Phase II – Environmental Site Investigation

137-141 George Street and 110-116 York
Ottawa, Ontario

Prepared for Claridge Homes

Report: PE2709-5
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TABLE OF CONTENTS

List of Figures

List of Tables

List of Appendices

EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the property addressed 137-141 George Street and 110-116 York Street, in the City of Ottawa, Ontario. The purpose of the Phase IIESA 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 was carried out in conjunction with a Geotechnical Investigation and consisted of three drilling programs were carried out on the following dates: February 24-28, 2023, August 14-16, 2023, and May 8-May 9. Together, the field programs consisted of drilling 16 boreholes to address the APECS identified in the Phase I ESA. Twelve of the boreholes were instrumented with groundwater monitoring wells to assess the groundwater beneath the Phase II Property. The monitoring well installed in BH1-23 was installed at a greater depth than the remainder of the wells, for geotechnical purposes.

The borehole profiles generally consist of a surficial layer of asphaltic concrete (ranging from 0.05-0.06 m in thickness), followed by fill material consisting of brown silty sand with gravel, crushed stone, cobbles and/or trace topsoil (with occasional pieces of building debris). The fill layer extended to a maximum depth of approximately 3.8 m and was underlain by glacial till consisting of a silty sand to sandy silt matrix with gravel, cobbles, and boulders. Grey limestone bedrock was encountered at a maximum depth of approximately 5.9 m below the existing ground surface.

Soil

A total of 40 samples and 4 duplicate samples were submitted for analysis of metals (including As, Sb, Se, Hg and CrVI), benzene, toluene, ethylbenzene xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and/or pH.

Metal, Mercury (Hg), PAH and/or PHC impacts were identified in the fill material across most of the Phase II Property. PHC impacts were also identified in the native glacial till in the southern portion of the Phase II Property.

Groundwater

Groundwater samples from monitoring wells installed in BH2-23, BH3-23, BH5-23 and BH6-23 were collected during the March 8, 2023, sampling event and submitted for laboratory analysis of BTEX, PHCs (F1-F4), and/or VOCs. The majority of the analyzed

PHC parameters were non-detect apart from the PHC F1 concentration in BH1-GW1, which complied with the applicable MECP Table 3 standards. The concentrations of PHC fractions F1 and F2 identified in BH5-23-GW1 exceeded the applicable MECP Table 3 standards, resulting in the completion of a second round of sampling.

All the analyzed VOC parameters were non-detect and therefore comply with the applicable MECP Table 3 standards, apart from the identified chloroform concentrations in BH3-23-GW1 and its duplicate sample (DUP1-23-GW1).

A second round of groundwater sampling was completed on March 23, 2023, and involved the analytical testing of PHCs and/or VOCs from groundwater obtained within BH3-23 and BH5-23. All the analyzed PHC and VOC parameters complied with the applicable MECP Table 3 standards.

A third round of groundwater sampling was completed on June 27, 2023, to obtain a second clean groundwater result from BH5-23, to comply with industry standards. The groundwater sample was submitted for BTEX and PHCs. Based on the analytical test results the concentrations of PHC fractions F1 and F2 once again exceeded the applicable MECP Table 3 standards.

Groundwater samples recovered from BH7-23 through BH9-23 were sampled on August 23, 2023, and submitted for analytical testing of BTEX or VOCs and PHCs. The monitoring well installed in BH10-23 was dry at the time of the sampling event. Apart from the chloroform concentration identified in BH9-23, all parameters complied with the MECP Table 3 standards. It should be noted that the PHC detection limits for Sample BH9-23 were elevated above the standards due to low sample volume.

Groundwater samples recovered from BH1-24, BH3-24 and BH4-24 on May 22, 2024, were submitted for analytical testing of Metals, Mercury, BTEX, VOCs and/or PHCs. Based on the analytical test results, all identified concentrations complied with the MECP Table 3 standards.

Recommendations

A remediation program was recommended in conjunction with site redevelopment, to remove all impacted soil and groundwater from the Phase II Property. Based on the findings of the Phase II ESA, it is expected that most of the fill will require of-site disposal at a registered landfill site. Deeper impacts within the native material are contained primarily to the southwestern corner of the site where groundwater impacts were also observed. It is expected that impacted groundwater, identified within the upper bedrock, near the soil-bedrock interface, will be remediation through the removal of impacted soil and underlying bedrock.

The remediation program is underway, with most of the soil having been removed from the site for disposal at a licenced landfill site or for beneficial reuse at a Class 1 Management Site or Reuse Site, in accordance with O.Reg. 406/19.

This Phase II ESA report will be updated with the findings of the remediation program once post-remediation groundwater monitoring has been completed, in accordance with O.Reg. 153/04, to support the filing of a Record of Site Condition.

1.0 INTRODUCTION

At the request of Claridge Homes, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment for the property addressed 141 George Street, which includes the civic addresses 137 George Street, 141 George Street, 110 York Street and 116 York Street, in the City of Ottawa, Ontario.

The purpose of this Phase II ESA has been to further address areas of potential environmental concern (APECs) identified on the Phase II Property and to delineated previously identified soil and groundwater impacts. The report also includes findings of previous field investigations.

1.1 Site Description

Address:	137-141 George Street and 110-116 York Street, Ottawa, Ontario
Location:	The Phase I Property is located between York Street and George Street, approximately 20m east of Dalhousie Street, in the City of Ottawa, Ontario. Refer to Figure 1 - Key Plan in the Figures section following the text.
Latitude and Longitude:	45° 25' 43.2" N, 75° 41' 24.9" W

Site Description:

Configuration:	Rectangular (approximate)
Site Area:	0.41 ha (approximate)
Zoning:	MD2 – Mixed Downtown Use (with a Mature Neighbourhoods Overlay on the York Street parcels)

1.2 Property Ownership

Paterson was engaged to conduct this Phase I-ESA by Mr. Stephen Poon with Claridge Homes, the current property owner. The Claridge Homes head office is located at 210 Gladstone Avenue, Suite 2001, Ottawa, Ontario K2P and 0Z9. Mr. Poon can by reached by telephone at (613) 233-6030.

1.3 Current and Proposed Future Uses

The northern portion of the Phase II Property addressed 110 York Street was most recently occupied by a vacant, two-storey commercial building fronting onto York Street. The building was demolished in April of 2024.

The remainder of the Phase II Property was occupied by commercial parking.

A multi-storey mixed used development is proposed. An underground parking lot associated with the proposed multi-storey residential building will occupy the entirety of the Phase II Property, while above-grade levels will be shared between the residential buidling and commercial hotel.

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 applies to the Phase II Property as the Phase II Property and neighbouring properties are all serviced by the municipality.

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 and the pH of the surface soil is between 5 and 9, while the pH of the subsurface soil is between 5 and 11.

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

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is located between York Street and George Street, approximately 20m east of Dalhousie Street in the City of Ottawa, Ontario. According to the City of Ottawa website, the Phase II Property is situated in a mixed used downtown zone with surrounding properties consisting of commercial and residential land use.

At the time of the most recent site visits, the Phase II Property was primarily occupied by a paved asphaltic parking lot that occupies the central and southern portions of the property. The northern portion of the Phase II Property addressed 110 York Street was occupied by the foundation and building rubble associated with the recently demolished commercial building.

The Phase II Property is relatively flat and at grade with York and Geroge Streets. The regional topography slopes gently downward to the north, towards the Ottawa River. Site drainage occurs primarily through sheet flow to catch basins located in the paved asphaltic parking lot on the Phase II Property as well as along York Street and George Street.

2.2 Past Investigations

As discussed in the Phase I-ESA, the following reports were reviewed prior to conducting this assessment:

- ‘Phase I Environmental Site Assessment, 325 Dalhousie Street, 110 York Street and 137 George Street – Ottawa, Ontario, prepared by Pinchin Environmental Ltd., dated May 2012.

Based on the findings of the Phase I ESA, a Phase II ESA was recommended to address the former RFOs on the properties addressed 321 to 325 Dalhousie Street (previously 327 Dalhousie Street, and 351 Dalhousie Street, situated at the northeast corner of the Dalhousie Street and George Street intersection, immediately west/southwest of the Phase I Property.

- Phase I and Limited Phase II Environmental Site Assessment, Commercial Property, 325 Dalhousie Street, 110 York Street and 137-141 George Street, Ottawa, Ontario”, prepared by Paterson Group Inc., dated June 8, 2012.

Based on the findings of the 2013 Phase I - ESA, environmental concerns were identified with regards to the historical uses of the Phase I Property and adjacent/neighbouring properties.

Based on the findings of the 2012 Phase I - ESA, APECs were identified with regards to the historical uses of the Phase I Property and adjacent/neighbouring properties.

Historical uses of concern included former gasoline service stations, automotive service garages, printers, dry cleaners, and a roofing manufacturer.

A limited subsurface investigation was conducted at 141 George Street on May 11, 2012, and consisted of the placement of one borehole, equipped with a groundwater monitoring well, that was installed at a depth of 5.6 m below the existing ground surface. One water sample was collected from the installed monitoring well and was submitted for analytical testing of volatile organic compounds (VOC) and petroleum hydrocarbon (PHC) parameters. No detectable concentrations of these parameters were identified, and the groundwater was therefore considered to comply with the 2011 MECP standards.

Further investigative work was recommended to assess the potential for impact from remaining potential environmental concerns that were not addressed as part of the Limited Phase II ESA.

- ‘Phase II Environmental Site Assessment, 110 York Street, 325 Dalhousie Street, 137 and 141 George Street, Ottawa, Ontario, prepared by Paterson Group Inc., dated July 27, 2012.

Four boreholes were advanced on the Phase I Property in July of 2012. The borehole locations were selected to assess the potential for impacts resulting from the identification of historical on-or off-site PCAs. Three of the boreholes were cored into bedrock and instrumented with groundwater monitoring wells.

Based on the results of the Phase II-ESA, petroleum hydrocarbon impacted soil exceeding the applicable MECP Table 3 standards was present on the southern portion of the Phase I Property, in the vicinity of BH1. The hydrocarbon impacts were considered to have resulted from the former RFO at 353 Dalhousie Street. Given that no additional soil impacts were identified at nearby borehole locations, the PHC-impacted material was considered limited in extent.

Demolition debris including pieces of concrete and brick, as well as lead concentrations in exceedance of the applicable MECP Table 3 standards were identified in the fill material underlying the asphaltic pavement in the southern portion of the Phase I Property. The fill layer was determined to vary in thickness from approximately 1.2 to 3 m.

Based on the analytical test results, the PHC and lead impacts were considered limited in extent and did not present an immediate risk to the use of the Phase I Property.

Based on the findings of the Phase II–ESA, it was recommended that the impacted soil be remediated at the time of site redevelopment.

- ‘Supplemental Phase II Environmental Site Assessment, 110 York Street, 321 Dalhousie Street, 137 and 141 George Street, Ottawa, Ontario”, prepared by Paterson Group Inc., dated August 10, 2012.

Five additional boreholes were advanced on the Phase I Property on August 9, 2012. The borehole locations were selected to further delineate the PHC impacted soil identified in BH1 during the previous investigation. No monitoring wells were installed at the time of the supplemental investigation.

Based on the results of the Phase II-ESA, PHC-impacted soil exceeding the applicable MECP Table 3 standards was identified in the vicinity of BH1 and BH5. Like the findings presented in the previous subsurface investigation, the soil impacts were considered to have been from the former use of the property at 351/353 Dalhousie Street, as an RFO. Given that the test results met the MECP Table 3 standards at nearby borehole locations, the contaminated soil was considered limited in extent.

- ‘Phase I Environmental Site Assessment, Proposed Mixed Use Development, 321-325 Dalhousie Street and 137-141 George Street – Ottawa, Ontario, prepared by Paterson dated April 2013.

According to historical research conducted as part of the 2013 Phase I ESA, the Phase I Property was initially developed with residential dwellings in the late 1800s. The portion of the Phase I Property addressed 137 George Street (formerly addressed 125 to 127 George Street) was occupied by a printing establishment from 1950 until 1965. The portion of the Phase I Property addressed 141 George Street (formerly addressed 137, 139 and 141 George Street and was occupied by three (3) units of an 11-unit row house in the 1950s. The neighbouring properties primarily consisted of residential dwellings, a school, office buildings and commercial establishments.

Five PCAs that resulted in APECs on the Phase I Property were identified with respect to the historical use of the Phase I Property and surrounding lands. The identified PCA's are as follows:

- ❑ Retail fuel outlet on the property addressed as 321 Dalhousie Street.
- ❑ Former retail fuel outlet on the property addressed 351 Dalhousie Street (currently addressed as 353 Dalhousie Street), immediately to the west of 137 George Street.
- ❑ Printer formerly located at 125-127 George Street (currently the parking lot addressed as 137 George Street).
- ❑ Dry-cleaning business at 343 Dalhousie Street, immediately to the west of 137 George Street.
- ❑ Fill material of unknown quality across the Phase I Property.

Past subsurface environmental investigations conducted for the subject property identified soil and groundwater impacted with petroleum hydrocarbons (PHCs) above the 2011 MECP Table 3 standards, on the southwestern portion of the site. A lead concentration exceeding the 2011 standard was also identified in the fill layer on the southwestern portion of the site. Based on the heterogeneous nature of the fill material and the presence of fill material across the subject property, pockets of metal-impacted fill were expected to be encountered across the site.

It was recommended that groundwater conditions be reassessed, prior to conducting a soil and groundwater remediation program.

- ❒ 'Updated Phase II-Environmental Site Assessment, Commercial Property, 325 Dalhousie Street, 110 York Street and 137-141 George Street, Ottawa, Ontario, prepared by Paterson dated November 29, 2013.

The Phase II-ESA Updated consisted of third round of sampling at the subject property, carried out on November 12, 2013. The purpose of the sampling event was to confirm the chloroform concentrations previous identified in the groundwater at the Phase II Property, had decreased, and to reassess the PHC F2 concentrations previously identified in BH1.

Due to insufficient sample volume at BH1, the analysis of the F2 parameter could not be completed, however samples from BH1, BH2 and BH4 were submitted for analytical testing of VOCs. Chloroform was not identified in any of the samples analysed; BTEX parameters as well and/or acetone were identified at concentrations well below the Table 3 Standards.

A remedial action plan consisting of a full-depth approach whereby all PHC and metal impacted soil would be removed from the boundaries of the subject property was recommended.

- ‘Phase I-Environmental Site Assessment, 137-141 George Street and 110-116 York Street, Ottawa, Ontario, prepared by Paterson dated September 4, 2024

Based on the findings of the recent Phase I-ESA in combination with a review of previous reports, no new APECs were identified on the subject parcels of land addressed 137-141 George Street and 110 York Street. Fill material of unknown quality and the use of road salt for deicing purposes during winter conditions were identified as APECs on the newly included parcel of land addressed 116 York. A Phase II-ESA was recommended and carried out.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The Phase II ESA, carried out in conjunction with a Geotechnical Investigation, included three separate drilling programs carried out during the interim of February 24, 2023, and May 2024.

The February 2023 investigation consisted of drilling six (6) boreholes, four (4) of which (BH2-23, BH3-23, BH5-23, and BH6-23) were instrumented with groundwater monitoring wells. These boreholes were placed to further address APECs identified during past Phase I-ESAs and provide coverage of the site for Geotechnical purposes.

The following August 2023 field program consists of the placement of four (4) boreholes, all instrumented with groundwater monitoring wells (BH7-23 through BH10-23). The purpose of the boreholes was to laterally and vertically delineate groundwater impacts identified during the February 2023 investigation.

Finally, the May 2024 field program consisted of drilling five (5) boreholes across the parcel addressed 116 York Street; this parcel had not been included in the previous investigations. Three (3) of the boreholes were instrumented with groundwater monitoring wells to access the groundwater table, if required.

The boreholes were drilled to a maximum depth of 15.3 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 during the Phase I ESA.

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

- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)
- Petroleum Hydrocarbons (PHCs)
- Metals (including arsenic (As), antimony (Sb), selenium (Se), mercury (Hg) and hexavalent chromium (CrVI)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Volatile Organic Compounds

In accordance with Section 49.1 of O.Reg.153/04, as amended, electrical conductivity (EC) and sodium adsorption ratio (SAR) are not considered to be CPCs.

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 this information, the bedrock in the area of the Phase I Property consists of interbedded limestone and shale of the Verulam Formation. Overburden soils are shown as glacial till, with a drift thickness on the order of 3 to 5 m. The findings of the previously completed surface investigations confirm the reported depths.

Groundwater is anticipated to flow in a northwesterly direction, towards the Ottawa River.

Existing Buildings and Structures

The northern portion of the Phase I Property is occupied by a vacant two-storey commercial building.

Water Bodies and Areas of Natural and Scientific Interest

No water bodies are present on the Phase I Property. The closest water body is the Ottawa River, located approximately 720m west of the Phase I Property.

No areas of natural scientific interest were identified within the Phase I Study Area.

Water Well Records

A search of the MECP 's web site for all drilled well records within 250 m of the Phase I Property was conducted on February 13, 2023. Two well records were documented for the Phase I Property and pertain to monitoring wells that were installed in 2012. The monitoring wells were installed in conjunction with the previously mentioned Phase II – ESA that was completed following the identification of APECs on the Phase I Property.

In addition to the documented records, three more monitoring wells were installed on the Phase I Property in conjunction with previously completed subsurface investigations. Based on the observations made during the geotechnical and environmental assessments, the water table was intercepted at depths ranging from 3.7 to 4.5 m below the existing ground surface. Interbedded limestone and shale bedrock was encountered at a maximum depth of 5 m below the existing ground surface.

Two monitoring well records were documented for the adjacent property to the west addressed 325 Dalhousie Street. An additional three monitoring well records were documented for properties within the Phase I Study Area. The monitoring wells were drilled to depths ranging from 1.5 to 4.57 m below grade.

The identified off-site monitoring wells are not considered to be indicative of the potential for environmental impacts on the Phase I Property.

Bedrock was encountered at a maximum depth of 5.41 m below the existing ground surface, and the groundwater table was intercepted at an average depth of 4.2 m. A copy of the well records has been appended to this report.

Neighbouring Land Use

The neighbouring lands within the Phase I Study Area is primarily residential with some commercial land use. Current land use is shown on Drawing PE2709-2R – Surrounding Land Use Plan, in the Figures section of this report.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Based on the findings of this Phase I ESA Update, four on-site and five off-site potentially contaminating activities (PCAs), were deemed to result in areas of potential environmental concern (APECs) with respect to the Phase I Property. These APECs and associated PCAs and CPCs are presented in the table below.

Table 1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern with respect to Phase I Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1 Importation of Fill Material of Unknown Quality	Entire Phase I Property	"Item 30 – Importation of Fill Material of Unknown Quality"	On-site	Metals Hg CrVI PAHs BTEX PHCs (F_1–F_4)	Soil
APEC 2 Former Aboveground Storage Tank (AST)	Southwestern portion of the Phase I Property	"Item 28 – Gasoline and Associated Products Storage in Fixed Tanks"	On-site	BTEX PHCs (F_1–F_4)	Soil Groundwater
APEC 3 Former Printer	Southern/southwestern portion of the Phase I Property	"Item 31 – Ink Manufacturing, Processing and Bulk Storage"	On-site	VOCs	Soil Groundwater
APEC 4 Former Dry Cleaner and Machine Shop	Western portion of the Phase I Property	"Item 37 – Operation of Dry-Cleaning Equipment (where chemicals are used)"and other	Adjacent property to the west	Metals PHCs BTEX VOCs	Soil and/or Groundwater
APEC 5 Former Retail Fuel Outlet	Southern portion of the Phase I Property	"Item 28 – Gasoline and Associated Products Storage in Fixed Tanks"	Adjacent property to the southwest	BTEX PHCs (F_1–F_4)	Soil Groundwater
APEC 6 Former Refined Petroleum Industry and Roofing Manufacturer	Southern portion of the Phase I Property	"Item 41 – Petroleum-derived Gas Refining, Manufacturing, Processing and Bulk Storage' Other	Further South of the Phase I Property, across George Street	BTEX PHCs (F_1–F_4) PAHs VOCs	Soil and/or Groundwater

Table 1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern with respect to Phase I Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 7 Former Automotive Service Garage	Southern portion of the Phase I Property	"Item 52 – Storage, Maintenance, Fueling and Repair of Equipment Vehicles, and Material Used to Maintain Transportation Systems"	Further South of the Phase I Property, across George Street	BTEX PHCs (F_1–F_4) PAHs VOCs	Soil Groundwater
APEC 8 Former Printer and Dry-Cleaner	Southern portion of the Phase I Property	"Item 31 – Ink Manufacturing, Processing and Bulk Storage" "Item 37 – Operation of Dry-Cleaning Equipment (where chemicals are used)"	Further South of the Phase I Property, across George Street	Metals VOCs	Soil Groundwater
APEC 9 Application of road salt for snow removal and de-icing purposes	Central, southern, and eastern portions of the Phase I Property	N/A	On-site	EC/SAR	Soil and Groundwater

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 RSC property.

Based on the significant coverage of asphaltic concrete on the Phase I Property, the use of salt during conditions of snow and ice is highly probable. As such, an additional APEC was included to account for the use of salt on the property. O.Reg. 153/04 is being relied upon.

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 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.

3.4 Deviations from Sampling and Analysis Plan

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

3.5 Impediments

Physical impediments encountered during the Phase II ESA program include underground utilities, the former building foundation, and parked vehicles which limited the location of certain boreholes.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation was conducted in stages during the interim of February 24, 2023, through May 9, 2024, in conjunction with a Geotechnical Investigation.

A total of 15 boreholes were drilled to depths ranging from approximately 3.6m to 15.3m below ground surface (bgs). Eleven of the boreholes were instrumented with groundwater monitoring wells upon their completion.

The boreholes were drilled with a low clearance drill rig operated by George Downing Estate Drilling of Hawkesbury, Ontario, under full-time supervision of Paterson personnel. The borehole locations are indicated on the attached Drawing PE2709-11- Test Hole Location Plan.

Borehole and monitoring well locations from previous investigations are also presented on Drawing PE2709-11.

4.2 Soil Sampling

A total of 83 soil samples were obtained from the boreholes by means of grab sampling from auger flights/auger samples and split spoon sampling.

Split spoon samples were taken at approximate 0.76 m intervals. Rock core samples were collected with the use of coring equipment.

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 provided in Appendix 2. Note that borehole logs from previous investigations are also included.

The borehole profiles generally consist of a surficial layer of asphaltic concrete (ranging from 0.05-0.06 m in thickness), followed by fill material consisting of brown silty sand with gravel, crushed stone, cobbles and/or trace topsoil. Building debris fragments, including concrete, brick, metal and/or wood, were identified in the fill layer at BH2-23, BH7-23, BH8-23, BH1-24 and BH3-24.

The fill layer extended to a maximum depth of 3.58 m in BH6-23 and was underlain by glacial till consisting of a silty sand to sandy silt matrix with gravel, cobbles, and boulders. The fill material within BH7-23 was underlain by a concrete slab which had previously served as a crane base during the development of the adjacent property to the west. Grey limestone bedrock was encountered at a maximum depth of 5.64 m below the existing ground surface.

Petroleum hydrocarbon odours were noted in soil samples recovered from BH5-23, BH7-23, BH8-23 and BH10-23.

Borehole locations are shown on Drawing PE2709-11 – Test Hole Location Plan.

4.3 Field Screening Measurements

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

To measure the soil vapours, the analyser probe is inserted into the nominal headspace above the soil sample. A photo ionization detector (PID) or Gastech was used to measure the vapour concentrations.

The sample is agitated/manipulated gently as the measurement is taken. The peak reading registered within the first 15 seconds is recorded as the vapour measurement.

The maximum vapour readings measured were obtained from Samples BH5-23-SS6 and BH8-23-SS6 and were recorded as 341.5 ppm and 1,500 ppm. Otherwise, the vapour readings were generally less than 50ppm. The high vapour reading is indicative of potential significant contamination from lighter fraction petroleum hydrocarbons. The vapour screening can not be relied upon to identify heavier petroleum products. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

4.4 Groundwater Monitoring Well Installation

Four environmental groundwater monitoring wells and one deep geotechnical monitoring well were installed on the Phase II Property as part of the subsurface investigation.

The monitoring wells consisted of 32 mm Schedule 40 threaded PVC risers and screens. Monitoring well construction details are listed in Table 2 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Borehole locations and elevations were surveyed geodetically by Paterson personnel.

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 (Geo)	61.52	15.32	12.3-15.3	11.5-15.3	3.6-11.5	Flushmount
BH2-23	61.53	7.6	4.6-7.6	4.2-7.6	2.4-4.2	Flushmount
BH3-23	61.87	7.6	4.5-7.6	3.9-7.6	2.4-4	Flushmount
BH5-23	62.08	6.8	3.7-6.8	3.3-6.8	1.8-3.3	Flushmount
BH6-23	62.09	7.1	4.1-7.1	4.1-7.1	2.4-3.4	Flushmount
BH1-24	60.78	10.03	7.03-10.03	6.67-10.03	0.00-7.03	Flushmount
BH3-24	60.92	10.26	7.26-10.26	6.67-10.26	0.00-7.26	Flushmount
BH4-24	61.33	10.34	7.34-10.34	6.12-10.34	0.00-7.34	Flushmount

4.5 Field Measurement of Water Quality Parameters

The first round of groundwater sampling was conducted on March 8, 2023. Water quality parameters were measured in the field using a multi-parameter analyzer. Parameters measured in the field included temperature, pH, and electrical conductivity. Secon and third rounds of sampling were carried out in March 23, 2023 and June 27, 2023 for BH3-23 and/or BH5-23, however the results of the initial sampling event are presented below.

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. Stabilized field parameter values are summarized in Table 3.

Table 3: Groundwater Quality Parameters

Well ID	Temperature (ºC)	Conductivity (µs)	pH
March 8, 2023			
BH2-23	9.2	3989	7.96
BH3-23	9.7	2778	8.19
BH5-23	11.3	2453	7.58
BH6-23	12.3	3595	12.4

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 4 and 5, respectively.

TABLE 4 – Analyzed Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameter					Rationale
		Metals[1]	BTEX	PHCs F_1-F_4	PAHs	VOCs	
BH1-23-SS2	0.76 – 1.37 m Silty Sand (Fill Material)	X	X	X	X		Assess fill material of unknown quality. Sample depth determined by CPC, location of APEC and associated medium.
BH1-23-SS3	1.60 – 2.20 m Silty Sand (Fill Material)	X	X	X	X		Assess fill material of unknown quality. Sample depth determined by CPC, location of APEC and associated medium.
BH1-23-SS4	2.30 – 2.90 m Silty Sand (Fill Material)			X		X	Assess potential soil impacts resulting from various off-site industries (eastern portion of Phase II Property). Sample depth determined by CPC, location of APEC and associated medium.
BH1-23-SS5	3.2 – 3.4 m Glacial Till (Native)		X	X			Assess potential impacts resulting from various off-site industries (eastern portion of Phase II Property). Sample depth determined by CPC, location of APEC and associated medium.
BH2-23-SS2	0.8 – 1.4 m Silty Sand (Fill Material)	X	X	X	X		Assess fill material of unknown quality. Sample depth determined by CPC, location of APEC and associated medium.
BH2-23-SS4	2.4-3.0 m Silty Sand (Fill Material)	X	X	X			Assess fill material of unknown quality. Sample depth determined by CPC, location of APEC and associated medium.
BH2-23-SS5	3.10 – 3.70 m Glacial till (Native)			X		X	Assess potential soil impacts resulting from various off-site industries (northeastern portion of Phase II Property) and general coverage. Sample depth determined by CPC, location of APEC and associated medium.
BH3-23-AU2	0.25 –0.61 m Silty Sand (Fill)	X	X	X	X		Assess fill material of unknown quality. Sample depth determined by CPC, location of APEC and associated medium.
BH3-23-SS4	1.6 - 2.2 m Silty Sand (Fill)	X	X	X	X	X	Assess fill material of unknown quality and general coverage. Sample depth determined by CPC, location of APEC and associated medium.
BH3-23-SS5	3.2 – 3.6 m Glacial Till (Native)	X	X	X		X	Assess potential soil impacts resulting from the former dry cleaner and machine shop previously located on the adjacent property to the west (western portion of Phase II Property) and general coverage. Sample depth determined by CPC, location of APEC and associated medium.
DUP1-23 (duplicate of BH3-23-SS5)	3.2 – 3.6 m Glacial Till (Native)					X	Assess potential soil impacts resulting from the former dry cleaner and machine shop previously located on the adjacent property to the west (western portion of Phase II Property) and general coverage. Sample depth determined by CPC, location of APEC and associated medium.
BH3-23-SS6	4.6 – 5.2 m Glacial Till (Native)	X				X	Assess potential soil impacts resulting from the former dry cleaner and machine shop previously located on the adjacent property to the west (western portion of Phase II Property) and general coverage. Sample depth determined by CPC, location of APEC and associated medium.
BH4-23-SS3	0.77 - 1.37 m Silty Sand (Fill)	X	X	X	X		Assess fill material of unknown quality and general coverage. Sample depth determined by CPC, location of APEC and associated medium.
BH4-23-SS4	1.6 - 2.2 m Glacial Till (Native)	X	X	X	X		Assess fill material of unknown quality and general coverage. Sample depth determined by CPC, location of APEC and associated medium.

TABLE 4 – Analyzed Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameter					Rationale
		Metals[1]	BTEX	PHCs F_1-F_4	PAHs	VOCs	
BH5-23-AU1	0.06 – 0.25 m Silty Sand (Fill)	X	X	X	X		Assess fill material of unknown quality and potential for soil impacts resulting from the former AST and printer previously located on the Phase II Property (southwestern portion of the Phase II Property). Sample depth determined by CPC, location of APEC and associated medium.
BH5-23-SS3	1.6 – 2.2 m Silty Sand (Fill)	X	X	X	X		Assess fill material of unknown quality and potential for soil impacts resulting from the former AST and printer previously located on the Phase II Property (southwestern portion of the Phase II Property). Sample depth determined by CPC, location of APEC and associated medium.
BH5-23-SS6	4 – 4.6 m Glacial Till (Native)	X		X		X	Assess potential for soil impacts resulting from the former AST and printer previously located on the Phase II Property, as well as former retail fuel outlet on adjacent property to the west (southwestern portion of the Phase II Property). Sample depth determined by CPC, location of APEC and associated medium.
DUP (duplicate of BH5-23-SS6	4 – 4.6 m Glacial Till (Native)	X		X		X	Assess potential for soil impacts resulting from the former AST and printer previously located on the Phase II Property, as well as former retail fuel outlet on adjacent property to the west (southwestern portion of the Phase II Property). Sample depth determined by CPC, location of APEC and associated medium.
BH6-23-SS2	0.77 – 1.37 m Silty Sand (Fill)	X	X	X	X		Assess fill material of unknown quality and general coverage. Sample depth determined by CPC, location of APEC and associated medium.
BH6-23-SS5	3.2 – 3.4 m Silty Sand (Fill)	X	X	X	X		Assess fill material of unknown quality and general coverage Sample depth determined by CPC, location of APEC and associated medium.
BH7-23-SS3	1.5-2.1 m Glacial Till (Native)		X	X			Delineation of previously identified PHC impacts. Samples selected based on results of vapour screening in combination with depth.
BH8-23-SS6	3.8-4.4 m Glacial Till (Native)		X	X			
BH1-24-AU1	0-0.3 m Silty Sand (Fill)	X	X	X	X		Assess potential impacts in the fill. Sample selected based on depth and visual observations.
BH1-24-SS3	1.5-2.1 m Silty Sand (Fill)	X	X	X	X		
BH1-24-SS5	3.0-3.6 m Glacial Till (Native)	X	X	X	X		Sample selected based on vapour screening and depth, to characterize soil for off-site disposal purposes.
BH2-24-AU1	0.1-0.3 m Silty Sand (Fill)	X	X	X	X		Assess potential impacts in the fill. Sample selected based on depth and visual observations.
BH2-24-SS3	1.5-2.1 m Glacial Till (Native)	X	X	X	X		Sample selected based on vapour screening and depth, to characterize soil for off-site disposal purposes.
BH3-24-AU1	0-0.46 m Silty Sand (Fill)	X	X	X	X		Assess potential impacts in the fill. Sample selected based on depth and visual observations.
BH3-24-SS5	3.0-3.6 m Glacial Till (Native)	X	X	X	X		Sample selected based on vapour screening and depth, to characterize soil for off-site disposal purposes.
BH4-24-AU1	0-0.46 m Silty Sand (Fill)	X	X	X	X		Assess potential impacts in the fill. Sample selected based on depth and visual observations.
BH4-24-SS2	0.73-1.37 m Silty Sand (Fill)	X	X	X	X		

TABLE 4 – Analyzed Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameter					Rationale
		Metals[1]	BTEX	PHCs F_1-F_4	PAHs	VOCs	
BH4-24-SS3	1.52-2.13 m Glacial Till (Native)	X			X		Sample selected based on vapour screening and depth, to characterize soil for off-site disposal purposes.
BH4-24-SS6	3.81-4.42 m Glacial Till (Native)	X	X	X			
BH5-24-AU1	0.05-0.46 m Silty Sand (Fill)	X	X	X	X		Assess potential impacts in the fill. Sample selected based on depth and visual observations.
BH5-24-SS2 (Bottom)	0.76-1.37 m Glacial Till (Native)	X	X	X			Sample selected based on vapour screening and depth, to characterize soil for off-site disposal purposes.

Notes:
1 – includes As, Sb, Se, CrVI and Hg (apart from BH-24-SS5, BH4-24-SS6 and BH5-24-SS2 (Bottom) for which CrVI and Hg was not analysed)

The submitted soil samples were selected for analysis based on vapour screening and field observations, in combination with information obtained during previous investigations, to assess APECs and associated CPCs identified in the Phase I – ESA.

As indicated, samples were also analysed to characterize soil for possible off-site beneficial reuse, in accordance with O.Reg. 406/19, as excess soil is expected to be generated during redevelopment. A comparison of the soil results to the Excess Soil Quality Standards, is provided under separate cover.

TABLE 5- Testing Parameters for Submitted Groundwater Samples

Sample ID	Screened Interval	Parameters Analyzed					Rationale
		PHCs F_1-F_4	BTEX	VOCs	Metals [1]	PAHs	
B2-23-GW1	4.6-7.6 m Glacial Till into Bedrock	X	X	X			Assess potential groundwater impacts resulting from various off-site industries (northeastern portion of Phase II Property). The screened interval was selected based on the depth at which the highest concentrations would likely be present (i.e., Top of water table, which straddles the soil/bedrock interface)

TABLE 5- Testing Parameters for Submitted Groundwater Samples

Sample ID	Screened Interval	Parameters Analyzed					Rationale
		PHCs F_1-F_4	BTEX	VOCs	Metals [1]	PAHs	
BH3-23-GW1	4.5-7.6 m Glacial Till into Bedrock		X	X			Assess potential groundwater impacts resulting from the former dry cleaner and machine shop previously located on the adjacent property to the west and for general coverage (western portion of Phase II Property) The screened interval was selected based on the depth at which the highest concentrations would likely be present (i.e., Top of water table, which straddles the soil/bedrock interface)
DUP1-23-GW1 (duplicate of BH3-23-GW1)	4.5-7.6 Glacial Till into Bedrock		X	X			Assess potential groundwater impacts resulting from the former dry cleaner and machine shop previously located on the adjacent property to the west and for general coverage (western portion of Phase II Property). The screened interval was selected based on the depth at which the highest concentrations would likely be present (i.e., Top of water table, which straddles the soil/bedrock interface)
BH5-23-GW1	3.7-6.8 Glacial Till into Bedrock	X	X	X			Assess potential groundwater impacts resulting from the former AST and printer on the Phase II Property, as well as the former retail fuel outlet on the adjacent property to the west (southwestern portion of the Phase II Property) The screened interval was selected based on the depth at which the highest concentrations would likely be present (i.e., Top of water table, which straddles the soil/bedrock interface)
BH6-23-GW1	4.1-7.1 Glacial Till into Bedrock	X	X	X			General Coverage
BH3-23-GW2	4.5-7.6 m Glacial Till into Bedrock	X	X	X			Confirm previous chloroform results have dissipated.
BH5-23-GW2	3.7-6.8 m Glacial Till into Bedrock	X	X				Confirm previous PHC results.
BH5-23-GW3	3.7-6.8 m Glacial Till into Bedrock	X	X				
BH7-23-GW1	3.8-6.8 m Glacial Till into Bedrock	X	X				Lateral delineation of impacts at BH5-23.
BH8-23-GW1	9.1-12.2 m Bedrock	X	X	X			Vertical delineation of impacts at BH5-23.
BH9-23-GW1	6.0-9.0 Bedrock	X	X				Lateral delineation of impacts at BH5-23.
BH1-24-GW1	7.0-10.3 m Bedrock	X	X		X	X	General Coverage (no groundwater CPC identified)
BH3-24-GW1	7.0-10.3 m Bedrock				X	X	
BH4-24-GW1	7.0-10.3 m Bedrock				X	X	

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

4.8 Residue Management

All 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 with a high-precisions GPS unit.

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 generally consist of a surficial layer of asphaltic concrete (ranging from 0.05-0.06 m in thickness), followed by fill material consisting of brown silty sand with gravel, crushed stone, cobbles and/or trace topsoil. Building debris fragments, including concrete, brick, metal and/or wood, were identified in the fill layer at BH2-23, BH7-23, BH8-23, BH1-24 and BH3-24.

The fill layer extended to a maximum depth of 3.58 m in BH3-23 and was underlain by glacial till consisting of a silty sand to silty clay matrix with gravel, cobbles and boulders. The fill material within BH6-23 was underlain by a concrete slab which had previously served as a crane base during the development of the adjacent property to the west. Grey limestone bedrock was encountered at a maximum depth of 5.64 m below the existing ground surface.

Groundwater was measured at depths ranging from approximately 2.5 to 6.3 mbgs. Based on field observations, the overburden was not considered to be the water bearing unit. Monitoring well BH10-23 installed within the overburden was dry. The groundwater is expected to be present within the bedrock near the soil-bedrock interface.

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

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling event on March 8, 2023, using an electronic water level meter. Groundwater levels were recorded from the monitoring wells installed in BH1-23, B2-23, BH3-23, BH5-23 and BH6-23. Groundwater levels are summarized below in Table 6.

TABLE 6 - Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1-23	61.52	4.49	57.03	March 8, 2023
BH2-23	60.53	4.98	55.55	March 8, 2023
BH3-23	61.87	3.48	58.39	March 8, 2023
BH5-23	62.09	2.51	59.58	March 8, 2023
BH6-23	62.08	2.77	59.31	March 8, 2023
BH3-23	61.87	4.52	57.35	March 23, 2023
BH5-23	62.09	3.99	58.1	March 23, 2023
BH6-23	62.08	4.91	57.17	March 23, 2023
BH1-24	60.78	3.46	57.32	May 22, 2024
BH3-24	60.92	6.15	54.78	May 22, 2024
BH4-24	61.33	6.29	55.04	May 22, 2024

Based on the groundwater elevations measured during the March 2023 sampling event, groundwater contour mapping was completed. Groundwater contours are shown on Drawing PE2709-11 – Test Hole Location Plan.

Based on the contour mapping, groundwater flow at the Phase II Property is in an easterly direction. The local groundwater flow may have been influenced by the deep excavation on the adjacent property to the east. Regional groundwater flow is expected to be in a northerly direction. It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations.

A horizontal hydraulic gradient of approximately 0.07 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

Field screening of the soil samples collected during drilling resulted in vapour readings ranging generally from 0.1 less than 50 ppm. Hydrocarbon odours were observed in soil Samples BH5-23-SS6 and BH8-23-SS6 which had the highest vapour readings of approximately 345 ppm and 1,500 ppm.

Building debris fragments, including concrete, brick, metal and/or wood, were identified in the fill layer at BH2-23, BH7-23, BH8-23, BH1-24 and BH3-24. No other unusual/deleterious materials or substances were identified within the fill material across the Phase II Property during the subsurface investigations.

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, 33 soil samples and 4 duplicate samples were submitted for analysis of metals (including As, Sb, Se, Hg and/or CrVI), PAHs, BTEX, PHCs (F1-F4), VOCs and/or pH. The results of all the analytical testing completed on the Phase II Property (including past assessments) are presented in Table A1 appended to this report. The laboratory Certificates of Analysis are also provided in the Appendix.

Metals (including As, Sb, Se), Hg and CrVI

All of the analyzed metal parameters are in compliance with the applicable MECP Table 3 Standards, with the exception of lead, mercury, and zinc in soil Sample BH2-23-SS2 and lead and mercury in soil Samples BH3-23-AU2 and BH4-24-SS2. Additionally, soil Sample BH4-SS3, which was submitted during the 2012 assessment, and Sample BH5-24-AU1, exceeded the MECP Table 3 standard for only lead.

Sample BH4-24-SS3 was submitted for analysis of methyl mercury due to the exceedance of mercury in Sample BH4-24-SS2. Methyl mercury was not detected in the sample analysed.

The analytical results for metals (including As, Sb, Se, CrVI and Hg) tested in soil are shown on Drawing PE2709-12– Analytical Testing Plan – Soil (Metals).

PAHs

Various PAH parameters identified in soil Samples BH2-23-SS2, BH3-23-AU2, BH1-24-SS3, BH2-24-AU1, BH3-24-AU1, BH4-24-AU1, BH4-24-SS2 and BH5-24-AU1, exceed the MECP Table 3 Standards. All other samples analysed meet the MECP Table 3 Residential Standards.

The analytical results for PAHs tested in soil are shown on PE2709-13 – Analytical Testing Plan – Soil (PAHs).

PHCs (F_1-F_4)

All the detected PHC concentrations in the analysed soil samples comply with the applicable MECP Table 3 Standards, apart from PHC fraction F_3 concentrations in soil Samples BH1-23-SS4, BH2-23-SS2, BH5-23-AU1, BH4-24-AU1, and PHC fractions F_1 and F_2 in Sample BH8-23-SS6. The analytical results for PHCs tested in soil are shown on Drawing PE2709-14 – Analytical Testing Plan – Soil (PHCs).

Additionally, soil Sample BH1-SS7 that was submitted as part of the 2012 assessment, had PHC fraction F_1 and F_2 that exceeded the applicable MECP Table 3 standards.

BTEX

No BTEX concentrations were identified in any of the samples analysed except for Sample BH8-23-SS6 which identified concentrations of BTEX well below the MECP Table 3 standards. All samples analysed comply with the MECP Table 3 standards. The analytical results for BTEX tested in soil are shown on Drawing PE2709-15 – Analytical Testing Plan – Soil (BTEX).

VOCs

No VOC parameters were identified in the samples analysed. As such, the results comply with the MECP Table 3 standards. The analytical results for VOCs tested in soil are shown on Drawing PE2709-16 – Analytical Testing Plan – Soil (VOCs).

The maximum parameter concentrations identified within the soil samples are listed below in Table 7.

TABLE 7: Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Soil Sample	Depth Interval (m BGS)
Antimony	2.2	BH2-23-SS2	0.8-1.4
Arsenic	10.2	BH6-23-SS5	3.2-3.4
Barium	321	BH2-23-SS2	0.8-1.4
Beryllium	0.6	BH2-23-SS2	0.8-1.4
Boron	16.2	BH6-23-SS2	0.76-1.37
Cadmium	0.6	BH2-23-SS2	0.8-1.4
Chromium	29.2	BH2-23-SS2	0.8-1.4
Cobalt	11.8	BH6-23-SS5	3.2-3.4
Copper	120	BH2-23-SS2	0.8-1.4
Lead	524	BH4-SS3	0.8-1.2
Mercury	**2.7**	BH2-23-SS2	0.8-1.4
Molybdenum	5.4	BH6-23-SS5	3.2-3.4
Nickel	20.3	BH6-23-SS5	3.2-3.4
Selenium	1.3	BH2-23-SS2	0.8-1.4
Silver	1.8	BH1-AU1	0-0.25
Vanadium	**321**	BH1-AU1	0-0.25
Zinc	**429**	BH2-23-SS2	0.8-1.4
Acenaphthene	0.76	BH2-23-SS2	0.8-1.4
Acenaphthylene	**0.19**	BH2-23-SS2	0.8-1.4
Anthracene	**1.58**	BH2-23-SS2	0.8-1.4
Benzo[a]anthracene	**2.72**	BH2-23-SS2	0.8-1.4
Benzo[a]pyrene	**2.37**	BH2-23-SS2	0.8-1.4
Benzo[b]fluoranthene	**3**	BH2-23-SS2	0.8-1.4
Benzo[g,h,i]perylene	1.45	BH2-23-SS2	0.8-1.4
Benzo[k]fluoranthene	**1.68**	BH2-23-SS2	0.8-1.4
Chrysene	2.68	BH2-23-SS2	0.8-1.4
Dibenzo[a,h]anthracene	**0.38**	BH2-23-SS2	0.8-1.4
Fluoranthene	**6.09**	BH2-23-SS2	0.8-1.4
Fluorene	0.53	BH2-23-SS2	0.8-1.4
Indeno [1,2,3-cd] pyrene	**1.4**	BH2-23-SS2	0.8-1.4
1-Methylnaphthalene	0.13	BH2-23-SS2	0.8-1.4
2-Methylnaphthalene	0.18	BH2-23-SS2	0.8-1.4
Methylnaphthalene (1&2)	0.31	BH2-23-SS2	0.8-1.4
Naphthalene	0.22	BH2-23-SS2	0.8-1.4
Phenanthrene	4.82	BH2-23-SS2	0.8-1.4
Pyrene	4.84	BH2-23-SS2	0.8-1.4
F1 PHCs (C6-C10)	**182**	BH1-SS7	4.6-4.7
F2 PHCs (C10-C16)	**118**	BH1-SS7	4.6-4.7
F3 PHCs (C16-C34)	**699**	BH5-23-AU1	0.06-0.25
F4 PHCs (C34-C50)	1650	BH5-23-AU1	0.06-0.25
Ethylbenzene	0.1	BH5-23-SS6	4-4.6
Xylenes, total	0.22	BH5-23-SS6	4-4.6

Notes:

- * Duplicate of BH3-AU1
- **Bold and Underlined** – Results exceed the selected MECP standards

5.6 Groundwater Quality

Five groundwater samples (including one duplicate) from monitoring wells installed in BH2-23, BH3-23, BH5-23 and BH6-23 were submitted for laboratory analysis of BTEX, PHCs and VOCs. The groundwater samples were obtained from the screened intervals noted in Table 2.

Six groundwater samples collected during the 2012 investigation, from previously existing monitoring wells in BH1, BH4 and BH1-11, were submitted for analytical testing of BTEX, PHCs and VOCs.

Analytical testing results from both the current program and 2012 investigation are presented in Table A2. The laboratory Certificates of Analysis are provided in Appendix 1.

PHCs (F_1-F_4)

Hydrocarbon parameters were not identified in any of the samples except for samples recovered from BH1 (2012), BH5-23, BH7-23 and BH1-24. The concentrations of PHC F_1 or PHC F_4 identified in BH1 (2012), BH7-23 and BH1-24, complied with the MECP Table 3 standards. Concentrations of PHC F_1 and F_2 identified in groundwater samples BH5-23-GW1 exceeded the MECP Table 3 standards, resulting in the completion of a second round of sampling.

Groundwater from BH5-23 was resampled and submitted for analytical testing of BTEX and PHCs. All the analytical test results from the second groundwater sampling event complied with the applicable MECP Table 3 standards.

A third groundwater sampling event with clean results was required to meet industry standards, however the results of this sampling event identified concentrations of PHC F_1 and F_2 similar to that identified in BH5-23-GW1, at levels above the MECP Table 3 standards.

The analytical results for groundwater tested are shown on Drawing PE2709-19– Analytical Testing Plan – Groundwater (PHCs).

BTEX/VOCs

No VOC parameters were identified in any of the samples analysed, apart from chloroform identified in BH1-GW1, BH4-GW1, BH4-GW2, BH3-23-GW1, DUP1-23-GW1, and BH8-23-GW1. Except for BH8-23-GW1, all wells were resampled, and chloroform was not identified.

The chloroform in the groundwater samples resulted from the use of municipally treated water for the bedrock coring process required for installation of monitoring wells. All concentrations of chloroform identified were less than 240 µg/L as lited in Table A of the MECP document entitled "Guidance for Addressing Chloroform at a Record of Site Condition Property" and as such, the exemption in Paragraph 2 of Section 49.1 or O.Reg. 153/04 is being relied upon.

All BTEX parameters identified were in compliance with the MECP Table 3 standards.

The analytical results for BTEX and VOCs in groundwater are shown on Drawing PE2709-17– Analytical Testing Plan – Groundwater (BTEX, VOCs).

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of the 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.

Four duplicate soil samples were collected from BH3-23-SS5 (DUP1-23), BH5-23-SS6 (DUP), BH1-24-SS5 (DUP1) and BH4-24-SS6 (DUP2), and were submitted for metals, PHCs, and/or VOCs. 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 BH5-23-SS6, BH1-24-SS5 and BH4-24-SS6 and their respective duplicate samples are provided in Tables 8A-8C.

All of the analyzed VOC concentrations in BH3-23-SS5 and its duplicate sample, DUP1-23, were not detected above the laboratory method detection limit; as such these results are not tabulated below.

Table 8A - QA/QC – Soil – BH5-23-SS6 and DUP					
Parameter	**MDL (µg/g)**	**BH5-23-SS6**	**DUP**	**RPD (%)**	**QA/QC Result**
Arsenic	1.0	4.1	4.6	11.5	Meets Target
Barium	1.0	129	211	48	Does Not Meet Target
Boron	5.0	8	8.9	5.3	Meets Target
Chromium	5.0	13.5	15.5	13.7	Meets Target
Cobalt	1.0	4.5	4.9	4.2	Meets Target
Copper	5.0	5	5.5	9.5	Meets Target
Lead	1.0	5	5.1	2	Meets Target
Nickel	5.0	11.4	12.5	9.2	Meets Target
Vanadium	10.0	15.4	18	4.2	Meets Target
Zinc	20.0	32.4	36.8	12.1	Meets Target
PHC F_1	7	7	8	13	Meets Target
PHC F_2	4	4	28	150	Does Not Meet Target
Ethylbenzene	0.05	0.1	0.08	22	Does Not Meet Target
Xylenes, total	0.05	0.22	0.21	4.6	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.

Table 8B - QA/QC – Soil – BH1-24-SS5 and DUP1					
Parameter	**MDL (µg/g)**	**BH1-24-SS5**	**DUP1**	**RPD (%)**	**QA/QC Result**
Arsenic	1.0	2.1	2.2	4.7	Meets Target
Barium	1.0	35.8	35.9	0.28	Meets Target
Boron	5.0	8	5.2	46.7	Does not Meet Target
Chromium	5.0	11.8	12.2	3.3	Meets Target
Cobalt	1.0	4.6	4.8	4.3	Meets Target
Copper	5.0	6.8	7.8	13.7	Meets Target
Lead	1.0	4	4.2	4.9	Meets Target
Nickel	5.0	8.3	8.7	4.7	Meets Target
Vanadium	10.0	18.7	19.1	2.1	Meets Target
Acenaphthene	0.02	0.02	0.02	0	Meets Target
Anthracene	0.02	0.06	0.06	0	Meets Target
Benzo[a]anthracene	0.02	0.05	0.05	0	Meets Target
Benzo[b]pyrene	0.02	0.04	0.04	0	Meets Target
Benzo[b]fluoranthene	0.02	0.04	0.03	28.6	Does not Meet Target
Benzo[g,h,i]perylene	0.02	0.02	0.03	40	Does not Meet Target
Benzo[k]fluoranthene	0.02	0.03	0.03	0	Meets Target
Chrysene	0.02	0.05	0.05	0	Meets Target
Fluoranthene	0.02	0.2	0.18	10.5	Meets Target
Fluorene	0.02	0.03	0.02	40	Does not Meet Target
Naphthalene	0.01	0.04	0.02	67	Does not Meet Target
Phenanthrene	0.02	0.19	0.18	5.4	Meets Target
Pyrene	0.02	0.14	0.14	0	Meets Target

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

Table 8C - QA/QC – Soil – BH4-24-SS6 and DUP2					
Parameter	**MDL (µg/g)**	**BH1-24-SS5**	**DUP2**	**RPD (%)**	**QA/QC Result**
Arsenic	1.0	3	2.7	10.5	Meets Target
Barium	1.0	36.7	43	15.8	Meets Target
Boron	5.0	7.4	7.7	4.0	Meets Target
Chromium	5.0	9.5	10.5	10	Meets Target
Cobalt	1.0	2.9	3.3	12.9	Meets Target
Lead	1.0	5.6	5.6	0	Meets Target
Nickel	5.0	6.5	7.1	8.8	Meets Target
Vanadium	10.0	13.6	14.9	9.1	Meets Target

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

Typically, RPD values below 20% indicate satisfactory quality. The relative percent difference (RPD) results calculated for three soil parameters (barium, ethylbenzene and PHC F2) identified in Sample BH5-23-SS6 and its duplicate, as well as for boron and several PAH parameters in Sample BH1-24-SS4 and its duplicate, 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 the soil samples and the corresponding duplicate, it should be noted that the concentrations of the parameters were well within the applicable MECP Table 3 Standards in both samples.

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 collected field data is sufficient to meet the overall objectives of this assessment.

A duplicate groundwater sample (DUP1-23-GW1) was obtained from the monitoring well installed in BH3-23 and submitted for laboratory analysis of VOC parameters. The RPD calculations for the original groundwater and duplicate sample are provided in Table 13.

Table 9 - QA/QC Calculations – Groundwater

Parameter	MDL (µg/L)	BH3-23-GW1	DUP1-23-GW1	RPD (%)	QA/QC Result
Benzene	0.5	0.6	0.6	0	Meets Target
Chloroform	0.5	2.5	2.6	4	Meets Target
Toluene	0.5	3.4	3.5	2.8	Meets Target
Xylenes, Total	0.5	4.5	4.2	7	Meets Target

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

All of the calculated RPD values from BH3-23-GW1 and the duplicate samples BH1-23-GW1 are well below the required 20%.

