑ REG 153/04 ☐ REG 406/19

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

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH
1	BH4-23-SS3	S		2	March 15, 2023		X			X				
2	BH4-23-SS5	↓		↓	↓		↓			↓				
3	BH5-23-SS1				March 16, 2023									X
4	BH5-23-SS4				↓									X
5	BH6-23-SS1													
6	BH6-23-SS3													
7	DUP	↓		↓	↓		↓			↓				
8														
9														
10														

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: FT FEDEX	Received at Lab: Jumeepreet Dhami	Verified By:
Relinquished By (Print): Bryce Lee	Date/Time: 20/03/23 1545	Date/Time: Mar 20, 2023 04:30	Date/Time: Mar 20/23 4:44
Date/Time: March 20, 2023	Temperature: °C	Temperature: 18.9 C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mike Beaudoin

Client PO: 57099
Project: PE5971
Custody:

Report Date: 29-Mar-2023
Order Date: 27-Mar-2023

Order #: 2313087

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

Paracel ID	Client ID
2313087-01	BH4-23-GW1
2313087-02	BH5-23-GW1
2313087-03	BH6-23-GW1
2313087-04	DUP

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 29-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 27-Mar-2023

Client PO: 57099

Project Description: PE5971

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-MS	EPA 200.8 - ICP-MS	28-Mar-23	28-Mar-23
PHC F1	CWS Tier 1 - P&T GC-FID	28-Mar-23	28-Mar-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	28-Mar-23	29-Mar-23
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	28-Mar-23	28-Mar-23

Certificate of Analysis

Report Date: 29-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 27-Mar-2023

Client PO: 57099

Project Description: PE5971

	Client ID:	BH4-23-GW1	BH5-23-GW1	BH6-23-GW1	DUP
	Sample Date:	24-Mar-23 09:00	24-Mar-23 09:00	24-Mar-23 09:00	24-Mar-23 09:00
	Sample ID:	2313087-01	2313087-02	2313087-03	2313087-04
	MDL/Units	Ground Water	Ground Water	Ground Water	Ground Water
Metals					
Antimony	0.5 ug/L	0.5	-	-	-
Arsenic	1 ug/L	<1	-	-	-
Barium	1 ug/L	65	-	-	-
Beryllium	0.5 ug/L	<0.5	-	-	-
Boron	10 ug/L	42	-	-	-
Cadmium	0.1 ug/L	<0.1	-	-	-
Chromium	1 ug/L	<1	-	-	-
Cobalt	0.5 ug/L	17.0	-	-	-
Copper	0.5 ug/L	1.0	-	-	-
Lead	0.1 ug/L	<0.1	-	-	-
Molybdenum	0.5 ug/L	8.2	-	-	-
Nickel	1 ug/L	3	-	-	-
Selenium	1 ug/L	<1	-	-	-
Silver	0.1 ug/L	<0.1	-	-	-
Sodium	200 ug/L	403000	-	-	-
Thallium	0.1 ug/L	<0.1	-	-	-
Uranium	0.1 ug/L	3.4	-	-	-
Vanadium	0.5 ug/L	<0.5	-	-	-
Zinc	5 ug/L	<5	-	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5 ug/L	1.5	0.8	0.6	2.7
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Report Date: 29-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 27-Mar-2023

Client PO: 57099

Project Description: PE5971

	Client ID:	BH4-23-GW1	BH5-23-GW1	BH6-23-GW1	DUP
	Sample Date:	24-Mar-23 09:00	24-Mar-23 09:00	24-Mar-23 09:00	24-Mar-23 09:00
	Sample ID:	2313087-01	2313087-02	2313087-03	2313087-04
	MDL/Units	Ground Water	Ground Water	Ground Water	Ground Water
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	131%	127%	126%	129%
Dibromofluoromethane	Surrogate	96.4%	94.6%	96.5%	96.2%
Toluene-d8	Surrogate	123%	122%	121%	121%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
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	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						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 57099