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, nine (9) PCAs were considered to result in APECs on the Phase II Property. The identified APECs on the Phase II Property are presented in Table 1 in the Phase I CSM and are as follows:

- ❒ APEC 1: Resulting from the importation of fill material of unknown quality (PCA #30);
- ❒ APEC 2: Resulting from the presence of a former on-site aboveground storage tank (AST) (PCA #28);
- ❒ APEC 3: Resulting from the presence of a former printer previously located on the southwestern portion of the Phase II Property (PCA #31);
- ❒ APEC 4: Resulting from the presence of a former dry cleaner and machine shop on the adjacent property to the west (PCA #37).
- ❒ APEC 5: Resulting from the presence of a former retail fuel outlet on the adjacent property to the west (PCA #28).
- ❒ APEC 6: Resulting from the presence of a former refined petroleum industry and roofing manufacturer previously located to the south, across George Street (PCAs #41 and #28);
- ❒ APEC 7: Resulting from the presence of a former automotive service garage previously located to the south, across George Street (PCA#52);
- ❒ APEC 8: Resulting from the presence of a former printer and drycleaner previously located to the south, across George Street (PCA #31 and #37)

- ❒ APEC 9: Application of road salt for the removal of snow and de-icing purposes (PCA #NA)

Based on the findings of the Phase I ESA, it is considered likely that road salt was applied to the surface of the parking lot across the Phase II Property for the safety of vehicular and pedestrian traffic under conditions of ice and/or snow. Although not defined as a specific PCA under Column A of Table 2 of O.Reg. 153/04, the use of salt for safety purposes is considered to result in an APEC on the Phase I Property (APEC 4).

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

In accordance with Section 49.1 of O.Reg. 153/04, any EC and SAR concentrations on the RSC Property that exceed the MECP Table 3 Standards for a residential/institutional land use are deemed not to be exceeded for the purpose of Part XV.1 of the Act. This exemption is being relied on for APEC 9.

Contaminants of Potential Concern

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

- ❒ Metals (including arsenic (As), antimony (Sb), selenium (Se), mercury (Hg) and hexavalent chromium (CrVI)) (Soil);
- ❒ Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (Soil and/or Groundwater);
- ❒ Petroleum Hydrocarbons (PHCs) (Soil and/or Groundwater);
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs) (Soil); and
- ❒ Volatile Organic Compounds (VOCs) (Soil and/or Groundwater)

In accordance with Section 49.1 of O.Reg.153/04, as amended, electrical conductivity (EC) and sodium adsorption ratio (SAR) are not considered to be CPCs.

Subsurface Structures and Utilities

The Phase I Property is situated in a municipally serviced area. Underground utility services on the subject land during the Phase I site visits include natural gas, electrical, cable, sewer and water services. Services have since been decommissioned.

No potable wells or private sewage systems were observed on the Phase I Property at the time of the site visit. No other subsurface structures were identified at the time of the site visit apart from the foundation associated with the former structure at 110 York Street.

Physical Setting

Site Stratigraphy

The stratigraphy of the Phase II Property generally consists of:

Groundwater was encountered within the overburden at depths ranging from 2.51 to 6.29 mbgs.

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

- Asphaltic concrete; encountered at depths ranging from approximately 0.05 to 0.06 mbgs.
- Fill material consisting of brown or grey silty sand with gravel, crushed stone, cobbles and/or trace topsoil; extending to a maximum depth of approximately 3.6 mbgs in BH6-23. Building debris fragments, including concrete, brick, metal and/or wood, were identified in the fill layer at BH2-23, BH7-23, BH8-23, BH1-24 and BH3-24.
- Glacial Till; consisting of brown to grey silty sand to sandy silt matrix with gravel, cobbles and boulders extending to a maximum depth of 5.64 mbgs. (The fill material within BH7-23 was underlain by a concrete slab which had previously served as a crane base during the development of the adjacent property to the west.)
- Grey limestone bedrock was encountered at a maximum depth of 5.64 mbgs.

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 at the soil-bedrock interface at depths ranging from 2.77 to 6.29 mbgs. Based on field observations, the soil is not considered to be a water-bearing unit; it is anticipated that the water table exists within the bedrock.

Based on the March 2023 groundwater monitoring event, groundwater flow was measured in an eastern direction with a hydraulic gradient of 0.07 m/m. It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations. The flow direction in the immediate vicinity of the Phase II Property is expected to have been influenced by the deep excavation on the adjacent property to the east. Regional groundwater flow is expected to be in a northerly direction, toward the Ottawa River. Groundwater contours are shown on Drawing PE2709-11 – Test Hole Location Plan.

Approximate Depth to Bedrock

Grey limestone bedrock was confirmed at each borehole location; depth to bedrock at the Phase II Property ranges from approximately 4.6 to 5.6m below grade.

Approximate Depth to Water Table

The water table was measured at depths ranging from 2.77 to 6.29 mbgs.

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 and the pH of the surface soil is between 5 and 9 while the pH of the subsurface soil is between 5 and 11.

Section 43.1 of the Regulation does not apply to the Phase II Property given the property is not a shallow soil property and is not within 30m of a body of water.

Areas Where Excess Soil Has Been Finally Placed on the Phase II Property

No excess soil has been finally placed on, in or under the Phase II Property.

Existing Buildings and Structures

The northern portion of the Phase I Property was most recently occupied by a vacant, two-storey commercial building fronting onto York Street (civic address 110 York Street). The former structure was demolished in April 2024.

Proposed Buildings and Other Structures

The proposed site development for the Phase II Property will consist of a multi-storey, mixed-used development comprised of residential dwellings and a commercial hotel. An underground parking lot will occupy the entire Phase II Property below grade.

Environmental Condition

Areas Where Contaminants are Present

Based on the findings of the current Phase II ESA, including the results of past investigations, fill material impacted with metals, mercury, PHCs and PAHs was identified in pockets across the site. Additionally, PHC impacted glacial till was also identified on the southern portion of the Phase II Property, primarily within the southwest corner. A PHC F_3 concentration identified at BH1-23 on the southeastern portion of the site within the native material, is considered to be from a separate source.

Groundwater impacted with PHCs was identified at BH5-23; based on the findings of the Phase II ESA, the impacted groundwater is confined within the southwestern portion of the Phase II Property. The groundwater impacts are expected to be present within the soil-bedrock interface.

Types of Contaminants

Contaminants include metals, mercury, PHC and PAH concentrations in the soil, as well as PHC F_1 and F_2 concentrations in the groundwater. Note that methyl mercury was also analysed in a soil sample recovered from BH4-24, given the mercury exceedance; no methyl mercury was identified in the sample analysed.

Contaminated Media

Based on the findings of this Phase II ESA, the fill material across most of the site and the native glacial till on the southern portion of Phase II Property, has been impacted with PHCs, metals, mercury and/or PAHs.

Groundwater within the southwestern portion of the site has been impacted with PHC $F_1$and PHC F_2 concentrations.

What Is Known About Areas Where Contaminants Are Present

The impacted fill material is considered to have resulted from the importation of fill material of unknown quality, for historical grading purposes following the demolition of previously existing buildings on the Phase II Property.

The native glacial till within the southwestern corner of the site is considered to have resulted from the former operation of a retail fuel outlet (RFO) on the adjacent property to the west.

Similarly, the groundwater on this portion of the site is impacted with residual PHC concentrations considered to have originated from the former RFO.

A PHC F_3 concentration identified at BH1-23 on the southeastern portion of the site within the native material, is expected to be from a separate source, possibly associated with former buildings on this portion of the site.

Distribution and Migration of Contaminants

Based on the findings of the Phase I and Phase II ESA, contaminants of concern identified within the fill material are not considered to have migrated significantly beyond the fil layer.

The native glacial till impacts are also considered to be limited in extent and are isolated primarily to the southern portion of the Phase II Property.

Discharge of Contaminants

Based on the findings of this Phase II ESA, the shallow soil impacts are considered to have resulted from the importation of fill material of unknown quality. The PHC impacted native glacial till on the southwestern portion of the Phase II Property is considered to have resulted from the former operation of an RFO on the adjacent property to the west, while the PHC F_3 concentration identified on the southeastern portion of the site within the native soil, may be associated with former on-site buildings on this portion of the Phase II Property.

Climatic and Meteorological Conditions

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

Given the site was covered with asphaltic concrete outside of the former building footprints, significant downward leaching of contaminants is expected to have occurred, although some leaching by means of infiltration of precipitation may have occurred through cracks in the asphaltic concrete.

Groundwater levels and/or flow are not considered to have had a significant affect on contaminant distribution at the RSC Property; based on the Phase II ESA, groundwater impacts are confined to the southwestern portion of the property within the upper layers of bedrock near the soil-bedrock interface.

Potential for Vapour Intrusion

Based on the findings of the Phase II ESA, the potential for vapour intrusion is negligible given that soil impacted with volatile compounds (PHCs) was situated outside of the building footprint.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the property addressed 137-141 George Street and 110-116 York Street, in the City of Ottawa, Ontario. The purpose of the Phase IIESA 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 was carried out in conjunction with a Geotechnical Investigation and consisted of three drilling programs were carried out on the following dates: February 24-28, 2023, August 14-16, 2023, and May 8-May 9. Together, the field programs consisted of drilling 16 boreholes to address the APECS identified in the Phase I ESA. Twelve of the boreholes were instrumented with groundwater monitoring wells to assess the groundwater beneath the Phase II Property. The monitoring well installed in BH1-23 was installed at a greater depth than the remainder of the wells, for geotechnical purposes.

The borehole profiles generally consist of a surficial layer of asphaltic concrete (ranging from 0.05-0.06 m in thickness), followed by fill material consisting of brown silty sand with gravel, crushed stone, cobbles and/or trace topsoil (with occasional pieces of building debris). The fill layer extended to a maximum depth of approximately 3.8 m and was underlain by glacial till consisting of a silty sand to sandy silt matrix with gravel, cobbles, and boulders. Grey limestone bedrock was encountered at a maximum depth of approximately 5.9 m below the existing ground surface.

Soil

A total of 40 samples and 4 duplicate samples were submitted for analysis of metals (including As, Sb, Se, Hg and CrVI), benzene, toluene, ethylbenzene xylenes (BTEX), petroleum hydrocarbons (PHCs, F1-F4), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and/or pH.

Metal, Mercury (Hg), PAH and/or PHC impacts were identified in the fill material across most of the Phase II Property. PHC impacts were also identified in the native glacial till in the southern portion of the Phase II Property.

Groundwater

Groundwater samples from monitoring wells installed in BH2-23, BH3-23, BH5-23 and BH6-23 were collected during the March 8, 2023, sampling event and submitted for laboratory analysis of BTEX, PHCs (F1-F4), and/or VOCs. The majority of the analyzed PHC parameters were non-detect apart from the PHC F1 concentration in BH1-GW1, which complied with the applicable MECP Table 3 standards. The concentrations of PHC fractions F1 and F2 identified in BH5-23-GW1 exceeded the applicable MECP Table 3 standards, resulting in the completion of a second round of sampling.

All the analyzed VOC parameters were non-detect and therefore comply with the applicable MECP Table 3 standards, apart from the identified chloroform concentrations in BH3-23-GW1 and its duplicate sample (DUP1-23-GW1).

A second round of groundwater sampling was completed on March 23, 2023, and involved the analytical testing of PHCs and/or VOCs from groundwater obtained within BH3-23 and BH5-23. All the analyzed PHC and VOC parameters complied with the applicable MECP Table 3 standards.

A third round of groundwater sampling was completed on June 27, 2023, to obtain a second clean groundwater result from BH5-23, to comply with industry standards. The groundwater sample was submitted for BTEX and PHCs. Based on the analytical test results the concentrations of PHC fractions F1 and F2 once again exceeded the applicable MECP Table 3 standards.

Groundwater samples recovered from BH7-23 through BH9-23 were sampled on August 23, 2023, and submitted for analytical testing of BTEX or VOCs and PHCs. The monitoring well installed in BH10-23 was dry at the time of the sampling event. Apart from the chloroform concentration identified in BH9-23, all parameters complied with the MECP Table 3 standards. It should be noted that the PHC detection limits for Sample BH9-23 were elevated above the standards due to low sample volume.

Groundwater samples recovered from BH1-24, BH3-24 and BH4-24 on May 22, 2024, were submitted for analytical testing of Metals, Mercury, BTEX, VOCs and/or PHCs. Based on the analytical test results, all identified concentrations complied with the MECP Table 3 standards.

Recommendations

A remediation program was recommended in conjunction with site redevelopment, to remove all impacted soil and groundwater from the Phase II Property. Based on the findings of the Phase II ESA, it is expected that most of the fill will require of-site disposal at a registered landfill site. Deeper impacts within the native material are contained primarily to the southwestern corner of the site where groundwater impacts were also observed. It is expected that impacted groundwater, identified within the upper bedrock, near the soil-bedrock interface, will be remediation through the removal of impacted soil and underlying bedrock.

The remediation program is underway, with most of the soil having been removed from the site for disposal at a licenced landfill site or for beneficial reuse at a Class 1 Management Site or Reuse Site, in accordance with O.Reg. 406/19.

This Phase II ESA report will be updated with the findings of the remediation program once post-remediation groundwater monitoring has been completed, in accordance with O.Reg. 153/04, to support the filing of a Record of Site Condition.

7.0 STATEMENT OF LIMITATIONS

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

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

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

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

Paterson Group Inc.

Mohammed Ramadan, B.Sc.

Karyn Munch, P.Eng., Q.P.ESA

Report Distribution:

- ❒ Claridge Homes
- ❒ Paterson Group

FIGURES

DRAWING PE2709-11 – TEST HOLE LOCATION PLAN

DRAWING PE2709-12 – ANALYTICAL TESTING PLAN – SOIL-METALS
DRAWING PE2709-12A – CROSS SECTION A-A' – SOIL-METALS
DRAWING PE2709-12B – CROSS SECTION B-B' – SOIL-METALS
DRAWING PE2709-12C – CROSS SECTION C-C' – SOIL-METALS

DRAWING PE2709-13 – ANALYTICAL TESTING PLAN – SOIL-PAHS
DRAWING PE2709-13A – CROSS SECTION A-A' – SOIL-PAHS
DRAWING PE2709-13B – CROSS SECTION B-B' – SOIL-PAHS
DRAWING PE2709-13C– CROSS SECTION C-C' – SOIL-PAHS

DRAWING PE2709-14 – ANALYTICAL TESTING PLAN – SOIL-PHCS
DRAWING PE2709-14A – CROSS SECTION A-A' – SOIL-PHCS
DRAWING PE2709-14B – CROSS SECTION B-B' – SOIL-PHCS
DRAWING PE2709-14C – CROSS SECTION C-C' – SOIL-PHCS

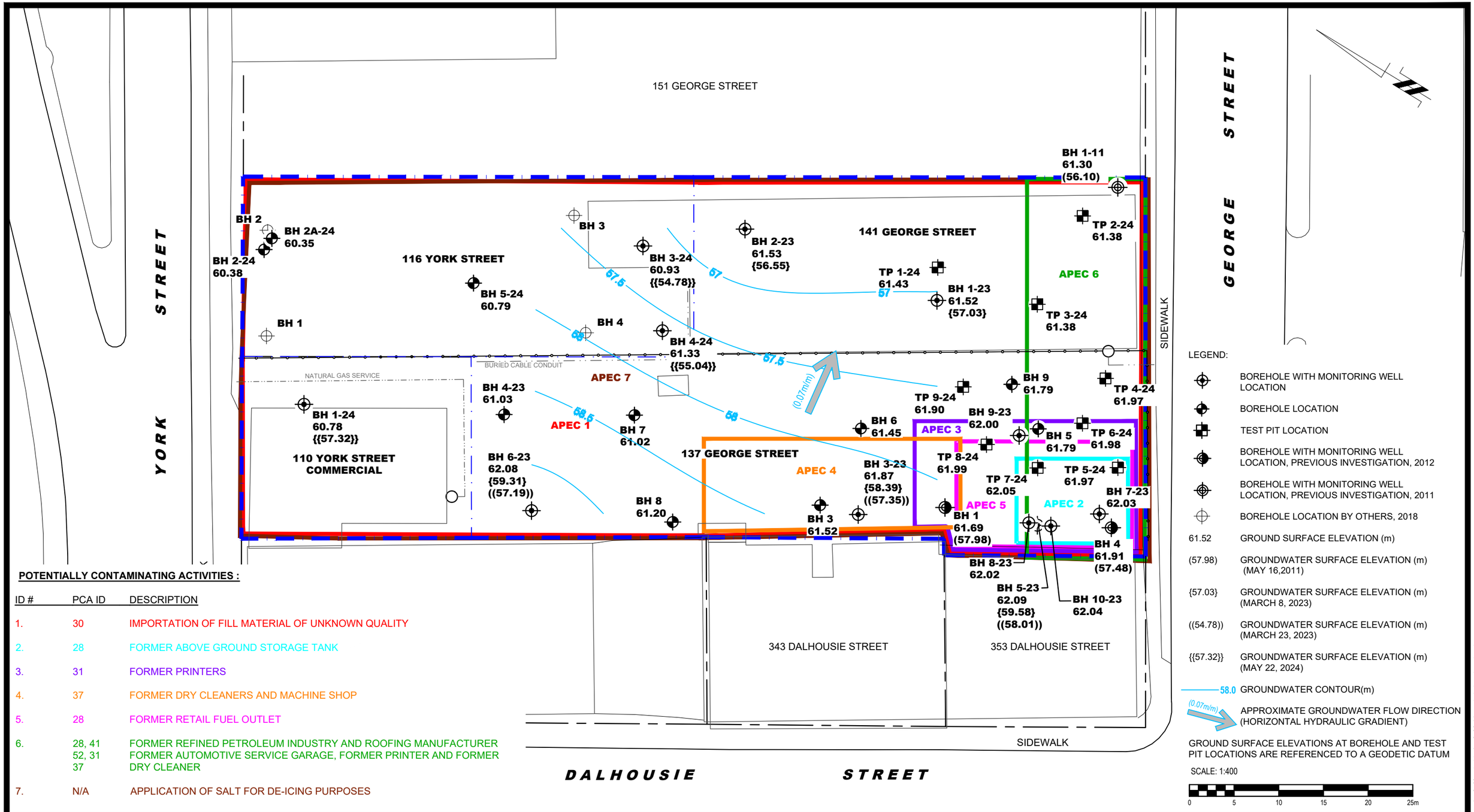
DRAWING PE2709-15 – ANALYTICAL TESTING PLAN – SOIL-BTEX
DRAWING PE2709-15A – CROSS SECTION A-A' – SOIL-BTEX
DRAWING PE2709-15B – CROSS SECTION B-B' – SOIL-BTEX
DRAWING PE2709-15C – CROSS SECTION C-C' – SOIL-BTEX

DRAWING PE2709-16 – ANALYTICAL TESTING PLAN – SOIL-VOCs
DRAWING PE2709-16A – CROSS SECTION A-A' – SOIL-VOCs
DRAWING PE2709-16B – CROSS SECTION B-B' – SOIL-VOCs
DRAWING PE2709-16C – CROSS SECTION C-C' – SOIL-VOCs

DRAWING PE2709-17 – ANALYTICAL TESTING PLAN – GROUNDWATER-BTEX, VOCs
DRAWING PE2709-17A – CROSS-SECTION A – A' – GROUNDWATER-BTEX, VOCs
DRAWING PE2709-17B – CROSS-SECTION B – B' – GROUNDWATER-BTEX, VOCs
DRAWING PE2709-17C – CROSS-SECTION C – C' – GROUNDWATER-BTEX, VOCs

DRAWING PE2709-18 – ANALYTICAL TESTING PLAN – GROUNDWATER-METALS, HG, CRVI, PAHS
DRAWING PE2709-18A – CROSS-SECTION A – A' – GROUNDWATER-METALS, HG, CRVI, PAHS
DRAWING PE2709-18B – CROSS-SECTION B – B' – GROUNDWATER-METALS, HG, CRVI, PAHS
DRAWING PE2709-18C – CROSS-SECTION C – C' – GROUNDWATER-METALS, HG, CRVI, PAHS

DRAWING PE2709-19 – ANALYTICAL TESTING PLAN – GROUNDWATER-PHCS
DRAWING PE2709-19A – CROSS-SECTION A – A' – GROUNDWATER-PHCS
DRAWING PE2709-19B – CROSS-SECTION B – B' – GROUNDWATER-PHCS
DRAWING PE2709-19C – CROSS-SECTION C – C' – GROUNDWATER-PHCS



POTENTIALLY CONTAMINATING ACTIVITIES :

ID #	PCA ID	DESCRIPTION
1.	30	IMPORTATION OF FILL MATERIAL OF UNKNOWN QUALITY
2.	28	FORMER ABOVE GROUND STORAGE TANK
3.	31	FORMER PRINTERS
4.	37	FORMER DRY CLEANERS AND MACHINE SHOP
5.	28	FORMER RETAIL FUEL OUTLET
6.	28, 41 52, 31 37	FORMER REFINED PETROLEUM INDUSTRY AND ROOFING MANUFACTURER FORMER AUTOMOTIVE SERVICE GARAGE, FORMER PRINTER AND FORMER DRY CLEANER
7.	N/A	APPLICATION OF SALT FOR DE-ICING PURPOSES

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- TEST PIT LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION, PREVIOUS INVESTIGATION, 2012
- BOREHOLE WITH MONITORING WELL LOCATION, PREVIOUS INVESTIGATION, 2011
- BOREHOLE LOCATION BY OTHERS, 2018
- 61.52 GROUND SURFACE ELEVATION (m)
- (57.98) GROUNDWATER SURFACE ELEVATION (m) (MAY 16,2011)
- {57.03} GROUNDWATER SURFACE ELEVATION (m) (MARCH 8, 2023)
- ((54.78)) GROUNDWATER SURFACE ELEVATION (m) (MARCH 23, 2023)
- {{57.32}} GROUNDWATER SURFACE ELEVATION (m) (MAY 22, 2024)
- 58.0 GROUNDWATER CONTOUR(m)
- (0.07m/m) APPROXIMATE GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

GROUND SURFACE ELEVATIONS AT BOREHOLE AND TEST PIT LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:400

0 5 10 15 20 25m

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

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:400	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-11
Approved by: KM	Revision No.:

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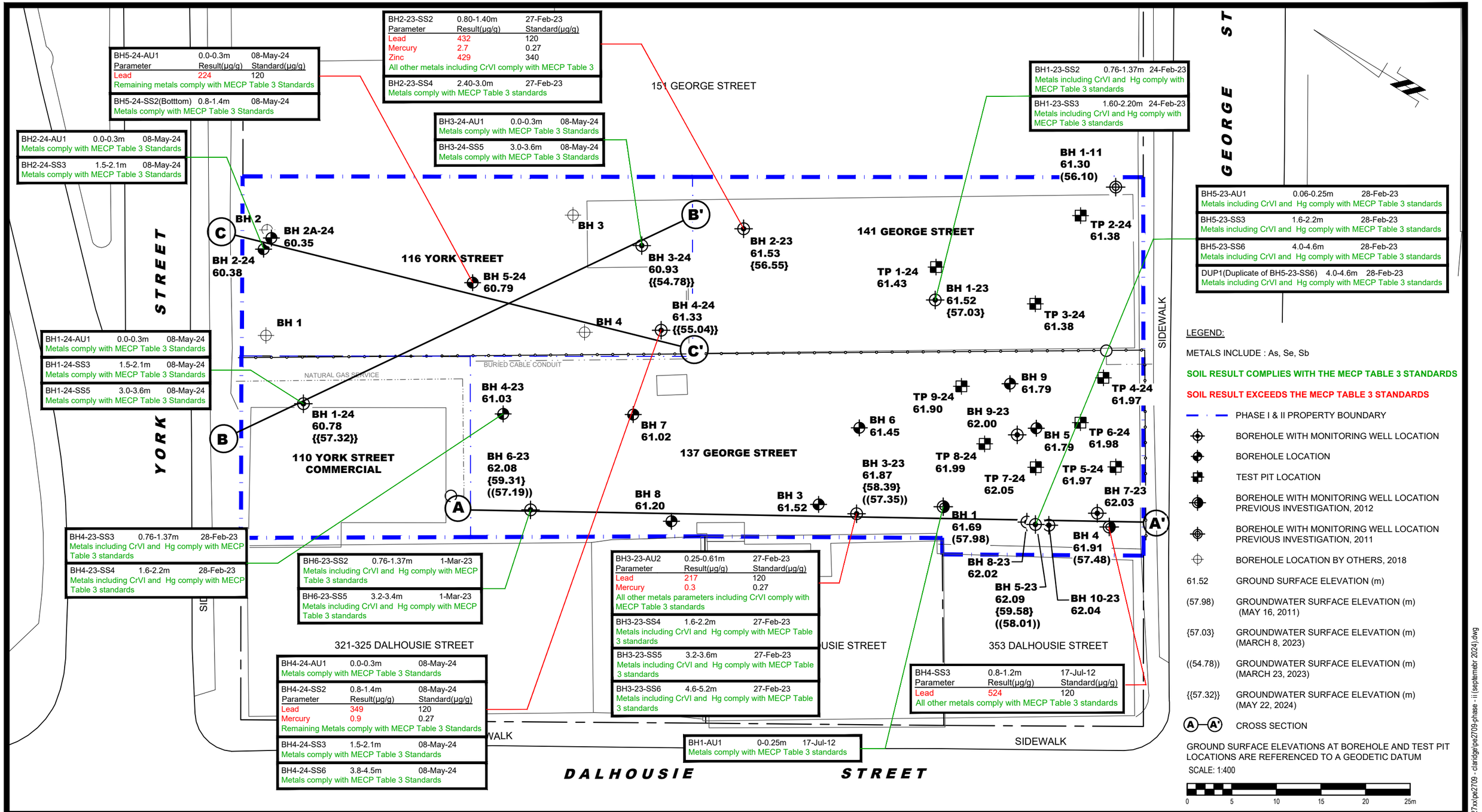

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (METALS)

Scale: 1:400	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-12
Approved by: KM	Revision No.:

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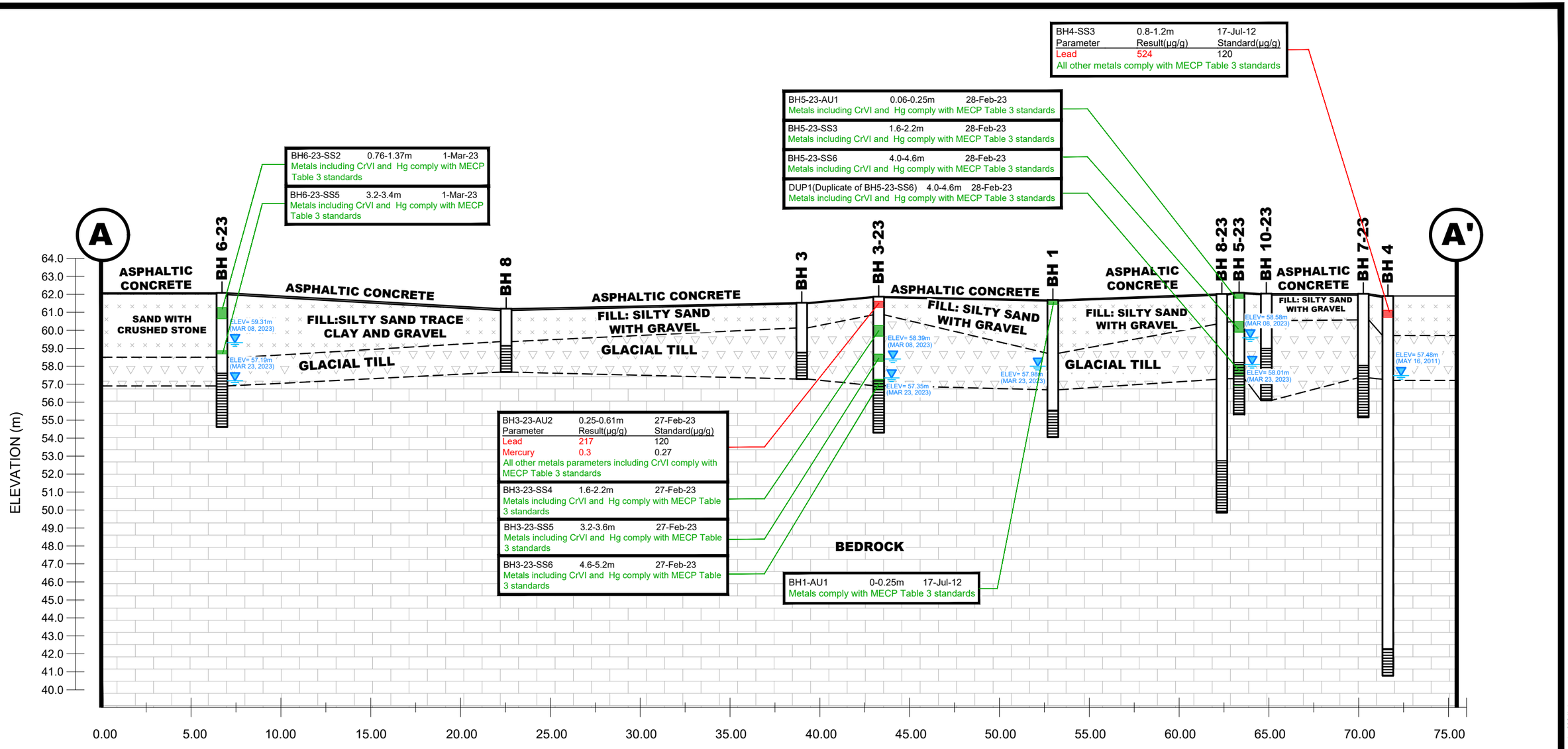

BH6-23-SS2 0.76-1.37m 1-Mar-23
Metals including CrVI and Hg comply with MECP Table 3 standards

BH6-23-SS5 3.2-3.4m 1-Mar-23
Metals including CrVI and Hg comply with MECP Table 3 standards

BH4-SS3 0.8-1.2m 17-Jul-12

Parameter	Result(µg/g)	Standard(µg/g)
Lead	524	120

All other metals comply with MECP Table 3 standards

BH5-23-AU1 0.06-0.25m 28-Feb-23
Metals including CrVI and Hg comply with MECP Table 3 standards

BH5-23-SS3 1.6-2.2m 28-Feb-23
Metals including CrVI and Hg comply with MECP Table 3 standards

BH5-23-SS6 4.0-4.6m 28-Feb-23
Metals including CrVI and Hg comply with MECP Table 3 standards

DUP1(Duplicate of BH5-23-SS6) 4.0-4.6m 28-Feb-23
Metals including CrVI and Hg comply with MECP Table 3 standards

BH3-23-AU2 0.25-0.61m 27-Feb-23

Parameter	Result(µg/g)	Standard(µg/g)
Lead	217	120
Mercury	0.3	0.27

All other metals parameters including CrVI comply with MECP Table 3 standards

BH3-23-SS4 1.6-2.2m 27-Feb-23
Metals including CrVI and Hg comply with MECP Table 3 standards

BH3-23-SS5 3.2-3.6m 27-Feb-23
Metals including CrVI and Hg comply with MECP Table 3 standards

BH3-23-SS6 4.6-5.2m 27-Feb-23
Metals including CrVI and Hg comply with MECP Table 3 standards

BH1-AU1 0-0.25m 17-Jul-12
Metals comply with MECP Table 3 standards

LEGEND:

METALS INCLUDE : As, Se, Sb

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:
CROSS SECTION A-A' - SOIL (METALS)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-12A
Approved by: KM	Revision No.:

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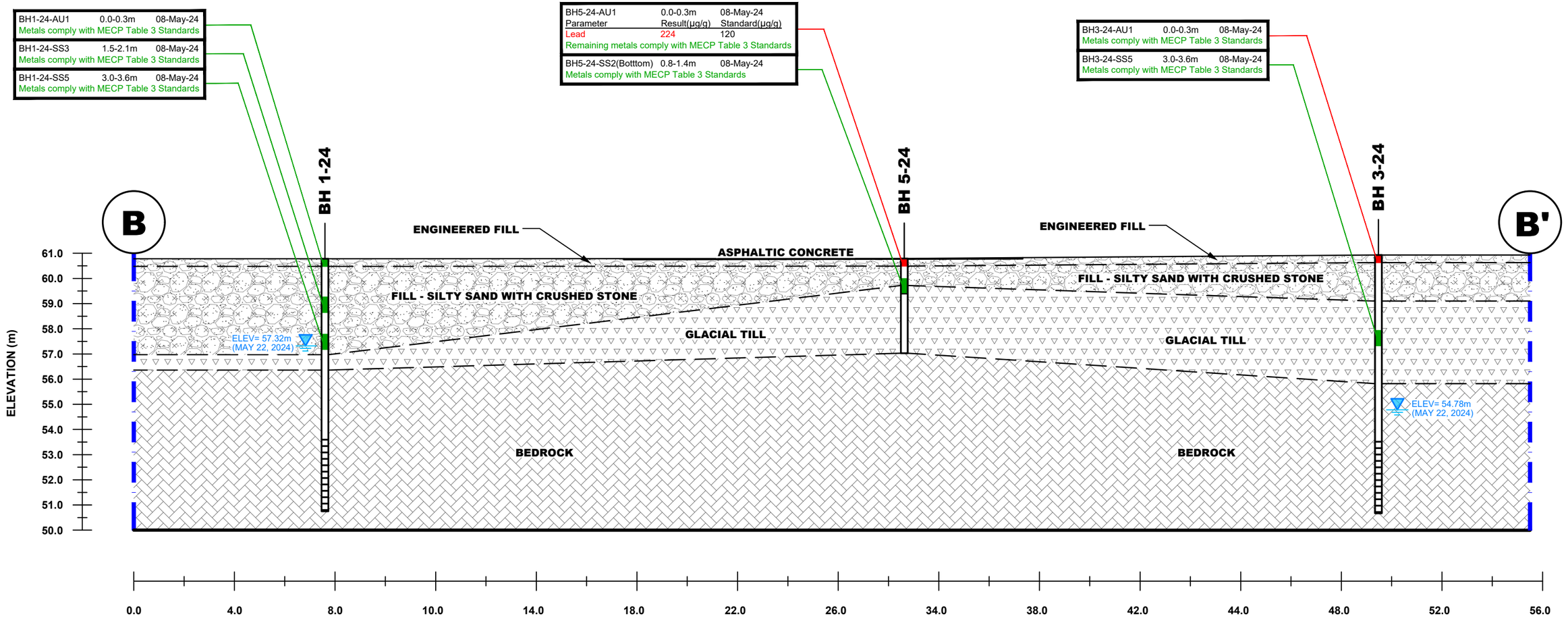
BH1-24-AU1	0.0-0.3m	08-May-24
Metals comply with MECP Table 3 Standards		
BH1-24-SS3	1.5-2.1m	08-May-24
Metals comply with MECP Table 3 Standards		
BH1-24-SS5	3.0-3.6m	08-May-24
Metals comply with MECP Table 3 Standards		

BH5-24-AU1	0.0-0.3m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Lead	224	120
Remaining metals comply with MECP Table 3 Standards		
BH5-24-SS2(Botttom)	0.8-1.4m	08-May-24
Metals comply with MECP Table 3 Standards		

BH3-24-AU1	0.0-0.3m	08-May-24
Metals comply with MECP Table 3 Standards		
BH3-24-SS5	3.0-3.6m	08-May-24
Metals comply with MECP Table 3 Standards		



LEGEND:

METALS INCLUDE : As, Se, Sb

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (METALS)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-12B
Approved by: KM	Revision No.:

11x17

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BH5-24-AU1	0.0-0.3m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Lead	224	120
Remaining metals comply with MECP Table 3 Standards		

BH5-24-SS2(Botttom)	0.8-1.4m	08-May-24
Metals comply with MECP Table 3 Standards		

BH2-24-AU1	0.0-0.3m	08-May-24
Metals comply with MECP Table 3 Standards		

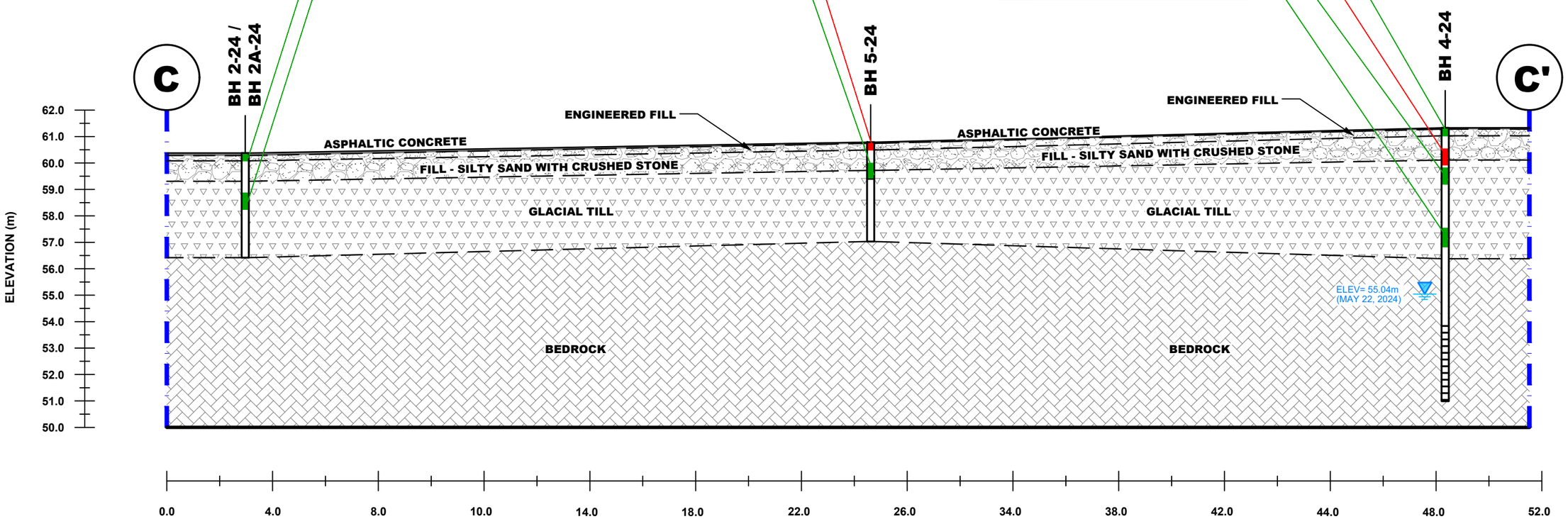
BH2-24-SS3	1.5-2.1m	08-May-24
Metals comply with MECP Table 3 Standards		

BH4-24-AU1	0.0-0.3m	08-May-24
Metals comply with MECP Table 3 Standards		

BH4-24-SS2	0.8-1.4m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Lead	349	120
Mercury	0.9	0.27
Remaining Metals comply with MECP Table 3 Standards		

BH4-24-SS3	1.5-2.1m	08-May-24
Metals comply with MECP Table 3 Standards		

BH4-24-SS6	3.8-4.5m	08-May-24
Metals comply with MECP Table 3 Standards		



LEGEND:

METALS INCLUDE : As, Se, Sb

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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

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CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION C-C' - SOIL (METALS)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-12C
Approved by: KM	Revision No.:

11x17

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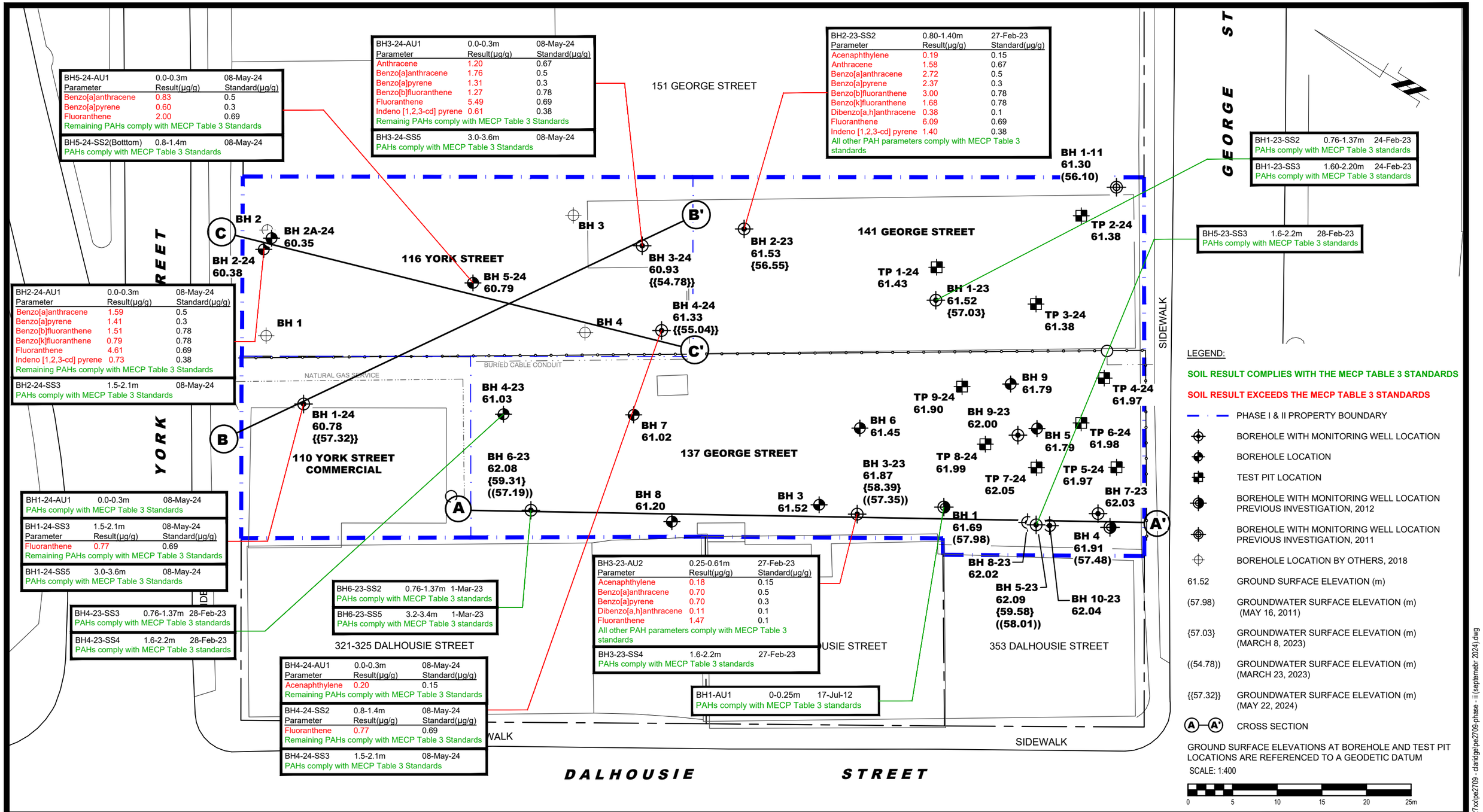

BH5-24-AU1 0.0-0.3m 08-May-24

Parameter	Result(µg/g)	Standard(µg/g)
Benzo[a]anthracene	0.83	0.5
Benzo[a]pyrene	0.60	0.3
Fluoranthene	2.00	0.69

Remaining PAHs comply with MECP Table 3 Standards

BH5-24-SS2(Botttom) 0.8-1.4m 08-May-24
PAHs comply with MECP Table 3 Standards

BH3-24-AU1 0.0-0.3m 08-May-24

Parameter	Result(µg/g)	Standard(µg/g)
Anthracene	1.20	0.67
Benzo[a]anthracene	1.76	0.5
Benzo[a]pyrene	1.31	0.3
Benzo[b]fluoranthene	1.27	0.78
Fluoranthene	5.49	0.69
Indeno [1,2,3-cd] pyrene	0.61	0.38

Remainig PAHs comply with MECP Table 3 Standards

BH3-24-SS5 3.0-3.6m 08-May-24
PAHs comply with MECP Table 3 Standards

BH2-23-SS2 0.80-1.40m 27-Feb-23

Parameter	Result(µg/g)	Standard(µg/g)
Acenaphthylene	0.19	0.15
Anthracene	1.58	0.67
Benzo[a]anthracene	2.72	0.5
Benzo[a]pyrene	2.37	0.3
Benzo[b]fluoranthene	3.00	0.78
Benzo[k]fluoranthene	1.68	0.78
Dibenzo[a,h]anthracene	0.38	0.1
Fluoranthene	6.09	0.69
Indeno [1,2,3-cd] pyrene	1.40	0.38

All other PAH parameters comply with MECP Table 3 standards

BH1-23-SS2 0.76-1.37m 24-Feb-23
PAHs comply with MECP Table 3 standards

BH1-23-SS3 1.60-2.20m 24-Feb-23
PAHs comply with MECP Table 3 standards

BH5-23-SS3 1.6-2.2m 28-Feb-23
PAHs comply with MECP Table 3 standards

BH2-24-AU1 0.0-0.3m 08-May-24

Parameter	Result(µg/g)	Standard(µg/g)
Benzo[a]anthracene	1.59	0.5
Benzo[a]pyrene	1.41	0.3
Benzo[b]fluoranthene	1.51	0.78
Benzo[k]fluoranthene	0.79	0.78
Fluoranthene	4.61	0.69
Indeno [1,2,3-cd] pyrene	0.73	0.38

Remaining PAHs comply with MECP Table 3 Standards

BH2-24-SS3 1.5-2.1m 08-May-24
PAHs comply with MECP Table 3 Standards

BH1-24-AU1 0.0-0.3m 08-May-24
PAHs comply with MECP Table 3 Standards

BH1-24-SS3 1.5-2.1m 08-May-24

Parameter	Result(µg/g)	Standard(µg/g)
Fluoranthene	0.77	0.69

Remaining PAHs comply with MECP Table 3 Standards

BH1-24-SS5 3.0-3.6m 08-May-24
PAHs comply with MECP Table 3 Standards

BH4-23-SS3 0.76-1.37m 28-Feb-23
PAHs comply with MECP Table 3 standards

BH4-23-SS4 1.6-2.2m 28-Feb-23
PAHs comply with MECP Table 3 standards

BH6-23-SS2 0.76-1.37m 1-Mar-23
PAHs comply with MECP Table 3 standards

BH6-23-SS5 3.2-3.4m 1-Mar-23
PAHs comply with MECP Table 3 standards

BH3-23-AU2 0.25-0.61m 27-Feb-23

Parameter	Result(µg/g)	Standard(µg/g)
Acenaphthylene	0.18	0.15
Benzo[a]anthracene	0.70	0.5
Benzo[a]pyrene	0.70	0.3
Dibenzo[a,h]anthracene	0.11	0.1
Fluoranthene	1.47	0.1

All other PAH parameters comply with MECP Table 3 standards

BH3-23-SS4 1.6-2.2m 27-Feb-23
PAHs comply with MECP Table 3 standards

BH1-AU1 0-0.25m 17-Jul-12
PAHs comply with MECP Table 3 standards

BH4-24-AU1 0.0-0.3m 08-May-24

Parameter	Result(µg/g)	Standard(µg/g)
Acenaphthylene	0.20	0.15

Remaining PAHs comply with MECP Table 3 Standards

BH4-24-SS2 0.8-1.4m 08-May-24

Parameter	Result(µg/g)	Standard(µg/g)
Fluoranthene	0.77	0.69

Remaining PAHs comply with MECP Table 3 Standards

BH4-24-SS3 1.5-2.1m 08-May-24
PAHs comply with MECP Table 3 Standards

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

- PHASE I & II PROPERTY BOUNDARY
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- TEST PIT LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION PREVIOUS INVESTIGATION, 2012
- BOREHOLE WITH MONITORING WELL LOCATION PREVIOUS INVESTIGATION, 2011
- BOREHOLE LOCATION BY OTHERS, 2018
- 61.52 GROUND SURFACE ELEVATION (m)
- (57.98) GROUNDWATER SURFACE ELEVATION (m) (MAY 16, 2011)
- {57.03} GROUNDWATER SURFACE ELEVATION (m) (MARCH 8, 2023)
- ((54.78)) GROUNDWATER SURFACE ELEVATION (m) (MARCH 23, 2023)
- {{57.32}} GROUNDWATER SURFACE ELEVATION (m) (MAY 22, 2024)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE AND TEST PIT LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:400

0 5 10 15 20 25m

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

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (PAHs)

Scale: 1:400	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-13
Approved by: KM	Revision No.:

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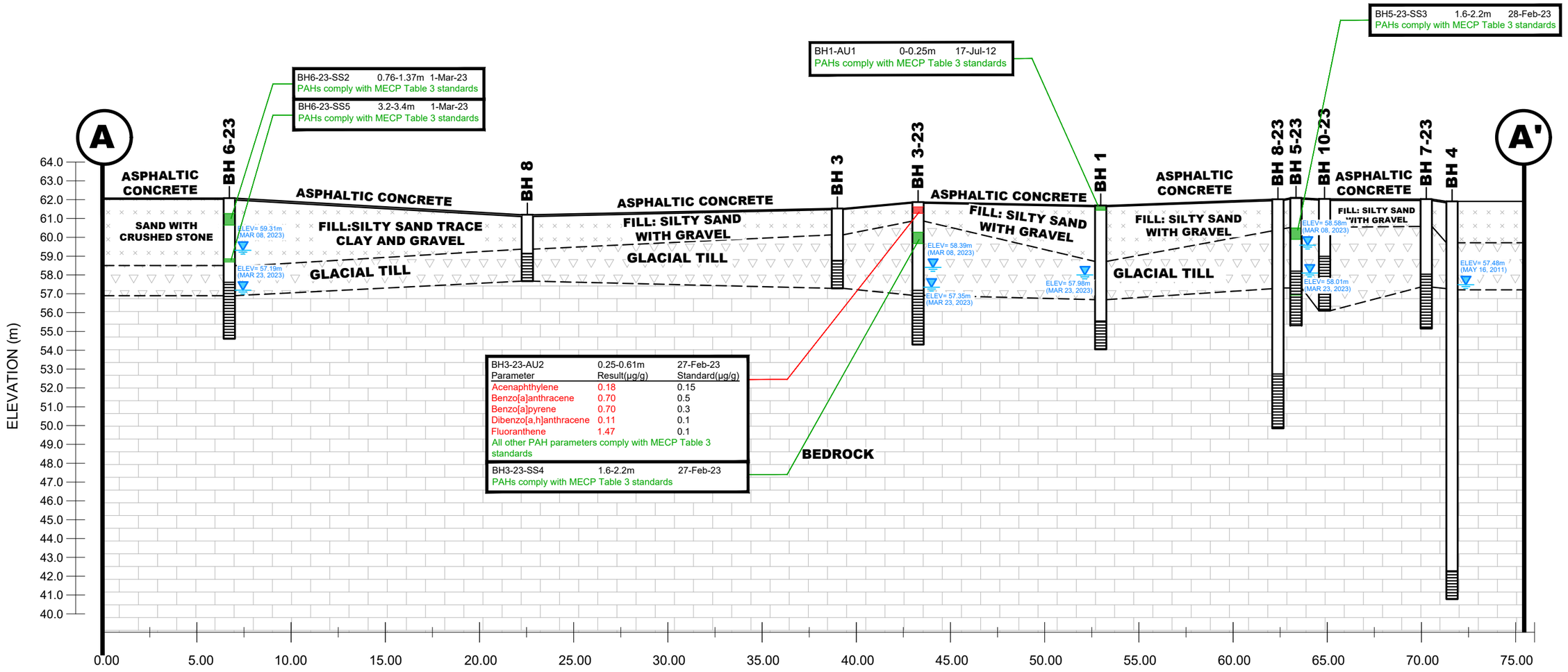

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (PAHs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-13A
Approved by: KM	Revision No.:

11x17

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BH1-24-AU1	0.0-0.3m	08-May-24
PAHs comply with MECP Table 3 Standards		

BH1-24-SS3	1.5-2.1m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Fluoranthene	0.77	0.69
Remaining PAHs comply with MECP Table 3 Standards		

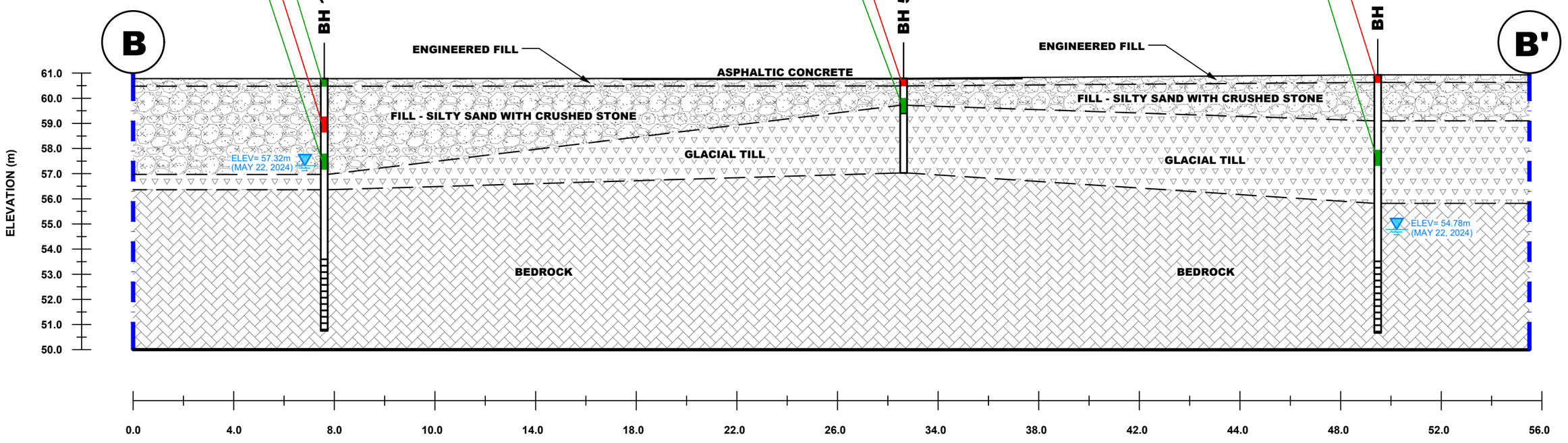
BH1-24-SS5	3.0-3.6m	08-May-24
PAHs comply with MECP Table 3 Standards		

BH5-24-AU1	0.0-0.3m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Benzo[a]anthracene	0.83	0.5
Benzo[a]pyrene	0.60	0.3
Fluoranthene	2.00	0.69
Remaining PAHs comply with MECP Table 3 Standards		

BH5-24-SS2(Botttom)	0.8-1.4m	08-May-24
PAHs comply with MECP Table 3 Standards		

BH3-24-AU1	0.0-0.3m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Anthracene	1.20	0.67
Benzo[a]anthracene	1.76	0.5
Benzo[a]pyrene	1.31	0.3
Benzo[b]fluoranthene	1.27	0.78
Fluoranthene	5.49	0.69
Indeno [1,2,3-cd] pyrene	0.61	0.38
Remainig PAHs comply with MECP Table 3 Standards		

BH3-24-SS5	3.0-3.6m	08-May-24
PAHs comply with MECP Table 3 Standards		



LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (PAHs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-13B
Approved by: KM	Revision No.:

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BH5-24-AU1	0.0-0.3m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Benzo[a]anthracene	0.83	0.5
Benzo[a]pyrene	0.60	0.3
Fluoranthene	2.00	0.69
Remaining PAHs comply with MECP Table 3 Standards		

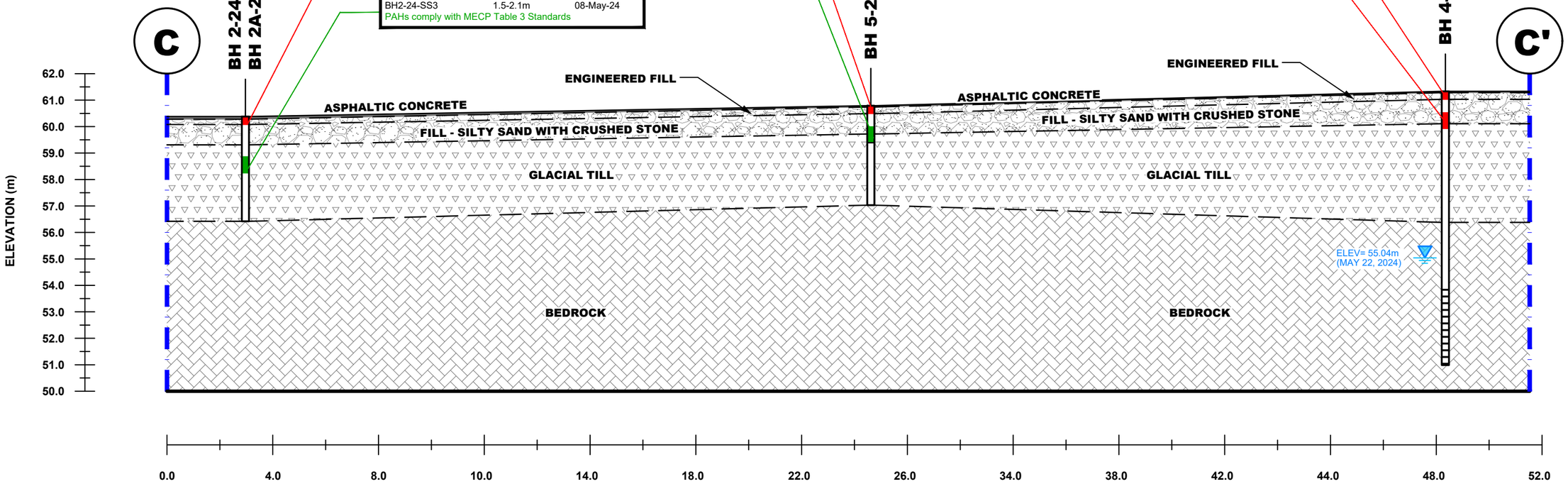
BH5-24-SS2(Botttom)	0.8-1.4m	08-May-24
PAHs comply with MECP Table 3 Standards		

BH2-24-AU1	0.0-0.3m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Benzo[a]anthracene	1.59	0.5
Benzo[a]pyrene	1.41	0.3
Benzo[b]fluoranthene	1.51	0.78
Benzo[k]fluoranthene	0.79	0.78
Fluoranthene	4.61	0.69
Indeno [1,2,3-cd] pyrene	0.73	0.38
Remaining PAHs comply with MECP Table 3 Standards		

BH2-24-SS3	1.5-2.1m	08-May-24
PAHs comply with MECP Table 3 Standards		

BH4-24-AU1	0.0-0.3m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Acenaphthylene	0.20	0.15
Remaining PAHs comply with MECP Table 3 Standards		

BH4-24-SS2	0.8-1.4m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
Fluoranthene	0.77	0.69
Remaining PAHs comply with MECP Table 3 Standards		



LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION C-C' - SOIL (PAHs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-13C
Approved by: KM	Revision No.:

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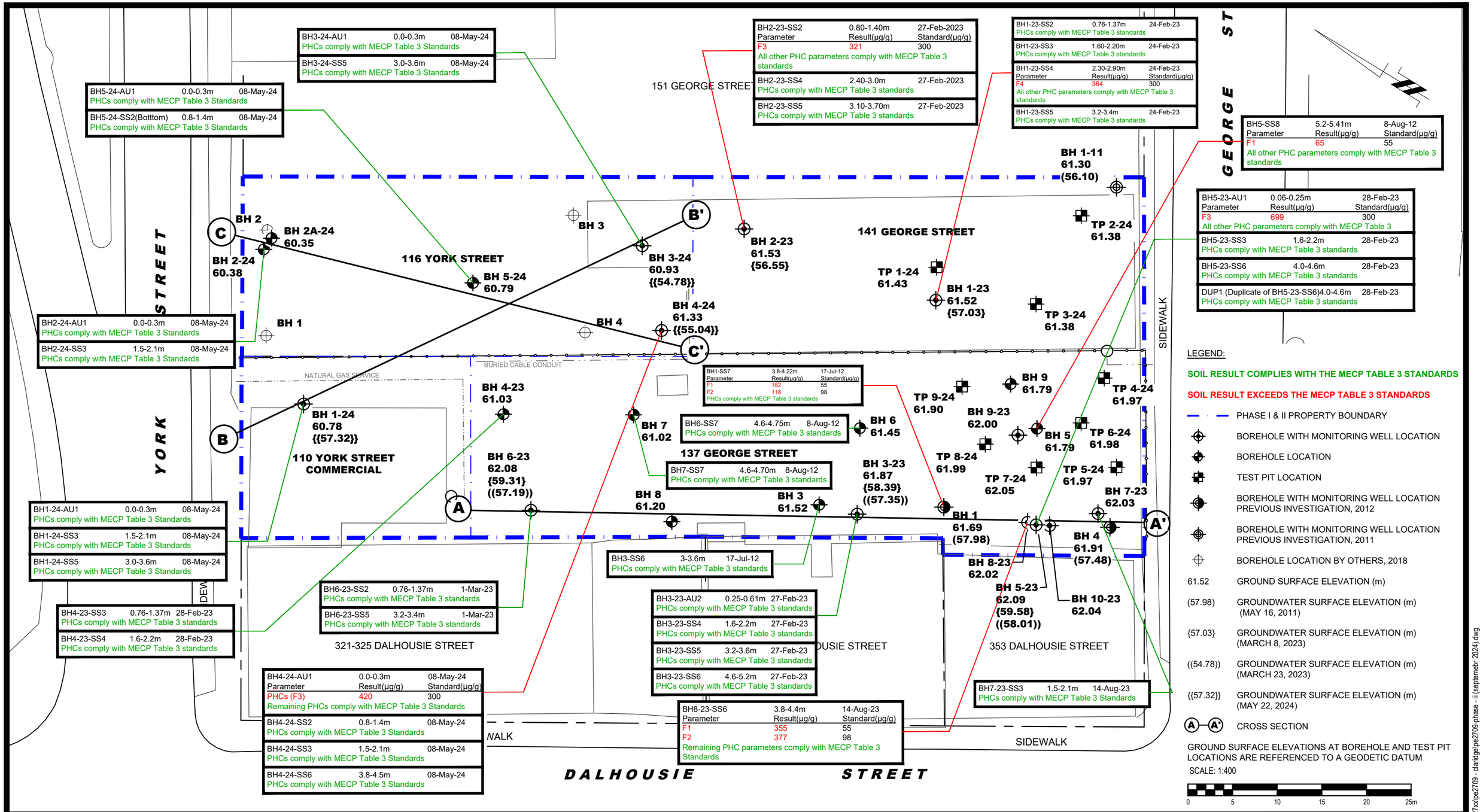

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9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (PHCs)

Scale: 1:400	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-14
Approved by: KM	Revision No.:

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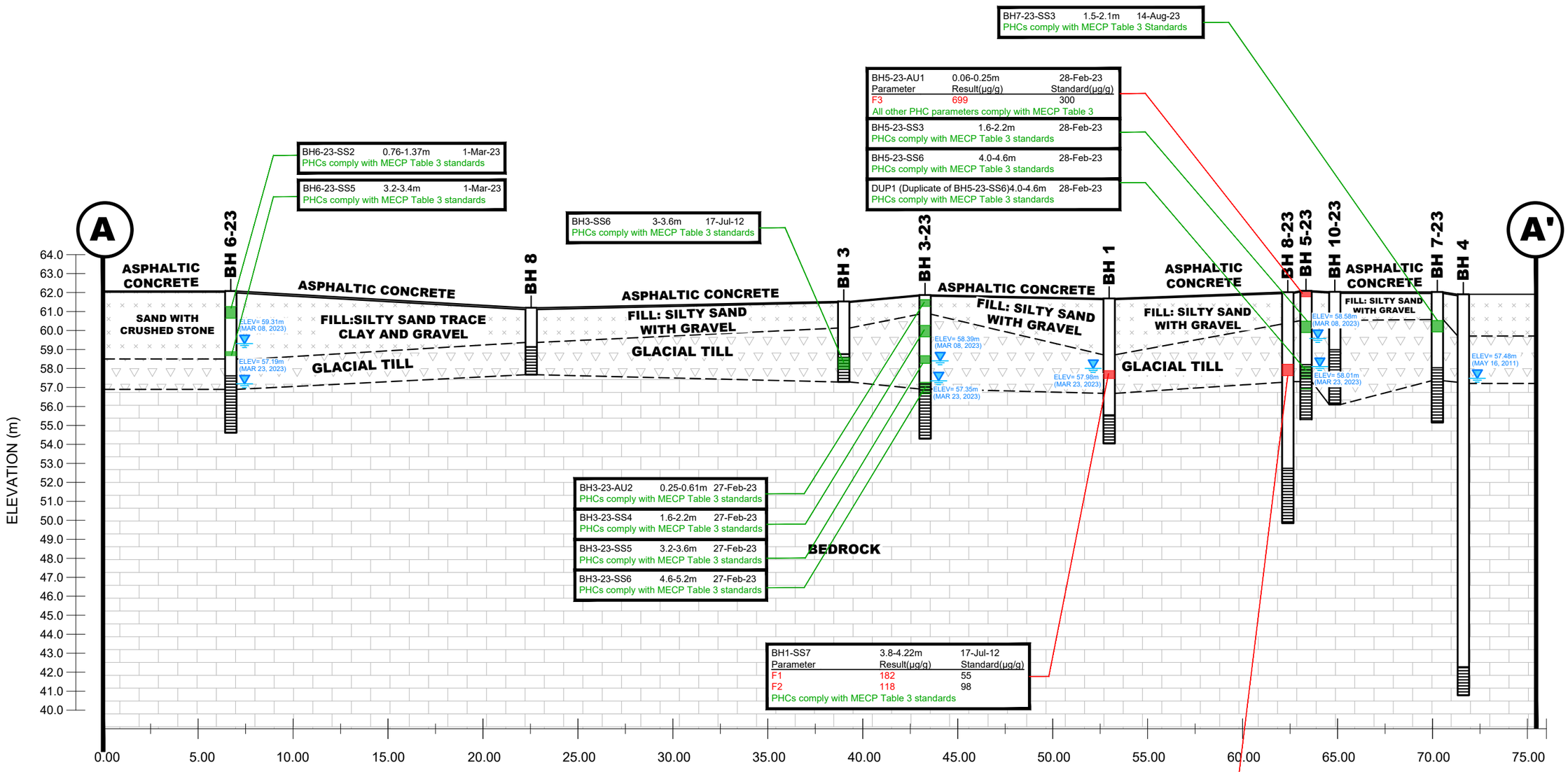

BH7-23-SS3 1.5-2.1m 14-Aug-23
PHCs comply with MECP Table 3 Standards

BH5-23-AU1 0.06-0.25m 28-Feb-23

Parameter	Result(µg/g)	Standard(µg/g)
F3	699	300

All other PHC parameters comply with MECP Table 3

BH5-23-SS3 1.6-2.2m 28-Feb-23
PHCs comply with MECP Table 3 standards

BH5-23-SS6 4.0-4.6m 28-Feb-23
PHCs comply with MECP Table 3 standards

DUP1 (Duplicate of BH5-23-SS6)4.0-4.6m 28-Feb-23
PHCs comply with MECP Table 3 standards

BH6-23-SS2 0.76-1.37m 1-Mar-23
PHCs comply with MECP Table 3 standards

BH6-23-SS5 3.2-3.4m 1-Mar-23
PHCs comply with MECP Table 3 standards

BH3-SS6 3-3.6m 17-Jul-12
PHCs comply with MECP Table 3 standards

BH3-23-AU2 0.25-0.61m 27-Feb-23
PHCs comply with MECP Table 3 standards

BH3-23-SS4 1.6-2.2m 27-Feb-23
PHCs comply with MECP Table 3 standards

BH3-23-SS5 3.2-3.6m 27-Feb-23
PHCs comply with MECP Table 3 standards

BH3-23-SS6 4.6-5.2m 27-Feb-23
PHCs comply with MECP Table 3 standards

BH1-SS7 3.8-4.22m 17-Jul-12

Parameter	Result(µg/g)	Standard(µg/g)
F1	182	55
F2	118	98

PHCs comply with MECP Table 3 standards

BH8-23-SS6 3.8-4.4m 14-Aug-23

Parameter	Result(µg/g)	Standard(µg/g)
F1	355	55
F2	377	98

Remaining PHC parameters comply with MECP Table 3 Standards

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (PHCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-14A
Approved by: KM	Revision No.:

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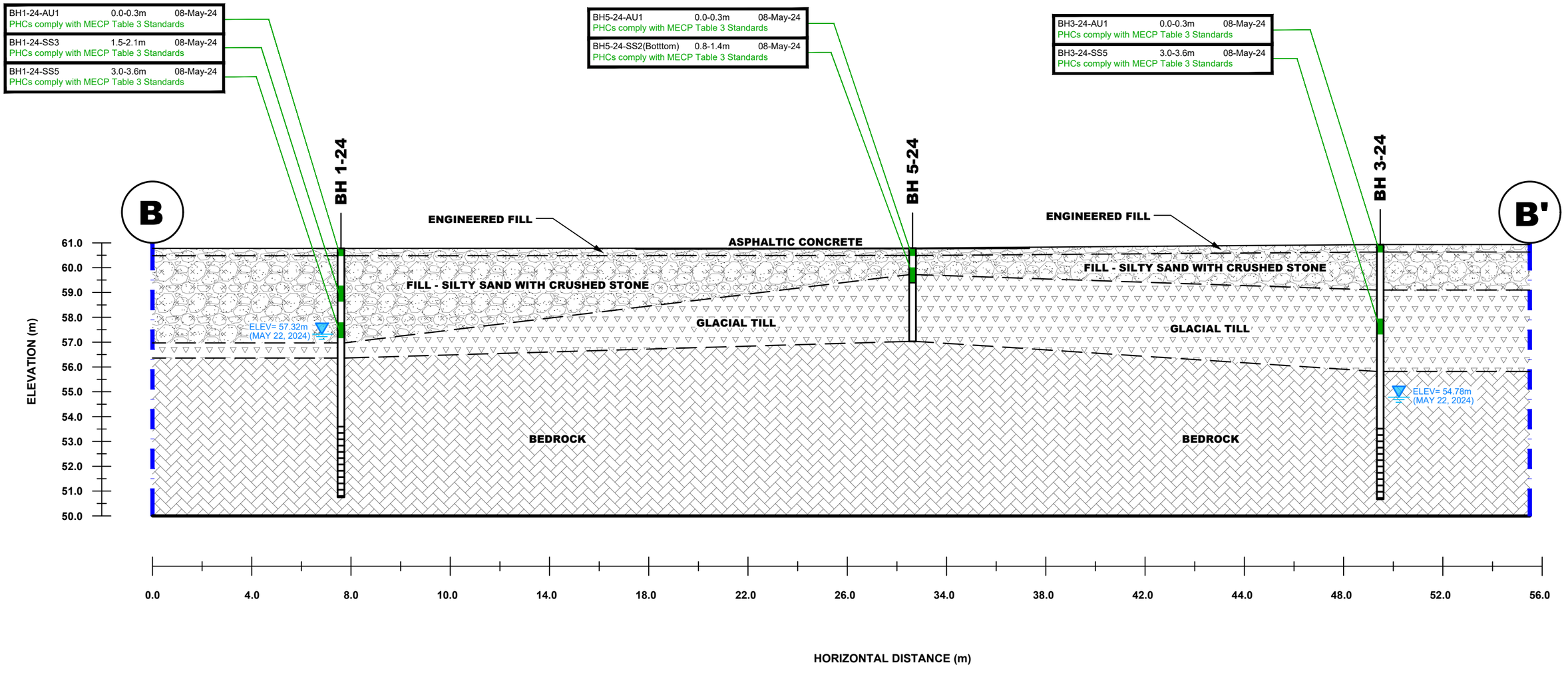
11x17

BH1-24-AU1 0.0-0.3m 08-May-24
PHCs comply with MECP Table 3 Standards
BH1-24-SS3 1.5-2.1m 08-May-24
PHCs comply with MECP Table 3 Standards
BH1-24-SS5 3.0-3.6m 08-May-24
PHCs comply with MECP Table 3 Standards

BH5-24-AU1 0.0-0.3m 08-May-24
PHCs comply with MECP Table 3 Standards
BH5-24-SS2(Botttom) 0.8-1.4m 08-May-24
PHCs comply with MECP Table 3 Standards

BH3-24-AU1 0.0-0.3m 08-May-24
PHCs comply with MECP Table 3 Standards
BH3-24-SS5 3.0-3.6m 08-May-24
PHCs comply with MECP Table 3 Standards



LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

PATERSON GROUP
9 AURIGA DRIVE
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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:
CROSS SECTION B-B' - SOIL (PHCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-14B
Approved by: KM	Revision No.:

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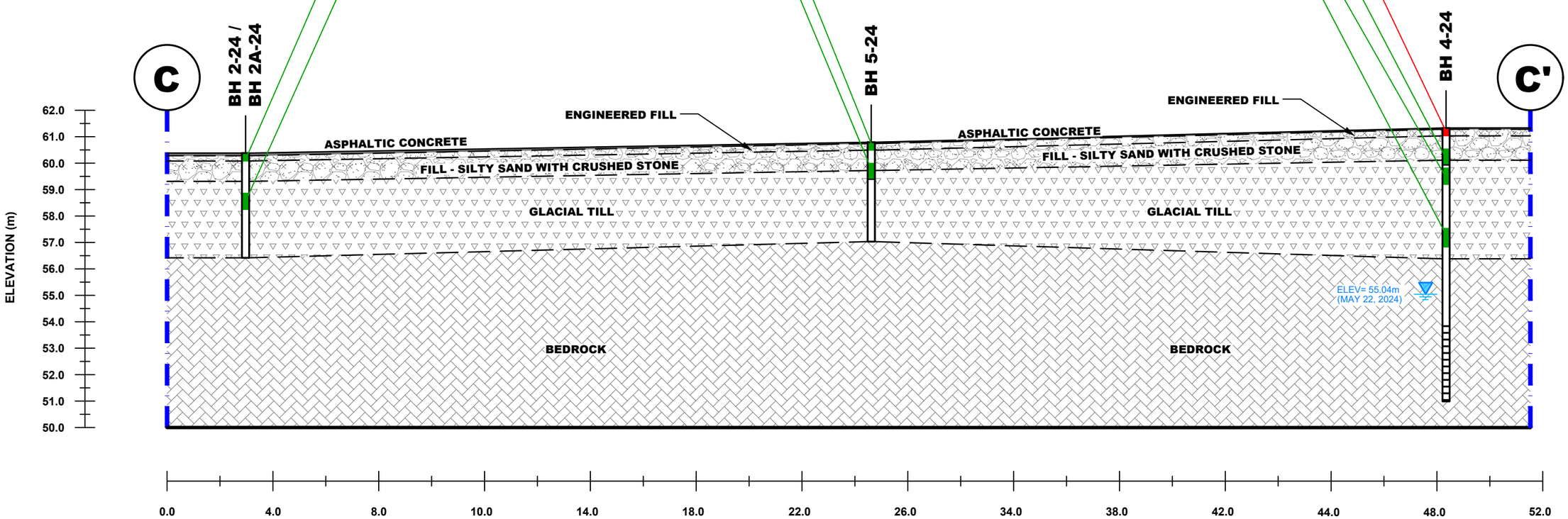
11x17

BH5-24-AU1	0.0-0.3m	08-May-24
PHCs comply with MECP Table 3 Standards		
BH5-24-SS2(Botttom)	0.8-1.4m	08-May-24
PHCs comply with MECP Table 3 Standards		

BH2-24-AU1	0.0-0.3m	08-May-24
PHCs comply with MECP Table 3 Standards		
BH2-24-SS3	1.5-2.1m	08-May-24
PHCs comply with MECP Table 3 Standards		

BH4-24-AU1	0.0-0.3m	08-May-24
Parameter	Result(µg/g)	Standard(µg/g)
PHCs (F3)	420	300
Remaining PHCs comply with MECP Table 3 Standards		
BH4-24-SS2	0.8-1.4m	08-May-24
PHCs comply with MECP Table 3 Standards		
BH4-24-SS3	1.5-2.1m	08-May-24
PHCs comply with MECP Table 3 Standards		
BH4-24-SS6	3.8-4.5m	08-May-24
PHCs comply with MECP Table 3 Standards		



LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

PATERSON GROUP
9 AURIGA DRIVE
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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION C-C' - SOIL (PHCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-14C
Approved by: KM	Revision No.:

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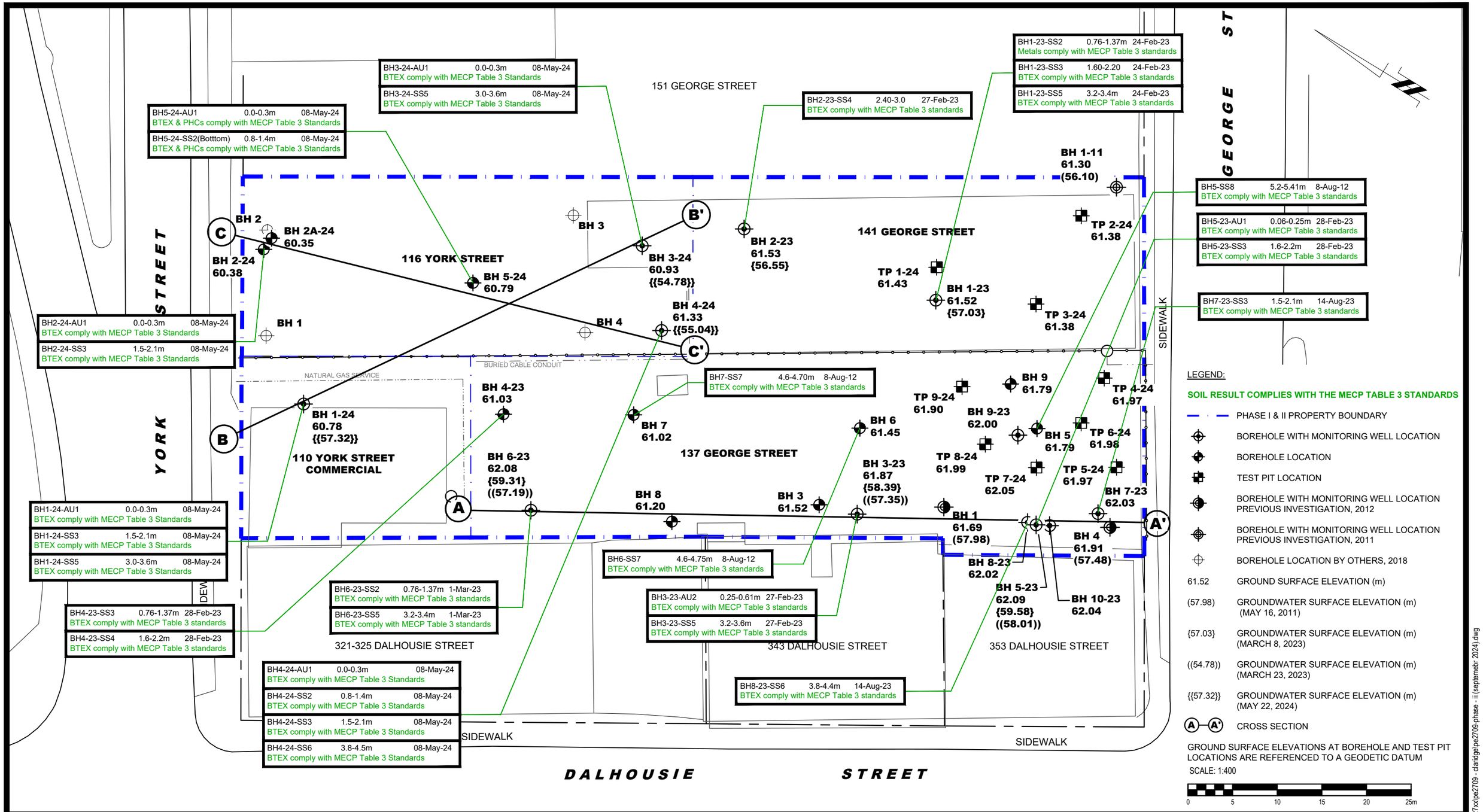

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

- PHASE I & II PROPERTY BOUNDARY
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- TEST PIT LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION PREVIOUS INVESTIGATION, 2012
- BOREHOLE WITH MONITORING WELL LOCATION PREVIOUS INVESTIGATION, 2011
- BOREHOLE LOCATION BY OTHERS, 2018
- 61.52 GROUND SURFACE ELEVATION (m)
- (57.98) GROUNDWATER SURFACE ELEVATION (m) (MAY 16, 2011)
- {57.03} GROUNDWATER SURFACE ELEVATION (m) (MARCH 8, 2023)
- ((54.78)) GROUNDWATER SURFACE ELEVATION (m) (MARCH 23, 2023)
- {{57.32}} GROUNDWATER SURFACE ELEVATION (m) (MAY 22, 2024)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE AND TEST PIT LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:400

0 5 10 15 20 25m

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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (BTEX)

Scale: 1:400	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-15
Approved by: KM	Revision No.:

11x17

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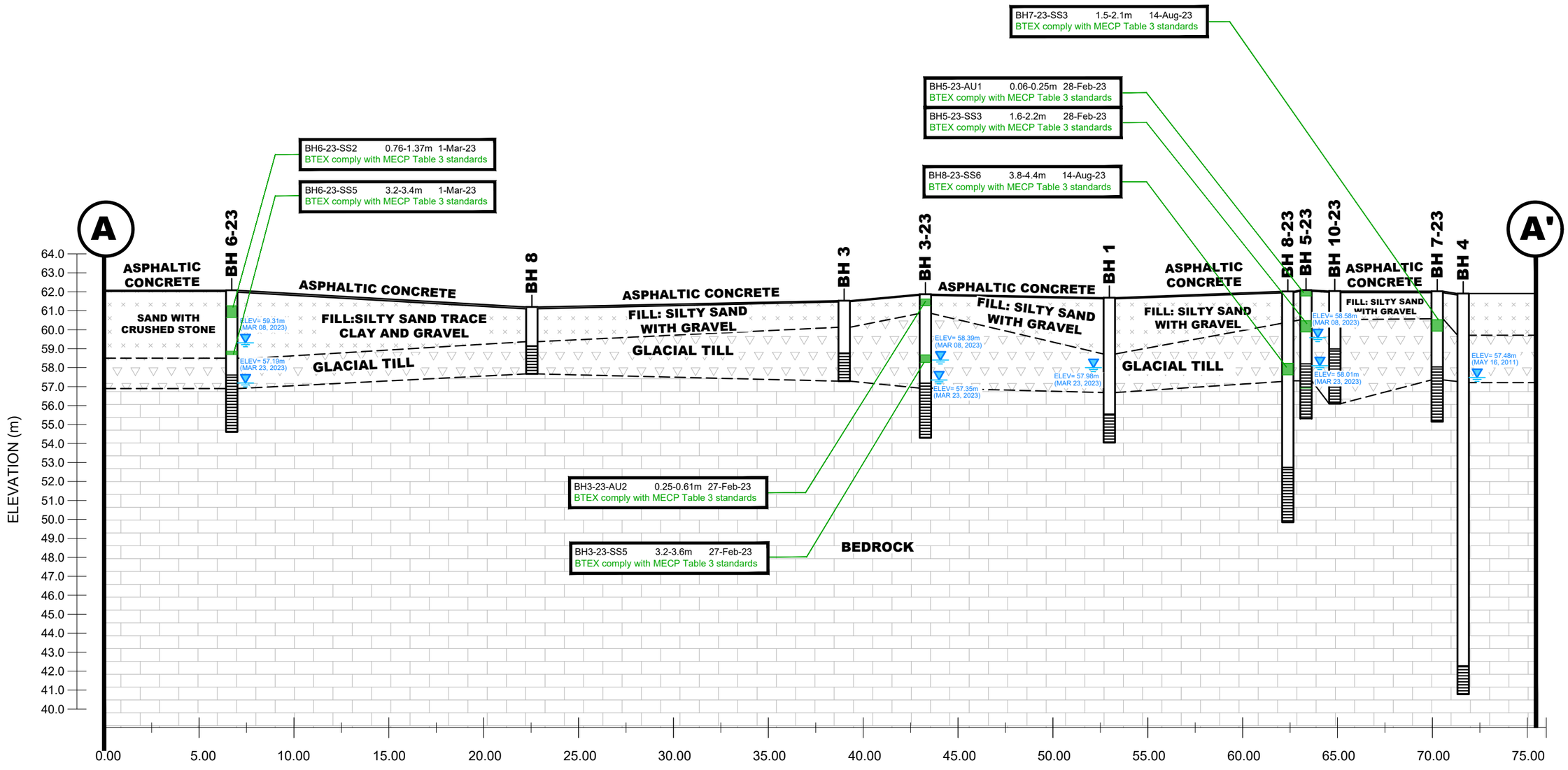

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

PATERSON GROUP
9 AURIGA DRIVE
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TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (BTEX)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-14A
Approved by: KM	Revision No.:

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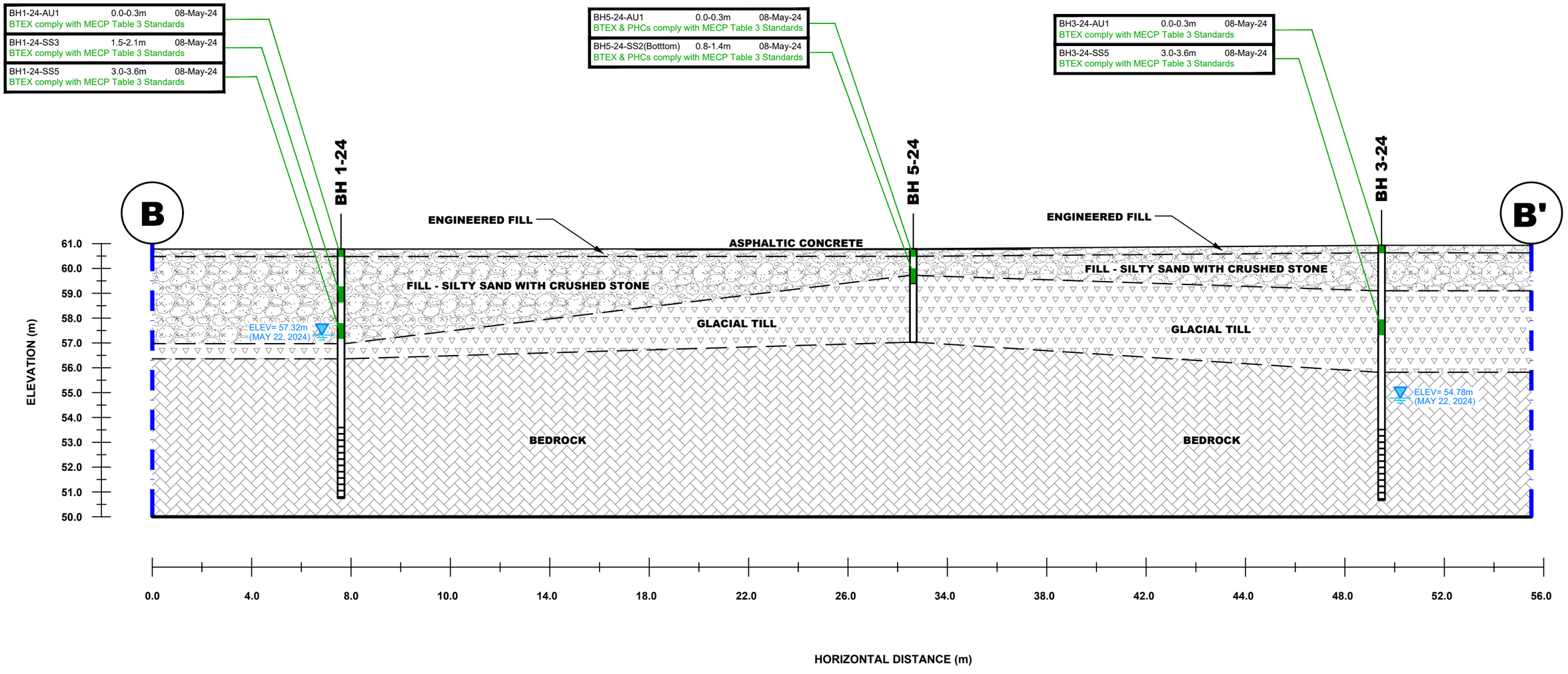
BH1-24-AU1	0.0-0.3m	08-May-24
BTEX comply with MECP Table 3 Standards		
BH1-24-SS3	1.5-2.1m	08-May-24
BTEX comply with MECP Table 3 Standards		
BH1-24-SS5	3.0-3.6m	08-May-24
BTEX comply with MECP Table 3 Standards		

BH5-24-AU1	0.0-0.3m	08-May-24
BTEX & PHCs comply with MECP Table 3 Standards		
BH5-24-SS2(Botttom)	0.8-1.4m	08-May-24
BTEX & PHCs comply with MECP Table 3 Standards		

BH3-24-AU1	0.0-0.3m	08-May-24
BTEX comply with MECP Table 3 Standards		
BH3-24-SS5	3.0-3.6m	08-May-24
BTEX comply with MECP Table 3 Standards		



LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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9 AURIGA DRIVE
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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (BTEX)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-15B
Approved by: KM	Revision No.:

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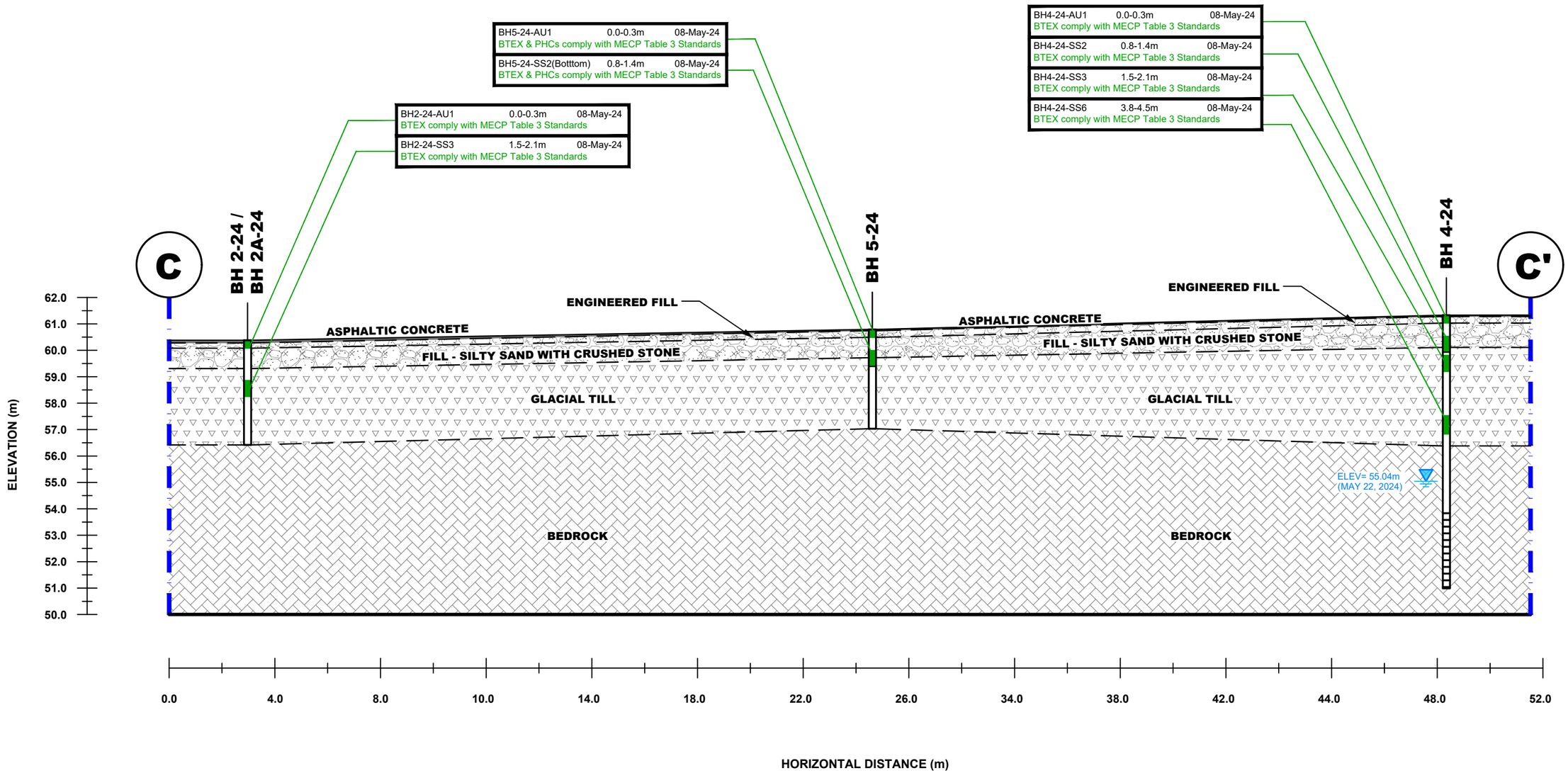

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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9 AURIGA DRIVE
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NO.	REVISIONS	DATE	INITIAL

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PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION C-C' - SOIL (BTEX)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-15C
Approved by: KM	Revision No.:

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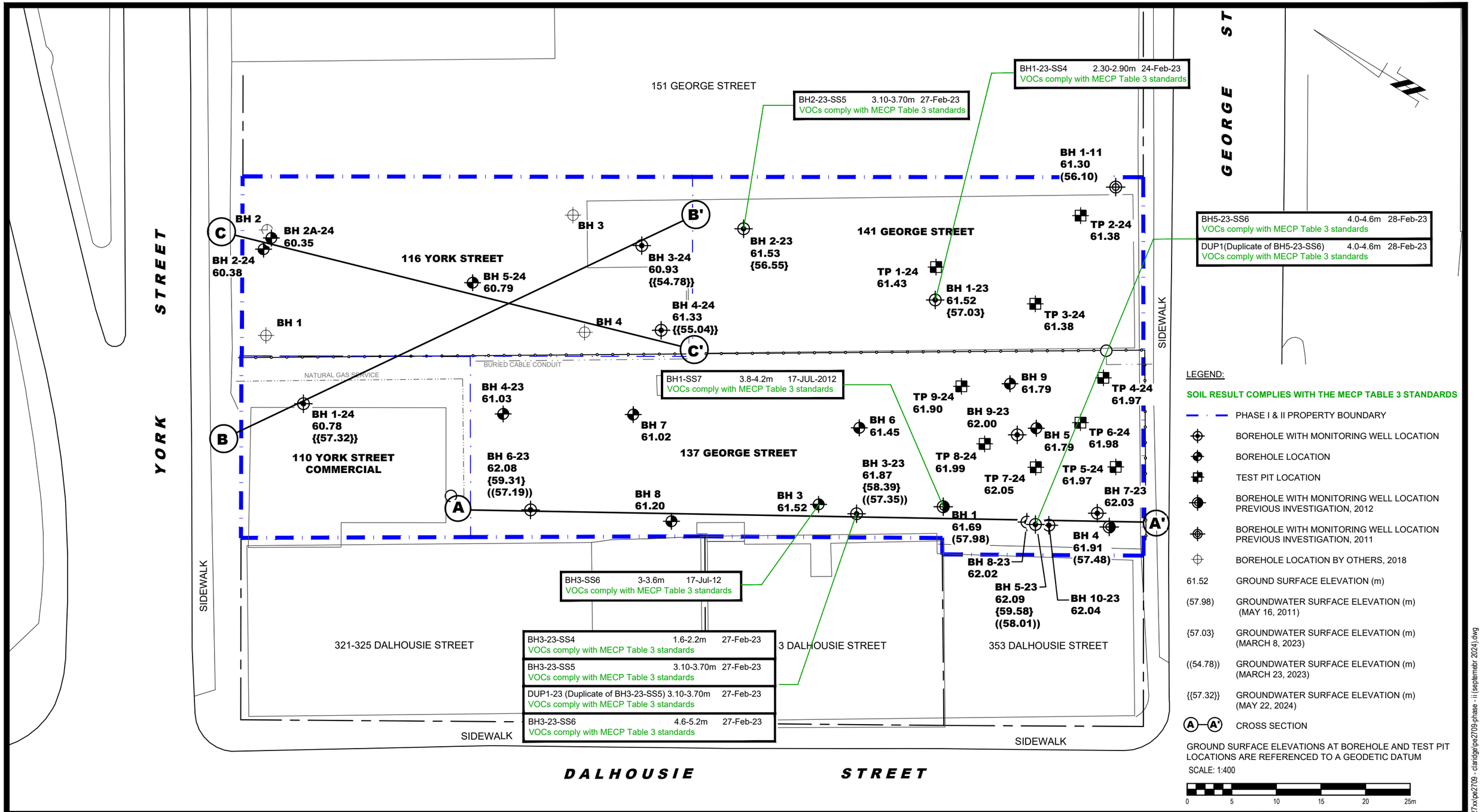

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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (VOCs)

Scale: 1:400	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-16
Approved by: KM	Revision No.:

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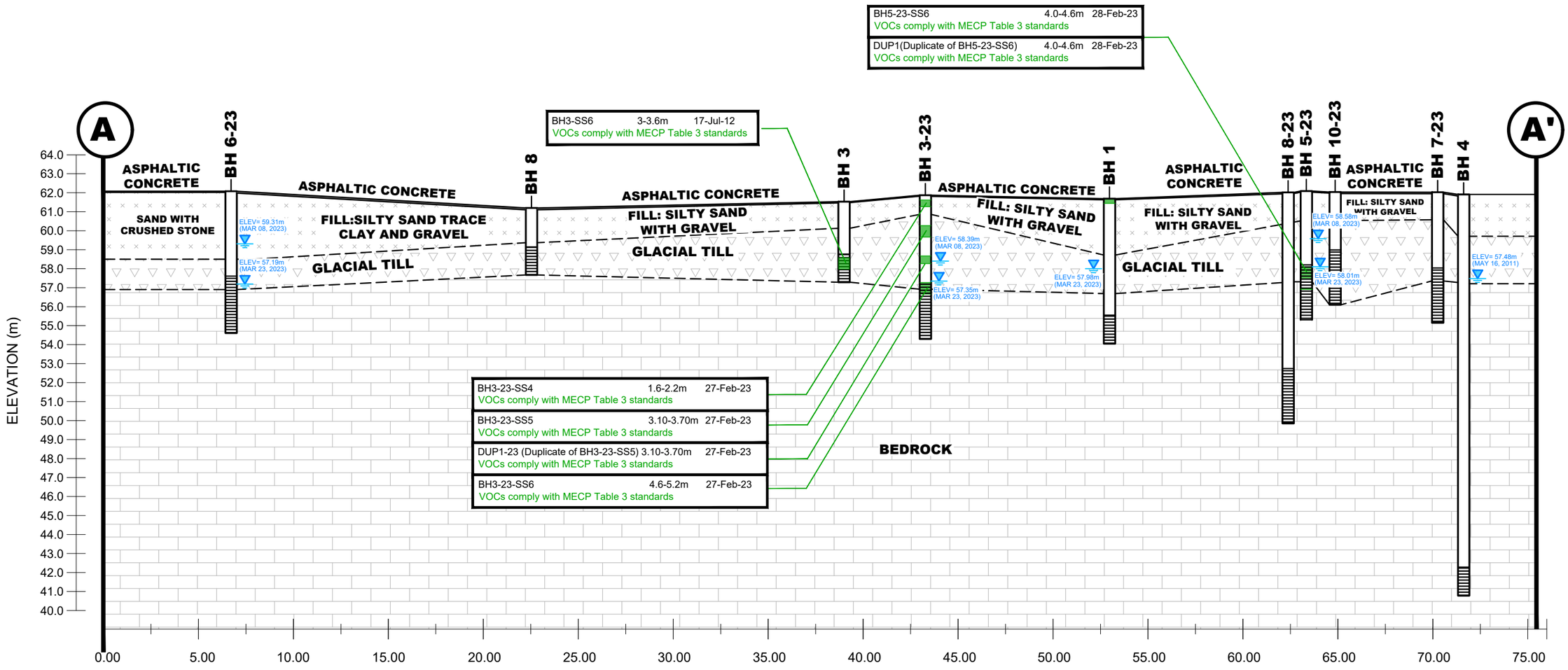

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

PATERSON GROUP
9 AURIGA DRIVE
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TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (VOCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-16A
Approved by: KM	Revision No.:

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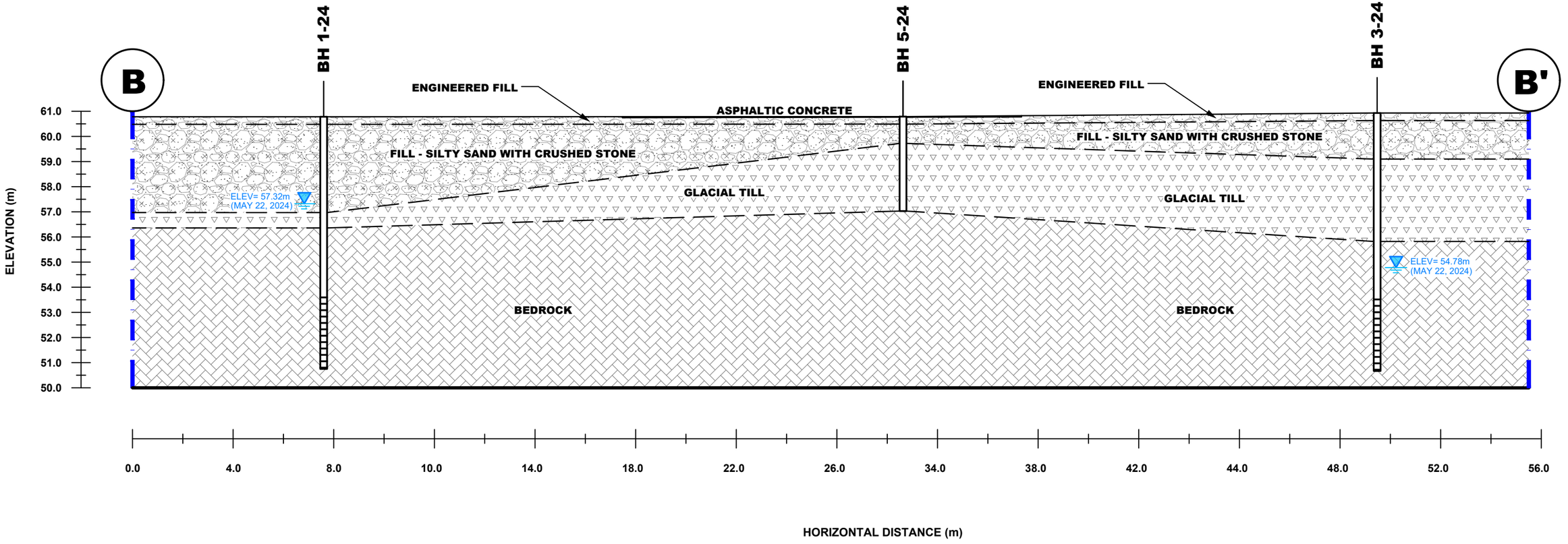

LEGEND:

PHASE I & II PROPERTY BOUNDARY

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9 AURIGA DRIVE
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PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (VOCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-16B
Approved by: KM	Revision No.:

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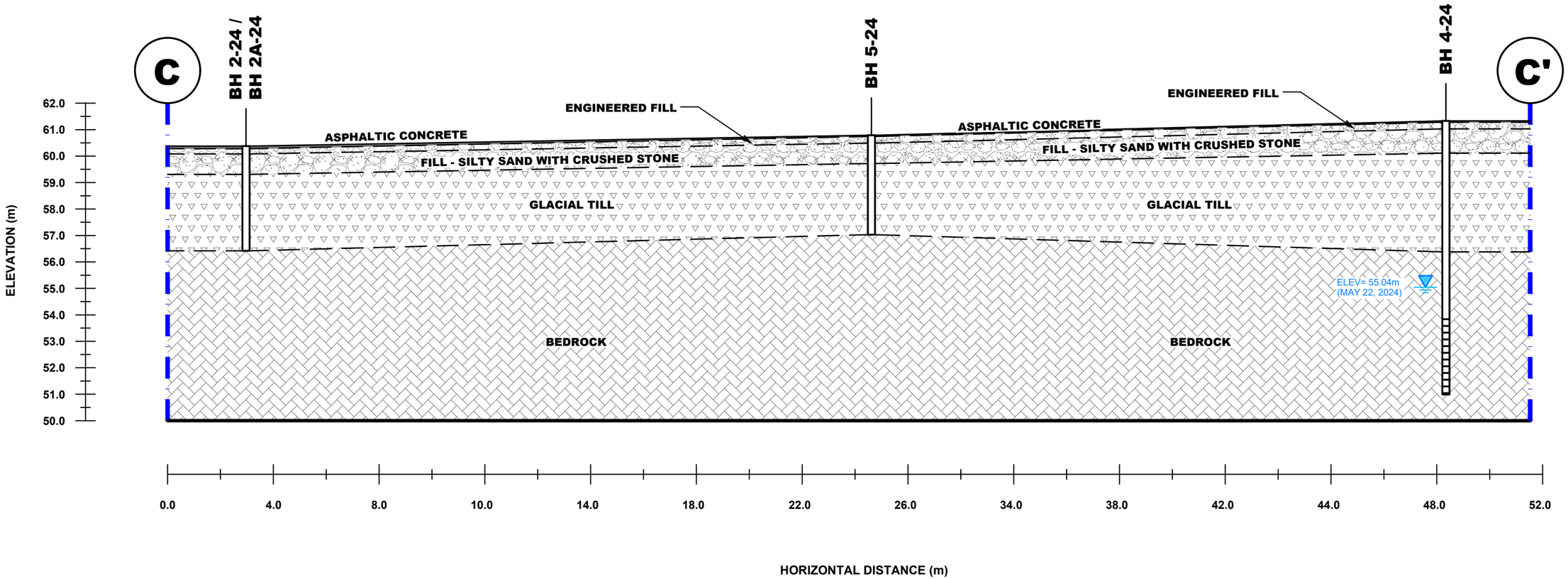

LEGEND:

PHASE I & II PROPERTY BOUNDARY

PATERSON GROUP
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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION C-C' - SOIL (VOCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-16C
Approved by: KM	Revision No.:

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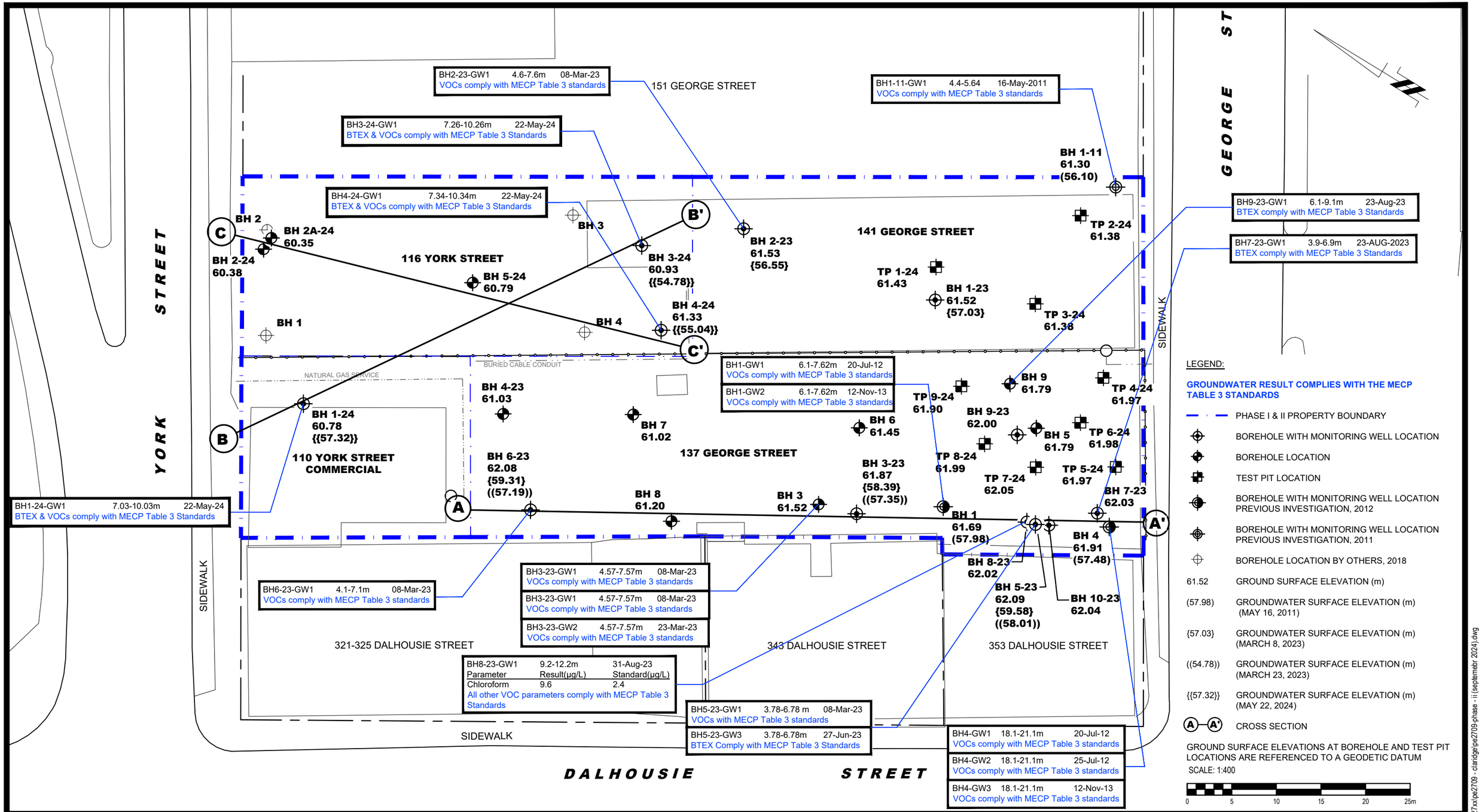

PATERSON GROUP
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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - GROUNDWATER (BTEX AND VOCs)**

Scale: 1:400	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-17
Approved by: KM	Revision No.:

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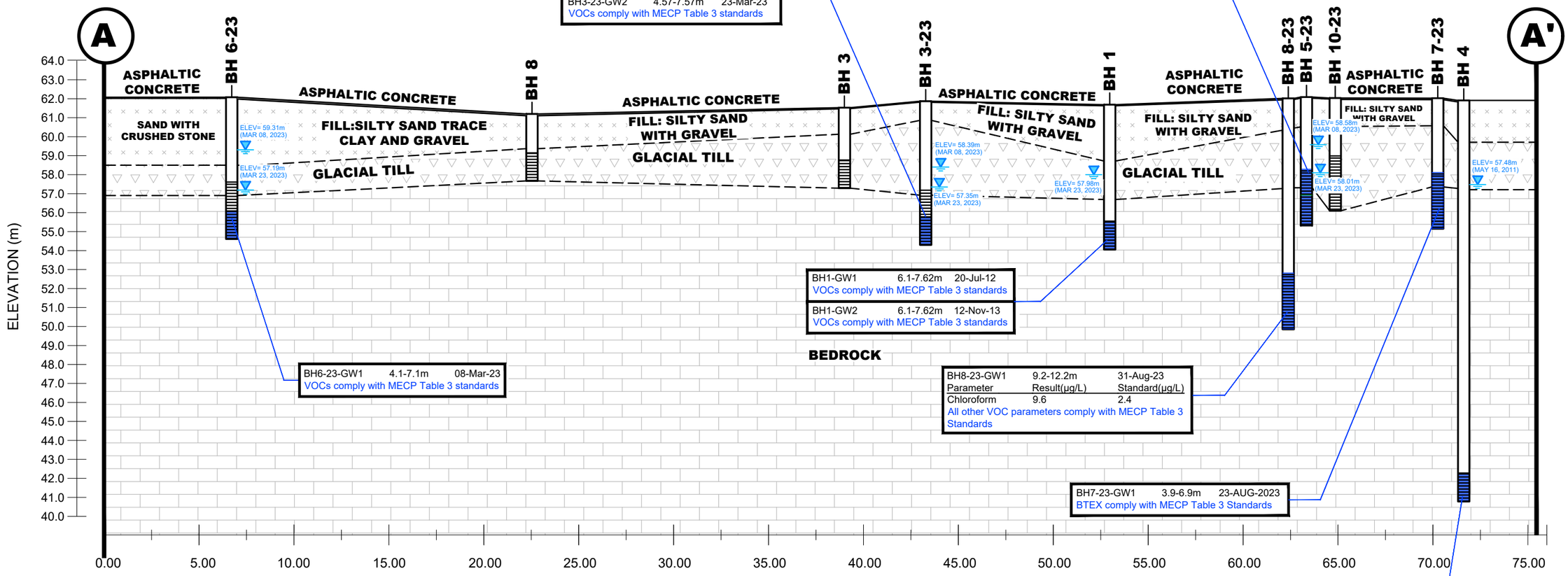

BH3-23-GW1	4.57-7.57m	08-Mar-23
VOCs comply with MECP Table 3 standards		
BH3-23-GW1	4.57-7.57m	08-Mar-23
VOCs comply with MECP Table 3 standards		
BH3-23-GW2	4.57-7.57m	23-Mar-23
VOCs comply with MECP Table 3 standards		

BH5-23-GW1	3.78-6.78 m	08-Mar-23
VOCs with MECP Table 3 standards		
BH5-23-GW3	3.78-6.78m	27-Jun-23
BTEX Comply with MECP Table 3 Standards		

BH1-GW1	6.1-7.62m	20-Jul-12
VOCs comply with MECP Table 3 standards		
BH1-GW2	6.1-7.62m	12-Nov-13
VOCs comply with MECP Table 3 standards		

BH6-23-GW1	4.1-7.1m	08-Mar-23
VOCs comply with MECP Table 3 standards		

BH8-23-GW1	9.2-12.2m	31-Aug-23
Parameter	Result(µg/L)	Standard(µg/L)
Chloroform	9.6	2.4
All other VOC parameters comply with MECP Table 3 Standards		

BH7-23-GW1	3.9-6.9m	23-AUG-2023
BTEX comply with MECP Table 3 Standards		

BH4-GW1	18.1-21.1m	20-Jul-12
VOCs comply with MECP Table 3 standards		
BH4-GW2	18.1-21.1m	25-Jul-12
VOCs comply with MECP Table 3 standards		
BH4-GW3	18.1-21.1m	12-Nov-13
VOCs comply with MECP Table 3 standards		

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-17A
Approved by: KM	Revision No.:

11x17

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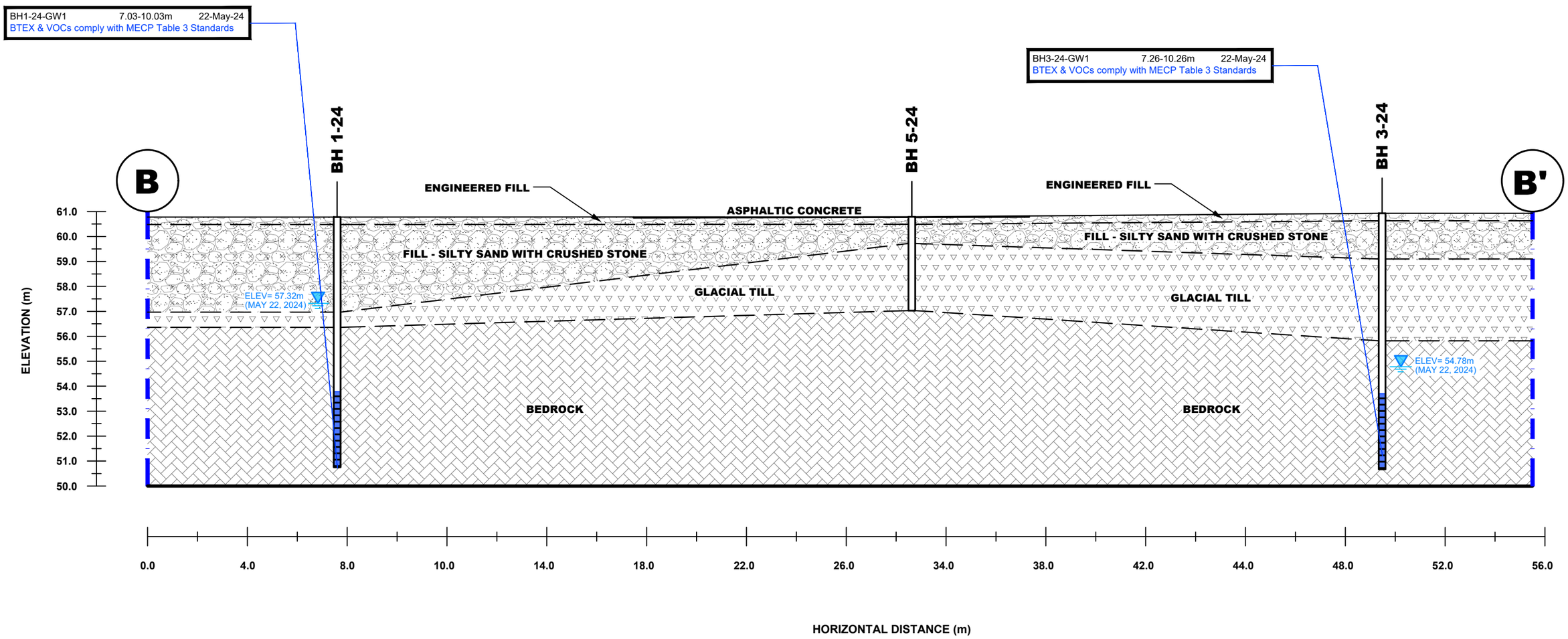
BH1-24-GW1 7.03-10.03m 22-May-24
BTEX & VOCs comply with MECP Table 3 Standards

BH3-24-GW1 7.26-10.26m 22-May-24
BTEX & VOCs comply with MECP Table 3 Standards



LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

PATERSON GROUP
9 AURIGA DRIVE
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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title: CROSS SECTION B-B' - GROUNDWATER (BTEX AND VOCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-17B
Approved by: KM	Revision No.:

11x17

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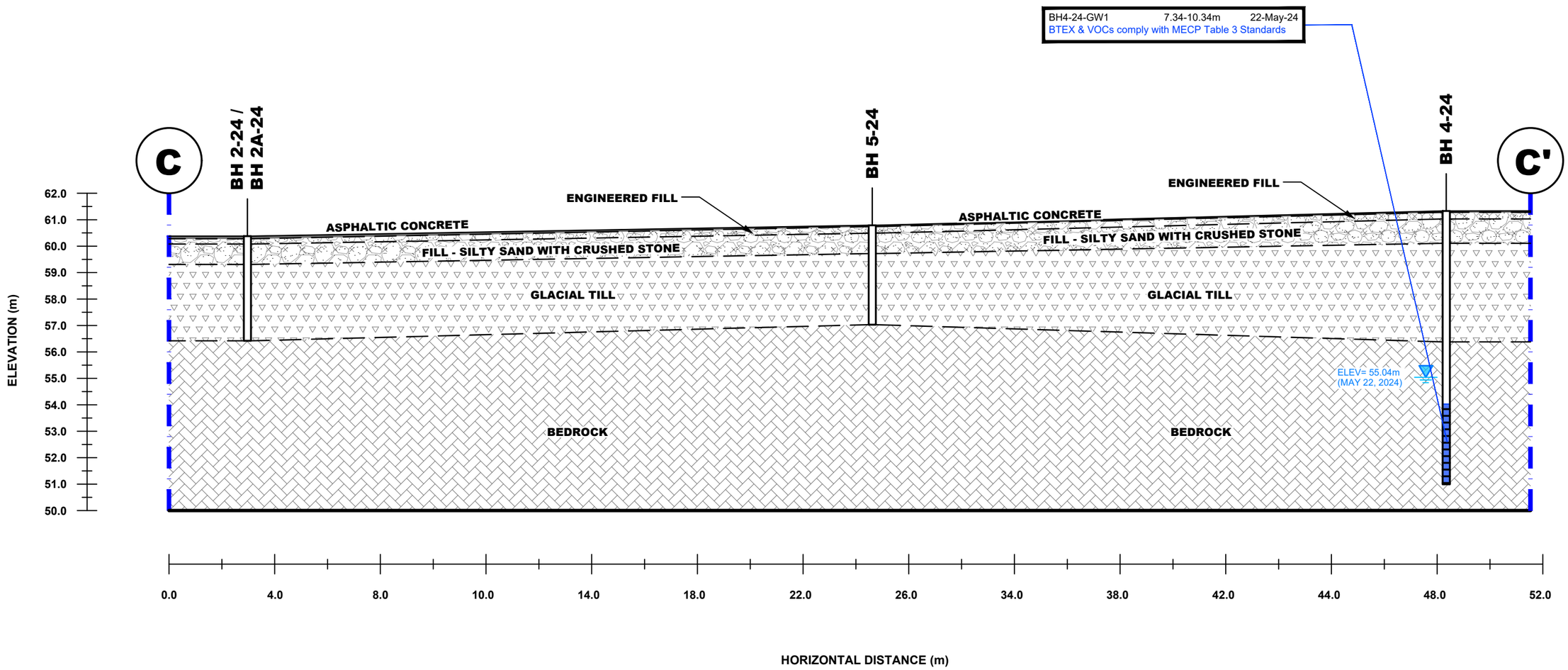

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

PATERSON GROUP
9 AURIGA DRIVE
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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:
CROSS SECTION C-C' - GROUNDWATER (BTEX, VOCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-17C
Approved by: KM	Revision No.:

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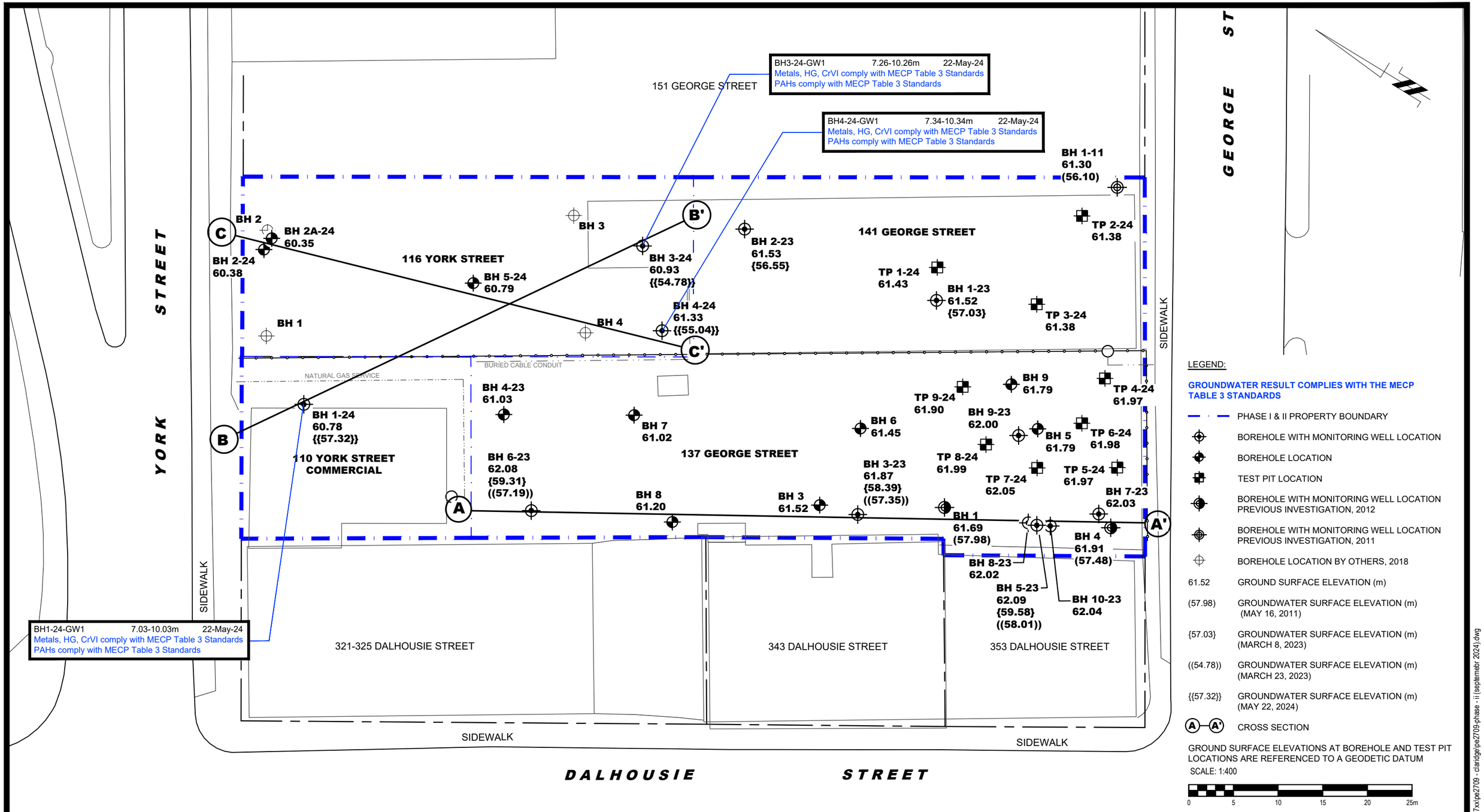

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

- PHASE I & II PROPERTY BOUNDARY
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- TEST PIT LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION PREVIOUS INVESTIGATION, 2012
- BOREHOLE WITH MONITORING WELL LOCATION PREVIOUS INVESTIGATION, 2011
- BOREHOLE LOCATION BY OTHERS, 2018
- 61.52 GROUND SURFACE ELEVATION (m)
- (57.98) GROUNDWATER SURFACE ELEVATION (m) (MAY 16, 2011)
- {57.03} GROUNDWATER SURFACE ELEVATION (m) (MARCH 8, 2023)
- ((54.78)) GROUNDWATER SURFACE ELEVATION (m) (MARCH 23, 2023)
- {{57.32}} GROUNDWATER SURFACE ELEVATION (m) (MAY 22, 2024)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE AND TEST PIT LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:400

0 5 10 15 20 25m

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

NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - GROUNDWATER (METALS, Hg, CrVI, & PAHs)**

Scale: 1:400	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-18
Approved by: KM	Revision No.:

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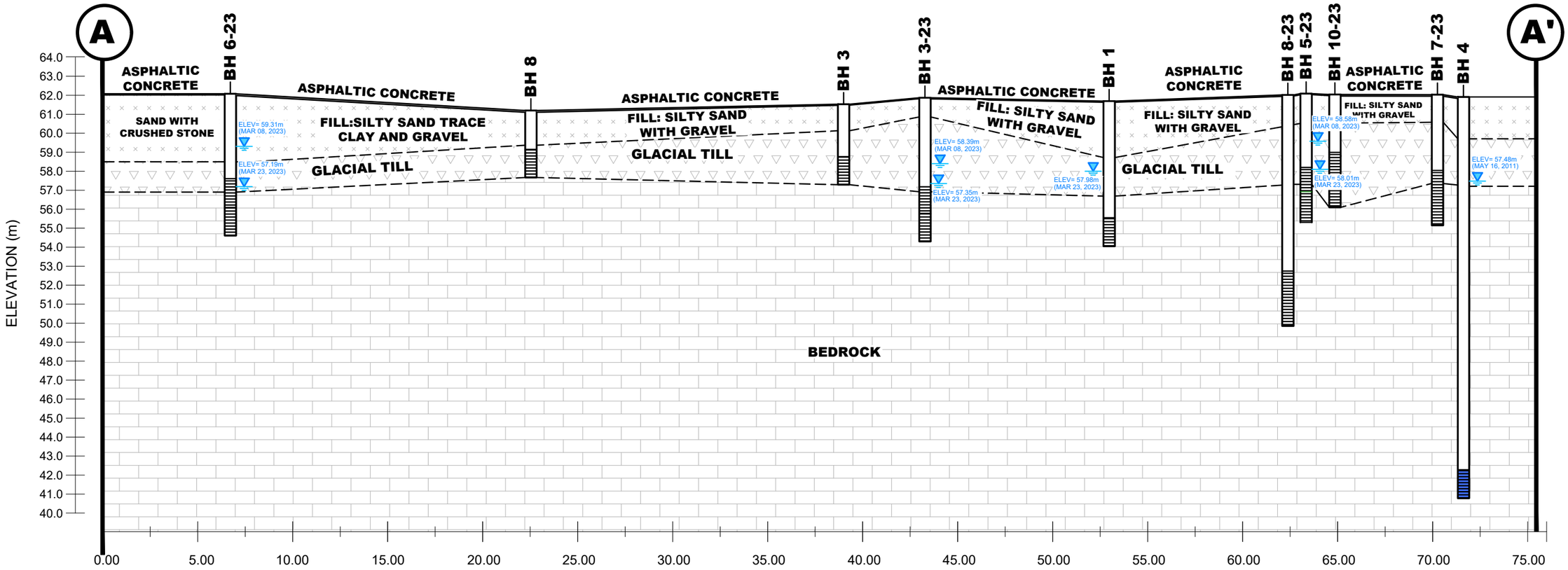

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title: ANALYTICAL TESTING PLAN - GROUNDWATER (METALS, Hg, CrVI, & PAHs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-18A
Approved by: KM	Revision No.:

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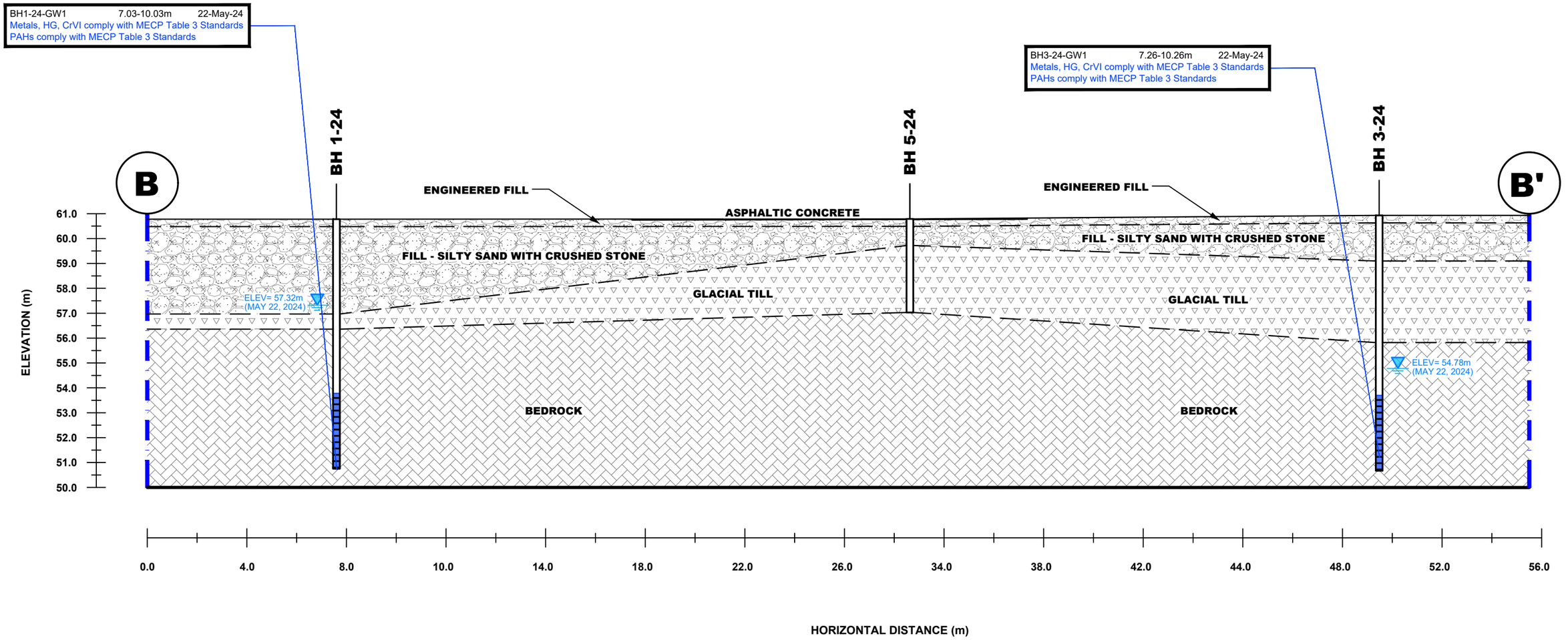
BH1-24-GW1 7.03-10.03m 22-May-24
Metals, HG, CrVI comply with MECP Table 3 Standards
PAHs comply with MECP Table 3 Standards

BH3-24-GW1 7.26-10.26m 22-May-24
Metals, HG, CrVI comply with MECP Table 3 Standards
PAHs comply with MECP Table 3 Standards



LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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OTTAWA, ON
K2E 7T9
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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title: CROSS SECTION B-B' - GROUNDWATER (METALS, Hg, CrVI, & PAHs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-18B
Approved by: KM	Revision No.:

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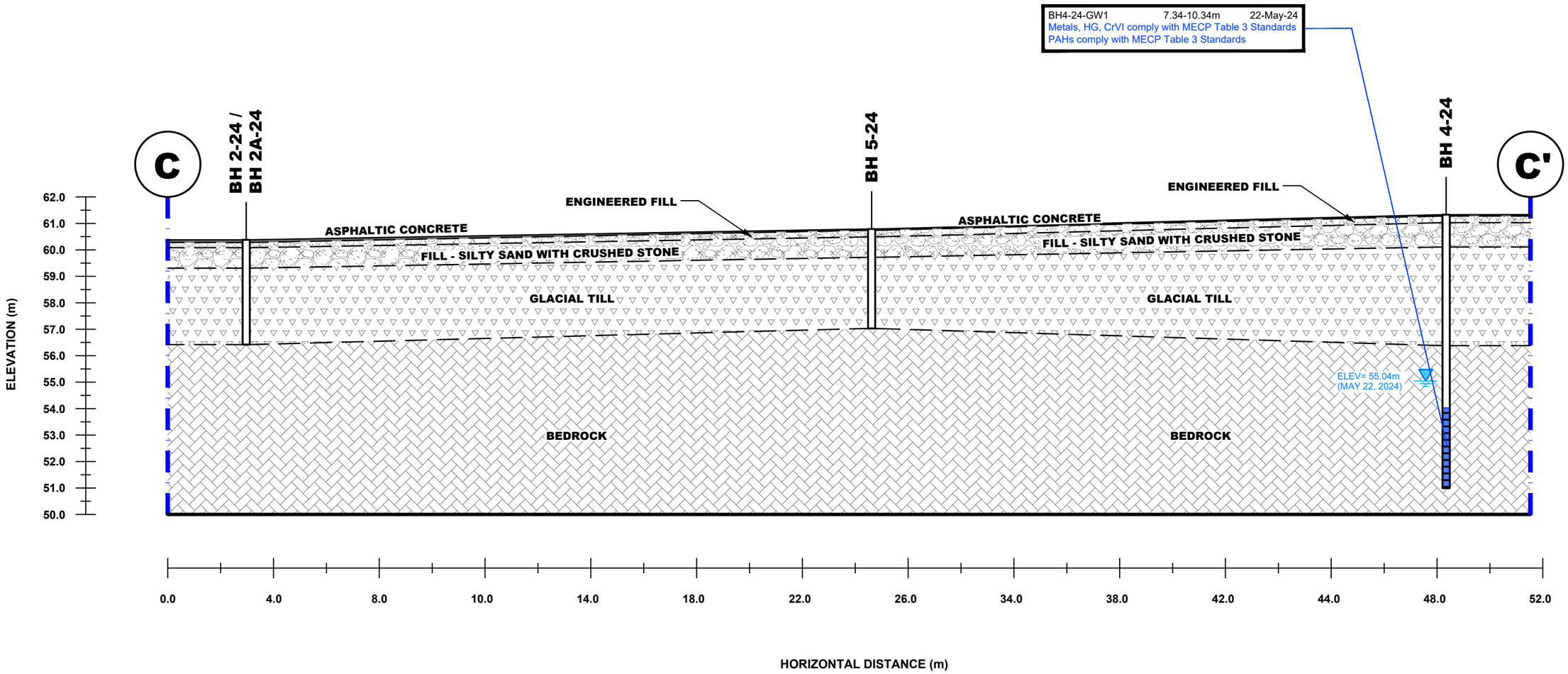

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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OTTAWA, ON
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NO.	REVISIONS	DATE	INITIAL

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PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title: CROSS SECTION C-C' - GROUNDWATER (METALS, Hg, CrVI, & PAHs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-18C
Approved by: KM	Revision No.:

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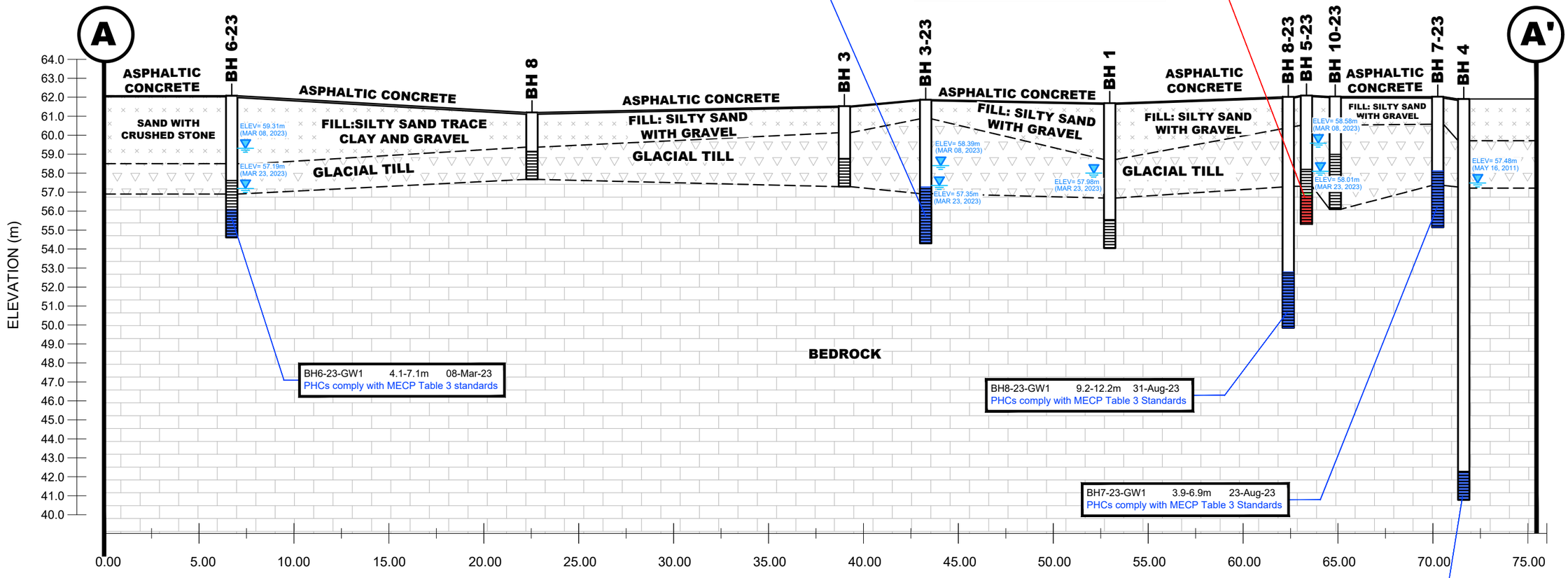

BH5-23-GW1	3.78-6.78 m	08-Mar-23
Parameter	Result(µg/L)	Standard(µg/L)
F1	1210	750
F2	266	150

All other PHC parameters comply with MECP Table 3 standards

BH5-23-GW2 3.78-6.78 m 23-Mar-23
PHCs comply with MECP Table 3 standards

BH5-23-GW3	3.78-6.78m	27-Jun-23
Parameter	Result(µg/L)	Standard(µg/L)
F1	1050	750
F2	398	150

All other PHC parameters comply with MECP Table 3 Standards

BH3-23-GW2 4.57-7.57m 23-Mar-23
PHCs comply with MECP Table 3 standards

BH6-23-GW1 4.1-7.1m 08-Mar-23
PHCs comply with MECP Table 3 standards

BH8-23-GW1 9.2-12.2m 31-Aug-23
PHCs comply with MECP Table 3 Standards

BH7-23-GW1 3.9-6.9m 23-Aug-23
PHCs comply with MECP Table 3 Standards

BH4-GW1 18.1-21.1m 20-Jul-12
PHCs comply with MECP Table 3 standards

BH4-GW2 18.1-21.1m 25-Jul-12
PHCs comply with MECP Table 3 standards

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title:
CROSS SECTION A-A' - GROUNDWATER (PHCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-19A
Approved by: KM	Revision No.:

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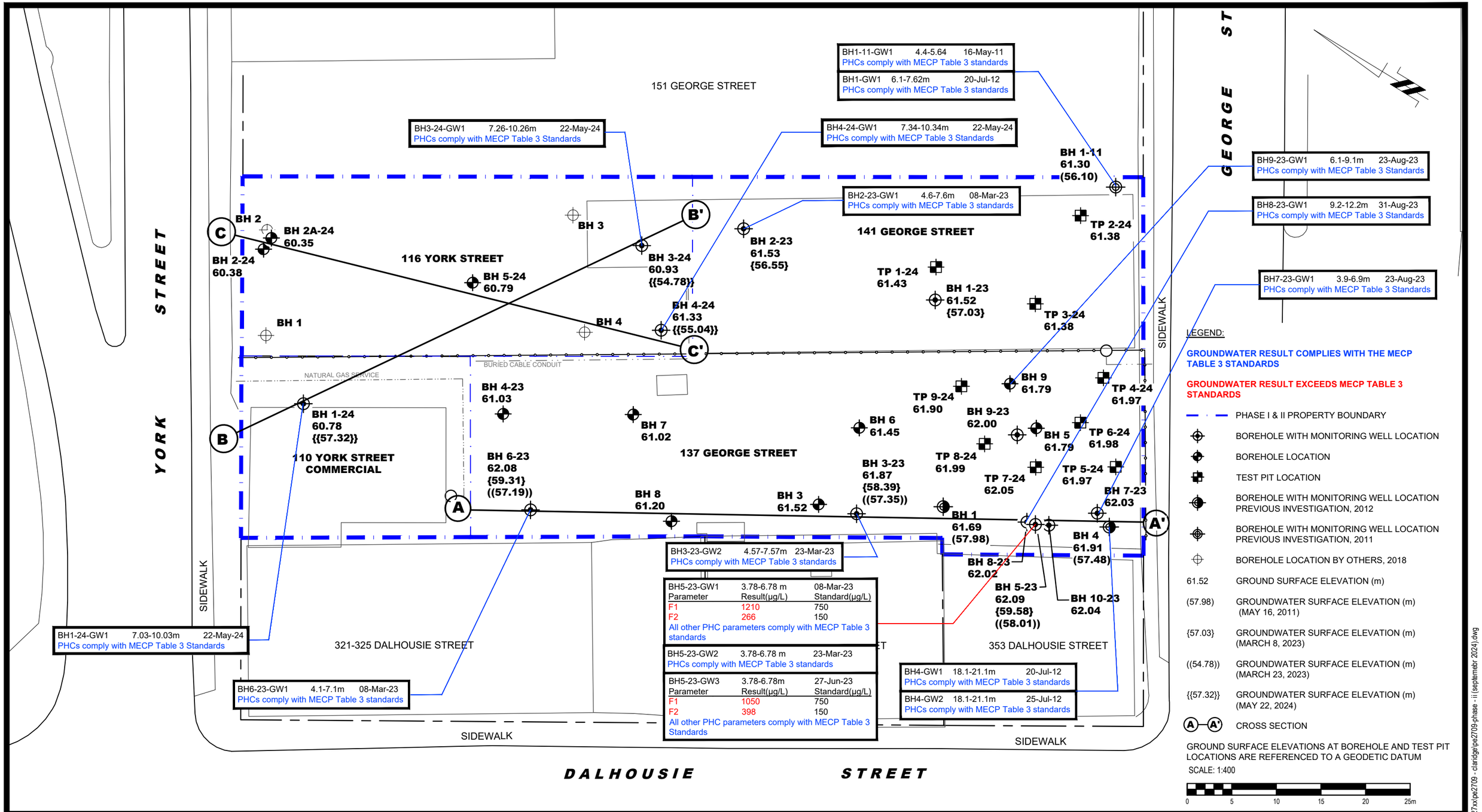

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 3 STANDARDS

- PHASE I & II PROPERTY BOUNDARY
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- TEST PIT LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION PREVIOUS INVESTIGATION, 2012
- BOREHOLE WITH MONITORING WELL LOCATION PREVIOUS INVESTIGATION, 2011
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- 61.52 GROUND SURFACE ELEVATION (m)
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- ((54.78)) GROUNDWATER SURFACE ELEVATION (m) (MARCH 23, 2023)
- {{57.32}} GROUNDWATER SURFACE ELEVATION (m) (MAY 22, 2024)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE AND TEST PIT LOCATIONS ARE REFERENCED TO A GEODETIC DATUM

SCALE: 1:400

0 5 10 15 20 25m

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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - GROUNDWATER (PHCs)**

Scale: 1:400	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-19
Approved by: KM	Revision No.:

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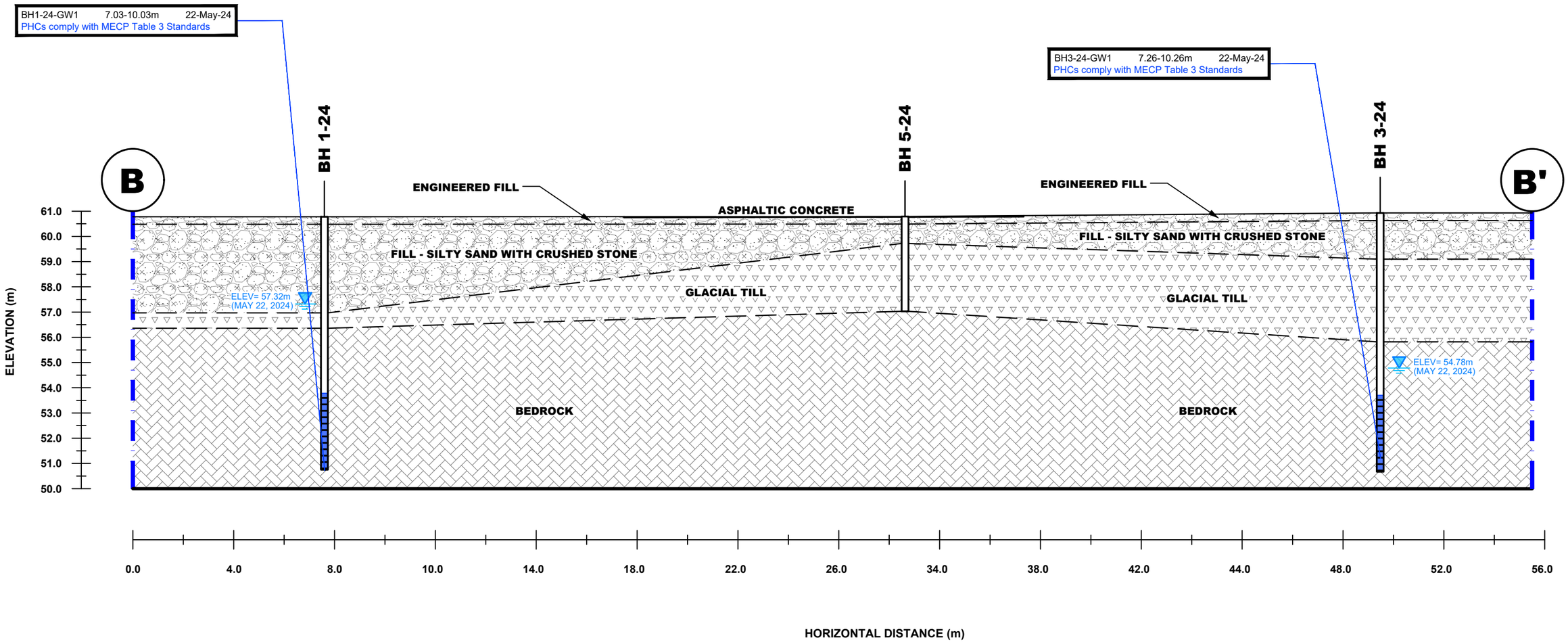
BH1-24-GW1 7.03-10.03m 22-May-24
PHCs comply with MECP Table 3 Standards

BH3-24-GW1 7.26-10.26m 22-May-24
PHCs comply with MECP Table 3 Standards



LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title: CROSS SECTION B-B' - GROUNDWATER (PHCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-19B
Approved by: KM	Revision No.:

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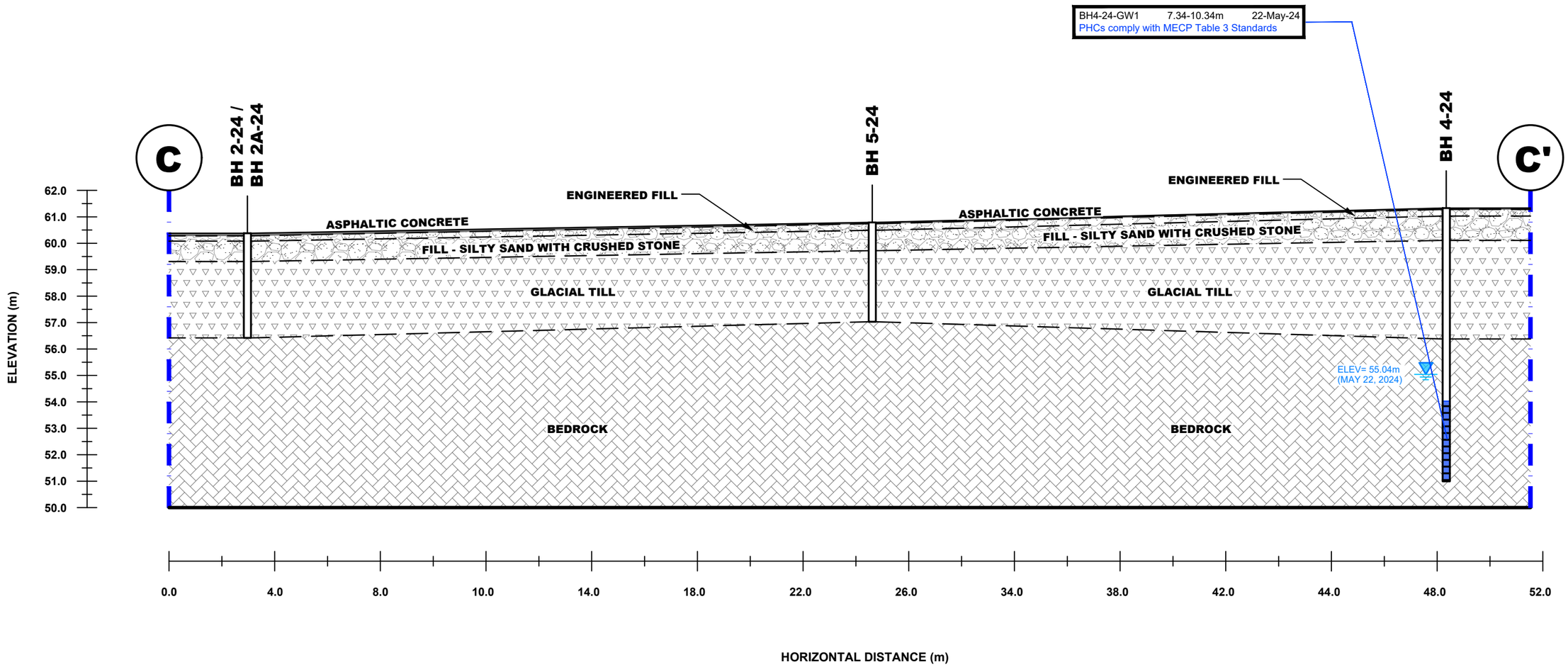

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 3 STANDARDS

PHASE I & II PROPERTY BOUNDARY

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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II-ENVIRONMENTAL SITE ASSESSMENT
137-141 GEORGE STREET AND 110-116 YORK STREET
OTTAWA, ONTARIO

Title: CROSS SECTION C-C' - GROUNDWATER (PHCs)

Scale: AS SHOWN	Date: 09/2024
Drawn by: GK	Report No.: PE2709-REP.04
Checked by: JC	Dwg. No.: PE2709-19C
Approved by: KM	Revision No.:

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TABLES

TABLE A1: SOIL ANALYTICAL RESULTS COMPARED TO MECP TABLE 3 STANDARDS RESIDENTIAL PROPERTY USE

TABLE A2: SOIL ANALYTICAL RESULTS COMPARED TO MECP TABLE 3 STANDARDS RESIDENTIAL PROPERTY USE

Table A1: Soil Analytical Test Results Compared to MECP Table 3 Standards Residential Property Use

Parameter	Units	MDL	Regulation	BH1-AU1 1229217-01	BH1-SS7 1229139-01	BH3-SS6 1229139-03	BH4-SS3 1229217-02	BH5-SS8 1232102-01	BH6-SS7 1232102-02	BH7-SS7 1232102-03	BH1-23-SS2 2310245-12	BH1-23-SS3 2310245-01	BH1-23-SS4 2309081-02	BH1-23-SS5 2310245-13	BH2-23-SS2 2310245-02	BH2-23-SS4 2310245-03	BH2-23-SS5 2309472-01	BH3-23-AU2 2310245-04	BH3-23-SS4 2310245-05	BH3-23-SS5 2310245-14	DUP1-23 2309472-07	BH3-23-SS6 2310245-15	BH4-23-SS3 2309472-05	BH4-23-SS4 2310245-06	BH5-23-AU1 2310245-07	BH5-23-SS3 2310245-08	BH5-23-SS6 2310245-09	BH6-23-SS2 2309472-06	BH6-23-SS5 2310245-10
Sample Depth (m)			Reg 153/04-Table 3 Residential, coarse	0.00-0.25	3.80-4.20	3.00-3.60	0.80-1.20	5.20-5.41	4.60-4.75	4.60-4.70	0.76-1.37	1.60-2.20	2.29-2.90	3.20-3.40	0.80-1.40	2.40-3.00	3.05-3.66	0.25-0.61	1.60-2.20	3.20-3.60	3.20-3.60	4.20-5.60	0.76-1.37	1.60-2.20	0.06-0.25	1.60-2.20	4.00-4.60	0.76-1.37	3.20-3.40
Sample Date				17/Jul/2012	17/Jul/2012	17/Jul/2012	18/Jul/2012	8/Aug/2012	8/Aug/2012	8/Aug/2012	24/Feb/2023	24/Feb/2023	24/Feb/2023	24/Feb/2023	27/Feb/2023	27/Feb/2023	27/Feb/2023	27/Feb/2023	27/Feb/2023	27/Feb/2023	27/Feb/2023	27/Feb/2023	28/Feb/2023	28/Feb/2023	28/Feb/2023	28/Feb/2023	28/Feb/2023	28/Feb/2023	1/Mar/2023
Physical Characteristics																													
% Solids	% by Wt.	0.1		98.6	89.1	90.4	89.6	74.0	96.4	96.5	90.7	93.2	92.5	92.2	88.4	92.7	92.6	90.6	96.2	90.5	93.4	91.1	92.5	92.5	92.6	98.4	94.2	96.5	94.7
General Inorganics																													
SAR	N/A	0.01	5.0	-	-	-	-	-	-	-	1.9	0.8	-	-	1.61	1.77	-	2.16	1.19	1.54	-	2.07	4.39	4.44	0.9	1.32	1.25	4.65	1.88
Conductivity	uS/cm	5.00	700	-	-	-	-	-	-	-	943	469	-	-	1360	693	-	442	209	260	-	317	1160	1090	280	293	226	1770	3310
pH	pH Units	0.05	NV	-	-	-	-	-	-	-	-	-	-	-	7.69	7.76	-	7.66	-	-	-	7.88	7.59	-	-	7.89	-	7.89	-
Metals																													
Antimony	ug/g dry	1.0	7.5	<1	-	-	2	-	-	-	ND (1.0)	ND (1.0)	-	-	2.2	ND (1.0)	-	2.2	ND (1.0)	ND (1.0)	-	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Arsenic	ug/g dry	1.0	18	2	-	-	2	-	-	-	3.5	3.8	-	-	8	2.6	-	6.8	4.1	2.9	-	2.5	3.4	3.5	5.9	2.8	4.1	2.2	10.2
Barium	ug/g dry	1.0	390	20	-	-	184	-	-	-	62.5	30.7	-	-	321	27.1	-	126	38.6	87.3	-	68.1	31.3	27.1	24.1	38.1	129	211	64.7
Beryllium	ug/g dry	0.5	4.0	<0.5	-	-	<0.5	-	-	-	ND (0.5)	ND (0.5)	-	-	0.6	ND (0.5)	-	0.6	ND (0.5)	ND (0.5)	-	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Boron	ug/g dry	0.5	120	<5.0	-	-	<5.0	-	-	-	ND (5.0)	6.4	-	-	7	6.5	-	ND (5.0)	5.6	5.3	-	8.1	6.8	7.2	6.8	5.6	8	16.2	11.6
Cadmium	ug/g dry	0.5	1.2	<0.5	-	-	0.5	-	-	-	ND (0.5)	ND (0.5)	-	-	0.6	ND (0.5)	-	ND (0.5)	ND (0.5)	ND (0.5)	-	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chromium (VI)	ug/g dry	0.2	8.0	-	-	-	-	-	-	-	ND (0.2)	ND (0.2)	-	-	ND (0.2)	ND (0.2)	-	ND (0.2)	ND (0.2)	ND (0.2)	-	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Chromium	ug/g dry	5	160	7	-	-	14	-	-	-	14.9	12.2	-	-	29.2	10.1	-	16.7	11.3	9.9	-	10.8	13	12.5	15.9	10.5	13.5	11	13.6
Cobalt	ug/g dry	1	22	3	-	-	3	-	-	-	3.9	3.8	-	-	7.1	3.6	-	5.7	4.2	3.2	-	2.8	3.3	3.5	6.8	3.7	4.5	5.5	11.8
Copper	ug/g dry	5	140	6	-	-	17	-	-	-	13	9.3	-	-	120	5.7	-	36.6	8.7	ND (5.0)	-	ND (5.0)	6.1	7	12.4	5.9	ND (5.0)	7.2	9.6
Lead	ug/g dry	1	120	9	-	-	524	-	-	-	61.9	3.6	-	-	432	3.2	-	217	5.3	3.3	-	2.8	12.3	4.5	32.5	4.5	5	5.8	19.7
Mercury	ug/g dry	0.1	0.27	-	-	-	-	-	-	-	0.2	ND (0.1)	-	-	2.7	ND (0.1)	-	0.3	ND (0.1)	ND (0.1)	-	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Molybdenum	ug/g dry	1	6.9	2	-	-	1	-	-	-	ND (1.0)	ND (1.0)	-	-	1.1	ND (1.0)	-	1.3	ND (1.0)	ND (1.0)	-	ND (1.0)	ND (1.0)	ND (1.0)	6.7	ND (1.0)	ND (1.0)	1	5.4
Nickel	ug/g dry	5	100	11	-	-	8	-	-	-	8.7	8.2	-	-	17	7.1	-	14.3	8.6	6.8	-	7.2	7.5	7.7	15.6	6.8	11.4	10.1	20.3
Selenium	ug/g dry	1	2.4	<1	-	-	<1	-	-	-	ND (1.0)	ND (1.0)	-	-	1.3	ND (1.0)	-	ND (1.0)	ND (1.0)	ND (1.0)	-	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Silver	ug/g dry	0.3	20	1.8	-	-	1.5	-	-	-	ND (0.3)	ND (0.3)	-	-	0.6	ND (0.3)	-	ND (0.3)	ND (0.3)	ND (0.3)	-	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Thallium	ug/g dry	1	1.0	<1	-	-	<1	-	-	-	ND (1.0)	ND (1.0)	-	-	ND (1.0)	ND (1.0)	-	ND (1.0)	ND (1.0)	ND (1.0)	-	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Uranium	ug/g dry	1	23	<1	-	-	<1	-	-	-	ND (1.0)	ND (1.0)	-	-	ND (1.0)	ND (1.0)	-	ND (1.0)	ND (1.0)	ND (1.0)	-	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vanadium	ug/g dry	1	86	30	-	-	20	-	-	-	17.2	17.5	-	-	26.1	15.7	-	22.1	19.2	15.7	-	12.9	18.9	19.5	25.8	14.3	15.4	ND (10.0)	10.5
Zinc	ug/g dry	10	340	<20	-	-	191	-	-	-	55.3	21.8	-	-	429	ND (20.0)	-	74.8	20.5	ND (20.0)	-	ND (20.0)	32.1	23.8	26.3	ND (20.0)	ND (20.0)	ND (20.0)	ND (20.0)
Methyl Mercury	ug/g dry	0.00005	0.0084	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatiles																													
Acetone	ug/g dry	0.5	16	-	ND (0.50)	ND (0.50)	-	-	-	-	-	-	ND (0.50)	-	-	-	ND (0.50)	-	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	-	-	-	-	ND (0.50)	-	-
Benzene	ug/g dry	0.02	0.21	-	ND (0.02)	ND (0.02)	-	-	-	-	-	-	ND (0.02)	-	-	-	ND (0.02)	-	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	-	-	-	-	ND (0.02)	-	-
Bromodichloromethane	ug/g dry	0.05	13	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Bromoform	ug/g dry	0.05	0.27	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Bromomethane	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Carbon Tetrachloride	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Chlorobenzene	ug/g dry	0.05	2.4	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Chloroform	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Dibromochloromethane	ug/g dry	0.05	9.4	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Dichlorodifluoromethane	ug/g dry	0.2	16	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,2-Dichlorobenzene	ug/g dry	0.05	3.4	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,3-Dichlorobenzene	ug/g dry	0.05	4.8	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,4-Dichlorobenzene	ug/g dry	0.05	0.083	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,1-Dichloroethane	ug/g dry	0.05	3.5	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,2-Dichloroethane	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,1-Dichloroethylene	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
cis-1,2-Dichloroethylene	ug/g dry	0.05	3.4	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
trans-1,2-Dichloroethylene	ug/g dry	0.05	0.084	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,2-Dichloropropane	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
cis-1,3-Dichloropropylene	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
trans-1,3-Dichloropropylene	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,3-Dichloropropene, total	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Ethylbenzene	ug/g dry	0.05	2.0	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	0.1	-	-
Ethylene dibromide (dibromoethane, 1,2-)	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Hexane	ug/g dry	0.05	2.8	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Methyl Ethyl Ketone (2-Butanone)	ug/g dry	0.05	16	-	ND (0.50)	ND (0.50)	-	-	-	-	-	-	ND (0.50)	-	-	-	ND (0.50)	-	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	-	-	-	-	ND (0.50)	-	-
Methyl Isobutyl Ketone	ug/g dry	0.05	1.7	-	ND (0.50)	ND (0.50)	-	-	-	-	-	-	ND (0.50)	-	-	-	ND (0.50)	-	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	-	-	-	-	ND (0.50)	-	-
Methyl tert-butyl ether	ug/g dry	0.05	0.75	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Methylene Chloride	ug/g dry	0.5	0.1	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Styrene	ug/g dry	2	0.7	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,1,1,2-Tetrachloroethane	ug/g dry	0.5	0.058	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,1,2,2-Tetrachloroethane	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Tetrachloroethylene	ug/g dry	0.05	0.28	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Toluene	ug/g dry	0.05	2.3	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,1,1-Trichloroethane	ug/g dry	0.05	0.38	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
1,1,2-Trichloroethane	ug/g dry	0.05	0.05	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Trichloroethylene	ug/g dry	0.05	0.061	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Trichlorofluoromethane	ug/g dry	0.05	4.0	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Vinyl Chloride	ug/g dry	0.05	0.02	-	ND (0.02)	ND (0.02)	-	-	-	-	-	-	ND (0.02)	-	-	-	ND (0.02)	-	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	-	-	-	-	ND (0.02)	-	-
m/p-Xylene	ug/g dry	0.05	3.1	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	0.22	-	-
o-Xylene	ug/g dry	0.05	3.1	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	ND (0.05)	-	-
Xylenes, total	ug/g dry	0.05	3.1	-	ND (0.05)	ND (0.05)	-	-	-	-	-	-	ND (0.05)	-	-	-	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	-	-	-	0.22	-	-
BTEX																													
Benzene	ug/g dry	0.02	0.21	-	-	-	-	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	-	ND (0.02)	ND (0.02)	ND (0.02)	-	ND (0.02)	-	ND (0.02)	-	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	-	ND (0.02)	ND (0.02)
Ethylbenzene	ug/g dry	0.05	2.0	-	-	-	-	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	-	ND (0.05)	-	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)
Toluene	ug/g dry	0.05	2.3	-	-	-	-	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	-	ND (0.05)	-	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)
m/p-Xylene	ug/g dry	0.05	3.1	-	-	-	-	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	-	ND (0.05)	-	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry	0.05	3.1	-	-	-	-	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	-	ND (0.05)	-	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	0.05	3.1	-	-	-	-	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	-	ND (0.05)	-	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	-	ND (0.05)	ND (0.05)
Hydrocarbons																													
F1 PHCs (C6-C10)	ug/g dry	7	55	-	182	ND (7)	-	65	8	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	-	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	4	98	-	118	ND (4)	-	74	<4	<4	17	ND (4)	43	ND (4)	ND (40)	ND (4)	ND (4)	ND (4)	ND (4)	ND (4)	-	ND (4)	ND (4)	ND (4)	ND (80)	ND (4)	ND (4)	ND (4)	ND (4)
F3 PHCs (C16-C34)	ug/g dry	8	300	-	ND (8)	ND (8)	-	<8	<8	62	107	ND (8)	364	ND (8)	312	ND (8)	ND (8)	48	ND (8)	ND (8)	-	ND (8)	ND (8)	ND (8)	699	ND (8)	ND (8)	50	15
F4 PHCs (C34-C50)	ug/g dry	6	2800	-	ND (6)	ND (6)	-	<6	<6	112	70	ND (6)	197	ND (6)	298	ND (6)	ND (6)	23	ND (6)	ND (6)	-	ND (6)	ND (6)	ND (6)	1650	ND (6)	ND (6)	42	11
F4G PHCs (gravimetric)	ug/g dry	50	2800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatiles																													
Acenaphthene	ug/g dry	0.02	7.9	<0.08	-	-	-	-	-	-	0.03	ND (0.02)	-	-	0.76	-	-	0.07	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Acenaphthylene	ug/g dry	0.02	0.15	<0.08	-	-	-	-	-	-	0.05	ND (0.02)	-	-	0.19	-	-	0.18	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Anthracene	ug/g dry	0.02	0.67	0.09	-	-	-	-	-	-	0.09	ND (0.02)	-	-	1.58	-	-	0.29	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Benzo[a]anthracene	ug/g dry	0.02	0.5	<0.08	-	-	-	-	-	-	0.23	ND (0.02)	-	-	2.72	-	-	0.7	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Benzo[a]pyrene	ug/g dry	0.02	0.3	<0.08	-	-	-	-	-	-	0.26	ND (0.02)	-	-	2.37	-	-	0.7	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Benzo[b]fluoranthene	ug/g dry	0.02	0.78	<0.08	-	-	-	-	-	-	0.29	ND (0.02)	-	-	3	-	-	0.73	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Benzo[g,h,i]perylene	ug/g dry	0.02	6.6	<0.08	-	-	-	-	-	-	0.16	ND (0.02)	-	-	1.45	-	-	0.38	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Benzo[k]fluoranthene	ug/g dry	0.02	0.78	<0.08	-	-	-	-	-	-	0.14	ND (0.02)	-	-	1.68	-	-	0.42	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Chrysene	ug/g dry	0.02	7.0	0.82	-	-	-	-	-	-	0.29	ND (0.02)	-	-	2.68	-	-	0.71	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Dibenzo[a,h]anthracene	ug/g dry	0.02	0.1	<0.08	-	-	-	-	-	-	0.04	ND (0.02)	-	-	0.38	-	-	0.11	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Fluoranthene	ug/g dry	0.02	0.69	<0.08	-	-	-	-	-	-	0.56	ND (0.02)	-	-	6.09	-	-	1.47	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Fluorene	ug/g dry	0.02	62	<0.08	-	-	-	-	-	-	0.02	ND (0.02)	-	-	0.53	-	-	0.08	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Indeno [1,2,3-cd] pyrene	ug/g dry	0.02	0.38	<0.08	-	-	-	-	-	-	0.14	ND (0.02)	-	-	1.4	-	-	0.37	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
1-Methylnaphthalene	ug/g dry	0.02	0.99	0.1	-	-	-	-	-	-	0.13	ND (0.02)	-	-	0.12	-	-	0.09	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
2-Methylnaphthalene	ug/g dry	0.02	0.99	0.13	-	-	-	-	-	-	0.18	ND (0.02)	-	-	0.16	-	-	0.12	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Methylnaphthalene (1&2)	ug/g dry	0.04	0.99	0.23	-	-	-	-	-	-	0.31	ND (0.04)	-	-	0.28	-	-	0.21	ND (0.04)	-	-	-	ND (0.04)	ND (0.04)	ND (0.80)	ND (0.04)	-	ND (0.04)	ND (0.04)
Naphthalene	ug/g dry	0.01	0.6	0.05	-	-	-	-	-	-	0.14	ND (0.01)	-	-	0.22	-	-	0.16	ND (0.01)	-	-	-	ND (0.01)	ND (0.01)	ND (0.20)	ND (0.01)	-	ND (0.01)	ND (0.01)
Phenanthrene	ug/g dry	0.02	6.2	0.32	-	-	-	-	-	-	0.42	ND (0.02)	-	-	4.82	-	-	0.89	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)
Pyrene	ug/g dry	0.02	78	0.22	-	-	-	-	-	-	0.5	ND (0.02)	-	-	4.84	-	-	1.28	ND (0.02)	-	-	-	ND (0.02)	ND (0.02)	ND (0.40)	ND (0.02)	-	ND (0.02)	ND (0.02)