Report Date: 29-Mar-2023

Order Date: 27-Mar-2023

Project Description: PE5971

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*108*		*ug/L*		*135*	*50-140*			
Surrogate: Dibromofluoromethane	*77.7*		*ug/L*		*97.2*	*50-140*			
Surrogate: Toluene-d8	*100*		*ug/L*		*125*	*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	
Metals									
Antimony	ND	0.5	ug/L	ND			NC	20	
Arsenic	ND	1	ug/L	ND			NC	20	
Barium	23.3	1	ug/L	23.1			0.8	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	18	10	ug/L	18			0.8	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	ND	0.5	ug/L	ND			NC	20	
Copper	1.20	0.5	ug/L	1.21			1.1	20	
Lead	ND	0.1	ug/L	ND			NC	20	
Molybdenum	1.04	0.5	ug/L	1.00			3.5	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	17500	200	ug/L	17000			2.7	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	7	5	ug/L	7			6.7	20	
Volatiles									
Acetone	488	5.0	ug/L	473			3.2	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	1.30	0.5	ug/L	1.34			3.0	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*86.8*		*ug/L*		*108*	*50-140*			
Surrogate: Dibromofluoromethane	*77.3*		*ug/L*		*96.6*	*50-140*			
Surrogate: Toluene-d8	*95.6*		*ug/L*		*120*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1920	25	ug/L	ND	95.8	68-117			
F2 PHCs (C10-C16)	1700	100	ug/L	ND	106	60-140			
F3 PHCs (C16-C34)	4340	100	ug/L	ND	111	60-140			
F4 PHCs (C34-C50)	2700	100	ug/L	ND	109	60-140			
Metals									
Arsenic	49.3	1	ug/L	ND	97.8	80-120			
Barium	69.1	1	ug/L	23.1	92.0	80-120			
Beryllium	48.8	0.5	ug/L	ND	97.5	80-120			
Boron	59	10	ug/L	18	80.6	80-120			
Cadmium	47.4	0.1	ug/L	ND	94.9	80-120			
Chromium	49.3	1	ug/L	ND	98.0	80-120			
Cobalt	48.2	0.5	ug/L	ND	96.4	80-120			
Copper	47.2	0.5	ug/L	1.21	92.0	80-120			
Lead	43.1	0.1	ug/L	ND	86.0	80-120			
Molybdenum	45.9	0.5	ug/L	1.00	89.8	80-120			
Nickel	48.1	1	ug/L	ND	95.1	80-120			
Selenium	45.9	1	ug/L	ND	91.5	80-120			
Silver	46.6	0.1	ug/L	ND	93.1	80-120			
Sodium	26000	200	ug/L	17000	90.2	80-120			
Thallium	44.4	0.1	ug/L	ND	88.8	80-120			
Uranium	45.1	0.1	ug/L	ND	90.3	80-120			
Vanadium	49.7	0.5	ug/L	ND	99.1	80-120			
Zinc	52	5	ug/L	7	90.4	80-120			
Volatiles									
Acetone	114	5.0	ug/L	ND	114	50-140			
Benzene	47.1	0.5	ug/L	ND	118	60-130			
Bromodichloromethane	49.3	0.5	ug/L	ND	123	60-130			
Bromoform	41.6	0.5	ug/L	ND	104	60-130			
Bromomethane	38.8	0.5	ug/L	ND	97.0	50-140			
Carbon Tetrachloride	43.6	0.2	ug/L	ND	109	60-130			
Chlorobenzene	36.2	0.5	ug/L	ND	90.5	60-130			
Chloroform	46.1	0.5	ug/L	ND	115	60-130			
Dibromochloromethane	41.2	0.5	ug/L	ND	103	60-130			
Dichlorodifluoromethane	44.2	1.0	ug/L	ND	110	50-140			
1,2-Dichlorobenzene	34.2	0.5	ug/L	ND	85.4	60-130			
1,3-Dichlorobenzene	36.9	0.5	ug/L	ND	92.3	60-130			
1,4-Dichlorobenzene	32.4	0.5	ug/L	ND	81.0	60-130			
1,1-Dichloroethane	49.3	0.5	ug/L	ND	123	60-130			