2.00 Result exceeds Reg 153/04-Table 3 Residential, coarse Standards
ND (0.2) MDL exceeds Reg 153/04-Table 3 Residential, coarse Standards
ND (0.2) No concentrations identified above the MDL
- Parameter not analysed
NV No value given for indicated parameter

Table A1: Soil Analytical Test Results Compared to MECP Table 3 Standards Residential Property Use

Parameter	Units	MDL	Regulation	DUP 2310245-11	BH7-23-SS3 2333190-01	BH8-23-SS6 2333190-02	BH1-24-AU1 2420225-01	BH1-24-SS3 2420225-02	BH1-24-SS5 2420225-03	BH2-24-AU1 2420225-04	BH2-24-SS3 2420225-05	BH3-24-AU1 2420225-06	BH3-24-SS5 2420225-07	BH4-24-AU1 2420225-08	BH4-24-SS2 2420225-09	BH4-24-SS3 2420225-10	BH4-24-SS6 2420225-11	BH5-24-AU1 2420225-12	BH5-24-SS2(BOTTOM) 2420225-13	DUP1 2420225-14	DUP2 2420225-15
Sample Depth (m)			Reg 153/04-Table 3 Residential, coarse	4.00-4.60	1.52-2.13	3.81-4.42	0.00-0.30	1.52-2.13	3.05-3.66	0.10-0.30	1.52-2.13	0.00-0.46	3.05-3.66	0.00-0.46	0.76-1.37	1.52 - 2.13	3.81-4.42	0.05-0.46	0.76-1.37	3.05-3.66	3.81-4.42
Sample Date				28/Feb/2023	14/Aug/2023	14/Aug/2023	8/May/2024	8/May/2024	8/May/2024	8/May/2024	8/May/2024	9/May/2024	9/May/2024	9/May/2024	9/May/2024	9/May/2024	9/May/2024	9/May/2024	9/May/2024	8/May/2024	9/May/2024
Physical Characteristics																					
% Solids	% by Wt.	0.1		96.0	91.8	93.6	91.5	91.5	90.4	96.4	91.8	91.6	92.1	93.6	80.8	93.6	94.5	93.4	92.9	92	93.7
General Inorganics																					
SAR	N/A	0.01	5.0	1.43	-	-	2.19	1.6	1.87	4.11	6.83	2.29	2.08	0.28	2.3	-	2.21	2	1.54	2.18	1.75
Conductivity	uS/cm	5.00	700	304	-	-	2330	583	402	544	944	406	459	156	272	-	357	363	353	433	347
pH	pH Units	0.05	NV	-	-	-	N/A	N/A	8.79	7.28	N/A	N/A	7.79	N/A	N/A	-	N/A	7.4	N/A	9.6	N/A
Metals																					
Antimony	ug/g dry	1.0	7.5	ND (1.0)	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	<1.0	<1.0
Arsenic	ug/g dry	1.0	18	4.6	-	-	2.6	2	2.1	2.7	2.3	2.8	2.9	4	5.2	4.8	3	4.2	2.1	2.2	2.7
Barium	ug/g dry	1.0	390	211	-	-	99.5	29.9	35.8	87.8	41.1	59.5	21.3	98.2	177	36.2	36.7	137	30.2	35.9	43
Beryllium	ug/g dry	0.5	4.0	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	ug/g dry	0.5	120	8.9	-	-	11	6.2	<5.0	11.1	<5.0	6.5	7.4	7.3	5.3	6.7	7.4	5.2	<5.0	5.2	7.7
Cadmium	ug/g dry	0.5	1.2	ND (0.5)	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5
Chromium (VI)	ug/g dry	0.2	8.0	ND (0.2)	-	-	0.8	0.3	<0.2	<0.2	<0.2	0.2	-	<0.2	<0.2	N/A	-	0.4	-	<0.2	-
Chromium	ug/g dry	5	160	15.5	-	-	20.5	10.5	11.8	14.8	11.7	13	11.7	10.4	18.5	13.9	9.5	14.2	10.1	12.2	10.5
Cobalt	ug/g dry	1	22	4.9	-	-	5.7	4.9	4.6	5.4	4.6	4.7	3.6	5.1	4.6	6.4	2.9	4.8	3.6	4.8	3.3
Copper	ug/g dry	5	140	5.5	-	-	16.1	9.9	6.8	12.8	8.3	12.4	5.5	11.8	22.7	10.2	<5.0	53.8	6.6	7.8	<5.0
Lead	ug/g dry	1	120	5.1	-	-	32.9	10.5	4	32.1	3.7	43.4	5.2	50.7	349	8.5	5.6	224	3.7	4.2	5.6
Mercury	ug/g dry	0.1	0.27	ND (0.1)	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	-	<0.1	0.9	<0.1	-	0.2	-	<0.1	-
Molybdenum	ug/g dry	1	6.9	ND (1.0)	-	-	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	<1.0	1.1	<1.0	1.1	<1.0	<1.0	<1.0
Nickel	ug/g dry	5	100	12.5	-	-	13.2	10.8	8.3	11.5	8.4	9.5	8.3	11.3	10.2	10.4	6.5	14.9	6.9	8.7	7.1
Selenium	ug/g dry	1	2.4	ND (1.0)	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/g dry	0.3	20	ND (0.3)	-	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Thallium	ug/g dry	1	1.0	ND (1.0)	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium	ug/g dry	1	23	ND (1.0)	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	ug/g dry	1	86	18	-	-	27.5	14.9	18.7	25.1	20.6	19.8	16.7	27.6	21.1	21.1	13.6	28.8	16.2	19.1	14.9
Zinc	ug/g dry	10	340	ND (20.0)	-	-	35.1	<20.0	<20.0	34.7	<20.0	45.1	<20.0	26.6	94.5	75.7	<20.0	228	<20.0	<20.0	<20.0
Methyl Mercury	ug/g dry	0.00005	0.0084	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.00005)	-	-	-	-	-
Volatiles																					
Acetone	ug/g dry	0.5	16	ND (0.50)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	ug/g dry	0.02	0.21	ND (0.02)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	ug/g dry	0.05	13	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	ug/g dry	0.05	0.27	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	ug/g dry	0.05	2.4	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	ug/g dry	0.05	9.4	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/g dry	0.2	16	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/g dry	0.05	3.4	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/g dry	0.05	4.8	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/g dry	0.05	0.083	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	ug/g dry	0.05	3.5	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethylene	ug/g dry	0.05	3.4	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethylene	ug/g dry	0.05	0.084	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropene, total	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	ug/g dry	0.05	2.0	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene dibromide (dibromoethane, 1,2-)	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	ug/g dry	0.05	2.8	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Ethyl Ketone (2-Butanone)	ug/g dry	0.05	16	ND (0.50)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Isobutyl Ketone	ug/g dry	0.05	1.7	ND (0.50)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	ug/g dry	0.05	0.75	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	ug/g dry	0.5	0.1	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	ug/g dry	2	0.7	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	ug/g dry	0.5	0.058	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	ug/g dry	0.05	0.28	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	ug/g dry	0.05	2.3	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/g dry	0.05	0.38	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/g dry	0.05	0.05	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	ug/g dry	0.05	0.061	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	ug/g dry	0.05	4.0	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	ug/g dry	0.05	0.02	ND (0.02)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
m/p-Xylene	ug/g dry	0.05	3.1	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	ug/g dry	0.05	3.1	ND (0.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, total	ug/g dry	0.05	3.1	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX																					
Benzene	ug/g dry	0.02	0.21	-	ND (0.02)	ND (0.02)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	ug/g dry	0.05	2.0	-	ND (0.05)	0.28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	ug/g dry	0.05	2.3	-	ND (0.05)	0.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05
m/p-Xylene	ug/g dry	0.05	3.1	-	ND (0.05)	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g dry	0.05	3.1	-	ND (0.05)	ND (0.05)	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes, total	ug/g dry	0.05	3.1	-	ND (0.05)	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05
Hydrocarbons																					
F1 PHCs (C6-C10)	ug/g dry	7	55	8	ND (7)	355	<7	<7	<7	<7	<7	<7	<7	<7	<7	-	<7	<7	<7	<7	<7
F2 PHCs (C10-C16)	ug/g dry	4	98	28	ND (4)	377	<4	<4	<4	<40	39	<4	<4	<80	6	-	9	<40	<4	<4	<4
F3 PHCs (C16-C34)	ug/g dry	8	300	ND (8)	ND (8)	74	105	44	<8	164	58	169	<8	420	54	-	14	269	<8	15	<8
F4 PHCs (C34-C50)	ug/g dry	6	2800	ND (6)	ND (6)	10	263	74	<6	1040	80	135	<6	1800	67	-	25	777	<6	13	<6
F4G PHCs (gravimetric)	ug/g dry	50	2800	-	-	-	382	-	-	1680	-	131	-	2540	87	-	-	707	-	-	-
Semi-Volatiles																					
Acenaphthene	ug/g dry	0.02	7.9	-	-	-	<0.02	0.08	0.02	<0.40	<0.02	<0.40	<0.02	<0.02	0.03	<0.02	-	0.1	<0.02	0.02	-
Acenaphthylene	ug/g dry	0.02	0.15	-	-	-	<0.02	<0.02	<0.02	<0.40	<0.02	<0.40	<0.02	0.2	0.06	<0.02	-	0.14	<0.02	<0.02	-
Anthracene	ug/g dry	0.02	0.67	-	-	-	0.03	0.2	0.06	0.54	<0.02	1.2	<0.02	0.15	0.13	<0.02	-	0.26	<0.02	0.06	-
Benzo[a]anthracene	ug/g dry	0.02	0.5	-	-	-	0.05	0.22	0.05	1.59	<0.02	1.76	<0.02	0.27	0.31	<0.02	-	0.83	<0.02	0.05	-
Benzo[a]pyrene	ug/g dry	0.02	0.3	-	-	-	0.04	0.15	0.04	1.41	<0.02	1.31	<0.02	0.2	0.26	<0.02	-	0.6	<0.02	0.04	-
Benzo[b]fluoranthene	ug/g dry	0.02	0.78	-	-	-	0.05	0.16	0.04	1.51	<0.02	1.27	<0.02	0.19	0.23	<0.02	-	0.74	<0.02	0.03	-
Benzo[g,h,i]perylene	ug/g dry	0.02	6.6	-	-	-	0.03	0.08	0.02	0.87	<0.02	0.65	<0.02	0.14	0.14	<0.02	-	0.26	<0.02	<0.02	-
Benzo[k]fluoranthene	ug/g dry	0.02	0.78	-	-	-	0.03	0.12	0.03	0.79	<0.02	0.78	<0.02	0.12	0.16	<0.02	-	0.42	<0.02	0.03	-
Chrysene	ug/g dry	0.02	7.0	-	-	-	0.04	0.2	0.05	1.92	<0.02	1.78	<0.02	0.24	0.25	<0.02	-	0.76	<0.02	0.05	-
Dibenzo[a,h]anthracene	ug/g dry	0.02	0.1	-	-	-	<0.02	0.02	<0.02	<0.40	<0.02	<0.40	<0.02	0.03	0.02	<0.02	-	0.08	<0.02	<0.02	-
Fluoranthene	ug/g dry	0.02	0.69	-	-	-	0.11	0.77	0.2	4.61	0.02	5.49	<0.02	0.51	0.77	<0.02	-	2	<0.02	0.18	-
Fluorene	ug/g dry	0.02	62	-	-	-	<0.02	0.09	0.03	<0.40	<0.02	0.43	<0.02	<0.02	0.02	<0.02	-	0.09	<0.02	0.02	-
Indeno [1,2,3-cd] pyrene	ug/g dry	0.02	0.38	-	-	-	0.02	0.08	<0.02	0.73	<0.02	0.61	<0.02	0.07	0.13	<0.02	-	0.25	<0.02	<0.02	-
1-Methylnaphthalene	ug/g dry	0.02	0.99	-	-	-	<0.02	<0.02	<0.02	<0.40	<0.02	<0.40	<0.02	<0.02	<0.02	<0.02	-	0.02	<0.02	<0.02	-
2-Methylnaphthalene	ug/g dry	0.02	0.99	-	-	-	<0.02	<0.02	<0.02	<0.40	<0.02	<0.40	<0.02	0.02	<0.02	<0.02	-	0.02	<0.02	<0.02	-
Methylnaphthalene (1&2)	ug/g dry	0.04	0.99	-	-	-	<0.04	<0.04	<0.04	<0.80	<0.04	<0.80	<0.04	<0.04	<0.04	<0.04	-	0.04	<0.04	<0.04	-
Naphthalene	ug/g dry	0.01	0.6	-	-	-	0.02	0.06	0.04	<0.20	<0.01	0.38	<0.01	0.01	0.04	<0.01	-	0.03	<0.01	0.02	-
Phenanthrene	ug/g dry	0.02	6.2	-	-	-	0.06	0.67	0.19	2.4	<0.02	4.17	<0.02	0.19	0.37	<0.02	-	1.02	<0.02	0.18	-
Pyrene	ug/g dry	0.02	78	-	-	-	0.09	0.54	0.14	4.59	0.02	4.56	<0.02	0.45	0.73	<0.02	-	1.67	<0.02	0.14	-

2.00	Result exceeds Reg 153/04-Table 3 Residential, coarse Standards
ND (0.2)	MDL exceeds Reg 153/04-Table 3 Residential, coarse Standards
ND (0.2)	No concentrations identified above the MDL
-	Parameter not analysed
NV	No value given for indicated parameter

Table A2: Groundwater Analytical Test Results Compared to MECP Table 3 Standards Residential Property Use

Parameter	Units	MDL	Regulation	BH1-GW1	BH1-GW1	BH4-GW1	BH4-GW2	BH1-GW2	BH4-GW3	BH2-23-GW1	BH3-23-GW1	BH5-23-GW1	BH6-23-GW1	DUP1-23-GW1	BH3-23-GW2	BH5-23-GW2	BH5-23-GW3	BH7-23-GW1	BH9-23-GW1	BH8-23-GW1	BH1-24-GW1	BH3-24-GW1	BH4-24-GW1
Sample Depth (m)			Reg 153/04-Table 3 Non-Potable	4.4-5.64	6.1-7.62	18.1-21.1	18.1-21.1	6.1-7.62	18.1-21.1	4.6-7.6	4.57-7.57	3.78-6.78	4.1-7.1	4.57-7.57	4.57-7.57	3.78-6.78	3.78-6.79	3.83-6.88	6.02-9.07	9.12-12.17	7.03-10.03	7.26-10.26	7.34-10.34
Sample Date			Groundwater, coarse	16/May/2011	20/Jul/2012	20/Jul/2012	25/Jul/2012	12/Nov/2013	12/Nov/2013	8/Mar/2023	8/Mar/2023	8/Mar/2023	8/Mar/2023	8/Mar/2023	23/Mar/2023	23/Mar/2023	27/Jun/2023	23/Aug/2023	23/Aug/2023	31/Aug/2023	22/May/2024	22/May/2024	22/May/2024
Metals																							
Mercury	ug/L	0.1	0.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.1)	ND (0.1)	ND (0.1)
Antimony	ug/L	0.5	20000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.8	0.7
Arsenic	ug/L	1	1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1)	ND (1)	1
Barium	ug/L	1	29000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	831	882	377
Beryllium	ug/L	0.5	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.5)	ND (0.5)	ND (0.5)
Boron	ug/L	10	45000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	403	164	172
Cadmium	ug/L	0.1	2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.1)	ND (0.1)	ND (0.1)
Chromium	ug/L	1	810	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1)	ND (1)	ND (1)
Chromium (VI)	ug/L	10	140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (10)	ND (10)	ND (10)
Cobalt	ug/L	0.5	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.5)	ND (0.5)	ND (0.5)
Copper	ug/L	0.5	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	2.7	2.6
Lead	ug/L	0.1	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	0.4	0.6
Molybdenum	ug/L	0.5	9200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	9.7	12.1
Nickel	ug/L	1	490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1
Selenium	ug/L	1	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1)	ND (1)	4
Silver	ug/L	0.1	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.1)	ND (0.1)	ND (0.1)
Sodium	ug/L	200	2300000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	908000	1430000	783000
Thallium	ug/L	0.1	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1
Uranium	ug/L	0.1	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	3.9	2.5
Vanadium	ug/L	0.5	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	0.6	0.7
Zinc	ug/L	5	1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (5)	ND (5)	ND (5)
Volatiles																							
Acetone	ug/L	5.0	130000	ND (5.0)	82.4	40.6	104	ND (5.0)	117	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	-	-	-	-	ND (5.0)	-	-	-
Benzene	ug/L	0.5	44	ND (0.5)	ND (0.5)	1.1	ND (0.5)	ND (0.5)	8	ND (0.5)	0.6	ND (0.5)	ND (0.5)	0.6	ND (0.5)	ND (0.5)	1.2	3.6	ND (0.5)	ND (0.5)	ND (0.5)	-	-
Bromodichloromethane	ug/L	0.5	85000	ND (0.5)	ND (0.5)	3.8	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Bromoform	ug/L	0.5	380	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Bromomethane	ug/L	0.5	5.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Carbon Tetrachloride	ug/L	0.2	0.79	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	-	-	-	-	ND (0.2)	-	-	-
Chlorobenzene	ug/L	0.5	630	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Chloroform	ug/L	0.5	2.4	ND (0.5)	16.1	21.8	3.1	ND (0.5)	ND (0.5)	ND (0.5)	2.5	ND (0.5)	1	2.6	ND (0.5)	-	-	-	-	9.6	-	-	-
Dibromochloromethane	ug/L	0.5	82000	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Dichlorodifluoromethane	ug/L	1.0	4400	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	-	-	-	-	ND (1.0)	-	-	-
1,2-Dichlorobenzene	ug/L	0.5	4600	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.7	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,3-Dichlorobenzene	ug/L	0.5	9600	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,4-Dichlorobenzene	ug/L	0.5	8.0	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,1-Dichloroethane	ug/L	0.5	320	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,2-Dichloroethane	ug/L	0.5	1.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,1-Dichloroethylene	ug/L	0.5	1.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
cis-1,2-Dichloroethylene	ug/L	0.5	1.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
trans-1,2-Dichloroethylene	ug/L	0.5	1.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,2-Dichloropropane	ug/L	0.5	16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
cis-1,3-Dichloropropylene	ug/L	0.5	5.2	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
trans-1,3-Dichloropropylene	ug/L	0.5	5.2	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,3-Dichloropropene, total	ug/L	0.5	5.2	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Ethylbenzene	ug/L	0.5	2300	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.2	ND (0.5)	ND (0.5)	17	ND (0.5)	ND (0.5)	ND (0.5)	9.2	10.7	0.9	ND (0.5)	ND (0.5)	ND (0.5)	-	-
Ethylene dibromide (dibromoethane, 1	ug/L	0.2	0.25	-	-	-	-	-	-	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	-	-	-	-	ND (0.2)	-	-	-
Hexane	ug/L	1.0	51	ND (1.0)	2.1	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	-	-	-	-	ND (1.0)	-	-	-
Methyl Ethyl Ketone (2-Butanone)	ug/L	5.0	470000	ND (5.0)	10.7	8.4	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	-	-	-	-	ND (5.0)	-	-	-
Methyl Isobutyl Ketone	ug/L	5.0	140000	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	-	-	-	-	ND (5.0)	-	-	-
Methyl tert-butyl ether	ug/L	2.0	190	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	-	-	-	-	ND (2.0)	-	-	-
Methylene Chloride	ug/L	5.0	610	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	-	-	-	-	ND (5.0)	-	-	-
Styrene	ug/L	0.5	1300	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,1,1,2-Tetrachloroethane	ug/L	0.5	3.3	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,1,2,2-Tetrachloroethane	ug/L	0.5	3.2	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Tetrachloroethylene	ug/L	0.5	1.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Toluene	ug/L	0.5	18000	ND (0.5)	6.2	5.6	ND (0.5)	ND (0.5)	1.4	ND (0.5)	3.4	1	ND (0.5)	3.5	ND (0.5)	2.4	1	1.5	ND (0.5)	ND (0.5)	ND (0.5)	-	-
1,1,1-Trichloroethane	ug/L	0.5	640	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
1,1,2-Trichloroethane	ug/L	0.5	4.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Trichloroethylene	ug/L	0.5	1.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
Trichlorofluoromethane	ug/L	1.0	2500	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	-	-	-	-	ND (1.0)	-	-	-
Vinyl Chloride	ug/L	0.5	0.5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	-	-	-	-	ND (0.5)	-	-	-
m/p-Xylene	ug/L	0.5	4200	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.6	ND (0.5)	3.2	22	ND (0.5)	3.2	ND (0.5)	11.5	12.4	6	ND (0.5)	ND (0.5)	ND (0.5)	-	-
o-Xylene	ug/L	0.5	4200	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.1	ND (0.5)	1	2	ND (0.5)	1	ND (0.5)	1.4	0.9	0.8	ND (0.5)	ND (0.5)	ND (0.5)	-	-
Xylenes, total	ug/L	0.5	4200	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	2.8	ND (0.5)	4.1	24	ND (0.5)	4.2	ND (0.5)	12.9	13.2	6.8	ND (0.5)	ND (0.5)	ND (0.5)	-	-
BTEX																							
Benzene	ug/L	0.5	44	ND (0.5)	ND (0.5)	1.1	ND (0.5)	ND (0.5)	8	ND (0.5)	0.6	ND (0.5)	ND (0.5)	0.6	ND (0.5)	ND (0.5)	1.2	3.6	ND (0.5)	ND (0.5)	ND (0.5)	-	-
Ethylbenzene	ug/L	0.5	2300	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.2	ND (0.5)	ND (0.5)	17	ND (0.5)	ND (0.5)	ND (0.5)	9.2	10.7	0.9	ND (0.5)	ND (0.5)	ND (0.5)	-	-
Toluene	ug/L	0.5	18000	ND (0.5)	6.2	5.6	ND (0.5)	ND (0.5)	1.4	ND (0.5)	3.4	1	ND (0.5)	3.5	ND (0.5)	2.4	1	1.5	ND (0.5)	ND (0.5)	ND (0.5)	-	-
m/p-Xylene	ug/L	0.5	4200	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.6	ND (0.5)	3.2	22	ND (0.5)	3.2	ND (0.5)	11.5	12.4	6	ND (0.5)	ND (0.5)	ND (0.5)	-	-
o-Xylene	ug/L	0.5	4200	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.1	ND (0.5)	1	2	ND (0.5)	1	ND (0.5)	1.4	0.9	0.8	ND (0.5)	ND (0.5)	ND (0.5)	-	-
Xylenes, total	ug/L	0.5	4200	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	2.8	ND (0.5)	4.1	24	ND (0.5)	4.2	ND (0.5)	12.9	13.2	6.8	ND (0.5)	ND (0.5)	ND (0.5)	-	-
Hydrocarbons																							
F1 PHCs (C6-C10)	ug/L	25	750	ND (25)	45	ND (25)	ND (25)	-	-	ND (25)	-	1210	ND (25)	-	ND (25)	742	1050	450	ND (25)	ND (25)	ND (25)	-	-
F2 PHCs (C10-C16)	ug/L	100	150	ND (100)	ND (100)	ND (100)	ND (100)	-	-	ND (100)	-	266	ND (100)	-	ND (100)	ND (100)	398	ND (100)	ND (100)	ND (476)	ND (100)	-	-
F3 PHCs (C16-C34)	ug/L	100	500	ND (100)	ND (100)	ND (100)	ND (100)	-	-	ND (100)	-	ND (100)	ND (100)	-	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (476)	ND (100)	-	-
F4 PHCs (C34-C50)	ug/L	100	500	ND (100)	ND (100)	ND (100)	ND (100)	-	-	ND (100)	-	ND (100)	ND (100)	-	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (476)	282	-	-
Semi-Volatiles																							
Acenaphthene	ug/L	0.05	600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Acenaphthylene	ug/L	0.05	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Anthracene	ug/L	0.01	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.01)	ND (0.01)	ND (0.01)
Benzo[a]anthracene	ug/L	0.01	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.01)	ND (0.01)	ND (0.01)
Benzo[a]pyrene	ug/L	0.01	0.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.01)	ND (0.01)	ND (0.01)
Benzo[b]fluoranthene	ug/L	0.05	0.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[g,h,i]perylene	ug/L	0.05	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[k]fluoranthene	ug/L	0.05	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Chrysene	ug/L	0.05	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Dibenzo[a,h]anthracene	ug/L	0.05	0.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Fluoranthene	ug/L	0.01	130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.01)	ND (0.01)	ND (0.01)
Fluorene	ug/L	0.05	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Indeno [1,2,3-cd] pyrene	ug/L	0.05	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
1-Methylnaphthalene	ug/L	0.05	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
2-Methylnaphthalene	ug/L	0.05	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Methylnaphthalene (1&2)	ug/L	0.10	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.10)	ND (0.10)	ND (0.10)
Naphthalene	ug/L	0.05	1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Phenanthrene	ug/L	0.05	580	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.05)	ND (0.05)	ND (0.05)
Pyrene	ug/L	0.01	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.01)	ND (0.01)	ND (0.01)

2.00	Result exceeds Reg 153/04-Table 3 Non-Potable Groundwater, coarse Standards
ND (0.2)	MDL exceeds Reg 153/04-Table 3 Non-Potable Groundwater, coarse Standards
ND (0.2)	No concentrations identified above the MDL
-	Parameter not analysed
NV	No value given for indicated parameter

APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

PATERSON GROUP

Sampling & Analysis Plan

137-141 George Street and 110-116 York Street
Ottawa, Ontario

Prepared for Claridge Homes

Report: PE2709-SAP_Rev
May 1, 2024

TABLE OF CONTENTS

PAGE

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Claridge Homes, to conduct a Phase II – Environmental Site Assessment (Phase II ESA) for the property addressed 141 George Street, in the City of Ottawa, Ontario.

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

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-23	Eastern portion of the Phase II Property; to assess potential impacts resulting from the presence of fill material of unknown quality as well as general coverage for the geotechnical program.	12-15 m; to intercept the groundwater table for the purpose of installing a monitoring well as part of the geotechnical program.
BH2-23	Northern portion of the Phase II Property; to assess potential impacts resulting from the importation of fill material of unknown quality.	5-8 m; to intercept the groundwater table for the purpose of installing a monitoring well.
BH3-23	Western portion of the Phase II Property; to assess potential impacts resulting from former off-site dry cleaner and machine shop.	5-8 m; to intercept the groundwater table for the purpose of installing a monitoring well.
BH4-23	Northwestern portion of the Phase II Property; to assess potential impacts resulting from the importation of fill material of unknown quality.	12-15 m to provide general coverage for the environmental and geotechnical programs.
BH5-23	Southwestern portion of the Phase II Property; to assess potential impacts resulting from former on-site aboveground storage tank (AST), off-site retail fuel outlet and various former off-site industries.	5-8 m; to intercept the groundwater table for the purpose of installing a monitoring well.
BH6-23	Northwestern portion of the Phase II Property; to assess potential impacts resulting from the presence of fill material of unknown quality.	5-8 m; to intercept the groundwater table for the purpose of installing a monitoring well.
BH7-23	Southwestern portion of the Phase II Property; to delineate soil and/or groundwater impacts	5-7m; to intercept groundwater table for the purpose of installing a monitoring well and laterally delineate impacts identified at BH5-23
BH8-23		9-12m; to vertically delineate groundwater impacts identified at BH5-23
BH9-23		6-9m; to laterally delineate impacts identified at BH5-23
BH10-23		3-6m; shallow monitoring well installation, to determine if groundwater present in overburden
BH1-24	To provide general coverage of the site fill and proposed building footprint for environmental and geotechnical purposes.	7-10m; to access groundwater table if required
BH2-24		4m – assess fill and underlying native
BH3-24		7-10m; to access groundwater table if required
BH4-24		
BH5-24		4m – assess fill and underlying native

Borehole locations are shown on Drawing PE2709-11 – Test Hole Location Plan, appended to the main report.

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

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

2.0 ANALYTICAL TESTING PROGRAM

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

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

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

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

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

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

Equipment

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

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

Determining Borehole Locations

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

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

Drilling Procedure

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

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

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

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

3.2 Monitoring Well Installation Procedure

Equipment

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

Procedure

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

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

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

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS

Physical impediments to the Sampling and Analysis plan may include:

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

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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** July 17, 2012

FILE NO. PE2709

HOLE NO. BH 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.69
50 mm Asphaltic concrete over crushed stone 0.25		AU	1				
		AU	2				
FILL: Sand and gravel 0.69							
		SS	3	42	9	1	60.69
FILL: Brown silty sand, trace clay, brick, gravel, cobbles		SS	4	50	26	2	59.69
2.21							
FILL: Brown silty clay with sand and gravel		SS	5	33	9		
2.97		SS	6	100	50+	3	58.69
GLACIAL TILL: Grey silty clay with sand, gravel, cobbles		SS	7	50	12	4	57.69
		SS	8	67	50+		
5.00						5	56.69
		RC	1	92	67	6	55.69
BEDROCK: Grey limestone							
		RC	2	100	100	7	54.69
7.62							
End of Borehole							
(GWL @ 3.71m-July 20, 2012)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** July 17, 2012

FILE NO. PE2709

HOLE NO. BH 2

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	62.02
Asphaltic concrete 0.05		AU	1				
		AU	2				
FILL: Brown silty sand with gravel							
1.22		SS	3	29	6	1	61.02
		SS	4	21	23	2	60.02
GLACIAL TILL: Brown silty clay with sand, gravel, cobbles, boulders							
		SS	5	42	13		
3.30		SS	6	36	50+	3	59.02
		SS	7	80	50+	4	58.02
GLACIAL TILL: Brown silty sand with gravel, cobbles, boulders							
4.90		SS	8			5	57.02
		RC	1	100	47		
						6	56.02
BEDROCK: Grey limestone		RC	2	100	100	7	55.02
		RC	3	100	100	8	54.02
8.76							
End of Borehole							
(GWL @ 4.50m-July 20, 2012)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** July 17, 2012

FILE NO. PE2709

HOLE NO. BH 3

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	61.53
		AU	2				
FILL: Brown silty sand with gravel, crushed stone		SS	3	77	50+	1	60.53
1.40							
		SS	4	0	15	2	59.53
		SS	5	50	17		
GLACIAL TILL: Brown silty sand with gravel, cobbles, boulders						3	58.53
		SS	6	50	34		
		SS	7	0	50+	4	57.53
4.24							
End of Borehole							
Practical refusal to augering at 4.24m depth							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** July 18, 2012

FILE NO. PE2709

HOLE NO. BH 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.91
25mm Asphaltic concrete over crushed stone 0.30		AU	1				
		AU	2				
FILL: Brown silty sand with gravel, cobbles, brick and concrete		SS	3	25	3	1	60.91
		SS	4	42	27	2	59.91
2.21							
		SS	5	33	24	3	58.91
GLACIAL TILL: Brown silty sand with gravel, cobbles, boulders		SS	6	50	33		
		SS	7	40	50+	4	57.91
4.70							
		RC	1	100	72	5	56.91
						6	55.91
		RC	2	100	100	7	54.91
BEDROCK: Grey limestone		RC	3	100	100	8	53.91
						9	52.91
		RC	4	100	100	10	51.91
						11	50.91
		RC	5	100	87	12	49.91

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** July 18, 2012

FILE NO. PE2709

HOLE NO. BH 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						12	49.91
		RC	6	100	100	13	48.91
		RC	7	100	100	14	47.91
		RC	8	100	98	15	46.91
BEDROCK: Grey limestone						16	45.91
		RC	9	100	100	17	44.91
		RC	10	100	100	18	43.91
		RC	11	100	100	19	42.91
						20	41.91
21.13						21	40.91
End of Borehole							
(GWL @ 4.43m-July 20, 2012)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** August 8, 2012

FILE NO. PE2709

HOLE NO. BH 5

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.79
Asphaltic concrete 0.10		AU	1				
FILL: Dark brown silty clay, some sand, gravel, crushed stone		SS	2	17	9	1	60.79
- some mortar by 1.5m depth		SS	3	21	3	2	59.79
2.21							
		SS	4	50	23	3	58.79
GLACIAL TILL: Brown silty clay with sand, gravel, cobbles		SS	5	67	33		
		SS	6	62	53	4	57.79
		SS	7	67	61	5	56.79
5.41		SS	8		50+		
End of Borehole							
Practical refusal to augering at 5.41m depth							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** August 8, 2012

FILE NO. PE2709

HOLE NO. BH 6

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.10		AU	1			0	61.45
FILL: Brown silty sand with gravel, crushed stone, trace clay		SS	2	42	4	1	60.45
		SS	3	54	8	2	59.45
2.44		SS	4	58	40		
GLACIAL TILL: Brown silty clay with sand, gravel, cobbles		SS	5	86	50+	3	58.45
		SS	6	80	50+	4	57.45
4.75		SS	7	43	50+		
End of Borehole							
Practical refusal to augering at 4.75m depth							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** August 8, 2012

FILE NO. PE2709

HOLE NO. BH 7

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.10		AU	1			0	61.02
		SS	2	17	11	1	60.02
FILL: Brown silty sand with gravel, cobbles, concrete, asphalt, trace organics		SS	3	25	17	2	59.02
		SS	4	75	26	3	58.02
3.20		SS	5	21	21		
GLACIAL TILL: Grey-brown silty clay with sand, gravel, cobbles		SS	6	29	23	4	57.02
4.70		SS	7	80	50+		
End of Borehole							
Practical refusal to augering at 4.70m depth							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** August 8, 2012

FILE NO. PE2709

HOLE NO. BH 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.20
Asphaltic concrete 0.10		AU	1				
FILL: Brown silty sand, trace clay and gravel		SS	2	29	11	1	60.20
1.83		SS	3	58	30	2	59.20
GLACIAL TILL: Brown to grey silty clay with sand, gravel, cobbles		SS	4	46	69		
		SS	5	52	59	3	58.20
3.53							
End of Borehole							
Practical refusal to augering at 3.53m depth							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
110 York St., 321 Dalhousie St. & 167-141 George St.
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger **DATE** August 8, 2012

FILE NO. PE2709

HOLE NO. BH 9

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.79
Asphaltic concrete 0.10		AU	1				
FILL: Brown silty sand with gravel, clay, brick, mortar		SS	2		4	1	60.79
1.40							
End of Borehole							
Practical refusal to augering at 1.40m depth							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
141 George Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Portable Drill **DATE** May 11, 2011

FILE NO. PE2289

HOLE NO. BH 1-11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Interlocking brick 0.06						0	61.30
FILL: Brown silty sand with gravel		SS	1	58	9		
		SS	2	8	4	1	60.30
1.37							
GLACIAL TILL: Brown silty sand with gravel and clay, trace cobbles		SS	3	33	46		
		SS	4	53	50+	2	59.30
2.26							
GLACIAL TILL: Grey silty clay with sand, gravel, cobbles and boulders		RC	1	32			
		RC	2	18		3	58.30
		RC	3	100			
		RC	4	64			
3.96						4	57.30
BEDROCK: Grey limestone		RC	5	100			
		RC	6	71		5	56.30
		RC	7				
5.64							
End of Borehole							
(GWL @ 5.20m - May 16, 2011)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** February 24, 2023

FILE NO. PE2709

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						0	61.52
Asphaltic concrete 0.05		AU	1				
FILL: Crushed stone 0.30							
FILL: Dark brown silty sand, some gravel 0.69		SS	2	29	14	1	60.52
FILL: Brown silty sand with gravel and crushed stone		SS	3	58	20	2	59.52
2.74		SS	4	54	23		
		SS	5	86	50+	3	58.52
GLACIAL TILL: Dense to very dense, brown silty sand to sandy silt with gravel, cobbles and boulders		RC	1			4	57.52
5.36						5	56.52
		RC	2	100	87	6	55.52
		RC	3	100	100	7	54.52
		RC	4	100	100	8	53.52
						9	52.52
BEDROCK: Good to excellent quality, grey limestone		RC	5	100	100	10	51.52
		RC	6	100	100	11	50.52
		RC	7	100	100	12	49.52
		RC	8	100	100	13	48.52
15.32						14	47.52
End of Borehole						15	46.52
(GWL @ 4.49m - March 8, 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.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

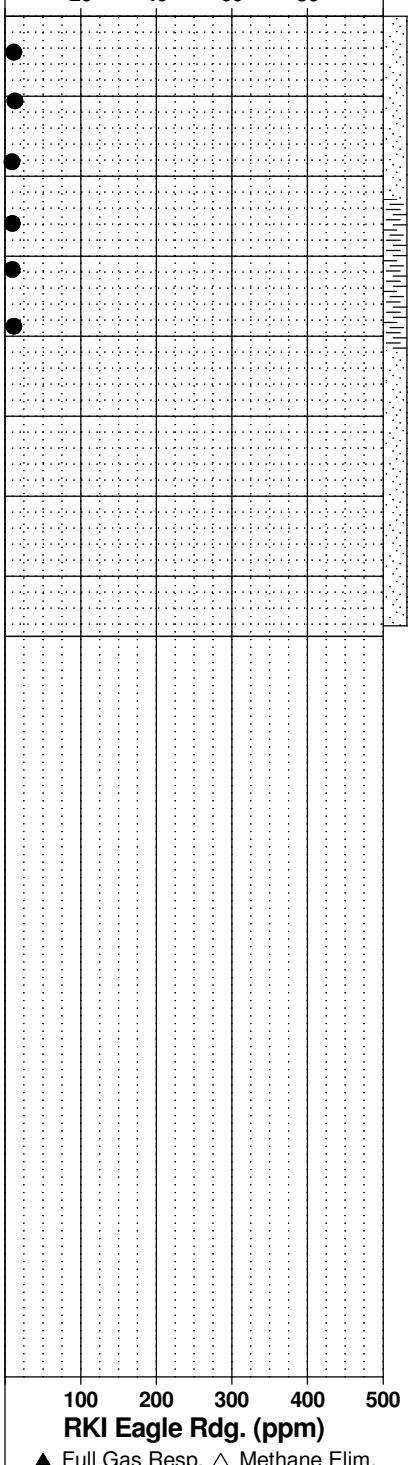
BORINGS BY CME-55 Low Clearance Drill **DATE** February 24, 2023

FILE NO. PE2709

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 0.06		AU	1			0	61.53
FILL: Crushed stone with sand 0.69		SS	2	42	5	1	60.53
FILL: Brown silty sand, some gravel, wood, crushed stone, trace brick		SS	3	58	15	2	59.53
2.59		SS	4	62	38		
		SS	5	100	50+	3	58.53
GLACIAL TILL: Dense to very dense, brown silty sand to sandy silt with gravel, cobbles and boulders		SS	6	100	50+	4	57.53
		RC	1	100		5	56.53
5.64		RC	2	100	100	6	55.53
BEDROCK: Excellent quality, grey limestone		RC	3	100	100	7	54.53
7.75							
End of Borehole							
(GWL @ 4.98m - March 8, 2023)							

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



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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** February 27, 2023

FILE NO. PE2709

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							
Asphaltic concrete 0.06		AU	1			0	61.87
FILL: Dark brown sand with gravel 0.69		AU	2				
and crushed stone 1.01		SS	3	50	18	1	60.87
FILL: Brown silty sand to sandy silt, some gravel, cobbles, trace topsoil		SS	4	58	33	2	59.87
GLACIAL TILL: Compact to dense, brown silty sand to sandy silt with gravel, cobbles and boulders		SS	5	42	27	3	58.87
4.95		SS	6	100	50+	4	57.87
		RC	1	100	100	5	56.87
BEDROCK: Excellent quality, grey limestone		RC	2	100	100	6	55.87
7.57						7	54.87
End of Borehole							
(GWL @ 3.48m - March 8, 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.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** February 27, 2023

FILE NO. PE2709

HOLE NO. BH 4-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
Asphaltic concrete 0.05		AU	1			0	61.03		
FILL: Crushed stone with sand 0.25		AU	2						
FILL: Brown sand - some crushed stone by 0.6m depth 1.45		SS	3	25	18	1	60.03		
		SS	4	46	24	2	59.03		
GLACIAL TILL: Compact to dense, brown silty sand with gravel, cobbles and boulders						3	58.03		
		RC	1	35		4	57.03		
4.65									
		RC	2	100	93	5	56.03		
		RC	3	100	100	6	55.03		
		RC	4	100	100	7	54.03		
BEDROCK: Excellent quality, grey limestone		RC	5	100	100	8	53.03		
		RC	6	100	100	9	52.03		
		RC	7	100	100	10	51.03		
		RC	8	100	100	11	50.03		
15.16						12	49.03		
End of Borehole						13	48.03		
						14	47.03		
						15	46.03		

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

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

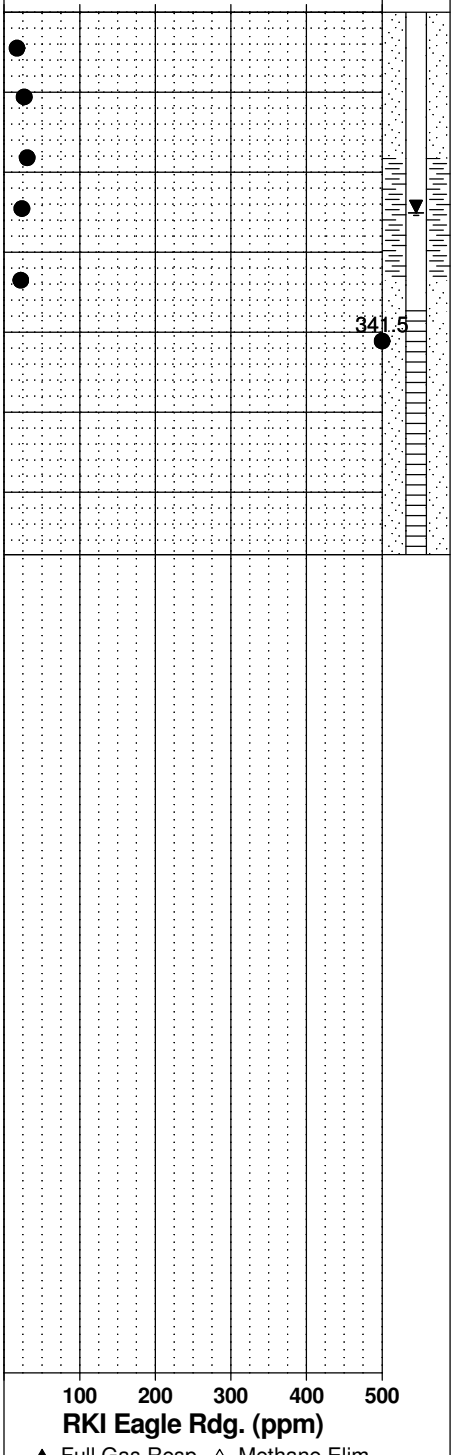
BORINGS BY CME-55 Low Clearance Drill **DATE** February 28, 2023

FILE NO. PE2709

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							
Asphaltic concrete 0.06						0	62.09
FILL: Dark brown silty sand, some gravel 0.25 / 1.01		AU	1				
FILL: Dark brown silty sand with gravel and crushed stone		SS	2	50	50	1	61.09
GLACIAL TILL: Compact to very dense, brown silty sand to sandy silt with gravel, cobbles and boulders		SS	3	33	22	2	60.09
		SS	4	92	50+		
		SS	5	67	37	3	59.09
- grey by 4.1m depth		SS	6	96	50+	4	58.09
4.93		SS	7	100	50+		
BEDROCK: Good to excellent quality, grey limestone		RC	1	100	76	5	57.09
6.78		RC	2	100	100	6	56.09
End of Borehole							
(GWL @ 2.51m - March 8, 2023)							

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



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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** February 28, 2023

FILE NO. PE2709

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						0	62.08
Asphaltic concrete 0.06		AU	1				
FILL: Dark brown sand with crushed stone		SS	2	54	18	1	61.08
		SS	3	58	26	2	60.08
		SS	4	58	19		
3.58		SS	5	70	50+	3	59.08
Reinforced concrete slab (former crane base)		RC	1	100		4	58.08
5.18		RC	2	100	95	5	57.08
BEDROCK: Excellent quality, grey limestone						6	56.08
		RC	3	100	100	7	55.08
7.47							
End of Borehole							
(GWL @ 2.77m - March 8, 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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

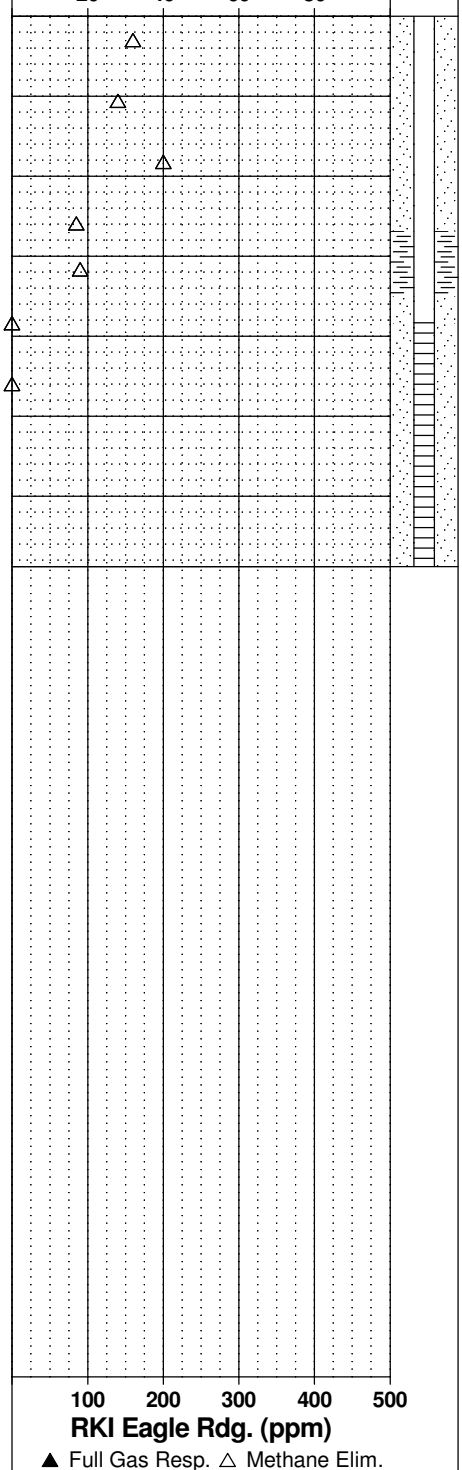
BORINGS BY CME-55 Low Clearance Drill **DATE** August 14, 2023

FILE NO. PE2709

HOLE NO. BH 7-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08		AU	1			0	62.03
FILL: Brown silty sand wtih gravel and crushed stone, trace brick 1.45		SS	2	8	18	1	61.03
		SS	3	50	14	2	60.03
GLACIAL TILL: Compact to very dense, brown silty sand with gravel, cobbles and boulders		SS	4	50	38		
		SS	5	67	50+	3	59.03
		SS	6	100	50+	4	58.03
4.67		SS	7	100	50+		
BEDROCK: Good to excellent quality, grey limestone						5	57.03
						6	56.03
6.88							
End of Borehole							

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



Monitoring Well Construction

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9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** August 14, 2023

FILE NO. PE2709

HOLE NO. BH 8-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	62.02
Asphaltic concrete 0.10		AU	1				
FILL: Brown silty sand, some gravel and crushed stone, trace brick and wood 1.07		SS	2	25	7	1	61.02
		SS	3	50	25	2	60.02
GLACIAL TILL: Compact to very dense, brown silty sand with gravel, cobbles and boulders		SS	4	58	25	3	59.02
		SS	5	25	44		
		SS	6	50	50+	4	58.02
4.75						5	57.02
		RC	1	100	62	6	56.02
BEDROCK: Fair to excellent quality, grey limestone		RC	2	100	100	7	55.02
		RC	3	100	100	8	54.02
		RC	4	100	100	9	53.02
		RC	5	100	100	10	52.02
12.17						11	51.02
End of Borehole						12	50.02

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

1500

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
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

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

FILE NO. PE2709

HOLE NO. BH 9-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.08		AU	1			0	62.00
FILL: Brown silty sand, some gravel and crushed stone 0.69		SS	2	67	8	1	61.00
		SS	3	836	22	2	60.00
GLACIAL TILL: Compact to very dense, brown silty sand with gravel, cobbles and boulders		SS	4	75	31	3	59.00
		SS	5	67	46		
- some clay by 4.5m depth		SS	6	75	17	4	58.00
		SS	7	60	50+		
5.43		SS	8	50	50+	5	57.00
		RC	1	100	100	6	56.00
BEDROCK: Excellent quality, grey limestone		RC	2	100	100	7	55.00
		RC	3	100	100	8	54.00
9.07						9	53.00
End of Borehole							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
137 & 141 George Street and 110 York Street
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill **DATE** August 14, 2023

FILE NO. PE2709

HOLE NO. BH10-23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	62.04		
						1	61.04		
						2	60.04		
OVERBURDEN						3	59.04		
						4	58.04		
						5	57.04		
5.94									
End of Borehole									

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80

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

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9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase I - Environmental Site Assessment
116 York Street
Ottawa, Ontario

EASTING: 368143.796 **NORTHING:** 5032427.793 **ELEVATION:** 60.78
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** May 8, 2024

FILE NO. PE6422
HOLE NO. BH 1-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	60.78
FILL: Compact brown silty sand with crushed concrete and stone, trace brick, metals, wood		AU	1				
		SS	2	21	10	1	59.78
		SS	3	42	4	2	58.78
2.29							
FILL: Stiff to very stiff brown silty clay with some sand, curshed stone and concrete, trace cobbles, brick, wood, metals		SS	4	25	9	3	57.78
		SS	5	54	31		
3.81							
GLACIAL TILL: Very dense grey sandy silt with gravel, cobbles and boulders		SS	6	29	+50	4	56.78
4.42							
BEDROCK: Excellent quality grey limestone bedrock with interbedded shale seams		RC	1	100	97	5	55.78
						6	54.78
		RC	2	100	100	7	53.78
		RC	3	100	100	8	52.78
						9	51.78
		RC	4	100	100		
10.03						10	50.78
End of Borehole							
(GWL @ 3.46m - May 22, 2024)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80

MONITORING WELL CONSTRUCTION

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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase I - Environmental Site Assessment
116 York Street
Ottawa, Ontario

EASTING: 368156.266 **NORTHING:** 5032440.634 **ELEVATION:** 60.38
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** May 8, 2024

FILE NO. PE6422
HOLE NO. BH 2-24

SAMPLE DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	PIEZOMETER CONSTRUCTION
GROUND SURFACE									
ASPHALT	0.10						0	60.38	
FILL: Compact granualr with crushed stone and gravel	0.20		AU	1					
FILL: Compact brown silty sand with some clay, trace graveland crushed stone									
	1.07		SS	2	29	5	1	59.38	
GLACIAL TILL: Dense to very dense brown silty sand with clay, trace gravel, occasional cobbles and boulders			SS	3	63	15	2	58.38	
			SS	4	42	16	3	57.38	
			SS	5		49			
	3.96								
End of Borehole									

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

20 40 60 80

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

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase I - Environmental Site Assessment
116 York Street
Ottawa, Ontario

EASTING: 368157.789 **NORTHING:** 5032440.535 **ELEVATION:** 60.35
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** May 8, 2024

FILE NO. PE6422
HOLE NO. BH 2A-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	PIEZOMETER CONSTRUCTION
GROUND SURFACE						0	60.35		
Inferred **OVERBURDEN**						1	59.35		
						2	58.35		
						3	57.35		
		SS	6	17	+50	4	56.35	●	
		SS	7		+50			●	
5.18									
End of Borehole									

Photo Ionization Detector: ○ Lower Explosive Limit %
20 40 60 80
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

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9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Phase I - Environmental Site Assessment
116 York Street
Ottawa, Ontario

EASTING: 368178.7 **NORTHING:** 5032404.654 **ELEVATION:** 60.93
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** May 8, 2024

FILE NO. PE6422
HOLE NO. BH 3-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	60.93
FILL: Brown silty sand with gravel and crushed stone, occasional concrete, brick and wood, trace clay		AU	1				
		SS	2	17	2	1	59.93
1.83		SS	3	21	6	2	58.93
GLACIAL TILL: Dense to very dense brown sandy silt with some gravel, occasional cobbles and boulders - Sandy pocket @ 2.29 m		SS	4	25	32		
		SS	5	29	+50	3	57.93
		RC	1	21	0	4	56.93
		SS	6		+50		
5.11						5	55.93
BEDROCK: Excellent quality grey limestone bedrock with interbedded shale seams		RC	2	83	100	6	54.93
		RC	3	100	100	7	53.93
		RC	4	100	100	8	52.93
		RC	5	100	100	9	51.93
10.26						10	50.93
End of Borehole (GWL @ 6.15m - May 22, 2024)							

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 I - Environmental Site Assessment
116 York Street
Ottawa, Ontario

EASTING: 368171.728 **NORTHING:** 5032397.855 **ELEVATION:** 61.33
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** May 9, 2024

FILE NO. PE6422
HOLE NO. BH 4-24

SAMPLE DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							0	61.33
ASPHALT	0.03		AU	1				
FILL: Granular, light brown silty sand with gravel and crushed stone	0.20							
FILL: Firm dark brown silty clay with sand and gravel, some crushed stone, trace topsoil	1.22		SS	2	54	6	1	60.33
GLACIAL TILL: Compact to very dense brown sandy silt, gravel, occasional cobbles and boulders			SS	3	38	18	2	59.33
			SS	4	13	29	3	58.33
			SS	5	50	12		
			SS	6	50	+50	4	57.33
	4.95		SS	7	29	+50	5	56.33
BEDROCK: Good to excellent quality grey limestone bedrock with interbedded shale seams			RC	1	100	67	6	55.33
			RC	2	100	86	7	54.33
			RC	3	100	100	8	53.33
							9	52.33
			RC	4	100	8	10	51.33
	10.34							
End of Borehole								
(GWL @ 6.29m - May 22, 2024)								

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

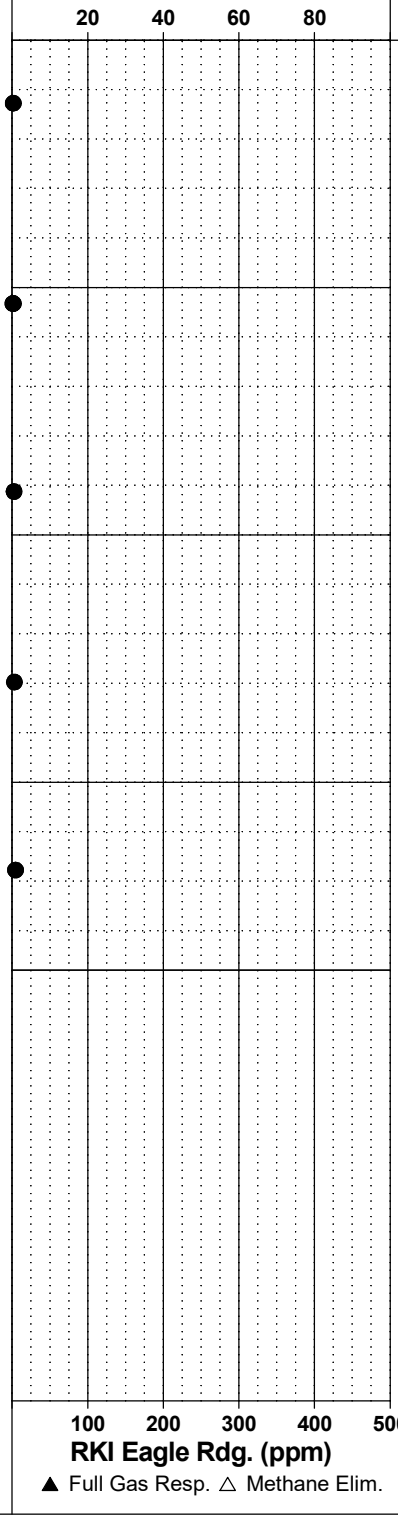
Phase I - Environmental Site Assessment
116 York Street
Ottawa, Ontario

EASTING: 368165.269 **NORTHING:** 5032418.67 **ELEVATION:** 60.79
DATUM: Geodetic
REMARKS:
BORINGS BY: CME-55 Low Clearance Drill **DATE:** May 9, 2024

FILE NO. PE6422
HOLE NO. BH 5-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	PIEZOMETER CONSTRUCTION
GROUND SURFACE								
ASPHALT 0.05						0	60.79	
FILL: Granular, brown silty sand with gravel and crushed stone 0.23		AU	1					
FILL: Firm brown silty sand with clay, gravel, crushed stone								
1.07		SS	2	54	5	1	59.79	
GLACIAL TILL: Compact to dense brown silty sand with clay and gravel, occasional cobbles and boulders		SS	3	63	29	2	58.79	
		SS	4	38	+50	3	57.79	
		SS	5	54	20			
3.76								
End of Borehole Practical refusal to augering @ 3.76 m								

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



▲ Full Gas Resp. △ Methane Elim.

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

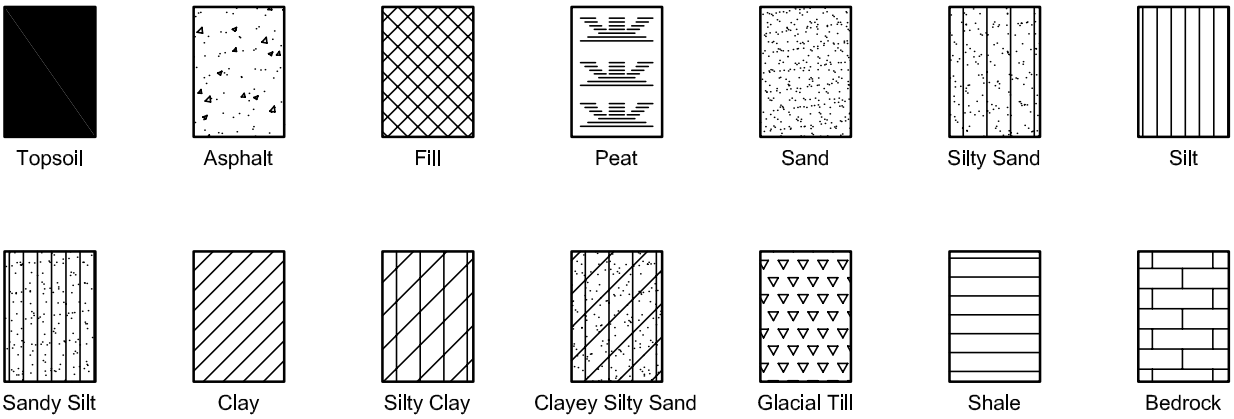
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

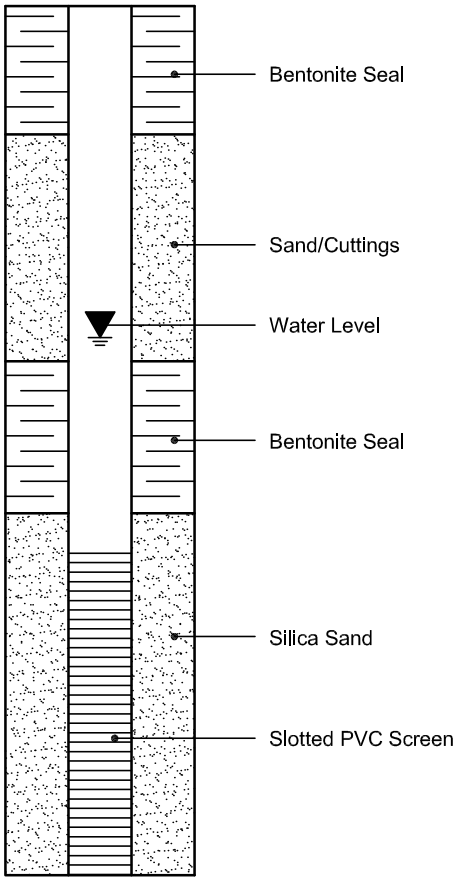
SYMBOLS AND TERMS (continued)

STRATA PLOT

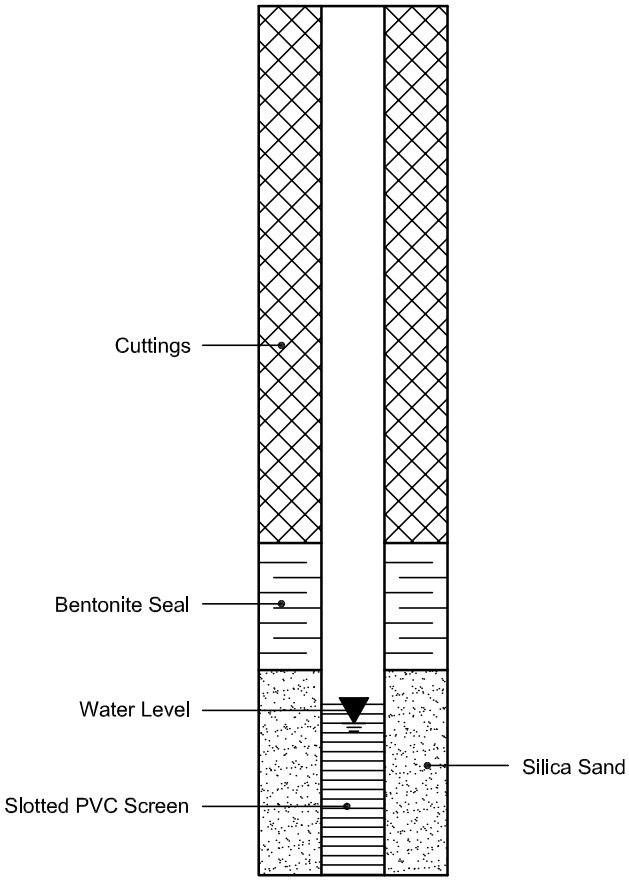


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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p: 1-800-749-1947
e: paracel@paracellabs.com
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Certificate of Analysis

Paterson Group Consulting Engineers
154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Dan Arnott

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

Client PO: 13160
Project: PE2709
Custody: 94851

Report Date: 20-Jul-2012
Order Date: 18-Jul-2012
Order #: 1229139

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

Paracel ID	Client ID
1229139-01	BH1-SS7
1229139-02	BH2-SS8
1229139-03	BH3-SS6

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 20-Jul-2012
Order Date:18-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13160 Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME PHC F1	CWS Tier 1 - P&T GC-FID	18-Jul-12	20-Jul-12
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	19-Jul-12	20-Jul-12
Solids, %	Gravimetric, calculation	19-Jul-12	19-Jul-12
VOCs	EPA 8260 - P&T GC-MS	18-Jul-12	20-Jul-12

Certificate of Analysis

Report Date: 20-Jul-2012
Order Date:18-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13160 Project Description: PE2709

	Client ID:	BH1-SS7	BH2-SS8	BH3-SS6	-
	Sample Date:	17-Jul-12	17-Jul-12	17-Jul-12	-
	Sample ID:	1229139-01	1229139-02	1229139-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	89.1	91.7	90.4	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	<0.50	<0.50	-
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Bromoform	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Bromomethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Chloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Chloroform	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Chloromethane	0.20 ug/g dry	<0.20	<0.20	<0.20	-
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,2-Dibromoethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,2-Dichloroethylene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Hexane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	<0.50	-
Methyl Butyl Ketone (2-Hexanone)	2.00 ug/g dry	<2.00	<2.00	<2.00	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	<0.50	-

Certificate of Analysis

Report Date: 20-Jul-2012
Order Date:18-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13160 Project Description: PE2709

	Client ID:	BH1-SS7	BH2-SS8	BH3-SS6	-
	Sample Date:	17-Jul-12	17-Jul-12	17-Jul-12	-
	Sample ID:	1229139-01	1229139-02	1229139-03	-
	MDL/Units	Soil	Soil	Soil	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Styrene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,2,4-Trichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	-
1,3,5-Trimethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	<0.02	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<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	-
4-Bromofluorobenzene	Surrogate	102%	109%	115%	-
Dibromofluoromethane	Surrogate	92.6%	92.9%	91.6%	-
Toluene-d8	Surrogate	97.3%	100%	103%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	182	20	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	118	18	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	-

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 20-Jul-2012
Order Date:18-Jul-2012

Client PO: 13160 Project Description: PE2709

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroethane	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Chloromethane	ND	0.20	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dibromoethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloroethylene, total	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Butyl Ketone (2-Hexanone)	ND	2.00	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,2,4-Trichlorobenzene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
1,3,5-Trimethylbenzene	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*9.36*		*ug/g*		*117*	*50-140*			
Surrogate: Dibromofluoromethane	*7.69*		*ug/g*		*96.1*	*50-140*			
Surrogate: Toluene-d8	*8.43*		*ug/g*		*105*	*50-140*			

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 20-Jul-2012
Order Date:18-Jul-2012

Client PO: 13160 Project Description: PE2709

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	37	8	ug/g dry	129			110.0	30	QR-01
F4 PHCs (C34-C50)	69	6	ug/g dry	136			65.1	30	QR-01
Physical Characteristics									
% Solids	87.3	0.1	% by Wt.	91.9			5.2	25	
Volatiles									
Acetone	ND	0.50	ug/g dry	ND				50	
Benzene	ND	0.02	ug/g dry	ND				50	
Bromodichloromethane	ND	0.05	ug/g dry	ND				50	
Bromoform	ND	0.05	ug/g dry	ND				50	
Bromomethane	ND	0.05	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND				50	
Chlorobenzene	ND	0.05	ug/g dry	ND				50	
Chloroethane	ND	0.05	ug/g dry	ND				50	
Chloroform	ND	0.05	ug/g dry	ND				50	
Chloromethane	ND	0.20	ug/g dry	ND				50	
Dibromochloromethane	ND	0.05	ug/g dry	ND				50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND				50	
1,2-Dibromoethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Hexane	ND	0.05	ug/g dry	ND				50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND				50	
Methyl Butyl Ketone (2-Hexanone)	ND	2.00	ug/g dry	ND				50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND				50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND				50	
Methylene Chloride	ND	0.05	ug/g dry	ND				50	
Styrene	ND	0.05	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
1,2,4-Trichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND				50	
Trichloroethylene	ND	0.05	ug/g dry	ND				50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND				50	
1,3,5-Trimethylbenzene	ND	0.05	ug/g dry	ND				50	
Vinyl chloride	ND	0.02	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	*6.68*		*ug/g dry*	*ND*	*113*	*50-140*			
Surrogate: Dibromofluoromethane	*5.51*		*ug/g dry*	*ND*	*93.0*	*50-140*			

Certificate of Analysis

Report Date: 20-Jul-2012
Order Date:18-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13160 Project Description: PE2709

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Surrogate: Toluene-d8	*5.93*		*ug/g dry*	*ND*	*100*	*50-140*			

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 20-Jul-2012
Order Date:18-Jul-2012

Client PO: 13160 Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	218	7	ug/g	ND	109	80-120			
F2 PHCs (C10-C16)	66	4	ug/g	ND	82.5	80-120			
F3 PHCs (C16-C34)	189	8	ug/g	ND	94.5	80-120			
F4 PHCs (C34-C50)	100	6	ug/g	ND	83.6	80-120			
Volatiles									
Acetone	11.7	0.50	ug/g	ND	117	50-140			
Benzene	4.10	0.02	ug/g	ND	102	60-130			
Bromodichloromethane	4.63	0.05	ug/g	ND	116	60-130			
Bromoform	5.17	0.05	ug/g	ND	129	60-130			
Bromomethane	3.46	0.05	ug/g	ND	86.6	50-140			
Carbon Tetrachloride	4.20	0.05	ug/g	ND	105	60-130			
Chlorobenzene	4.53	0.05	ug/g	ND	113	60-130			
Chloroethane	4.37	0.05	ug/g	ND	109	50-140			
Chloroform	4.60	0.05	ug/g	ND	115	60-130			
Chloromethane	2.70	0.20	ug/g	ND	67.4	50-140			
Dibromochloromethane	5.17	0.05	ug/g	ND	129	60-130			
Dichlorodifluoromethane	3.18	0.05	ug/g	ND	79.6	50-140			
1,2-Dibromoethane	4.94	0.05	ug/g	ND	123	60-130			
1,2-Dichlorobenzene	5.09	0.05	ug/g	ND	127	60-130			
1,3-Dichlorobenzene	4.75	0.05	ug/g	ND	119	60-130			
1,4-Dichlorobenzene	4.79	0.05	ug/g	ND	120	60-130			
1,1-Dichloroethane	4.51	0.05	ug/g	ND	113	60-130			
1,2-Dichloroethane	4.37	0.05	ug/g	ND	109	60-130			
1,1-Dichloroethylene	2.92	0.05	ug/g	ND	73.1	60-130			
cis-1,2-Dichloroethylene	4.47	0.05	ug/g	ND	112	60-130			
trans-1,2-Dichloroethylene	3.45	0.05	ug/g	ND	86.3	60-130			
1,2-Dichloropropane	4.17	0.05	ug/g	ND	104	60-130			
cis-1,3-Dichloropropylene	4.87	0.05	ug/g	ND	122	60-130			
trans-1,3-Dichloropropylene	5.01	0.05	ug/g	ND	125	60-130			
Ethylbenzene	3.90	0.05	ug/g	ND	97.4	60-130			
Hexane	4.38	0.05	ug/g	ND	110	60-130			
Methyl Ethyl Ketone (2-Butanone)	10.8	0.50	ug/g	ND	108	50-140			
Methyl Butyl Ketone (2-Hexanone)	12.8	2.00	ug/g	ND	128	50-140			
Methyl Isobutyl Ketone	12.9	0.50	ug/g	ND	129	50-140			
Methyl tert-butyl ether	12.1	0.05	ug/g	ND	121	50-140			
Methylene Chloride	3.68	0.05	ug/g	ND	92.0	60-130			
Styrene	4.45	0.05	ug/g	ND	111	60-130			
1,1,1,2-Tetrachloroethane	4.66	0.05	ug/g	ND	117	60-130			
1,1,2,2-Tetrachloroethane	5.08	0.05	ug/g	ND	127	60-130			
Tetrachloroethylene	3.51	0.05	ug/g	ND	87.7	60-130			
Toluene	4.44	0.05	ug/g	ND	111	60-130			
1,2,4-Trichlorobenzene	3.61	0.05	ug/g	ND	90.3	60-130			
1,1,1-Trichloroethane	3.95	0.05	ug/g	ND	98.8	60-130			
1,1,2-Trichloroethane	5.15	0.05	ug/g	ND	129	60-130			
Trichloroethylene	3.49	0.05	ug/g	ND	87.3	60-130			
Trichlorofluoromethane	4.30	0.05	ug/g	ND	107	50-140			
1,3,5-Trimethylbenzene	3.53	0.05	ug/g	ND	88.2	60-130			
Vinyl chloride	3.16	0.02	ug/g	ND	79.1	50-140			
m,p-Xylenes	7.76	0.05	ug/g	ND	97.0	60-130			

Certificate of Analysis

Report Date: 20-Jul-2012
Order Date:18-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13160 Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	4.23	0.05	ug/g	ND	106	60-130			
Surrogate: 4-Bromofluorobenzene	*7.10*		*ug/g*		*88.8*	*50-140*			

Certificate of Analysis

Report Date: 20-Jul-2012
Order Date:18-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13160 Project Description: PE2709

Qualifier Notes:

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

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

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Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody
(Lab Use Only)
Nº 94851

Page 1 of 1

Client Name: Paterson Group Inc.	Project Reference: PE2709	TAT: [X] Regular [ ] 3 Day	
Contact Name: Dan Arnott	Quote #	[ ] 2 Day [ ] 1 Day	
Address: 154 Colonnade Rd Ottawa, ON K2E 7J5	PO # 13160		
Telephone: 613.226.7381	Email Address: darnott@patersongroup.ca	Date Required:	

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

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

Required Analyses

Paracel Order Number: 1229139

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP/MS	Hg	CrVI	B (HWS)							
1	BH1-SS7	S		2	17-Jul-12		X	X												✓
2	BH2-SS8	S		↓	↓		X	X												✓
3	BH3-SS6	S		↓	↓		X	X												✓
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: Walk-in

Relinquished By (Print & Sign): DAN ARNOTT	Received by Driver/Depot:	Received at Lab:	Verified By: MJC
Date/Time: 12-51pm 18-Jul-12	Date/Time:	Date/Time: July 18/12 12:50p	Date/Time: July 18/12 2:18
	Temperature: ____ °C	Temperature: 19.1 °C	pH Verified [ ] By: N/A

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Head Office
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Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers
154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Dan Arnott

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

Client PO: 13161
Project: PE2709
Custody: 94801

Report Date: 24-Jul-2012
Order Date: 19-Jul-2012
Order #: 1229217

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

Paracel ID	Client ID
1229217-01	BH1-AU1
1229217-02	BH4-SS3

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:19-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13161 Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals	EPA 6020 - Digestion - ICP-MS	20-Jul-12	21-Jul-12
PAHs by GC-MS, standard scan	EPA 8270 - GC-MS, extraction	20-Jul-12	24-Jul-12
Solids, %	Gravimetric, calculation	20-Jul-12	20-Jul-12

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:19-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13161 Project Description: PE2709

	Client ID:	BH1-AU1	BH4-SS3	-	-
	Sample Date:	17-Jul-12	18-Jul-12	-	-
	Sample ID:	1229217-01	1229217-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	98.6	89.6	-	-
Metals					
Antimony	1 ug/g dry	<1	2	-	-
Arsenic	1 ug/g dry	2	2	-	-
Barium	1 ug/g dry	20	184	-	-
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 ug/g dry	7	14	-	-
Cobalt	1 ug/g dry	3	3	-	-
Copper	5 ug/g dry	6	17	-	-
Lead	1 ug/g dry	9	524	-	-
Molybdenum	1 ug/g dry	2	1	-	-
Nickel	5 ug/g dry	11	8	-	-
Selenium	1 ug/g dry	<1	<1	-	-
Silver	0.3 ug/g dry	1.8	1.5	-	-
Thallium	1 ug/g dry	<1	<1	-	-
Uranium	1 ug/g dry	<1	<1	-	-
Vanadium	10 ug/g dry	30	20	-	-
Zinc	20 ug/g dry	<20	191	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.08 [1]	-	-	-
Acenaphthylene	0.02 ug/g dry	<0.08 [1]	-	-	-
Anthracene	0.02 ug/g dry	<0.08 [1]	-	-	-
Benzo [a] anthracene	0.02 ug/g dry	0.09	-	-	-
Benzo [a] pyrene	0.02 ug/g dry	<0.08 [1]	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.08 [1]	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.08 [1]	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.08 [1]	-	-	-
Biphenyl	0.02 ug/g dry	<0.08 [1]	-	-	-
Chrysene	0.02 ug/g dry	0.82	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.08 [1]	-	-	-
Fluoranthene	0.02 ug/g dry	<0.08 [1]	-	-	-

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:19-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13161 Project Description: PE2709

	Client ID:	BH1-AU1	BH4-SS3	-	-
	Sample Date:	17-Jul-12	18-Jul-12	-	-
	Sample ID:	1229217-01	1229217-02	-	-
	MDL/Units	Soil	Soil	-	-
Fluorene	0.02 ug/g dry	<0.08 [1]	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.08 [1]	-	-	-
1-Methylnaphthalene	0.02 ug/g dry	0.10	-	-	-
2-Methylnaphthalene	0.02 ug/g dry	0.13	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	0.23	-	-	-
Naphthalene	0.01 ug/g dry	0.05	-	-	-
Phenanthrene	0.02 ug/g dry	0.32	-	-	-
Pyrene	0.02 ug/g dry	0.22	-	-	-
2-Fluorobiphenyl	Surrogate	113%	-	-	-
Terphenyl-d14	Surrogate	108%	-	-	-

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 24-Jul-2012
Order Date:19-Jul-2012

Client PO: 13161 Project Description: PE2709

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1	ug/g						
Arsenic	ND	1	ug/g						
Barium	ND	1	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5	ug/g						
Cobalt	ND	1	ug/g						
Copper	ND	5	ug/g						
Lead	ND	1	ug/g						
Molybdenum	ND	1	ug/g						
Nickel	ND	5	ug/g						
Selenium	ND	1	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1	ug/g						
Uranium	ND	1	ug/g						
Vanadium	ND	10	ug/g						
Zinc	ND	20	ug/g						

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:19-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13161 Project Description: PE2709

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1	ug/g dry	ND			0.0	30	
Arsenic	ND	1	ug/g dry	ND			0.0	30	
Barium	14.2	1	ug/g dry	13.9			2.8	30	
Beryllium	ND	0.5	ug/g dry	ND			0.0	30	
Boron	ND	5.0	ug/g dry	ND			0.0	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	10.2	5	ug/g dry	10.0			2.3	30	
Cobalt	2.4	1	ug/g dry	2.3			2.8	30	
Copper	ND	5	ug/g dry	ND			0.0	30	
Lead	ND	1	ug/g dry	1.8			0.0	30	
Molybdenum	1.2	1	ug/g dry	ND			0.0	30	
Nickel	6.3	5	ug/g dry	6.1			4.0	30	
Selenium	ND	1	ug/g dry	ND			0.0	30	
Silver	ND	0.3	ug/g dry	ND			0.0	30	
Thallium	ND	1	ug/g dry	ND			0.0	30	
Uranium	ND	1	ug/g dry	ND			0.0	30	
Vanadium	14.8	10	ug/g dry	13.8			6.7	30	
Zinc	ND	20	ug/g dry	ND			0.0	30	
Physical Characteristics									
% Solids	84.8	0.1	% by Wt.	88.0			3.6	25	

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 24-Jul-2012
Order Date:19-Jul-2012

Client PO: 13161 Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	51.0		ug/L	0.01	102	70-130			
Arsenic	49.5		ug/L	0.1	98.7	70-130			
Barium	55.5		ug/L	5.5	100	70-130			
Beryllium	52.8		ug/L	0.08	105	70-130			
Boron	48.3		ug/L	0.5	95.6	70-130			
Cadmium	47.8		ug/L	0.007	95.5	70-130			
Chromium	55.4		ug/L	4.0	103	70-130			
Cobalt	50.9		ug/L	0.9	99.9	70-130			
Copper	50.9		ug/L	1.5	98.8	70-130			
Lead	51.4		ug/L	0.7	101	70-130			
Molybdenum	48.1		ug/L	0.07	96.1	70-130			
Nickel	52.8		ug/L	2.4	101	70-130			
Selenium	50.2		ug/L	ND	100	70-130			
Silver	41.4		ug/L	0.01	82.7	70-130			
Thallium	56.7		ug/L	ND	114	70-130			
Uranium	51.7		ug/L	0.1	103	70-130			
Vanadium	57.7		ug/L	5.5	104	70-130			
Zinc	53.2		ug/L	4.2	98.0	70-130			

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:19-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 13161 Project Description: PE2709

Qualifier Notes:

Sample Qualifiers :

1 : Elevated detection limits due to the nature of the sample matrix.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

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Page 1 of 1

Client Name: Paterson Group Inc.
Contact Name: Dan Arnott
Address: 154 Colonnade Rd, Ottawa, ON K2E 7J5
Telephone: 613.226.7381

Project Reference: PE2709
Quote #
PO # 13161
Email Address: darnott@patersongroup.ca

TAT: | | Regular | | 3 Day | X | 2 Day | | | 1 Day
Date Required: _____

Criteria: | | O. Reg. 153/04 Table _ | X | O. Reg. 153/11 (Current) Table 3 | | RSC Filing | | O. Reg. 558/00 | | PWQO | | CCME | | SUB (Storm) | | SUB (Sanitary) Municipality: _____ | | Other: _____

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

Paracel Order Number: 1229217

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP/MS	Hg	CrVI	B (HWS)							
1	BH1-AV1	S		1	17-Jul-12				X	X					250 ml					✓
2	BH4-SS3	S		1	18-Jul-12					X					"					✓
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: Paracel

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
DAN ARNOTT	M. Scouse	SUNEEP ORN	MJC
Date/Time: 1:23 pm, 19-Jul-12	Date/Time: 19/07/12 3:35 PM	Date/Time: JUL 19, 2012 05.05	Date/Time: July 19/12, 5:37
	Temperature: ___ °C	Temperature: 19.9 °C	pH Verified		By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers
154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Dan Arnott

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

Client PO: 12278
Project: PE2709
Custody: 5106

Report Date: 9-Aug-2012
Order Date: 8-Aug-2012
Order #: 1232102

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

Paracel ID	Client ID
1232102-01	BH5-SS8
1232102-02	BH6-SS7
1232102-03	BH7-SS7

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 09-Aug-2012
Order Date:8-Aug-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12278 Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	8-Aug-12	9-Aug-12
CCME PHC F1	CWS Tier 1 - P&T GC-FID	8-Aug-12	9-Aug-12
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	8-Aug-12	9-Aug-12
Solids, %	Gravimetric, calculation	9-Aug-12	9-Aug-12

Certificate of Analysis

Report Date: 09-Aug-2012
Order Date:8-Aug-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12278 Project Description: PE2709

	Client ID:	BH5-SS8	BH6-SS7	BH7-SS7	-
	Sample Date:	08-Aug-12	08-Aug-12	08-Aug-12	-
	Sample ID:	1232102-01	1232102-02	1232102-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	74.0	96.4	96.5	-
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	90.2%	92.8%	93.3%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	65	8	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	74	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	62	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	112	-

Certificate of Analysis

Report Date: 09-Aug-2012
Order Date:8-Aug-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12278 Project Description: PE2709

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.22*		*ug/g*		*101*	*50-140*			

Certificate of Analysis

Report Date: 09-Aug-2012
Order Date:8-Aug-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12278 Project Description: PE2709

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Physical Characteristics									
% Solids	68.7	0.1	% by Wt.	66.6			3.1	25	

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 09-Aug-2012
Order Date:8-Aug-2012

Client PO: 12278 Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	205	7	ug/g	ND	103	80-120			
Volatiles									
Benzene	3.89	0.02	ug/g	ND	97.1	60-130			
Ethylbenzene	2.78	0.05	ug/g	ND	69.4	60-130			
Toluene	3.99	0.05	ug/g	ND	99.7	60-130			
m,p-Xylenes	6.54	0.05	ug/g	ND	81.8	60-130			
o-Xylene	2.69	0.05	ug/g	ND	67.2	60-130			
Surrogate: Toluene-d8	*2.72*		*ug/g*		*85.1*	*50-140*			

Certificate of Analysis

Report Date: 09-Aug-2012
Order Date:8-Aug-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12278 Project Description: PE2709

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

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Client Name: Paterson Group Inc.
Project Reference: PE2709
Contact Name: Dan Arnott
Quote #
Address: 154 Colonnade Rd Ottawa, ON K2E 7J5
PO # Will call 12278 (per Dan)
Email Address: darnott@patersongroup.ca
Telephone:

TAT: [ ] Regular [ ] 3 Day [ ] 2 Day [X] 1 Day
Date Required: _____

Criteria: [ ] O. Reg. 153/04 Table __ [X] O. Reg. 153/11 (Current) Table 1 [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

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

Required Analyses

Paracel Order Number: 1232102

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	BTEX	PHCs F1-F4									
1	BH5-SS7	S		2	8-Aug-12	10am	/	-				120 ml	* 1	Vial	→ needs SS8?		
2	BH6-SS7	↓		2	↓	1pm	/	-				↓					✓
3	BH7-SS7	↓		2	↓	2pm	/	-				↓					✓
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: Will call w/ P.O. Sample #1 should read SS8 per Dan. SC.

Method of Delivery: Walk-in

Relinquished By (Print & Sign): ~~Dan Arnott~~ DAN ARNOTT
Date/Time: 3:40pm 8-Aug-12

Received by Driver/Depot:
Date/Time:
Temperature: _____ °C

Received at Lab:
Date/Time: Aug 8/12 3:41p
Temperature: 28.3 °C

Verified By:
Date/Time: Aug 8/12 4:48p
pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Karyn Munch

Client PO: 56968
Project: PE2709
Custody:

Report Date: 13-Mar-2023
Order Date: 8-Mar-2023

Order #: 2310245

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

Paracel ID	Client ID
2310245-01	BH1-23-SS3
2310245-02	BH2-23-SS2
2310245-03	BH2-23-SS4
2310245-04	BH3-23-AU2
2310245-05	BH3-23-SS4
2310245-06	BH4-23-SS4
2310245-07	BH5-23-AU1
2310245-08	BH5-23-SS3
2310245-09	BH5-23-SS6
2310245-10	BH6-23-SS5
2310245-11	DUP
2310245-12	BH1-23-SS2
2310245-13	BH1-23-SS5
2310245-14	BH3-23-SS5
2310245-15	BH3-23-SS6

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 13-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2023

Client PO: 56968

Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	7-Mar-23	7-Mar-23
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	9-Mar-23	10-Mar-23
Conductivity	MOE E3138 - probe @25 °C, water ext	9-Mar-23	9-Mar-23
Mercury by CVAA	EPA 7471B - CVAA, digestion	10-Mar-23	10-Mar-23
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	10-Mar-23	10-Mar-23
PHC F1	CWS Tier 1 - P&T GC-FID	7-Mar-23	7-Mar-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	8-Mar-23	10-Mar-23
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	9-Mar-23	9-Mar-23
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	8-Mar-23	11-Mar-23
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	9-Mar-23	9-Mar-23
SAR	Calculated	9-Mar-23	10-Mar-23
Solids, %	CWS Tier 1 - Gravimetric	9-Mar-23	9-Mar-23

Certificate of Analysis

Report Date: 13-Mar-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 8-Mar-2023

Client PO: **56968**

Project Description: PE2709

	Client ID:	BH1-23-SS3	BH2-23-SS2	BH2-23-SS4	BH3-23-AU2
	Sample Date:	24-Feb-23 09:00	27-Feb-23 09:00	27-Feb-23 09:00	27-Feb-23 09:00
	Sample ID:	2310245-01	2310245-02	2310245-03	2310245-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	93.2	88.4	92.7	90.6
General Inorganics					
SAR	0.01 N/A	0.80	1.61	1.77	2.16
Conductivity	5 uS/cm	469	1360	693	442
pH	0.05 pH Units	-	7.69	7.76	7.66
Metals					
Antimony	1.0 ug/g dry	<1.0	2.2	<1.0	2.2
Arsenic	1.0 ug/g dry	3.8	8.0	2.6	6.8
Barium	1.0 ug/g dry	30.7	321	27.1	126
Beryllium	0.5 ug/g dry	<0.5	0.6	<0.5	0.6
Boron	5.0 ug/g dry	6.4	7.0	6.5	<5.0
Cadmium	0.5 ug/g dry	<0.5	0.6	<0.5	<0.5
Chromium	5.0 ug/g dry	12.2	29.2	10.1	16.7
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	3.8	7.1	3.6	5.7
Copper	5.0 ug/g dry	9.3	120	5.7	36.6
Lead	1.0 ug/g dry	3.6	432	3.2	217
Mercury	0.1 ug/g dry	<0.1	2.7	<0.1	0.3
Molybdenum	1.0 ug/g dry	<1.0	1.1	<1.0	1.3
Nickel	5.0 ug/g dry	8.2	17.0	7.1	14.3
Selenium	1.0 ug/g dry	<1.0	1.3	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	0.6	<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	17.5	26.1	15.7	22.1
Zinc	20.0 ug/g dry	21.8	429	<20.0	74.8
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	123%	127%	124%	118%
Hydrocarbons					

Certificate of Analysis

Report Date: 13-Mar-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 8-Mar-2023

Client PO: **56968**

Project Description: PE2709

	Client ID:	BH1-23-SS3	BH2-23-SS2	BH2-23-SS4	BH3-23-AU2
	Sample Date:	24-Feb-23 09:00	27-Feb-23 09:00	27-Feb-23 09:00	27-Feb-23 09:00
	Sample ID:	2310245-01	2310245-02	2310245-03	2310245-04
	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	<40 [1]	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	312	<8	48 [2]
F4 PHCs (C34-C50)	6 ug/g dry	<6	298	<6	23 [2]
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	0.76	-	0.07
Acenaphthylene	0.02 ug/g dry	<0.02	0.19	-	0.18
Anthracene	0.02 ug/g dry	<0.02	1.58	-	0.29
Benzo [a] anthracene	0.02 ug/g dry	<0.02	2.72	-	0.70
Benzo [a] pyrene	0.02 ug/g dry	<0.02	2.37	-	0.70
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	3.00	-	0.73
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	1.45	-	0.38
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	1.68	-	0.42
Chrysene	0.02 ug/g dry	<0.02	2.68	-	0.71
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	0.38	-	0.11
Fluoranthene	0.02 ug/g dry	<0.02	6.09	-	1.47
Fluorene	0.02 ug/g dry	<0.02	0.53	-	0.08
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	1.40	-	0.37
1-Methylnaphthalene	0.02 ug/g dry	<0.02	0.12	-	0.09
2-Methylnaphthalene	0.02 ug/g dry	<0.02	0.16	-	0.12
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	0.28	-	0.21
Naphthalene	0.01 ug/g dry	<0.01	0.22	-	0.16
Phenanthrene	0.02 ug/g dry	<0.02	4.82	-	0.89
Pyrene	0.02 ug/g dry	<0.02	4.84	-	1.28
2-Fluorobiphenyl	Surrogate	106%	101%	-	108%
Terphenyl-d14	Surrogate	115%	110%	-	108%

Certificate of Analysis

Report Date: 13-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2023

Client PO: 56968

Project Description: PE2709

	Client ID:	BH3-23-SS4	BH4-23-SS4	BH5-23-AU1	BH5-23-SS3
	Sample Date:	27-Feb-23 09:00	28-Feb-23 09:00	28-Feb-23 09:00	28-Feb-23 09:00
	Sample ID:	2310245-05	2310245-06	2310245-07	2310245-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	96.2	92.5	92.6	98.4
General Inorganics					
SAR	0.01 N/A	1.19	4.44	0.90	1.32
Conductivity	5 uS/cm	209	1090	280	293
pH	0.05 pH Units	-	-	-	7.89
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	4.1	3.5	5.9	2.8
Barium	1.0 ug/g dry	38.6	27.1	24.1	38.1
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Boron	5.0 ug/g dry	5.6	7.2	6.8	5.6
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	11.3	12.5	15.9	10.5
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	4.2	3.5	6.8	3.7
Copper	5.0 ug/g dry	8.7	7.0	12.4	5.9
Lead	1.0 ug/g dry	5.3	4.5	32.5	4.5
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Molybdenum	1.0 ug/g dry	<1.0	<1.0	6.7	<1.0
Nickel	5.0 ug/g dry	8.6	7.7	15.6	6.8
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	19.2	19.5	25.8	14.3
Zinc	20.0 ug/g dry	20.5	23.8	26.3	<20.0
Volatiles					
Acetone	0.50 ug/g dry	<0.50	-	-	-
Benzene	0.02 ug/g dry	<0.02	-	-	-
Bromodichloromethane	0.05 ug/g dry	<0.05	-	-	-
Bromoform	0.05 ug/g dry	<0.05	-	-	-
Bromomethane	0.05 ug/g dry	<0.05	-	-	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	-	-	-
Chlorobenzene	0.05 ug/g dry	<0.05	-	-	-
Chloroform	0.05 ug/g dry	<0.05	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 56968

Report Date: 13-Mar-2023

Order Date: 8-Mar-2023

Project Description: PE2709

	Client ID:	BH3-23-SS4	BH4-23-SS4	BH5-23-AU1	BH5-23-SS3
	Sample Date:	27-Feb-23 09:00	28-Feb-23 09:00	28-Feb-23 09:00	28-Feb-23 09:00
	Sample ID:	2310245-05	2310245-06	2310245-07	2310245-08
	MDL/Units	Soil	Soil	Soil	Soil
Dibromochloromethane	0.05 ug/g dry	<0.05	-	-	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	-	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Ethylene dibromide (dibromoethane, 1	0.05 ug/g dry	<0.05	-	-	-
Hexane	0.05 ug/g dry	<0.05	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	-	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	-	-	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	-	-	-
Methylene Chloride	0.05 ug/g dry	<0.05	-	-	-
Styrene	0.05 ug/g dry	<0.05	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
Trichloroethylene	0.05 ug/g dry	<0.05	-	-	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	-	-	-
Vinyl chloride	0.02 ug/g dry	<0.02	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
4-Bromofluorobenzene	Surrogate	98.1%	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 56968

Report Date: 13-Mar-2023

Order Date: 8-Mar-2023

Project Description: PE2709

	Client ID:	BH3-23-SS4	BH4-23-SS4	BH5-23-AU1	BH5-23-SS3
	Sample Date:	27-Feb-23 09:00	28-Feb-23 09:00	28-Feb-23 09:00	28-Feb-23 09:00
	Sample ID:	2310245-05	2310245-06	2310245-07	2310245-08
	MDL/Units	Soil	Soil	Soil	Soil
Dibromofluoromethane	Surrogate	104%	-	-	-
Toluene-d8	Surrogate	121%	-	-	-
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	-	126%	126%	120%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<80 [1]	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	699	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	1650	<6
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.80 [1]	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.20 [1]	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.40 [1]	<0.02
2-Fluorobiphenyl	Surrogate	104%	96.1%	69.4%	95.0%

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 56968

Report Date: 13-Mar-2023

Order Date: 8-Mar-2023

Project Description: PE2709

	Client ID:	BH3-23-SS4	BH4-23-SS4	BH5-23-AU1	BH5-23-SS3
	Sample Date:	27-Feb-23 09:00	28-Feb-23 09:00	28-Feb-23 09:00	28-Feb-23 09:00
	Sample ID:	2310245-05	2310245-06	2310245-07	2310245-08
	MDL/Units	Soil	Soil	Soil	Soil
Terphenyl-d14	Surrogate	109%	111%	101%	111%

Certificate of Analysis

Report Date: 13-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2023

Client PO: 56968

Project Description: PE2709

	Client ID:	BH5-23-SS6	BH6-23-SS5	DUP	BH1-23-SS2
	Sample Date:	28-Feb-23 09:00	01-Mar-23 09:00	28-Feb-23 09:00	24-Feb-23 09:00
	Sample ID:	2310245-09	2310245-10	2310245-11	2310245-12
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	94.2	94.7	96.0	92.4
General Inorganics					
SAR	0.01 N/A	1.25	1.88	1.43	1.90
Conductivity	5 uS/cm	226	3310	304	943
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Arsenic	1.0 ug/g dry	4.1	10.2	4.6	-
Barium	1.0 ug/g dry	129	64.7	211	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	0.5	-
Boron	5.0 ug/g dry	8.0	11.6	8.9	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Chromium	5.0 ug/g dry	13.5	13.6	15.5	-
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	-
Cobalt	1.0 ug/g dry	4.5	11.8	4.9	-
Copper	5.0 ug/g dry	<5.0	9.6	5.5	-
Lead	1.0 ug/g dry	5.0	19.7	5.1	-
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	-
Molybdenum	1.0 ug/g dry	<1.0	5.4	<1.0	-
Nickel	5.0 ug/g dry	11.4	20.3	12.5	-
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	15.4	10.5	18.0	-
Zinc	20.0 ug/g dry	<20.0	<20.0	<20.0	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	-	<0.50	-
Benzene	0.02 ug/g dry	<0.02	-	<0.02	-
Bromodichloromethane	0.05 ug/g dry	<0.05	-	<0.05	-
Bromoform	0.05 ug/g dry	<0.05	-	<0.05	-
Bromomethane	0.05 ug/g dry	<0.05	-	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	-	<0.05	-
Chlorobenzene	0.05 ug/g dry	<0.05	-	<0.05	-
Chloroform	0.05 ug/g dry	<0.05	-	<0.05	-
Dibromochloromethane	0.05 ug/g dry	<0.05	-	<0.05	-

Certificate of Analysis

Report Date: 13-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2023

Client PO: 56968

Project Description: PE2709

	Client ID:	BH5-23-SS6	BH6-23-SS5	DUP	BH1-23-SS2
	Sample Date:	28-Feb-23 09:00	01-Mar-23 09:00	28-Feb-23 09:00	24-Feb-23 09:00
	Sample ID:	2310245-09	2310245-10	2310245-11	2310245-12
	MDL/Units	Soil	Soil	Soil	Soil
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	-	<0.05	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	-	<0.05	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	-	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	-	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	-	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	-	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	-	<0.05	-
Ethylbenzene	0.05 ug/g dry	0.10	-	0.08	-
Ethylene dibromide (dibromoethane, 1	0.05 ug/g dry	<0.05	-	<0.05	-
Hexane	0.05 ug/g dry	<0.05	-	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	-	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	-	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	-	<0.05	-
Methylene Chloride	0.05 ug/g dry	<0.05	-	<0.05	-
Styrene	0.05 ug/g dry	<0.05	-	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	-	<0.05	-
Toluene	0.05 ug/g dry	<0.05	-	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
Trichloroethylene	0.05 ug/g dry	<0.05	-	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	-	<0.05	-
Vinyl chloride	0.02 ug/g dry	<0.02	-	<0.02	-
m,p-Xylenes	0.05 ug/g dry	0.22	-	0.21	-
o-Xylene	0.05 ug/g dry	<0.05	-	<0.05	-
Xylenes, total	0.05 ug/g dry	0.22	-	0.21	-
4-Bromofluorobenzene	Surrogate	98.2%	-	98.4%	-
Dibromofluoromethane	Surrogate	108%	-	104%	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 56968

Report Date: 13-Mar-2023

Order Date: 8-Mar-2023

Project Description: PE2709

	Client ID:	BH5-23-SS6	BH6-23-SS5	DUP	BH1-23-SS2
	Sample Date:	28-Feb-23 09:00	01-Mar-23 09:00	28-Feb-23 09:00	24-Feb-23 09:00
	Sample ID:	2310245-09	2310245-10	2310245-11	2310245-12
	MDL/Units	Soil	Soil	Soil	Soil
Toluene-d8	Surrogate	121%	-	120%	-
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	-	123%	-	122%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	8	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	28	17
F3 PHCs (C16-C34)	8 ug/g dry	<8	15	<8	107
F4 PHCs (C34-C50)	6 ug/g dry	<6	11	<6	70
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	-	105%	-	-
Terphenyl-d14	Surrogate	-	116%	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 56968

Report Date: 13-Mar-2023

Order Date: 8-Mar-2023

Project Description: PE2709

	Client ID:	BH1-23-SS5	BH3-23-SS5	BH3-23-SS6	-
	Sample Date:	24-Feb-23 09:00	27-Feb-23 09:00	27-Feb-23 09:00	-
	Sample ID:	2310245-13	2310245-14	2310245-15	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	92.2	90.5	91.1	-
General Inorganics					
SAR	0.01 N/A	-	1.54	2.07	-
Conductivity	5 uS/cm	-	260	317	-
pH	0.05 pH Units	-	-	7.88	-
Metals					
Antimony	1.0 ug/g dry	-	<1.0	<1.0	-
Arsenic	1.0 ug/g dry	-	2.9	2.5	-
Barium	1.0 ug/g dry	-	87.3	68.1	-
Beryllium	0.5 ug/g dry	-	<0.5	<0.5	-
Boron	5.0 ug/g dry	-	5.3	8.1	-
Cadmium	0.5 ug/g dry	-	<0.5	<0.5	-
Chromium	5.0 ug/g dry	-	9.9	10.8	-
Chromium (VI)	0.2 ug/g dry	-	<0.2	<0.2	-
Cobalt	1.0 ug/g dry	-	3.2	2.8	-
Copper	5.0 ug/g dry	-	<5.0	<5.0	-
Lead	1.0 ug/g dry	-	3.3	2.8	-
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	-	6.8	7.2	-
Selenium	1.0 ug/g dry	-	<1.0	<1.0	-
Silver	0.3 ug/g dry	-	<0.3	<0.3	-
Thallium	1.0 ug/g dry	-	<1.0	<1.0	-
Uranium	1.0 ug/g dry	-	<1.0	<1.0	-
Vanadium	10.0 ug/g dry	-	15.7	12.9	-
Zinc	20.0 ug/g dry	-	<20.0	<20.0	-
Volatiles					
Acetone	0.50 ug/g dry	-	-	<0.50	-
Benzene	0.02 ug/g dry	-	-	<0.02	-
Bromodichloromethane	0.05 ug/g dry	-	-	<0.05	-
Bromoform	0.05 ug/g dry	-	-	<0.05	-
Bromomethane	0.05 ug/g dry	-	-	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	-	-	<0.05	-
Chlorobenzene	0.05 ug/g dry	-	-	<0.05	-
Chloroform	0.05 ug/g dry	-	-	<0.05	-