1,2-Dichloroethane	41.8	0.5	ug/L	ND	105	60-130			
1,1-Dichloroethylene	36.7	0.5	ug/L	ND	91.8	60-130			
cis-1,2-Dichloroethylene	43.2	0.5	ug/L	ND	108	60-130			
trans-1,2-Dichloroethylene	37.7	0.5	ug/L	ND	94.2	60-130			
1,2-Dichloropropane	44.9	0.5	ug/L	ND	112	60-130			
cis-1,3-Dichloropropylene	44.7	0.5	ug/L	ND	112	60-130			
trans-1,3-Dichloropropylene	47.8	0.5	ug/L	ND	120	60-130			
Ethylbenzene	33.2	0.5	ug/L	ND	83.1	60-130			
Ethylene dibromide (dibromoethane, 1,2	36.2	0.2	ug/L	ND	90.5	60-130			
Hexane	32.6	1.0	ug/L	ND	81.4	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl Ethyl Ketone (2-Butanone)	111	5.0	ug/L	ND	111	50-140			
Methyl Isobutyl Ketone	108	5.0	ug/L	ND	108	50-140			
Methyl tert-butyl ether	122	2.0	ug/L	ND	122	50-140			
Methylene Chloride	42.7	5.0	ug/L	ND	107	60-130			
Styrene	32.7	0.5	ug/L	ND	81.8	60-130			
1,1,1,2-Tetrachloroethane	40.2	0.5	ug/L	ND	101	60-130			
1,1,2,2-Tetrachloroethane	41.8	0.5	ug/L	ND	104	60-130			
Tetrachloroethylene	30.7	0.5	ug/L	ND	76.8	60-130			
Toluene	35.1	0.5	ug/L	ND	87.8	60-130			
1,1,1-Trichloroethane	44.8	0.5	ug/L	ND	112	60-130			
1,1,2-Trichloroethane	42.9	0.5	ug/L	ND	107	60-130			
Trichloroethylene	40.4	0.5	ug/L	ND	101	60-130			
Trichlorofluoromethane	44.8	1.0	ug/L	ND	112	60-130			
Vinyl chloride	35.4	0.5	ug/L	ND	88.6	50-140			
m,p-Xylenes	69.4	0.5	ug/L	ND	86.7	60-130			
o-Xylene	35.6	0.5	ug/L	ND	89.0	60-130			
Surrogate: 4-Bromofluorobenzene	*79.5*		*ug/L*		*99.4*	*50-140*			
Surrogate: Dibromofluoromethane	*88.0*		*ug/L*		*110*	*50-140*			
Surrogate: Toluene-d8	*80.1*		*ug/L*		*100*	*50-140*			

Qualifier Notes:

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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: 2313087

Paracel Order Number (Lab Use Only): 2313087

Chain Of Custody (Lab Use Only)

Client Name: Paterson	Project Ref: PE5971
Contact Name: Mike Beaudoin	Quote #:
Address: 9 Auriga	PO #: 57090
Telephone: 613 226 7381	E-mail: GPaterson@Patersongroup.ca Mbeaudoin@Patersongroup.ca

Page 1 of 1

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

Date Required:

☒ REG 153/04 ☐ REG 406/19

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

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

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

	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	BH4-23-GW1	GW		4	Mar 24 2023		X	X		X			
2	BH5-23-GW1			3			X	X					
3	BH6-23-GW1			3			X	X					
4	DUP			3			X	X					
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign): GPat	Received By Driver/Depot: M TOUBE	Received at Lab: Sandra Dencsins	Verified By: Sandra Dencsins
Relinquished By (Print): Grant Paterson	Date/Time: 27/03/23 1530	Date/Time: Mar 27, 4:00	Date/Time: Mar 27, 4:12
Date/Time: Mar 27 2023	Temperature: °C	Temperature: 15.1	pH Verified: ☑ By: Sandra Dencsins