Certificate of Analysis

Report Date: 13-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2023

Client PO: 56968

Project Description: PE2709

	Client ID:	BH1-23-SS5	BH3-23-SS5	BH3-23-SS6	-
	Sample Date:	24-Feb-23 09:00	27-Feb-23 09:00	27-Feb-23 09:00	-
	Sample ID:	2310245-13	2310245-14	2310245-15	-
	MDL/Units	Soil	Soil	Soil	-
Dibromochloromethane	0.05 ug/g dry	-	-	<0.05	-
Dichlorodifluoromethane	0.05 ug/g dry	-	-	<0.05	-
1,2-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	-	-	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	-	-	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	-	-	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	-	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	-	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	-	-	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	-	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	-	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	-	<0.05	-
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	-
Ethylene dibromide (dibromoethane, 1	0.05 ug/g dry	-	-	<0.05	-
Hexane	0.05 ug/g dry	-	-	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	-	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	-	-	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	-	-	<0.05	-
Methylene Chloride	0.05 ug/g dry	-	-	<0.05	-
Styrene	0.05 ug/g dry	-	-	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	-	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	-	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	-	-	<0.05	-
Toluene	0.05 ug/g dry	-	-	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	-	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	-	<0.05	-
Trichloroethylene	0.05 ug/g dry	-	-	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	-	-	<0.05	-
Vinyl chloride	0.02 ug/g dry	-	-	<0.02	-
m,p-Xylenes	0.05 ug/g dry	-	-	<0.05	-
o-Xylene	0.05 ug/g dry	-	-	<0.05	-
Xylenes, total	0.05 ug/g dry	-	-	<0.05	-
4-Bromofluorobenzene	Surrogate	-	-	103%	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 56968

Report Date: 13-Mar-2023

Order Date: 8-Mar-2023

Project Description: PE2709

	Client ID:	BH1-23-SS5	BH3-23-SS5	BH3-23-SS6	-
	Sample Date:	24-Feb-23 09:00	27-Feb-23 09:00	27-Feb-23 09:00	-
	Sample ID:	2310245-13	2310245-14	2310245-15	-
	MDL/Units	Soil	Soil	Soil	-
Dibromofluoromethane	Surrogate	-	-	106%	-
Toluene-d8	Surrogate	-	-	125%	-
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	125%	119%	-	-
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	<8	<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
General Inorganics									
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
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	*1.56*		*ug/g*		*117*	*50-140*			
Surrogate: Terphenyl-d14	*1.64*		*ug/g*		*123*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*9.44*		*ug/g*		*118*	*50-140*			
Surrogate: Dibromofluoromethane	*8.12*		*ug/g*		*102*	*50-140*			
Surrogate: Toluene-d8	*9.93*		*ug/g*		*124*	*50-140*			
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*9.93*		*ug/g*		*124*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.78	0.01	N/A	0.76			2.6	30	
Conductivity	214	5	uS/cm	216			0.9	5	
pH	7.18	0.05	pH Units	7.20			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)	9	8	ug/g	14			39.7	30	
F4 PHCs (C34-C50)	ND	6	ug/g	10			NC	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	11.1	1.0	ug/g	9.8			12.6	30	
Barium	37.0	1.0	ug/g	37.7			1.7	30	
Beryllium	1.4	0.5	ug/g	1.3			4.2	30	
Boron	23.2	5.0	ug/g	20.6			11.8	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	0.7	0.2	ug/g	1.0			25.5	35	
Chromium	29.4	5.0	ug/g	28.0			4.6	30	
Cobalt	18.9	1.0	ug/g	18.1			4.0	30	
Copper	58.3	5.0	ug/g	55.7			4.6	30	
Lead	7.8	1.0	ug/g	6.3			20.8	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	36.6	5.0	ug/g	34.7			5.4	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	33.7			5.8	30	
Zinc	78.9	20.0	ug/g	75.4			4.6	30	
Physical Characteristics									
% Solids	93.2	0.1	% by Wt.	93.2			0.1	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	*1.28*		*ug/g*		*83.9*	*50-140*			
Surrogate: Terphenyl-d14	*1.44*		*ug/g*		*93.9*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*8.72*		*ug/g*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*8.95*		*ug/g*		*104*	*50-140*			
Surrogate: Toluene-d8	*10.4*		*ug/g*		*121*	*50-140*			
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	*10.4*		*ug/g*		*121*	*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)	182	7	ug/g	ND	91.2	80-120			
F2 PHCs (C10-C16)	119	4	ug/g	ND	130	60-140			
F3 PHCs (C16-C34)	304	8	ug/g	14	129	60-140			
F4 PHCs (C34-C50)	171	6	ug/g	10	113	60-140			
Metals									
Antimony	35.6	1.0	ug/g	ND	70.9	70-130			
Arsenic	52.4	1.0	ug/g	3.9	97.0	70-130			
Barium	60.2	1.0	ug/g	15.1	90.4	70-130			
Beryllium	49.0	0.5	ug/g	0.5	96.9	70-130			
Boron	53.9	5.0	ug/g	8.3	91.3	70-130			
Cadmium	46.1	0.5	ug/g	ND	92.2	70-130			
Chromium (VI)	5.2	0.2	ug/g	1.0	69.5	70-130			QM-05
Chromium	63.2	5.0	ug/g	11.2	104	70-130			
Cobalt	56.9	1.0	ug/g	7.3	99.3	70-130			
Copper	71.3	5.0	ug/g	22.3	98.0	70-130			
Lead	47.8	1.0	ug/g	2.5	90.5	70-130			
Mercury	1.42	0.1	ug/g	ND	94.8	70-130			
Molybdenum	50.5	1.0	ug/g	ND	101	70-130			
Nickel	63.5	5.0	ug/g	13.9	99.1	70-130			
Selenium	45.7	1.0	ug/g	ND	91.1	70-130			
Silver	42.6	0.3	ug/g	ND	85.0	70-130			
Thallium	45.6	1.0	ug/g	ND	91.0	70-130			
Uranium	47.5	1.0	ug/g	ND	94.4	70-130			
Vanadium	66.6	10.0	ug/g	13.5	106	70-130			
Zinc	75.7	20.0	ug/g	30.2	91.2	70-130			
Semi-Volatiles									
Acenaphthene	0.144	0.02	ug/g	ND	75.3	50-140			
Acenaphthylene	0.131	0.02	ug/g	ND	68.5	50-140			
Anthracene	0.139	0.02	ug/g	ND	72.8	50-140			
Benzo [a] anthracene	0.142	0.02	ug/g	ND	74.5	50-140			
Benzo [a] pyrene	0.149	0.02	ug/g	ND	77.8	50-140			
Benzo [b] fluoranthene	0.204	0.02	ug/g	ND	107	50-140			
Benzo [g,h,i] perylene	0.131	0.02	ug/g	ND	68.4	50-140			
Benzo [k] fluoranthene	0.155	0.02	ug/g	ND	80.9	50-140			
Chrysene	0.172	0.02	ug/g	ND	90.0	50-140			
Dibenzo [a,h] anthracene	0.133	0.02	ug/g	ND	69.8	50-140			
Fluoranthene	0.144	0.02	ug/g	ND	75.1	50-140			
Fluorene	0.141	0.02	ug/g	ND	73.7	50-140			
Indeno [1,2,3-cd] pyrene	0.141	0.02	ug/g	ND	74.0	50-140			
1-Methylnaphthalene	0.168	0.02	ug/g	ND	87.7	50-140			
2-Methylnaphthalene	0.171	0.02	ug/g	ND	89.7	50-140			
Naphthalene	0.164	0.01	ug/g	ND	85.6	50-140			
Phenanthrene	0.150	0.02	ug/g	ND	78.5	50-140			
Pyrene	0.140	0.02	ug/g	ND	73.4	50-140			
Surrogate: 2-Fluorobiphenyl	*1.17*		*ug/g*		*76.4*	*50-140*			
Surrogate: Terphenyl-d14	*1.31*		*ug/g*		*85.7*	*50-140*			
Volatiles									
Acetone	11.3	0.50	ug/g	ND	113	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	3.57	0.02	ug/g	ND	89.3	60-130			
Bromodichloromethane	3.64	0.05	ug/g	ND	90.9	60-130			
Bromoform	4.02	0.05	ug/g	ND	101	60-130			
Bromomethane	4.19	0.05	ug/g	ND	105	50-140			
Carbon Tetrachloride	3.55	0.05	ug/g	ND	88.8	60-130			
Chlorobenzene	3.95	0.05	ug/g	ND	98.7	60-130			
Chloroform	3.69	0.05	ug/g	ND	92.3	60-130			
Dibromochloromethane	4.20	0.05	ug/g	ND	105	60-130			
Dichlorodifluoromethane	3.11	0.05	ug/g	ND	77.7	50-140			
1,2-Dichlorobenzene	3.53	0.05	ug/g	ND	88.3	60-130			
1,3-Dichlorobenzene	3.62	0.05	ug/g	ND	90.5	60-130			
1,4-Dichlorobenzene	3.45	0.05	ug/g	ND	86.3	60-130			
1,1-Dichloroethane	3.97	0.05	ug/g	ND	99.3	60-130			
1,2-Dichloroethane	3.63	0.05	ug/g	ND	90.9	60-130			
1,1-Dichloroethylene	3.78	0.05	ug/g	ND	94.5	60-130			
cis-1,2-Dichloroethylene	3.59	0.05	ug/g	ND	89.8	60-130			
trans-1,2-Dichloroethylene	3.59	0.05	ug/g	ND	89.8	60-130			
1,2-Dichloropropane	3.42	0.05	ug/g	ND	85.5	60-130			
cis-1,3-Dichloropropylene	3.41	0.05	ug/g	ND	85.2	60-130			
trans-1,3-Dichloropropylene	3.52	0.05	ug/g	ND	88.0	60-130			
Ethylbenzene	3.86	0.05	ug/g	ND	96.5	60-130			
Ethylene dibromide (dibromoethane, 1,2-	3.94	0.05	ug/g	ND	98.5	60-130			
Hexane	4.02	0.05	ug/g	ND	101	60-130			
Methyl Ethyl Ketone (2-Butanone)	9.70	0.50	ug/g	ND	97.0	50-140			
Methyl Isobutyl Ketone	8.58	0.50	ug/g	ND	85.8	50-140			
Methyl tert-butyl ether	7.65	0.05	ug/g	ND	76.5	50-140			
Methylene Chloride	4.10	0.05	ug/g	ND	103	60-130			
Styrene	3.94	0.05	ug/g	ND	98.5	60-130			
1,1,1,2-Tetrachloroethane	4.00	0.05	ug/g	ND	100	60-130			
1,1,2,2-Tetrachloroethane	4.22	0.05	ug/g	ND	105	60-130			
Tetrachloroethylene	4.07	0.05	ug/g	ND	102	60-130			
Toluene	4.00	0.05	ug/g	ND	100	60-130			
1,1,1-Trichloroethane	3.58	0.05	ug/g	ND	89.6	60-130			
1,1,2-Trichloroethane	3.45	0.05	ug/g	ND	86.2	60-130			
Trichloroethylene	3.37	0.05	ug/g	ND	84.1	60-130			
Trichlorofluoromethane	4.47	0.05	ug/g	ND	112	50-140			
Vinyl chloride	3.53	0.02	ug/g	ND	88.2	50-140			
m,p-Xylenes	8.06	0.05	ug/g	ND	101	60-130			
o-Xylene	4.11	0.05	ug/g	ND	103	60-130			
Surrogate: 4-Bromofluorobenzene	*7.53*		*ug/g*		*94.2*	*50-140*			
Surrogate: Dibromofluoromethane	*7.79*		*ug/g*		*97.4*	*50-140*			
Surrogate: Toluene-d8	*8.30*		*ug/g*		*104*	*50-140*			
Benzene	3.57	0.02	ug/g	ND	89.3	60-130			
Ethylbenzene	3.86	0.05	ug/g	ND	96.5	60-130			
Toluene	4.00	0.05	ug/g	ND	100	60-130			
m,p-Xylenes	8.06	0.05	ug/g	ND	101	60-130			
o-Xylene	4.11	0.05	ug/g	ND	103	60-130			
Surrogate: Toluene-d8	*8.30*		*ug/g*		*104*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

1 : Elevated reporting limits due to the nature of the sample matrix.

2 : Some peak(s) in the GC-FID Chromatogram are not typical of petroleum hydrocarbon distillates. May be the result of high concentrations of non-mineral based compounds not completely removed by the method cleanup. Results may be biased high.

QC Qualifiers :

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

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: 2310245

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rio K1G 4J8
1947
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abs.com

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2310245	

Client Name: Paterson
Contact Name: Karyn Munch
Address: 9 Auriga Drive
Telephone: 613 226 7381

Project Ref: PE 2709
Quote #:
PO #: 56968
E-mail: KMunch@patersongroup.ca
SBecube@patersongroup.ca

Page 1 of 4

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	pH
1	BH1-23-SS3	S		2	Feb 24, 2023		X		X	X	X	X		X	
2	BH2-23-SS2				Feb 27, 2023		X		X	X	X	X		X	X
3	BH2-23-SS4				↓		X			X	X	X		X	X
4	BH3-23-AU2						X		X	X	X	X		X	
5	BH3-23-SS4				↓		X	X	X	X	X	X		X	
6	BH4-23-SS4				Feb 28, 2023		X		X	X	X	X		X	
7	BH5-23-AU1				↓		X		X	X	X	X		X	
8	BH5-23-SS3						X		X	X	X	X		X	X
9	BH5-23-SS6				↓		X	X		X	X	X		X	
10	BH6-23-SS5				March 1, 2023		X		X	X	X	X		X	

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign): BLee
Relinquished By (Print): Bryce Lee
Date/Time:

Received By Driver/Depot: A. Blouse
Date/Time: 08/03/23 1201
Temperature: °C

Received at Lab:
Date/Time: 08/03/23 1240
Temperature: 9.2

Verified By:
Date/Time: Mar 8/23 13:39
pH Verified: ☐ By: NK

PARACEL LABORATORIES

Paracel ID: 2310245

ad Office
0-2319 St. Laurent Blvd.
tawa, Ontario K1G 4J8
1-800-749-1947
paracel@paracellabs.com
ww.paracellabs.com

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

Client Name: Paterson
Contact Name: Karyn Munch
Address: 9 Auriga Drive
Telephone: 613 226 7381

Project Ref: PE 2709
Quote #:
PO #: 56968
E-mail: KMunch@patersongroup.ca
SBerube@patersongroup.ca

Page 2 of 4

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

☑ REG 153/04 ☐ REG 406/19

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

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

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR				
1	DUP	S		2	Feb 28, 2023		X	X		X	X	X		X				
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: A. LOUISE	Received at Lab:	Verified By:
Relinquished By (Print): Bryce Lee	Date/Time: 08/03/23 1201	Date/Time: 08/03/23 1240	Date/Time: Mar 8/23 1559
Date/Time:	Temperature: °C	Temperature: 9.2	pH Verified: ☐ By:

PARACEL LABORATORIES LTD.

Paracel ID: 2310245

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

Client Name: Paterson
Contact Name: Karyn Munch
Address: 9 Auriga Drive
Telephone: 613 226 7381

Project Ref: PE 2709
Quote #:
PO #: 56968
E-mail: KMunch@patersongroup.ca
SBerube@patersongroup.ca

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	pH			
1	BH3-23-SS5	S		2	Feb 27, 2023		X			X	X	X		X				
2	BH3-23-SS6	↓		↓	↓		X	X		X	X	X		X	X			
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments: ☆ These samples are already at the lab. The order number is 2309472

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Bryce Lee	Date/Time: 08/03/23 1701	Date/Time: 08/03/23 1240	Date/Time: Aug 8/23 1355
Date/Time:	Temperature: °C	Temperature: 9.2	pH Verified: ☐ By:

PARACEL LABORATORIES LTD.

Paracel ID: 2310245

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

Client Name: Paterson
Contact Name: Karyn Munch
Address: 9 Auriga Drive
Telephone: 613 226 7381

Project Ref: PE 2709
Quote #:
PO #: 56968
E-mail: kMunch@patersongroup.ca
SBerube@patersongroup.ca

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	pH
1	BH1-23-SS2	S		1	Feb 24, 23		X							X	X
2	BH1-23-SS5	↓		2	↓		X								
3															
4															
5															
6															
7															
8															
9															
10															

Comments: ☆ These samples are already in the lab. The order number is 2309081

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: T. Louise	Received at Lab:	Verified By:
Relinquished By (Print): Bryce Lee	Date/Time: 08/03/23 1200	Date/Time: 08/03/23 1240	Date/Time: Mar 8/2023 1355
Date/Time:	Temperature: °C	Temperature: 9.2	pH Verified: ☐ By:

Paracel ID: 2310245

PARACEL LABORATORIES

d Office
-2319 St. Laurent Blvd.
wa, Ontario K1G 4J8
-800-749-1947
aracel@paracellabs.com
w.paracellabs.com

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

Client Name: Paterson

Contact Name: Samuel Berube, Kanya Munch

Address: 9 Auriga Drive

Telephone: 613-226-7381

Project Ref: PE2709

Quote #:

PO #:

E-mail: Kmunch@patersongroup.ca
Sberube@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)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR	pH			
1	BH1-23-SS2	S		1	Feb. 24/23		✓							✓	✓			
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments: Attn Stephanie
- Missing Vial From Work Order 2309081

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: M. Tetrault	Received at Lab:	Verified By:
Relinquished By (Print): Samuel Berube	Date/Time: 08/03/23 1529	Date/Time: Mar 8 2023 1607	Date/Time: Mar 8 2023 1610
Date/Time:	Temperature: °C	Temperature: 13.9	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Sam Berube

Client PO: 56893
Project: PE2709
Custody:

Report Date: 2-Mar-2023
Order Date: 27-Feb-2023

Order #: 2309081

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

Paracel ID	Client ID
2309081-01	BH1-23-SS2
2309081-02	BH1-23-SS4

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 02-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 27-Feb-2023

Client PO: 56893

Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	1-Mar-23	2-Mar-23
Mercury by CVAA	EPA 7471B - CVAA, digestion	2-Mar-23	2-Mar-23
PHC F1	CWS Tier 1 - P&T GC-FID	28-Feb-23	28-Feb-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	27-Feb-23	28-Feb-23
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	1-Mar-23	1-Mar-23
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	27-Feb-23	2-Mar-23
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	28-Feb-23	28-Feb-23
Solids, %	CWS Tier 1 - Gravimetric	28-Feb-23	28-Feb-23

Certificate of Analysis

Report Date: 02-Mar-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 27-Feb-2023

Client PO: **56893**

Project Description: PE2709

	Client ID:	BH1-23-SS2	BH1-23-SS4	-	-
	Sample Date:	24-Feb-23 09:00	24-Feb-23 09:00	-	-
	Sample ID:	2309081-01	2309081-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	90.7	92.5	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	3.5	-	-	-
Barium	1.0 ug/g dry	62.5	-	-	-
Beryllium	0.5 ug/g dry	<0.5	-	-	-
Boron	5.0 ug/g dry	<5.0	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	14.9	-	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	-	-	-
Cobalt	1.0 ug/g dry	3.9	-	-	-
Copper	5.0 ug/g dry	13.0	-	-	-
Lead	1.0 ug/g dry	61.9	-	-	-
Mercury	0.1 ug/g dry	0.2	-	-	-
Molybdenum	1.0 ug/g dry	<1.0	-	-	-
Nickel	5.0 ug/g dry	8.7	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	<1.0	-	-	-
Vanadium	10.0 ug/g dry	17.2	-	-	-
Zinc	20.0 ug/g dry	55.3	-	-	-
Volatiles					
Acetone	0.50 ug/g dry	-	<0.50	-	-
Benzene	0.02 ug/g dry	-	<0.02	-	-
Bromodichloromethane	0.05 ug/g dry	-	<0.05	-	-
Bromoform	0.05 ug/g dry	-	<0.05	-	-
Bromomethane	0.05 ug/g dry	-	<0.05	-	-
Carbon Tetrachloride	0.05 ug/g dry	-	<0.05	-	-
Chlorobenzene	0.05 ug/g dry	-	<0.05	-	-
Chloroform	0.05 ug/g dry	-	<0.05	-	-
Dibromochloromethane	0.05 ug/g dry	-	<0.05	-	-
Dichlorodifluoromethane	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-

Certificate of Analysis

Report Date: 02-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 27-Feb-2023

Client PO: 56893

Project Description: PE2709

	Client ID:	BH1-23-SS2	BH1-23-SS4	-	-
	Sample Date:	24-Feb-23 09:00	24-Feb-23 09:00	-	-
	Sample ID:	2309081-01	2309081-02	-	-
	MDL/Units	Soil	Soil	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	-
1,1-Dichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	-	-
1,2-Dichloropropane	0.05 ug/g dry	-	<0.05	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	<0.05	-	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	-	<0.05	-	-
Hexane	0.05 ug/g dry	-	<0.05	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	<0.50	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	-	<0.50	-	-
Methyl tert-butyl ether	0.05 ug/g dry	-	<0.05	-	-
Methylene Chloride	0.05 ug/g dry	-	<0.05	-	-
Styrene	0.05 ug/g dry	-	<0.05	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	-	-
Tetrachloroethylene	0.05 ug/g dry	-	<0.05	-	-
Toluene	0.05 ug/g dry	-	<0.05	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	<0.05	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	<0.05	-	-
Trichloroethylene	0.05 ug/g dry	-	<0.05	-	-
Trichlorofluoromethane	0.05 ug/g dry	-	<0.05	-	-
Vinyl chloride	0.02 ug/g dry	-	<0.02	-	-
m,p-Xylenes	0.05 ug/g dry	-	<0.05	-	-
o-Xylene	0.05 ug/g dry	-	<0.05	-	-
Xylenes, total	0.05 ug/g dry	-	<0.05	-	-
4-Bromofluorobenzene	Surrogate	-	105%	-	-
Dibromofluoromethane	Surrogate	-	94.4%	-	-
Toluene-d8	Surrogate	-	115%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	-	43	-	-

Certificate of Analysis

Report Date: 02-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 27-Feb-2023

Client PO: 56893

Project Description: PE2709

	Client ID:	BH1-23-SS2	BH1-23-SS4	-	-
	Sample Date:	24-Feb-23 09:00	24-Feb-23 09:00	-	-
	Sample ID:	2309081-01	2309081-02	-	-
	MDL/Units	Soil	Soil	-	-
F3 PHCs (C16-C34)	8 ug/g dry	-	364	-	-
F4 PHCs (C34-C50)	6 ug/g dry	-	197	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	0.03	-	-	-
Acenaphthylene	0.02 ug/g dry	0.05	-	-	-
Anthracene	0.02 ug/g dry	0.09	-	-	-
Benzo [a] anthracene	0.02 ug/g dry	0.23	-	-	-
Benzo [a] pyrene	0.02 ug/g dry	0.26	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	0.29	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.16	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	0.14	-	-	-
Chrysene	0.02 ug/g dry	0.29	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	0.04	-	-	-
Fluoranthene	0.02 ug/g dry	0.56	-	-	-
Fluorene	0.02 ug/g dry	0.02	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.14	-	-	-
1-Methylnaphthalene	0.02 ug/g dry	0.13	-	-	-
2-Methylnaphthalene	0.02 ug/g dry	0.18	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	0.31	-	-	-
Naphthalene	0.01 ug/g dry	0.14	-	-	-
Phenanthrene	0.02 ug/g dry	0.42	-	-	-
Pyrene	0.02 ug/g dry	0.50	-	-	-
2-Fluorobiphenyl	Surrogate	101%	-	-	-
Terphenyl-d14	Surrogate	115%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
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	*1.61*		*ug/g*		*121*	*50-140*			
Surrogate: Terphenyl-d14	*1.63*		*ug/g*		*122*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*8.49*		*ug/g*		*106*	*50-140*			
Surrogate: Dibromofluoromethane	*7.36*		*ug/g*		*92.0*	*50-140*			
Surrogate: Toluene-d8	*8.87*		*ug/g*		*111*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	3.3	1.0	ug/g	3.5			6.1	30	
Barium	71.5	1.0	ug/g	62.5			13.5	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	ND	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	15.5	5.0	ug/g	14.9			4.4	30	
Cobalt	3.9	1.0	ug/g	3.9			0.9	30	
Copper	12.2	5.0	ug/g	13.0			6.7	30	
Lead	72.9	1.0	ug/g	61.9			16.3	30	
Mercury	0.217	0.1	ug/g	0.228			4.7	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	8.5	5.0	ug/g	8.7			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	16.6	10.0	ug/g	17.2			3.6	30	
Zinc	54.7	20.0	ug/g	55.3			1.1	30	
Physical Characteristics									
% Solids	92.5	0.1	% by Wt.	92.3			0.2	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	*1.38*		*ug/g*		*98.3*	*50-140*			
Surrogate: Terphenyl-d14	*1.73*		*ug/g*		*124*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*10.1*		*ug/g*		*111*	*50-140*			
Surrogate: Dibromofluoromethane	*8.71*		*ug/g*		*95.3*	*50-140*			
Surrogate: Toluene-d8	*10.8*		*ug/g*		*118*	*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)	163	7	ug/g	ND	81.3	80-120			
F2 PHCs (C10-C16)	89	4	ug/g	ND	102	60-140			
F3 PHCs (C16-C34)	228	8	ug/g	ND	107	60-140			
F4 PHCs (C34-C50)	166	6	ug/g	ND	123	60-140			
Metals									
Arsenic	48.0	1.0	ug/g	1.4	93.2	70-130			
Barium	69.9	1.0	ug/g	25.0	89.9	70-130			
Beryllium	47.5	0.5	ug/g	ND	94.7	70-130			
Boron	44.1	5.0	ug/g	ND	85.0	70-130			
Cadmium	43.9	0.5	ug/g	ND	87.6	70-130			
Chromium (VI)	0.07	0.2	ug/g	ND	35.0	70-130			QM-05
Chromium	54.7	5.0	ug/g	6.0	97.5	70-130			
Cobalt	48.5	1.0	ug/g	1.6	93.8	70-130			
Copper	49.8	5.0	ug/g	5.2	89.3	70-130			
Lead	71.4	1.0	ug/g	24.8	93.3	70-130			
Mercury	1.42	0.1	ug/g	0.228	79.3	70-130			
Molybdenum	45.8	1.0	ug/g	ND	91.2	70-130			
Nickel	50.4	5.0	ug/g	ND	93.8	70-130			
Selenium	45.0	1.0	ug/g	ND	89.6	70-130			
Silver	40.8	0.3	ug/g	ND	81.4	70-130			
Thallium	43.4	1.0	ug/g	ND	86.6	70-130			
Uranium	47.6	1.0	ug/g	ND	94.9	70-130			
Vanadium	54.9	10.0	ug/g	ND	96.0	70-130			
Zinc	64.1	20.0	ug/g	22.1	83.9	70-130			
Semi-Volatiles									
Acenaphthene	0.208	0.02	ug/g	ND	119	50-140			
Acenaphthylene	0.172	0.02	ug/g	ND	98.3	50-140			
Anthracene	0.168	0.02	ug/g	ND	95.7	50-140			
Benzo [a] anthracene	0.136	0.02	ug/g	ND	77.9	50-140			
Benzo [a] pyrene	0.148	0.02	ug/g	ND	84.8	50-140			
Benzo [b] fluoranthene	0.186	0.02	ug/g	ND	106	50-140			
Benzo [g,h,i] perylene	0.155	0.02	ug/g	ND	88.8	50-140			
Benzo [k] fluoranthene	0.157	0.02	ug/g	ND	89.8	50-140			
Chrysene	0.209	0.02	ug/g	ND	120	50-140			
Dibenzo [a,h] anthracene	0.156	0.02	ug/g	ND	89.3	50-140			
Fluoranthene	0.178	0.02	ug/g	ND	102	50-140			
Fluorene	0.204	0.02	ug/g	ND	117	50-140			
Indeno [1,2,3-cd] pyrene	0.161	0.02	ug/g	ND	92.1	50-140			
1-Methylnaphthalene	0.231	0.02	ug/g	ND	132	50-140			
2-Methylnaphthalene	0.235	0.02	ug/g	ND	134	50-140			
Naphthalene	0.240	0.01	ug/g	ND	137	50-140			
Phenanthrene	0.209	0.02	ug/g	ND	119	50-140			
Pyrene	0.177	0.02	ug/g	ND	101	50-140			
Surrogate: 2-Fluorobiphenyl	*1.61*		*ug/g*		*115*	*50-140*			
Surrogate: Terphenyl-d14	*1.95*		*ug/g*		*139*	*50-140*			
Volatiles									
Acetone	12.9	0.50	ug/g	ND	129	50-140			
Benzene	4.55	0.02	ug/g	ND	114	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromodichloromethane	3.68	0.05	ug/g	ND	92.1	60-130			
Bromoform	3.39	0.05	ug/g	ND	84.7	60-130			
Bromomethane	4.35	0.05	ug/g	ND	109	50-140			
Carbon Tetrachloride	3.04	0.05	ug/g	ND	75.9	60-130			
Chlorobenzene	4.11	0.05	ug/g	ND	103	60-130			
Chloroform	4.06	0.05	ug/g	ND	101	60-130			
Dibromochloromethane	3.45	0.05	ug/g	ND	86.2	60-130			
Dichlorodifluoromethane	4.12	0.05	ug/g	ND	103	50-140			
1,2-Dichlorobenzene	3.67	0.05	ug/g	ND	91.7	60-130			
1,3-Dichlorobenzene	3.53	0.05	ug/g	ND	88.2	60-130			
1,4-Dichlorobenzene	3.40	0.05	ug/g	ND	85.0	60-130			
1,1-Dichloroethane	4.12	0.05	ug/g	ND	103	60-130			
1,2-Dichloroethane	4.56	0.05	ug/g	ND	114	60-130			
1,1-Dichloroethylene	4.09	0.05	ug/g	ND	102	60-130			
cis-1,2-Dichloroethylene	3.87	0.05	ug/g	ND	96.6	60-130			
trans-1,2-Dichloroethylene	3.73	0.05	ug/g	ND	93.2	60-130			
1,2-Dichloropropane	4.53	0.05	ug/g	ND	113	60-130			
cis-1,3-Dichloropropylene	2.91	0.05	ug/g	ND	72.7	60-130			
trans-1,3-Dichloropropylene	2.62	0.05	ug/g	ND	65.5	60-130			
Ethylbenzene	4.38	0.05	ug/g	ND	110	60-130			
Ethylene dibromide (dibromoethane, 1,2	3.45	0.05	ug/g	ND	86.2	60-130			
Hexane	3.68	0.05	ug/g	ND	92.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	12.7	0.50	ug/g	ND	127	50-140			
Methyl Isobutyl Ketone	12.1	0.50	ug/g	ND	121	50-140			
Methyl tert-butyl ether	12.2	0.05	ug/g	ND	122	50-140			
Methylene Chloride	4.11	0.05	ug/g	ND	103	60-130			
Styrene	3.42	0.05	ug/g	ND	85.6	60-130			
1,1,1,2-Tetrachloroethane	3.35	0.05	ug/g	ND	83.8	60-130			
1,1,2,2-Tetrachloroethane	3.34	0.05	ug/g	ND	83.4	60-130			
Tetrachloroethylene	3.73	0.05	ug/g	ND	93.2	60-130			
Toluene	4.42	0.05	ug/g	ND	110	60-130			
1,1,1-Trichloroethane	3.44	0.05	ug/g	ND	86.1	60-130			
1,1,2-Trichloroethane	3.93	0.05	ug/g	ND	98.3	60-130			
Trichloroethylene	3.83	0.05	ug/g	ND	95.6	60-130			
Trichlorofluoromethane	3.82	0.05	ug/g	ND	95.4	50-140			
Vinyl chloride	2.89	0.02	ug/g	ND	72.3	50-140			
m,p-Xylenes	8.25	0.05	ug/g	ND	103	60-130			
o-Xylene	4.24	0.05	ug/g	ND	106	60-130			
Surrogate: 4-Bromofluorobenzene	*8.35*		*ug/g*		*104*	*50-140*			
Surrogate: Dibromofluoromethane	*8.33*		*ug/g*		*104*	*50-140*			
Surrogate: Toluene-d8	*8.58*		*ug/g*		*107*	*50-140*			

Qualifier Notes:

QC Qualifiers :

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

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: 2309081

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2309081	

Client Name: Paterson Group Inc.	Project Ref: PE2709	Page 1 of 1
Contact Name: Samuel Beaulne, Karyn Munch	Quote #:	Turnaround Time
Address: 9 Auriga Drive, Ottawa, ON	PO #: 56893	☐ 1 day ☐ 3 day
	E-mail: Sbeaulne@patersongroup.ca Kmunch@patersongroup.ca	☐ 2 day ☑ Regular
Telephone: 613-226-7381		Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH1-23-SS2	S		1	Feb. 24/23				✓	✓	✓	✓	
2	BH1-23-SS4			2			✓	✓					
3	BH1-23-SS5 (hold)	↓		2	↓								
4													
5													
6													
7													
8													
9													
10													

Comments: * please place BH1-23-SS5 on hold

Method of Delivery: Swift

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By: Sandra Dancsok
Relinquished By (Print): Samuel Beaulne	Date/Time:	Date/Time: Feb 27/23 3:55pm	Date/Time: Feb 27, 4:08
Date/Time:	Temperature: °C	Temperature: 13.6	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Sam Berube

Client PO: 56931
Project: PE2709
Custody:

Report Date: 8-Mar-2023
Order Date: 3-Mar-2023

Order #: 2309472

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

Paracel ID	Client ID
2309472-01	BH2-23-SS5
2309472-03	BH3-23-SS5
2309472-05	BH4-23-SS3
2309472-06	BH6-23-SS2
2309472-07	DUP1-23

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 08-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 3-Mar-2023

Client PO: 56931

Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	6-Mar-23	7-Mar-23
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	7-Mar-23	7-Mar-23
Conductivity	MOE E3138 - probe @25 °C, water ext	7-Mar-23	7-Mar-23
Mercury by CVAA	EPA 7471B - CVAA, digestion	7-Mar-23	7-Mar-23
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	6-Mar-23	7-Mar-23
PHC F1	CWS Tier 1 - P&T GC-FID	6-Mar-23	7-Mar-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	6-Mar-23	7-Mar-23
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	7-Mar-23	7-Mar-23
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	3-Mar-23	6-Mar-23
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	6-Mar-23	7-Mar-23
SAR	Calculated	7-Mar-23	7-Mar-23
Solids, %	CWS Tier 1 - Gravimetric	6-Mar-23	6-Mar-23

Certificate of Analysis

Report Date: 08-Mar-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 3-Mar-2023

Client PO: **56931**

Project Description: PE2709

	Client ID:	BH2-23-SS5	BH3-23-SS5	BH4-23-SS3	BH6-23-SS2
	Sample Date:	27-Feb-23 00:00	27-Feb-23 00:00	28-Feb-23 00:00	01-Mar-23 00:00
	Sample ID:	2309472-01	2309472-03	2309472-05	2309472-06
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	92.6	92.7	92.5	96.5
General Inorganics					
SAR	0.01 N/A	-	-	4.39	4.65
Conductivity	5 uS/cm	-	-	1160	1770
pH	0.05 pH Units	-	-	7.59	7.89
Metals					
Antimony	1.0 ug/g dry	-	-	<1.0	<1.0
Arsenic	1.0 ug/g dry	-	-	3.4	2.2
Barium	1.0 ug/g dry	-	-	31.3	211
Beryllium	0.5 ug/g dry	-	-	<0.5	<0.5
Boron	5.0 ug/g dry	-	-	6.8	16.2
Cadmium	0.5 ug/g dry	-	-	<0.5	<0.5
Chromium	5.0 ug/g dry	-	-	13.0	11.0
Chromium (VI)	0.2 ug/g dry	-	-	<0.2	<0.2
Cobalt	1.0 ug/g dry	-	-	3.3	5.5
Copper	5.0 ug/g dry	-	-	6.1	7.2
Lead	1.0 ug/g dry	-	-	12.3	5.8
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	-	-	7.5	10.1
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	-	-	18.9	<10.0
Zinc	20.0 ug/g dry	-	-	32.1	<20.0
Volatiles					
Acetone	0.50 ug/g dry	<0.50	<0.50	-	-
Benzene	0.02 ug/g dry	<0.02	<0.02	-	-
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	-	-
Bromoform	0.05 ug/g dry	<0.05	<0.05	-	-
Bromomethane	0.05 ug/g dry	<0.05	<0.05	-	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	-	-
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Chloroform	0.05 ug/g dry	<0.05	<0.05	-	-

Certificate of Analysis

Report Date: 08-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 3-Mar-2023

Client PO: 56931

Project Description: PE2709

	Client ID:	BH2-23-SS5	BH3-23-SS5	BH4-23-SS3	BH6-23-SS2
	Sample Date:	27-Feb-23 00:00	27-Feb-23 00:00	28-Feb-23 00:00	01-Mar-23 00:00
	Sample ID:	2309472-01	2309472-03	2309472-05	2309472-06
	MDL/Units	Soil	Soil	Soil	Soil
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	-	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	<0.05	<0.05	-	-
Hexane	0.05 ug/g dry	<0.05	<0.05	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	-	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	-	-
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	-	-
Styrene	0.05 ug/g dry	<0.05	<0.05	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene	0.05 ug/g dry	<0.05	<0.05	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	-	-
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	-	-
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	-	-
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	-	-
4-Bromofluorobenzene	Surrogate	104%	103%	-	-
Dibromofluoromethane	Surrogate	113%	113%	-	-

Certificate of Analysis

Report Date: 08-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 3-Mar-2023

Client PO: 56931

Project Description: PE2709

	Client ID:	BH2-23-SS5	BH3-23-SS5	BH4-23-SS3	BH6-23-SS2
	Sample Date:	27-Feb-23 00:00	27-Feb-23 00:00	28-Feb-23 00:00	01-Mar-23 00:00
	Sample ID:	2309472-01	2309472-03	2309472-05	2309472-06
	MDL/Units	Soil	Soil	Soil	Soil
Toluene-d8	Surrogate	119%	119%	-	-
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	-	-	120%	115%
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	<8	-	<8	50
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	<6	42
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	-	-	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	-	-	<0.02	<0.02
Anthracene	0.02 ug/g dry	-	-	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	-	-	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	-	-	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	-	-	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	-	-	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	-	-	<0.02	<0.02
Chrysene	0.02 ug/g dry	-	-	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	-	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	-	-	<0.02	<0.02
Fluorene	0.02 ug/g dry	-	-	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	-	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	-	-	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	-	-	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	-	-	<0.04	<0.04
Naphthalene	0.01 ug/g dry	-	-	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	-	-	<0.02	<0.02
Pyrene	0.02 ug/g dry	-	-	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	-	-	81.7%	105%
Terphenyl-d14	Surrogate	-	-	119%	132%

Certificate of Analysis

Report Date: 08-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 3-Mar-2023

Client PO: 56931

Project Description: PE2709

	Client ID:	DUP1-23	-	-	-
	Sample Date:	27-Feb-23 00:00	-	-	-
	Sample ID:	2309472-07	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	93.4	-	-	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	-	-	-
Benzene	0.02 ug/g dry	<0.02	-	-	-
Bromodichloromethane	0.05 ug/g dry	<0.05	-	-	-
Bromoform	0.05 ug/g dry	<0.05	-	-	-
Bromomethane	0.05 ug/g dry	<0.05	-	-	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	-	-	-
Chlorobenzene	0.05 ug/g dry	<0.05	-	-	-
Chloroform	0.05 ug/g dry	<0.05	-	-	-
Dibromochloromethane	0.05 ug/g dry	<0.05	-	-	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	-	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Ethylene dibromide (dibromoethane, 1	0.05 ug/g dry	<0.05	-	-	-
Hexane	0.05 ug/g dry	<0.05	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	-	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	-	-	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	-	-	-
Methylene Chloride	0.05 ug/g dry	<0.05	-	-	-
Styrene	0.05 ug/g dry	<0.05	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-

Certificate of Analysis

Report Date: 08-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 3-Mar-2023

Client PO: 56931

Project Description: PE2709

	Client ID:	DUP1-23	-	-	-
	Sample Date:	27-Feb-23 00:00	-	-	-
	Sample ID:	2309472-07	-	-	-
	MDL/Units	Soil	-	-	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
Trichloroethylene	0.05 ug/g dry	<0.05	-	-	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	-	-	-
Vinyl chloride	0.02 ug/g dry	<0.02	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
4-Bromofluorobenzene	Surrogate	99.6%	-	-	-
Dibromofluoromethane	Surrogate	111%	-	-	-
Toluene-d8	Surrogate	114%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
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	*1.20*		*ug/g*		*90.0*	*50-140*			
Surrogate: Terphenyl-d14	*1.54*		*ug/g*		*115*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*8.90*		*ug/g*		*111*	*50-140*			
Surrogate: Dibromofluoromethane	*8.64*		*ug/g*		*108*	*50-140*			
Surrogate: Toluene-d8	*9.44*		*ug/g*		*118*	*50-140*			
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*9.44*		*ug/g*		*118*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.79	0.01	N/A	0.78			1.3	30	
Conductivity	479	5	uS/cm	476			0.6	5	
pH	7.26	0.05	pH Units	7.30			0.5	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	321	4	ug/g	317			1.2	30	
F3 PHCs (C16-C34)	7740	8	ug/g	7540			2.5	30	
F4 PHCs (C34-C50)	1310	6	ug/g	1280			2.3	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	3.6	1.0	ug/g	3.4			6.2	30	
Barium	28.5	1.0	ug/g	31.3			9.6	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	5.9	5.0	ug/g	6.8			15.5	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	11.8	5.0	ug/g	13.0			9.8	30	
Cobalt	3.3	1.0	ug/g	3.3			1.6	30	
Copper	6.0	5.0	ug/g	6.1			1.8	30	
Lead	12.2	1.0	ug/g	12.3			1.1	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	7.2	5.0	ug/g	7.5			3.2	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	16.7	10.0	ug/g	18.9			12.4	30	
Zinc	30.8	20.0	ug/g	32.1			4.1	30	
Physical Characteristics									
% Solids	92.0	0.1	% by Wt.	92.5			0.5	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	*0.885*		*ug/g*		*51.7*	*50-140*			
Surrogate: Terphenyl-d14	*1.16*		*ug/g*		*68.0*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*9.94*		*ug/g*		*106*	*50-140*			
Surrogate: Dibromofluoromethane	*10.9*		*ug/g*		*115*	*50-140*			
Surrogate: Toluene-d8	*11.3*		*ug/g*		*120*	*50-140*			
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	*11.3*		*ug/g*		*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)	160	7	ug/g	ND	80.1	80-120			
F2 PHCs (C10-C16)	433	4	ug/g	317	123	60-140			
F3 PHCs (C16-C34)	233	8	ug/g	ND	119	80-120			
F4 PHCs (C34-C50)	121	6	ug/g	ND	97.6	80-120			
Metals									
Antimony	35.2	1.0	ug/g	ND	70.1	70-130			
Arsenic	47.7	1.0	ug/g	1.3	92.7	70-130			
Barium	55.0	1.0	ug/g	12.5	85.0	70-130			
Beryllium	45.7	0.5	ug/g	ND	91.0	70-130			
Boron	44.3	5.0	ug/g	ND	83.1	70-130			
Cadmium	45.2	0.5	ug/g	ND	90.3	70-130			
Chromium (VI)	4.4	0.2	ug/g	ND	81.5	70-130			
Chromium	54.1	5.0	ug/g	5.2	97.7	70-130			
Cobalt	48.0	1.0	ug/g	1.3	93.3	70-130			
Copper	46.3	5.0	ug/g	ND	87.7	70-130			
Lead	47.5	1.0	ug/g	4.9	85.1	70-130			
Mercury	1.15	0.1	ug/g	ND	76.4	70-130			
Molybdenum	49.3	1.0	ug/g	ND	98.2	70-130			
Nickel	49.0	5.0	ug/g	ND	92.1	70-130			
Selenium	42.3	1.0	ug/g	ND	84.3	70-130			
Silver	42.2	0.3	ug/g	ND	84.3	70-130			
Thallium	43.4	1.0	ug/g	ND	86.7	70-130			
Uranium	44.1	1.0	ug/g	ND	87.8	70-130			
Vanadium	55.5	10.0	ug/g	ND	95.8	70-130			
Zinc	53.3	20.0	ug/g	ND	81.0	70-130			
Semi-Volatiles									
Acenaphthene	0.142	0.02	ug/g	ND	85.4	50-140			
Acenaphthylene	0.119	0.02	ug/g	ND	71.5	50-140			
Anthracene	0.120	0.02	ug/g	ND	72.3	50-140			
Benzo [a] anthracene	0.100	0.02	ug/g	ND	60.2	50-140			
Benzo [a] pyrene	0.118	0.02	ug/g	ND	70.9	50-140			
Benzo [b] fluoranthene	0.144	0.02	ug/g	ND	86.6	50-140			
Benzo [g,h,i] perylene	0.124	0.02	ug/g	ND	74.5	50-140			
Benzo [k] fluoranthene	0.137	0.02	ug/g	ND	82.2	50-140			
Chrysene	0.130	0.02	ug/g	ND	78.0	50-140			
Dibenzo [a,h] anthracene	0.121	0.02	ug/g	ND	72.5	50-140			
Fluoranthene	0.113	0.02	ug/g	ND	67.9	50-140			
Fluorene	0.126	0.02	ug/g	ND	75.5	50-140			
Indeno [1,2,3-cd] pyrene	0.121	0.02	ug/g	ND	72.6	50-140			
1-Methylnaphthalene	0.133	0.02	ug/g	ND	79.8	50-140			
2-Methylnaphthalene	0.146	0.02	ug/g	ND	87.4	50-140			
Naphthalene	0.158	0.01	ug/g	ND	94.9	50-140			
Phenanthrene	0.124	0.02	ug/g	ND	74.4	50-140			
Pyrene	0.113	0.02	ug/g	ND	68.1	50-140			
Surrogate: 2-Fluorobiphenyl	*1.14*		*ug/g*		*85.8*	*50-140*			
Surrogate: Terphenyl-d14	*1.58*		*ug/g*		*118*	*50-140*			
Volatiles									
Acetone	13.0	0.50	ug/g	ND	130	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	4.86	0.02	ug/g	ND	121	60-130			
Bromodichloromethane	4.94	0.05	ug/g	ND	124	60-130			
Bromoform	4.92	0.05	ug/g	ND	123	60-130			
Bromomethane	4.10	0.05	ug/g	ND	102	50-140			
Carbon Tetrachloride	4.62	0.05	ug/g	ND	115	60-130			
Chlorobenzene	4.61	0.05	ug/g	ND	115	60-130			
Chloroform	4.83	0.05	ug/g	ND	121	60-130			
Dibromochloromethane	4.93	0.05	ug/g	ND	123	60-130			
Dichlorodifluoromethane	3.55	0.05	ug/g	ND	88.7	50-140			
1,2-Dichlorobenzene	4.36	0.05	ug/g	ND	109	60-130			
1,3-Dichlorobenzene	4.31	0.05	ug/g	ND	108	60-130			
1,4-Dichlorobenzene	4.14	0.05	ug/g	ND	103	60-130			
1,1-Dichloroethane	4.90	0.05	ug/g	ND	122	60-130			
1,2-Dichloroethane	4.82	0.05	ug/g	ND	121	60-130			
1,1-Dichloroethylene	4.86	0.05	ug/g	ND	122	60-130			
cis-1,2-Dichloroethylene	4.79	0.05	ug/g	ND	120	60-130			
trans-1,2-Dichloroethylene	4.79	0.05	ug/g	ND	120	60-130			
1,2-Dichloropropane	4.75	0.05	ug/g	ND	119	60-130			
cis-1,3-Dichloropropylene	4.76	0.05	ug/g	ND	119	60-130			
trans-1,3-Dichloropropylene	4.25	0.05	ug/g	ND	106	60-130			
Ethylbenzene	4.64	0.05	ug/g	ND	116	60-130			
Ethylene dibromide (dibromoethane, 1,2-	4.88	0.05	ug/g	ND	122	60-130			
Hexane	4.47	0.05	ug/g	ND	112	60-130			
Methyl Ethyl Ketone (2-Butanone)	13.0	0.50	ug/g	ND	130	50-140			
Methyl Isobutyl Ketone	12.7	0.50	ug/g	ND	127	50-140			
Methyl tert-butyl ether	9.87	0.05	ug/g	ND	98.7	50-140			
Methylene Chloride	4.68	0.05	ug/g	ND	117	60-130			
Styrene	4.90	0.05	ug/g	ND	122	60-130			
1,1,1,2-Tetrachloroethane	4.57	0.05	ug/g	ND	114	60-130			
1,1,2,2-Tetrachloroethane	4.65	0.05	ug/g	ND	116	60-130			
Tetrachloroethylene	4.74	0.05	ug/g	ND	118	60-130			
Toluene	4.60	0.05	ug/g	ND	115	60-130			
1,1,1-Trichloroethane	4.71	0.05	ug/g	ND	118	60-130			
1,1,2-Trichloroethane	4.31	0.05	ug/g	ND	108	60-130			
Trichloroethylene	4.57	0.05	ug/g	ND	114	60-130			
Trichlorofluoromethane	4.18	0.05	ug/g	ND	105	50-140			
Vinyl chloride	3.87	0.02	ug/g	ND	96.8	50-140			
m,p-Xylenes	9.41	0.05	ug/g	ND	118	60-130			
o-Xylene	4.88	0.05	ug/g	ND	122	60-130			
Surrogate: 4-Bromofluorobenzene	*7.86*		*ug/g*		*98.2*	*50-140*			
Surrogate: Dibromofluoromethane	*8.34*		*ug/g*		*104*	*50-140*			
Surrogate: Toluene-d8	*7.72*		*ug/g*		*96.5*	*50-140*			
Benzene	4.86	0.02	ug/g	ND	121	60-130			
Ethylbenzene	4.64	0.05	ug/g	ND	116	60-130			
Toluene	4.60	0.05	ug/g	ND	115	60-130			
m,p-Xylenes	9.41	0.05	ug/g	ND	118	60-130			
o-Xylene	4.88	0.05	ug/g	ND	122	60-130			
Surrogate: Toluene-d8	*7.72*		*ug/g*		*96.5*	*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: 2309472

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

Client Name: Paterson Samuel Berube / Karyn Munch
Contact Name: Samuel Berube + Karyn Munch
Address: 9 Auriga Drive
Telephone: 613-226-7381

Project Ref: PE2709
Quote #:
PO #: 56931
E-mail: sberube@patersongroup.ca kmunch@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 ☐ Other: Mun:

☐ 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)	pH	EC/SAR			
1	BH2-23-SS5	S		2	Feb. 27/23		✓	✓										
2	BH2-23-SS6 (HOLD)			2														
3	BH3-23-SS5			2				✓										
4	BH3-23-SS6 (HOLD)			2														
5	BH4-23-SS3			2	Feb. 28/23		✓		✓	✓	✓	✓		✓	✓			
6	BH6-23-SS2			2	Mar1.23		✓	✓	✓	✓	✓	✓		✓	✓			
7	DUP1-23			2	Feb. 27/23		✓	✓										
8																		
9																		
10																		

Required Analysis

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: M. TOUSE	Received at Lab: Sandra Demczuk	Verified By:
Relinquished By (Print): Samuel Berube	Date/Time: 03/03/23 1533	Date/Time: Mar3, 4:30	Date/Time: March 3/23 16:36
Date/Time:	Temperature: °C	Temperature: 13.2	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Sam Berube

Report Date: 18-Aug-2023
Order Date: 15-Aug-2023

Client PO: 58143
Project: PE2709
Custody:

Order #: 2333190

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

Paracel ID	Client ID
2333190-01	BH7-23-SS3
2333190-02	BH8-23-SS6

Approved By:

Dale Robertson, BSc
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	16-Aug-23	17-Aug-23
PHC F1	CWS Tier 1 - P&T GC-FID	16-Aug-23	17-Aug-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	15-Aug-23	18-Aug-23
Solids, %	CWS Tier 1 - Gravimetric	17-Aug-23	17-Aug-23

Certificate of Analysis

Report Date: 18-Aug-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 15-Aug-2023

Client PO: 58143

Project Description: PE2709

	Client ID:	BH7-23-SS3	BH8-23-SS6	-	-	-	-
	Sample Date:	14-Aug-23 09:00	14-Aug-23 09:00	-	-		
	Sample ID:	2333190-01	2333190-02	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	91.8	93.6	-	-	-	-
Volatiles							
Benzene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Ethylbenzene	0.05 ug/g	<0.05	0.28	-	-	-	-
Toluene	0.05 ug/g	<0.05	0.48	-	-	-	-
m,p-Xylenes	0.05 ug/g	<0.05	0.36	-	-	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	<0.05	0.36	-	-	-	-
Toluene-d8	Surrogate	128%	126%	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	355	-	-	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	377	-	-	-	-
F3 PHCs (C16-C34)	8 ug/g	<8	74	-	-	-	-
F4 PHCs (C34-C50)	6 ug/g	<6	10	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
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	*9.61*		*%*	*120*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	55	4	ug/g	48			13.5	30	
F3 PHCs (C16-C34)	76	8	ug/g	54			NC	30	
F4 PHCs (C34-C50)	12	6	ug/g	6			NC	30	
Physical Characteristics									
% Solids	92.2	0.1	% by Wt.	91.8			0.4	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	*11.8*		*%*		*129*	*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)	176	7	ug/g	ND	87.8	85-115			
F2 PHCs (C10-C16)	163	4	ug/g	48	133	60-140			
F3 PHCs (C16-C34)	310	8	ug/g	54	121	60-140			
F4 PHCs (C34-C50)	173	6	ug/g	6	124	60-140			
Volatiles									
Benzene	3.34	0.02	ug/g	ND	83.4	60-130			
Ethylbenzene	4.70	0.05	ug/g	ND	118	60-130			
Toluene	4.90	0.05	ug/g	ND	123	60-130			
m,p-Xylenes	7.42	0.05	ug/g	ND	92.7	60-130			
o-Xylene	4.50	0.05	ug/g	ND	113	60-130			
Surrogate: Toluene-d8	*7.82*		*%*		*97.8*	*50-140*			

Qualifier Notes:

QC Qualifiers:

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 unlesss otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.

- F1 range corrected for BTEX.

- F2 to F3 ranges corrected for appropriate PAHs where available.

- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.

- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC crite

- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES LTD.

Paracel ID: 2333190

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
23 33 190	

Client Name: Paterson Group	Project Ref: PE2709
Contact Name: Sam Berube	Quote #:
Address: 9 Auriga Dr Ottawa	PO #: 58143
Telephone: 613-226-7381	E-mail: 5berube@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

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

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
1	BH7-23-553	S		2	Aug 14/23		X											
2	BH8-23-556	S		2	Aug 14/23		X											
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): Trudy Blair	Received By Driver/Depot:	Received at Lab: HP	Verified By:
Relinquished By (Print): Trudy Blair	Date/Time:	Date/Time: Aug 15/23, 16:20	Date/Time: Aug 15/23 1632
Date/Time: Aug 15 2023	Temperature: °C	Temperature: 9.9° C	pH Verified: ☐ By:

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Certificate of Analysis

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

Report Date: 31-May-2024
Order Date: 14-May-2024

Client PO: 60196
Project: PE6422
Custody:

Revised Report

Order #: 2420225

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

Paracel ID	Client ID	Paracel ID	Client ID
2420225-01	BH1-24-AU1		
2420225-02	BH1-24-SS3		
2420225-03	BH1-24-SS5		
2420225-04	BH2-24-AU1		
2420225-05	BH2-24-SS3		
2420225-06	BH3-24-AU1		
2420225-07	BH3-24-SS5		
2420225-08	BH4-24-AU1		
2420225-09	BH4-24-SS2		
2420225-10	BH4-24-SS3		
2420225-11	BH4-24-SS6		
2420225-12	BH5-24-AU1		
2420225-13	BH5-24-SS2(BOTTOM)		
2420225-14	DUP1		
2420225-15	DUP2		

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 14-May-2024

Client PO: 60196

Project Description: PE6422

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	16-May-24	16-May-24
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	21-May-24	21-May-24
Conductivity	MOE E3138 - probe @25 °C, water ext	16-May-24	16-May-24
Mercury by CVAA	EPA 7471B - CVAA, digestion	16-May-24	16-May-24
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	17-May-24	17-May-24
PHC F1	CWS Tier 1 - P&T GC-FID	16-May-24	16-May-24
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	22-May-24	23-May-24
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	16-May-24	21-May-24
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	16-May-24	16-May-24
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	15-May-24	17-May-24
SAR	Calculated	16-May-24	16-May-24
Solids, %	CWS Tier 1 - Gravimetric	17-May-24	21-May-24

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 14-May-2024

Client PO: **60196**

Project Description: PE6422

	Client ID:	BH1-24-AU1	BH1-24-SS3	BH1-24-SS5	BH2-24-AU1	-	-
	Sample Date:	08-May-24 09:00	08-May-24 09:00	08-May-24 09:00	08-May-24 09:00		
	Sample ID:	2420225-01	2420225-02	2420225-03	2420225-04		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	91.5	91.5	90.4	96.4	-	-
General Inorganics							
SAR	0.01 N/A	2.19	1.60	1.87	4.11	-	-
Conductivity	5 uS/cm	2330	583	402	544	-	-
pH	0.05 pH Units	-	-	8.79	7.28	-	-
Metals							
Antimony	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Arsenic	1.0 ug/g	2.6	2.0	2.1	2.7	-	-
Barium	1.0 ug/g	99.5	29.9	35.8	87.8	-	-
Beryllium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	-	-
Boron	5.0 ug/g	11.0	6.2	<5.0	11.1	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	-	-
Chromium	5.0 ug/g	20.5	10.5	11.8	14.8	-	-
Chromium (VI)	0.2 ug/g	0.8	0.3	<0.2	<0.2	-	-
Cobalt	1.0 ug/g	5.7	4.9	4.6	5.4	-	-
Copper	5.0 ug/g	16.1	9.9	6.8	12.8	-	-
Lead	1.0 ug/g	32.9	10.5	4.0	32.1	-	-
Mercury	0.1 ug/g	<0.1	<0.1	<0.1	<0.1	-	-
Molybdenum	1.0 ug/g	1.5	<1.0	<1.0	<1.0	-	-
Nickel	5.0 ug/g	13.2	10.8	8.3	11.5	-	-
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	-	-
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Uranium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Vanadium	10.0 ug/g	27.5	14.9	18.7	25.1	-	-

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 14-May-2024

Client PO: **60196**

Project Description: **PE6422**

	Client ID:	BH1-24-AU1	BH1-24-SS3	BH1-24-SS5	BH2-24-AU1	-	-
	Sample Date:	08-May-24 09:00	08-May-24 09:00	08-May-24 09:00	08-May-24 09:00		
	Sample ID:	2420225-01	2420225-02	2420225-03	2420225-04		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Metals							
Zinc	20.0 ug/g	35.1	<20.0	<20.0	34.7	-	-
Volatiles							
Benzene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene-d8	Surrogate	82.2%	111%	115%	97.6%	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	<4	<40	-	-
F3 PHCs (C16-C34)	8 ug/g	105	44	<8	164	-	-
F4 PHCs (C34-C50)	6 ug/g	263 [3]	74	<6	1040 [3]	-	-
F4G PHCs (gravimetric)	50 ug/g	382	-	-	1680	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	0.08	0.02	<0.40 [1]	-	-
Acenaphthylene	0.02 ug/g	<0.02	<0.02	<0.02	<0.40 [1]	-	-
Anthracene	0.02 ug/g	0.03	0.20	0.06	0.54	-	-
Benzo [a] anthracene	0.02 ug/g	0.05	0.22	0.05	1.59	-	-
Benzo [a] pyrene	0.02 ug/g	0.04	0.15	0.04	1.41	-	-
Benzo [b] fluoranthene	0.02 ug/g	0.05	0.16	0.04	1.51	-	-
Benzo [g,h,i] perylene	0.02 ug/g	0.03	0.08	0.02	0.87	-	-
Benzo [k] fluoranthene	0.02 ug/g	0.03	0.12	0.03	0.79	-	-
Chrysene	0.02 ug/g	0.04	0.20	0.05	1.92	-	-

	Client ID:	BH1-24-AU1	BH1-24-SS3	BH1-24-SS5	BH2-24-AU1	-	-
	Sample Date:	08-May-24 09:00	08-May-24 09:00	08-May-24 09:00	08-May-24 09:00		
	Sample ID:	2420225-01	2420225-02	2420225-03	2420225-04		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Semi-Volatiles							
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	0.02	<0.02	<0.40 [1]	-	-
Fluoranthene	0.02 ug/g	0.11	0.77	0.20	4.61	-	-
Fluorene	0.02 ug/g	<0.02	0.09	0.03	<0.40	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	0.02	0.08	<0.02	0.73	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.40 [1]	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.40 [1]	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.04	<0.04	<0.80 [1]	-	-
Naphthalene	0.01 ug/g	0.02	0.06	0.04	<0.20 [1]	-	-
Phenanthrene	0.02 ug/g	0.06	0.67	0.19	2.40	-	-
Pyrene	0.02 ug/g	0.09	0.54	0.14	4.59	-	-
2-Fluorobiphenyl	Surrogate	70.3%	66.6%	62.2%	68.0%	-	-
Terphenyl-d14	Surrogate	79.6%	83.4%	79.8%	87.4%	-	-

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 14-May-2024

Client PO: **60196**

Project Description: **PE6422**

	Client ID:	BH2-24-SS3	BH3-24-AU1	BH3-24-SS5	BH4-24-AU1	-	-
	Sample Date:	08-May-24 09:00	09-May-24 09:00	09-May-24 09:00	09-May-24 09:00		
	Sample ID:	2420225-05	2420225-06	2420225-07	2420225-08		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	91.8	91.6	92.1	93.6	-	-
General Inorganics							
SAR	0.01 N/A	6.83	2.29	2.08	0.28	-	-
Conductivity	5 uS/cm	944	406	459	156	-	-
pH	0.05 pH Units	-	-	7.79	-	-	-
Metals							
Antimony	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Arsenic	1.0 ug/g	2.3	2.8	2.9	4.0	-	-
Barium	1.0 ug/g	41.1	59.5	21.3	98.2	-	-
Beryllium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	-	-
Boron	5.0 ug/g	<5.0	6.5	7.4	7.3	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	-	-
Chromium (VI)	0.2 ug/g	<0.2	0.2	-	<0.2	-	-
Chromium	5.0 ug/g	11.7	13.0	11.7	10.4	-	-
Cobalt	1.0 ug/g	4.6	4.7	3.6	5.1	-	-
Copper	5.0 ug/g	8.3	12.4	5.5	11.8	-	-
Lead	1.0 ug/g	3.7	43.4	5.2	50.7	-	-
Mercury	0.1 ug/g	<0.1	0.1	-	<0.1	-	-
Molybdenum	1.0 ug/g	<1.0	<1.0	<1.0	1.0	-	-
Nickel	5.0 ug/g	8.4	9.5	8.3	11.3	-	-
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	-	-
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Uranium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Vanadium	10.0 ug/g	20.6	19.8	16.7	27.6	-	-

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 14-May-2024

Client PO: **60196**

Project Description: **PE6422**

	Client ID:	BH2-24-SS3	BH3-24-AU1	BH3-24-SS5	BH4-24-AU1	-	-
	Sample Date:	08-May-24 09:00	09-May-24 09:00	09-May-24 09:00	09-May-24 09:00		
	Sample ID:	2420225-05	2420225-06	2420225-07	2420225-08		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Metals							
Zinc	20.0 ug/g	<20.0	45.1	<20.0	26.6	-	-
Volatiles							
Benzene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	0.07	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	0.07	<0.05	<0.05	-	-
Toluene-d8	Surrogate	103%	102%	114%	111%	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	39	<4	<4	<80 [2]	-	-
F3 PHCs (C16-C34)	8 ug/g	58	169	<8	420	-	-
F4 PHCs (C34-C50)	6 ug/g	80	135 [3]	<6	1800 [3]	-	-
F4G PHCs (gravimetric)	50 ug/g	-	131	-	2540	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	<0.40 [1]	<0.02	<0.02	-	-
Acenaphthylene	0.02 ug/g	<0.02	<0.40 [1]	<0.02	0.20	-	-
Anthracene	0.02 ug/g	<0.02	1.20	<0.02	0.15	-	-
Benzo [a] anthracene	0.02 ug/g	<0.02	1.76	<0.02	0.27	-	-
Benzo [a] pyrene	0.02 ug/g	<0.02	1.31	<0.02	0.20	-	-
Benzo [b] fluoranthene	0.02 ug/g	<0.02	1.27	<0.02	0.19	-	-
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	0.65	<0.02	0.14	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	0.78	<0.02	0.12	-	-
Chrysene	0.02 ug/g	<0.02	1.78	<0.02	0.24	-	-

	Client ID:	BH2-24-SS3	BH3-24-AU1	BH3-24-SS5	BH4-24-AU1	-	-
	Sample Date:	08-May-24 09:00	09-May-24 09:00	09-May-24 09:00	09-May-24 09:00		
	Sample ID:	2420225-05	2420225-06	2420225-07	2420225-08		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Semi-Volatiles							
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	<0.40 [1]	<0.02	0.03	-	-
Fluoranthene	0.02 ug/g	0.02	5.49	<0.02	0.51	-	-
Fluorene	0.02 ug/g	<0.02	0.43 [1]	<0.02	<0.02	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	0.61	<0.02	0.07	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.40 [1]	<0.02	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.40 [1]	<0.02	0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.80 [1]	<0.04	<0.04	-	-
Naphthalene	0.01 ug/g	<0.01	0.38	<0.01	0.01	-	-
Phenanthrene	0.02 ug/g	<0.02	4.17	<0.02	0.19	-	-
Pyrene	0.02 ug/g	0.02	4.56	<0.02	0.45	-	-
2-Fluorobiphenyl	Surrogate	70.5%	63.0%	66.1%	61.6%	-	-
Terphenyl-d14	Surrogate	87.8%	94.9%	82.5%	68.9%	-	-

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 14-May-2024

Client PO: **60196**

Project Description: **PE6422**

	Client ID:	BH4-24-SS2	BH4-24-SS3	BH4-24-SS6	BH5-24-AU1	-	-
	Sample Date:	09-May-24 09:00	09-May-24 09:00	09-May-24 09:00	09-May-24 09:00		
	Sample ID:	2420225-09	2420225-10	2420225-11	2420225-12		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	80.8	93.6	94.5	93.4	-	-
General Inorganics							
SAR	0.01 N/A	2.30	-	2.21	2.00	-	-
Conductivity	5 uS/cm	272	-	357	363	-	-
pH	0.05 pH Units	-	-	-	7.40	-	-
Metals							
Antimony	1.0 ug/g	<1.0	<1.0	<1.0	1.7	-	-
Arsenic	1.0 ug/g	5.2	4.8	3.0	4.2	-	-
Barium	1.0 ug/g	177	36.2	36.7	137	-	-
Beryllium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	-	-
Boron	5.0 ug/g	5.3	6.7	7.4	5.2	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	0.5	-	-
Chromium (VI)	0.2 ug/g	<0.2	-	-	0.4	-	-
Chromium	5.0 ug/g	18.5	13.9	9.5	14.2	-	-
Cobalt	1.0 ug/g	4.6	6.4	2.9	4.8	-	-
Copper	5.0 ug/g	22.7	10.2	<5.0	53.8	-	-
Lead	1.0 ug/g	349	8.5	5.6	224	-	-
Mercury	0.1 ug/g	0.9	<0.1	-	0.2	-	-
Molybdenum	1.0 ug/g	<1.0	1.1	<1.0	1.1	-	-
Nickel	5.0 ug/g	10.2	10.4	6.5	14.9	-	-
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	-	-
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Uranium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Vanadium	10.0 ug/g	21.1	21.1	13.6	28.8	-	-

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 14-May-2024

Client PO: **60196**

Project Description: **PE6422**

	Client ID:	BH4-24-SS2	BH4-24-SS3	BH4-24-SS6	BH5-24-AU1	-	-
	Sample Date:	09-May-24 09:00	09-May-24 09:00	09-May-24 09:00	09-May-24 09:00		
	Sample ID:	2420225-09	2420225-10	2420225-11	2420225-12		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Metals							
Zinc	20.0 ug/g	94.5	75.7	<20.0	228	-	-
Volatiles							
Benzene	0.02 ug/g	<0.02	-	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g	<0.05	-	<0.05	<0.05	-	-
Toluene	0.05 ug/g	<0.05	-	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g	<0.05	-	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	-	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	-	<0.05	<0.05	-	-
Toluene-d8	Surrogate	85.9%	-	126%	98.4%	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	-	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	6	-	9	<40 [2]	-	-
F3 PHCs (C16-C34)	8 ug/g	54	-	14	269	-	-
F4 PHCs (C34-C50)	6 ug/g	67 [3]	-	25	777 [3]	-	-
F4G PHCs (gravimetric)	50 ug/g	87	-	-	707	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	0.03	<0.02	-	0.10	-	-
Acenaphthylene	0.02 ug/g	0.06	<0.02	-	0.14	-	-
Anthracene	0.02 ug/g	0.13	<0.02	-	0.26	-	-
Benzo [a] anthracene	0.02 ug/g	0.31	<0.02	-	0.83	-	-
Benzo [a] pyrene	0.02 ug/g	0.26	<0.02	-	0.60	-	-
Benzo [b] fluoranthene	0.02 ug/g	0.23	<0.02	-	0.74	-	-
Benzo [g,h,i] perylene	0.02 ug/g	0.14	<0.02	-	0.26	-	-
Benzo [k] fluoranthene	0.02 ug/g	0.16	<0.02	-	0.42	-	-
Chrysene	0.02 ug/g	0.25	<0.02	-	0.76	-	-

	Client ID:	BH4-24-SS2	BH4-24-SS3	BH4-24-SS6	BH5-24-AU1	-	-
	Sample Date:	09-May-24 09:00	09-May-24 09:00	09-May-24 09:00	09-May-24 09:00		
	Sample ID:	2420225-09	2420225-10	2420225-11	2420225-12		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Semi-Volatiles							
Dibenzo [a,h] anthracene	0.02 ug/g	0.02	<0.02	-	0.08	-	-
Fluoranthene	0.02 ug/g	0.77	<0.02	-	2.00	-	-
Fluorene	0.02 ug/g	0.02	<0.02	-	0.09	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	0.13	<0.02	-	0.25	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	0.02	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.04	-	0.04	-	-
Naphthalene	0.01 ug/g	0.04	<0.01	-	0.03	-	-
Phenanthrene	0.02 ug/g	0.37	<0.02	-	1.02	-	-
Pyrene	0.02 ug/g	0.73	<0.02	-	1.67	-	-
2-Fluorobiphenyl	Surrogate	54.7%	64.5%	-	64.4%	-	-
Terphenyl-d14	Surrogate	73.9%	88.6%	-	73.5%	-	-

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 14-May-2024

Client PO: 60196

Project Description: PE6422

	Client ID:	BH5-24-SS2(BOTTOM)	DUP1	DUP2		-	-
	Sample Date:	09-May-24 09:00	08-May-24 09:00	09-May-24 09:00			
	Sample ID:	2420225-13	2420225-14	2420225-15			
	Matrix:	Soil	Soil	Soil			
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	92.9	92.0	93.7	-	-	-
General Inorganics							
SAR	0.01 N/A	1.54	2.18	1.75	-	-	-
Conductivity	5 uS/cm	353	433	347	-	-	-
pH	0.05 pH Units	-	9.60	-	-	-	-
Metals							
Antimony	1.0 ug/g	<1.0	<1.0	<1.0	-	-	-
Arsenic	1.0 ug/g	2.1	2.2	2.7	-	-	-
Barium	1.0 ug/g	30.2	35.9	43.0	-	-	-
Beryllium	0.5 ug/g	<0.5	<0.5	<0.5	-	-	-
Boron	5.0 ug/g	<5.0	5.2	7.7	-	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	-	-	-
Chromium (VI)	0.2 ug/g	-	<0.2	-	-	-	-
Chromium	5.0 ug/g	10.1	12.2	10.5	-	-	-
Cobalt	1.0 ug/g	3.6	4.8	3.3	-	-	-
Copper	5.0 ug/g	6.6	7.8	<5.0	-	-	-
Lead	1.0 ug/g	3.7	4.2	5.6	-	-	-
Mercury	0.1 ug/g	-	<0.1	-	-	-	-
Molybdenum	1.0 ug/g	<1.0	<1.0	<1.0	-	-	-
Nickel	5.0 ug/g	6.9	8.7	7.1	-	-	-
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	-	-	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	-	-	-
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	-	-	-
Uranium	1.0 ug/g	<1.0	<1.0	<1.0	-	-	-

	Client ID:	BH5-24-SS2(BOTTOM)	DUP1	DUP2		-	-
	Sample Date:	09-May-24 09:00	08-May-24 09:00	09-May-24 09:00			
	Sample ID:	2420225-13	2420225-14	2420225-15			
	Matrix:	Soil	Soil	Soil			
	MDL/Units						
Metals							
Vanadium	10.0 ug/g	16.2	19.1	14.9	-	-	-
Zinc	20.0 ug/g	<20.0	<20.0	<20.0	-	-	-
Volatiles							
Benzene	0.02 ug/g	<0.02	<0.02	<0.02	-	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	-	-	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	-	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	-	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	-	-	-
Toluene-d8	Surrogate	126%	107%	106%	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	-	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	<4	-	-	-
F3 PHCs (C16-C34)	8 ug/g	<8	15	<8	-	-	-
F4 PHCs (C34-C50)	6 ug/g	<6	13	<6	-	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	0.02	-	-	-	-
Acenaphthylene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Anthracene	0.02 ug/g	<0.02	0.06	-	-	-	-
Benzo [a] anthracene	0.02 ug/g	<0.02	0.05	-	-	-	-
Benzo [a] pyrene	0.02 ug/g	<0.02	0.04	-	-	-	-
Benzo [b] fluoranthene	0.02 ug/g	<0.02	0.03	-	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	0.03	-	-	-	-
Chrysene	0.02 ug/g	<0.02	0.05	-	-	-	-

	Client ID:	BH5-24-SS2(BOTTOM)	DUP1	DUP2		-	-
	Sample Date:	09-May-24 09:00	08-May-24 09:00	09-May-24 09:00			
	Sample ID:	2420225-13	2420225-14	2420225-15			
	Matrix:	Soil	Soil	Soil			
	MDL/Units						
Semi-Volatiles							
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Fluoranthene	0.02 ug/g	<0.02	0.18	-	-	-	-
Fluorene	0.02 ug/g	<0.02	0.02	-	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	<0.02	-	-	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	-	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.04	-	-	-	-
Naphthalene	0.01 ug/g	<0.01	0.02	-	-	-	-
Phenanthrene	0.02 ug/g	<0.02	0.18	-	-	-	-
Pyrene	0.02 ug/g	<0.02	0.14	-	-	-	-
2-Fluorobiphenyl	Surrogate	72.6%	54.1%	-	-	-	-
Terphenyl-d14	Surrogate	105%	62.6%	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%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					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*0.688*		*%*	*51.6*	*50-140*			
Surrogate: Terphenyl-d14	*1.11*		*%*	*83.4*	*50-140*			
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	*8.74*		*%*	*109*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	2.09	0.01	N/A	2.19			4.7	30	
Conductivity	2300	5	uS/cm	2330			1.3	5	
pH	6.22	0.05	pH Units	6.24			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)	79	8	ug/g	105			28.5	30	
F4 PHCs (C34-C50)	194	6	ug/g	263			30.4	30	QR-05
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	3.4	1.0	ug/g	3.4			0.6	30	
Barium	314	1.0	ug/g	333			6.0	30	
Beryllium	1.1	0.5	ug/g	1.0			9.1	30	
Boron	13.6	5.0	ug/g	13.3			2.9	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	0.2	0.2	ug/g	0.2			0.0	35	
Chromium	48.8	5.0	ug/g	50.0			2.6	30	
Cobalt	15.5	1.0	ug/g	16.1			3.6	30	
Copper	31.1	5.0	ug/g	32.3			3.8	30	
Lead	23.7	1.0	ug/g	24.3			2.3	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	32.8	5.0	ug/g	33.5			2.1	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	66.6	10.0	ug/g	68.8			3.2	30	
Zinc	86.5	20.0	ug/g	90.3			4.3	30	
Physical Characteristics									

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
% Solids	92.5	0.1	% by Wt.	91.8			0.8	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	ND	0.02	ug/g	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	ND	0.02	ug/g	ND			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	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	*1.44*		*%*		*66.7*	*50-140*			
Surrogate: Terphenyl-d14	*1.92*		*%*		*88.7*	*50-140*			
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	*9.46*		*%*		*108*	*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)	186	7	ug/g	ND	108	85-115			
F2 PHCs (C10-C16)	102	4	ug/g	ND	117	60-140			
F3 PHCs (C16-C34)	342	8	ug/g	105	111	60-140			
F4 PHCs (C34-C50)	395	6	ug/g	263	96.9	60-140			
F4G PHCs (gravimetric)	920	50	ug/g	ND	92.0	80-120			
Metals									
Arsenic	46.9	1.0	ug/g	1.4	91.1	70-130			
Barium	166	1.0	ug/g	133	65.4	70-130			QM-07
Beryllium	47.4	0.5	ug/g	ND	94.0	70-130			
Boron	47.2	5.0	ug/g	5.3	83.8	70-130			
Cadmium	42.6	0.5	ug/g	ND	85.0	70-130			
Chromium (VI)	4.2	0.2	ug/g	0.2	72.5	70-130			
Chromium	68.0	5.0	ug/g	20.0	95.9	70-130			
Cobalt	53.0	1.0	ug/g	6.4	93.2	70-130			
Copper	57.9	5.0	ug/g	12.9	89.9	70-130			
Lead	52.8	1.0	ug/g	9.7	86.2	70-130			
Mercury	1.43	0.1	ug/g	ND	95.0	70-130			
Molybdenum	45.5	1.0	ug/g	ND	90.4	70-130			
Nickel	58.6	5.0	ug/g	13.4	90.5	70-130			
Selenium	45.2	1.0	ug/g	ND	90.1	70-130			
Silver	37.2	0.3	ug/g	ND	74.3	70-130			
Thallium	45.2	1.0	ug/g	ND	90.1	70-130			
Uranium	47.6	1.0	ug/g	ND	94.7	70-130			
Vanadium	74.6	10.0	ug/g	27.5	94.1	70-130			
Zinc	77.2	20.0	ug/g	36.1	82.1	70-130			
Semi-Volatiles									
Acenaphthene	0.221	0.02	ug/g	ND	81.6	50-140			
Acenaphthylene	0.231	0.02	ug/g	ND	85.3	50-140			
Anthracene	0.247	0.02	ug/g	ND	91.3	50-140			
Benzo [a] anthracene	0.195	0.02	ug/g	ND	72.0	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzo [a] pyrene	0.159	0.02	ug/g	ND	58.9	50-140			
Benzo [b] fluoranthene	0.178	0.02	ug/g	ND	65.7	50-140			
Benzo [g,h,i] perylene	0.166	0.02	ug/g	ND	61.3	50-140			
Benzo [k] fluoranthene	0.194	0.02	ug/g	ND	71.7	50-140			
Chrysene	0.205	0.02	ug/g	ND	75.9	50-140			
Dibenzo [a,h] anthracene	0.174	0.02	ug/g	ND	64.4	50-140			
Fluoranthene	0.251	0.02	ug/g	ND	92.8	50-140			
Fluorene	0.209	0.02	ug/g	ND	77.1	50-140			
Indeno [1,2,3-cd] pyrene	0.146	0.02	ug/g	ND	54.1	50-140			
1-Methylnaphthalene	0.205	0.02	ug/g	ND	75.7	50-140			
2-Methylnaphthalene	0.173	0.02	ug/g	ND	64.0	50-140			
Naphthalene	0.208	0.01	ug/g	ND	76.9	50-140			
Phenanthrene	0.208	0.02	ug/g	ND	77.0	50-140			
Pyrene	0.249	0.02	ug/g	ND	92.0	50-140			
Surrogate: 2-Fluorobiphenyl	*1.34*		*%*		*62.0*	*50-140*			
Surrogate: Terphenyl-d14	*1.82*		*%*		*84.0*	*50-140*			
Volatiles									
Benzene	2.97	0.02	ug/g	ND	74.3	60-130			
Ethylbenzene	3.01	0.05	ug/g	ND	75.4	60-130			
Toluene	2.88	0.05	ug/g	ND	72.0	60-130			
m,p-Xylenes	6.29	0.05	ug/g	ND	78.6	60-130			
o-Xylene	2.73	0.05	ug/g	ND	68.3	60-130			

Qualifier Notes:

Sample Qualifiers :

1: Elevated reporting limit due to dilution required because of high target analyte concentration.

2: Elevated reporting limits due to the nature of the sample matrix.

Applies to Samples: BH4-24-AU1, BH5-24-AU1

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

Applies to Samples: BH1-24-AU1, BH2-24-AU1, BH3-24-AU1, BH4-24-AU1, BH4-24-SS2, BH5-24-AU1

QC Qualifiers:

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

QR-05 Duplicate RPDs higher than normally accepted. Remaining batch QA\QC was acceptable. May be sample effect.

Sample Data Revisions:

None

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 14-May-2024

Client PO: 60196

Project Description: PE6422

Work Order Revisions / Comments:

Revision 1 - Revised report includes additional metals and PAH analyses.

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unlesss otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.

- F1 range corrected for BTEX.

- F2 to F3 ranges corrected for appropriate PAHs where available.

- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.

- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES LTD.

Paracel ID: 2420225

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2420225	

Client Name: Paterson Group Inc.	Project Ref: PE6422	Page 1 of 2
Contact Name: Jeremy Camposarcone	Quote #:	
Address: 9 AURIGA DRIVE, OTTAWA ON K2E 7T9	PO #: 60196	**Turnaround Time**: ☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: jcamposarcone@patersongroup.ca, kmunch@patersongroup.ca	Date Required:

☐ REG 153/04 ☒ REG 406/19

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

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

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	PHC F1-F4 + BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH	EC	SAR		
1	BH1-24-AU1	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
2	BH1-24-SS3	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
3	BH1-24-SS5	S		2	5/8/2024		✔		✔	✔	✔	✔		✔	✔	✔		
4	BH2-24-AU1	S		2	5/8/2024		✔		✔	✔	✔	✔		✔	✔	✔		
5	BH2-24-SS3	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
6	BH3-24-AU1	S		2	5/9/2024		✔		✔	✔	✔	✔			✔	✔		
7	BH3-24-SS5	S		2	5/9/2024		✔			✔				✔	✔	✔		
8	BH4-24-AU1	S		2	5/9/2024		✔		✔	✔	✔	✔			✔	✔		
9	BH4-24-SS2	S		2	5/9/2024		✔		✔	✔	✔	✔			✔	✔		
10	BH4-24-SS3	S		2	5/9/2024				HOLD									

Comments: HOLD - BH4-24-SS3

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SO	Verified By: SS
Relinquished By (Print): Jeremy Camposarcone	Date/Time:	Date/Time: May 14, 2024 4:25pm	Date/Time: 15 May 24 0928
Date/Time: 5/13/2024	Temperature: °C	Temperature: 12.7	pH Verified: ☐ NA By:

PARACEL LABORATORIES LTD. | TI RI RI

Paracel ID: 2420225

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2420225	

Client Name: Paterson Group Inc.	Project Ref: PE6422	Page 2 of 2
Contact Name: Jeremy Camposarcone	Quote #:	**Turnaround Time**
Address: 9 AURIGA DRIVE OTTAWA ON K2E 7T9	PO #: 60196	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: jcamposarcone@patersongroup.ca kmunch@patersongroup.ca	Date Required:

☐ REG 153/04 ☒ REG 406/19

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

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHC F1-F4 + BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH	EC	SAR		
1	BH4-24-SS6	S		2	5/9/2024		✔			✔					✔	✔		
2	BH5-24-AU1	S		2	5/9/2024		✔		✔	✔	✔	✔		✓	✔	✔		
3	BH5-24-SS2(BOTTOM)	S		~~2~~ 3	5/9/2024		✔			✔					✔	✔		
4	DUP1	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
5	DUP2	S		2	5/9/2024		✔			✔					✔	✔		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SO	Verified By: SS
Relinquished By (Print): Jeremy Camposarcone	Date/Time:	Date/Time: May 14, 2024 4:25pm	Date/Time: 15 May 24 0928
Date/Time: 5/13/2024	Temperature: °C	Temperature: 12.7	pH Verified: ☒ N/A By:

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Subcontracted Analysis

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

Paracel Report No.	**2420225**
Client Project(s):	**PE6422**
Client PO:	**60196**
Reference:	**#24-017 Standing Offer 2024**
CoC Number:	

Order Date:	14-May-24
Report Date:	31-May-24

Sample(s) from this project were subcontracted for the listed parameters. A copy of the subcontractor's report is attached

Paracel ID	Client ID	Analysis
2420225-10	BH4-24-SS3	Methyl Mercury - soil

CERTIFICATE OF ANALYSIS

Work Order	: **WT2413665**	Page	: 1 of 2
Client	: **Paracel Laboratories Ltd**	Laboratory	: ALS Environmental - Waterloo
Contact	: Mark Foto	Account Manager	: Costas Farassoglou
Address	: 2319 St. Laurent Blvd. Unit 300 Ottawa ON Canada K1G 4J8	Address	: 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	: 613 731 9577	Telephone	: 613 225 8279
Project	: 2420225	Date Samples Received	: 28-May-2024 12:10
PO	: ----	Date Analysis Commenced	: 02-Jun-2024
C-O-C number	: ----	Issue Date	: 13-Jun-2024 09:08
Sampler	: CLIENT		
Site	: ----		
Quote number	: Standing Offer 2024		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/kg	micrograms per kilogram

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Soil/Solid** (Matrix: **Soil/Solid**)					*Client sample ID*	**BH4-24-SS3**	----	----	----	----
					Client sampling date / time	09-May-2024 09:00	----	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*		**WT2413665-001**	--------	--------	--------	--------
						Result	----	----	----	----
Speciated Metals										
Methylmercury (as MeHg)	22967-92-6	E538/VA	0.050	µg/kg		<0.050	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2413665**	Page	: 1 of 5
Client	: **Paracel Laboratories Ltd**	Laboratory	: ALS Environmental - Waterloo
Contact	: Mark Foto	Account Manager	: Costas Farassoglou
Address	: 2319 St. Laurent Blvd. Unit 300 Ottawa ON Canada K1G 4J8	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 613 731 9577	Telephone	: 613 225 8279
Project	: 2420225	Date Samples Received	: 28-May-2024 12:10
PO	: ----	Issue Date	: 13-Jun-2024 09:08
C-O-C number	: ----		
Sampler	: CLIENT		
Site	: ----		
Quote number	: Standing Offer 2024		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Methylmercury in Soil by GCAFS										
Glass soil jar/Teflon lined cap [ON MECP]										
BH4-24-SS3	E538	09-May-2024	07-Jun-2024	28 days	29 days	× EHT	10-Jun-2024	28 days	3 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Methylmercury in Soil by GCAFS	E538	1479163	1	11	9.0	5.0	✓
Laboratory Control Samples (LCS)							
Methylmercury in Soil by GCAFS	E538	1479163	2	11	18.1	10.0	✓
Method Blanks (MB)							
Methylmercury in Soil by GCAFS	E538	1479163	1	11	9.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Methylmercury in Soil by GCAFS	E538 ALS Environmental - Vancouver	Soil/Solid	DeWild et al. (2004)/EPA 1630 (mod)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Methylmercury Soil Digestion	EP538 ALS Environmental - Vancouver	Soil/Solid	DeWild et al. (2004)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

QUALITY CONTROL REPORT

Work Order	: **WT2413665**	Page	: 1 of 3
Client	: Paracel Laboratories Ltd	Laboratory	: ALS Environmental - Waterloo
Contact	: Mark Foto	Account Manager	: Costas Farassoglou
Address	: 2319 St. Laurent Blvd. Unit 300 Ottawa ON Canada K1G 4J8	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 613 731 9577	Telephone	: 613 225 8279
Project	: 2420225	Date Samples Received	: 28-May-2024 12:10
PO	: ----	Date Analysis Commenced	: 02-Jun-2024
C-O-C number	: ----	Issue Date	: 13-Jun-2024 09:08
Sampler	: CLIENT		
Site	: ----		
Quote number	: Standing Offer 2024		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Speciated Metals (QC Lot: 1479163)											
VA24B0502-001	Anonymous	Methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	0.230	0.133	0.097	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Speciated Metals (QCLot: 1479163)						
Methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 1479163)									
Methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	10 µg/kg	92.1	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Speciated Metals (QCLot: 1479163)									
QC-1479163-003	RM	Methylmercury (as MeHg)	22967-92-6	E538	14.8 µg/kg	108	70.0	130	----

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Subcontract Order

SENDING LABORATORY:

Paracel Laboratories Ltd.
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8
Phone: 613-731-9577
Fax: 613-731-9064

RECEIVING LABORATORY:

ALS Laboratory Group (Vancouver)
8081 Lougheed Highway
Burnaby, BC V5A 1W9
Phone: (604) 253-4188
Fax:

INVOICE TO:

Paracel Laboratories Ltd.
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8
Phone: 613-731-9577
Fax: 613-731-9064

Date Requested: **15-May-24**
Project Number: **2420225**
Submitted By: **Sarah Scullion**

Required Regulation	Reg 153
Turnaround Time	Standard

Sample ID	Matrix	Analyses Requested:	Sampled	Comments
BH4-24-SS3	Soil	Methyl Mercury - soil	09-May-24 09:00	

BB 05/29/24
8.4° 10:10

Environmental Division
Waterloo
Work Order Reference
WT2413665

Telephone : +1 519 886 6910

RECEIVED
29-05-2024

AB Sublet

Please email all results to mfoto@paracellabs.com, dbloom@paracellabs.com, drobertson@paracellabs.com

Released By — May 28/24 8:40
Date / Time

Lara R. — 28/05/24
Received By — Date

Temperature prior to Shipping: 10.0

13.5°C → ICE PACK
12:10

PARACEL LABORATORIES LTD.

Paracel ID: 2420225

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2420225	

Client Name: Paterson Group Inc.	Project Ref: PE6422	Page 1 of 2
Contact Name: Jeremy Camposarcone	Quote #:	**Turnaround Time**
Address: 9 AURIGA DRIVE, OTTAWA ON K2E 7T9	PO #: 60196	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: jcamposarcone@patersongroup.ca, kmunch@patersongroup.ca	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	PHC F1-F4 + BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH	EC	SAR		
1	BH1-24-AU1	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
2	BH1-24-SS3	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
3	BH1-24-SS5	S		2	5/8/2024		✔		✔	✔	✔	✔		✔	✔	✔		
4	BH2-24-AU1	S		2	5/8/2024		✔		✔	✔	✔	✔		✔	✔	✔		
5	BH2-24-SS3	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
6	BH3-24-AU1	S		2	5/9/2024		✔		✔	✔	✔	✔			✔	✔		
7	BH3-24-SS5	S		2	5/9/2024		✔			✔				✔	✔	✔		
8	BH4-24-AU1	S		2	5/9/2024		✔		✔	✔	✔	✔			✔	✔		
9	BH4-24-SS2	S		2	5/9/2024		✔		✔	✔	✔	✔			✔	✔		
10	BH4-24-SS3	S		2	5/9/2024					HOLD								

Comments: HOLD - BH4-24-SS3

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SO	Verified By: SS
Relinquished By (Print): Jeremy Camposarcone	Date/Time:	Date/Time: May 14, 2024 4:25pm	Date/Time: 15 May 24 0928
Date/Time: 5/13/2024	Temperature: °C	Temperature: 12.7	pH Verified: ☐ NA By:

PARACEL LABORATORIES LTD.

Paracel ID: 2420225

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2420225	

Client Name: Paterson Group Inc.	Project Ref: PE6422	Page 2 of 2
Contact Name: Jeremy Camposarcone	Quote #:	**Turnaround Time**
Address: 9 AURIGA DRIVE, OTTAWA ON K2E 7T9	PO #: 60196	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: jcamposarcone@patersongroup.ca, kmunch@patersongroup.ca	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	PHC F1-F4 + BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH	EC	SAR		
1	BH4-24-SS6	S		2	5/9/2024		✔			✔					✔	✔		
2	BH5-24-AU1	S		2	5/9/2024		✔		✔	✔	✔	✔		✓	✔	✔		
3	BH5-24-SS2(BOTTOM)	S		~~2~~ 3	5/9/2024		✔			✔					✔	✔		
4	DUP1	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
5	DUP2	S		2	5/9/2024		✔			✔					✔	✔		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SO	Verified By: SS
Relinquished By (Print): Jeremy Camposarcone	Date/Time:	Date/Time: May 14, 2024 4:25pm	Date/Time: 15 May 24 0928
Date/Time: 5/13/2024	Temperature: °C	Temperature: 12.7	pH Verified: ☐ NA By:

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p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Eric Leveque

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

Client PO: 10564
Project: PE2289
Custody: 84729

Report Date: 17-May-2011
Order Date: 16-May-2011
Order #: 1121005

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

Paracel ID	Client ID
1121005-01	BH1-GW1

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 17-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:16-May-2011

Client PO: 10564 Project Description: PE2289

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME PHC F1	CWS Tier 1 - P&T GC-FID	16-May-11	16-May-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	16-May-11	17-May-11
VOCs	EPA 624 - P&T GC-MS	16-May-11	16-May-11

Certificate of Analysis

Report Date: 17-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:16-May-2011

Client PO: 10564

Project Description: PE2289

	Client ID:	BH1-GW1	-	-	-
	Sample Date:	16-May-11	-	-	-
	Sample ID:	1121005-01	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	-	-	-
Benzene	0.5 ug/L	<0.5	-	-	-
Bromodichloromethane	0.5 ug/L	<0.5	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-
Bromomethane	0.5 ug/L	<0.5	-	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	-	-	-
Chlorobenzene	0.5 ug/L	<0.5	-	-	-
Chloroethane	1.0 ug/L	<1.0	-	-	-
Chloroform	0.5 ug/L	<0.5	-	-	-
Chloromethane	3.0 ug/L	<3.0	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	-	-	-
1,2-Dibromoethane	0.2 ug/L	<0.2	-	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Hexane	1.0 ug/L	<1.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	-	-	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	-	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	-	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	-	-	-
Methylene Chloride	5.0 ug/L	<5.0	-	-	-

Certificate of Analysis

Report Date: 17-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:16-May-2011

Client PO: 10564

Project Description: PE2289

	Client ID:	BH1-GW1	-	-	-
	Sample Date:	16-May-11	-	-	-
	Sample ID:	1121005-01	-	-	-
	MDL/Units	Water	-	-	-
Styrene	0.5 ug/L	<0.5	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	-	-	-
Trichloroethylene	0.5 ug/L	<0.5	-	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
1,2,4- Trimethylbenzene	0.5 ug/L	<0.5	-	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
4-Bromofluorobenzene	Surrogate	94.3%	-	-	-
Dibromofluoromethane	Surrogate	95.5%	-	-	-
Toluene-d8	Surrogate	101%	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-
F1 + F2 PHCs	125 ug/L	<125	-	-	-
F3 + F4 PHCs	200 ug/L	<200	-	-	-

Certificate of Analysis

Report Date: 17-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:16-May-2011

Client PO: 10564 Project Description: PE2289

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						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	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-Dichloroethylene, total	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						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	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						
1,2,4-Trichlorobenzene	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						
1,2,4- Trimethylbenzene	ND	0.5	ug/L						
1,3,5-Trimethylbenzene	ND	0.5	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	*34.3*		*ug/L*		*107*	*50-140*			
Surrogate: Dibromofluoromethane	*30.2*		*ug/L*		*94.4*	*50-140*			
Surrogate: Toluene-d8	*32.5*		*ug/L*		*102*	*50-140*			

Certificate of Analysis

Report Date: 17-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:16-May-2011

Client PO: 10564 Project Description: PE2289

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,2,4- Trimethylbenzene	ND	0.5	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*33.4*		*ug/L*	*ND*	*104*	*50-140*			
Surrogate: Dibromofluoromethane	*31.5*		*ug/L*	*ND*	*98.5*	*50-140*			
Surrogate: Toluene-d8	*31.4*		*ug/L*	*ND*	*98.1*	*50-140*			

Certificate of Analysis

Report Date: 17-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:16-May-2011

Client PO: 10564 Project Description: PE2289

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1980	25	ug/L	ND	98.8	68-117			
F2 PHCs (C10-C16)	1260	100	ug/L	ND	79.0	61-129			
F3 PHCs (C16-C34)	4180	100	ug/L	ND	104	61-129			
F4 PHCs (C34-C50)	3000	100	ug/L	ND	125	61-129			
Volatiles									
Acetone	71.9	5.0	ug/L	ND	71.9	50-140			
Benzene	30.5	0.5	ug/L	ND	76.2	60-130			
Bromodichloromethane	37.8	0.5	ug/L	ND	94.4	60-130			
Bromoform	39.2	0.5	ug/L	ND	98.0	60-130			
Bromomethane	22.5	0.5	ug/L	ND	56.2	50-140			
Carbon Tetrachloride	39.6	0.2	ug/L	ND	99.1	60-130			
Chlorobenzene	32.8	0.5	ug/L	ND	82.1	60-130			
Chloroethane	24.4	1.0	ug/L	ND	61.0	50-140			
Chloroform	36.6	0.5	ug/L	ND	91.5	60-130			
Chloromethane	23.0	3.0	ug/L	ND	57.5	50-140			
Dibromochloromethane	39.0	0.5	ug/L	ND	97.4	60-130			
Dichlorodifluoromethane	34.1	1.0	ug/L	ND	85.3	50-140			
1,2-Dibromoethane	30.4	0.2	ug/L	ND	75.9	60-130			
1,2-Dichlorobenzene	37.8	0.5	ug/L	ND	94.4	60-130			
1,3-Dichlorobenzene	37.4	0.5	ug/L	ND	93.6	60-130			
1,4-Dichlorobenzene	37.5	0.5	ug/L	ND	93.8	60-130			
1,1-Dichloroethane	28.0	0.5	ug/L	ND	70.0	60-130			
1,2-Dichloroethane	37.8	0.5	ug/L	ND	94.4	60-130			
1,1-Dichloroethylene	31.2	0.5	ug/L	ND	78.0	60-130			
cis-1,2-Dichloroethylene	31.5	0.5	ug/L	ND	78.7	60-130			
trans-1,2-Dichloroethylene	33.5	0.5	ug/L	ND	83.7	60-130			
1,2-Dichloropropane	27.7	0.5	ug/L	ND	69.2	60-130			
cis-1,3-Dichloropropylene	33.7	0.5	ug/L	ND	84.3	60-130			
trans-1,3-Dichloropropylene	36.5	0.5	ug/L	ND	91.2	60-130			
Ethylbenzene	30.9	0.5	ug/L	ND	77.3	60-130			
Hexane	29.0	1.0	ug/L	ND	72.6	60-130			
Methyl Ethyl Ketone (2-Butanone)	50.9	5.0	ug/L	ND	50.9	50-140			
Methyl Butyl Ketone (2-Hexanone)	56.0	10.0	ug/L	ND	56.0	50-140			
Methyl Isobutyl Ketone	59.3	5.0	ug/L	ND	59.3	50-140			
Methyl tert-butyl ether	129	2.0	ug/L	ND	129	50-140			
Methylene Chloride	32.6	5.0	ug/L	ND	81.4	60-130			
Styrene	29.1	0.5	ug/L	ND	72.8	60-130			
1,1,1,2-Tetrachloroethane	38.6	0.5	ug/L	ND	96.6	60-130			
1,1,2,2-Tetrachloroethane	30.3	0.5	ug/L	ND	75.8	60-130			
Tetrachloroethylene	36.6	0.5	ug/L	ND	91.5	60-130			
Toluene	32.6	0.5	ug/L	ND	81.6	60-130			
1,2,4-Trichlorobenzene	34.1	0.5	ug/L	ND	85.4	60-130			
1,1,1-Trichloroethane	40.6	0.5	ug/L	ND	101	60-130			
1,1,2-Trichloroethane	32.3	0.5	ug/L	ND	80.8	60-130			
Trichloroethylene	34.5	0.5	ug/L	ND	86.3	60-130			
Trichlorofluoromethane	41.5	1.0	ug/L	ND	104	60-130			
1,2,4- Trimethylbenzene	34.9	0.5	ug/L	ND	87.2	60-130			
1,3,5-Trimethylbenzene	39.4	0.5	ug/L	ND	98.6	60-130			
Vinyl chloride	23.7	0.5	ug/L	ND	59.3	50-140			
m,p-Xylenes	65.4	0.5	ug/L	ND	81.7	60-130			
o-Xylene	32.5	0.5	ug/L	ND	81.2	60-130			
Surrogate: 4-Bromofluorobenzene	*29.9*		*ug/L*		*93.6*	*50-140*			
Surrogate: Dibromofluoromethane	*31.8*		*ug/L*		*99.3*	*50-140*			

Certificate of Analysis

Report Date: 17-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:16-May-2011

Client PO: 10564

Project Description: PE2289

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Surrogate: Toluene-d8	*25.2*		*ug/L*		*78.6*	*50-140*			

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

CCME PHC additional information:

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

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t: 613-731-9577
800-749-1947
f: 613-731-9064
e: paracel@paracellabs.com

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Nº 84729

Page 1 of 1

Client Name: Paterson Group	Project Ref: PE2289	Reg. Drinking Water Waterworks Name:	
Contact Name: Eric Levegue	Quote #	Waterworks Number:	Sample Taken by: Print Name: T. Robinson
Address: 28 Concourse Gate, Unit1 Ottawa ON	PO # 10564	Address:	
Telephone: 613 226-7381	E-mail Address: elevegue@patersongroup.ca Fax:	After hours Contact: Public Health Unit:	Signature: TAT: 1-day | | 2-day | | Reg.

Matrix Types: S–Soil/Sed. GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P- Paint A-Air O-Other

Samples submitted under: (Indicate **ONLY** one)
☐ O. Reg 153 (511) Table 3 ☐ O. Reg 170/03 ☐ O. Reg 318/08 ☐ Private well
☐ CCME ____ ☐ O. Reg 243/07 ☐ O. Reg 319/08 ☐ Other: ____

Type of DW Sample: R = Raw; T = Treated; D = Distribution
Location Types: S = Surface Water; G = Ground Water

Paracel Order Number: 121005

	Sample ID / Location Name	Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken: Date	Sample Taken: Time	Free / Combined Chlorine Residual mg/L	Required Analyses: VOC's	Required Analyses: PHC's (F1-F4)						
1	BH1-GW1	GW			3	May16/11	8am		✓	✓						
2																
3																
4																
5																
6																
7																
8																
9																
10																

Comments:

Preservation Verification: pH ____ Temperature 10.6°C
Verified by: [signature]

Relinquished By (Print & Sign): T. Robinson [signature]

Date/Time: May 16 2011 9am

Lab Use Only:

Received By Driver/Depot:	Received at Lab:	Verified By:
Date/Time:	Date/Time: May 16/11 9:00a Walk-in	Date/Time: May 16/11 9:08a

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Head Office
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Certificate of Analysis

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

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

Client PO: 12261
Project: PE2709
Custody: 94393

Report Date: 24-Jul-2012
Order Date: 20-Jul-2012
Order #: 1229249

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

Paracel ID	Client ID
1229249-01	BH1-GW1
1229249-02	BH2-GW1
1229249-03	BH4-GW1

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12261 Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME PHC F1	CWS Tier 1 - P&T GC-FID	20-Jul-12	23-Jul-12
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	20-Jul-12	21-Jul-12
PAHs by GC-MS, standard scan	EPA 625 - GC-MS, extraction	23-Jul-12	24-Jul-12
VOCs	EPA 624 - P&T GC-MS	20-Jul-12	23-Jul-12

PARACEL LABORATORIES LTD.

Order #: 1229249

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12261 Project Description: PE2709

	Client ID:	BH1-GW1	BH2-GW1	BH4-GW1	-
	Sample Date:	20-Jul-12	20-Jul-12	20-Jul-12	-
	Sample ID:	1229249-01	1229249-02	1229249-03	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	82.4	691	40.6	-
Benzene	0.5 ug/L	<0.5	2.4	1.1	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	3.8	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Chloroform	0.5 ug/L	16.1	14.4	21.8	-
Chloromethane	3.0 ug/L	<3.0	<3.0	<3.0	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	<0.2	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	1.0	<0.5	-
Hexane	1.0 ug/L	2.1	2.2	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	10.7	8.0	8.4	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12261 Project Description: PE2709

	Client ID:	BH1-GW1	BH2-GW1	BH4-GW1	-
	Sample Date:	20-Jul-12	20-Jul-12	20-Jul-12	-
	Sample ID:	1229249-01	1229249-02	1229249-03	-
	MDL/Units	Water	Water	Water	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	6.2	5.8	5.6	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	1.2	<0.5	-
o-Xylene	0.5 ug/L	<0.5	1.6	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	2.8	<0.5	-
4-Bromofluorobenzene	Surrogate	110%	117%	109%	-
Dibromofluoromethane	Surrogate	106%	110%	106%	-
Toluene-d8	Surrogate	98.4%	94.8%	97.2%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	45	43	<25	-
F2 PHCs (C10-C16)	100 ug/L	<287	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<287	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<287	<100	<100	-
Semi-Volatiles					
Acenaphthene	0.05 ug/L	-	<0.05	-	-
Acenaphthylene	0.05 ug/L	-	<0.05	-	-
Anthracene	0.01 ug/L	-	<0.01	-	-
Benzo [a] anthracene	0.01 ug/L	-	<0.01	-	-
Benzo [a] pyrene	0.01 ug/L	-	<0.01	-	-
Benzo [b] fluoranthene	0.05 ug/L	-	<0.05	-	-
Benzo [g,h,i] perylene	0.05 ug/L	-	<0.05	-	-
Benzo [k] fluoranthene	0.05 ug/L	-	<0.05	-	-
Biphenyl	0.05 ug/L	-	0.12	-	-
Chrysene	0.05 ug/L	-	<0.05	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	-	<0.05	-	-

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12261 Project Description: PE2709

	Client ID:	BH1-GW1	BH2-GW1	BH4-GW1	-
	Sample Date:	20-Jul-12	20-Jul-12	20-Jul-12	-
	Sample ID:	1229249-01	1229249-02	1229249-03	-
	MDL/Units	Water	Water	Water	-
Fluoranthene	0.01 ug/L	-	<0.01	-	-
Fluorene	0.05 ug/L	-	0.06	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	-	<0.05	-	-
1-Methylnaphthalene	0.05 ug/L	-	0.33	-	-
2-Methylnaphthalene	0.05 ug/L	-	0.40	-	-
Methylnaphthalene (1&2)	0.10 ug/L	-	0.73	-	-
Naphthalene	0.05 ug/L	-	0.82	-	-
Phenanthrene	0.05 ug/L	-	<0.05	-	-
Pyrene	0.01 ug/L	-	<0.01	-	-
2-Fluorobiphenyl	Surrogate	-	73.4%	-	-
Terphenyl-d14	Surrogate	-	80.8%	-	-

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client PO: 12261 Project Description: PE2709

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						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						
Benzo [k] fluoranthene	ND	0.05	ug/L						
Biphenyl	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	*19.0*		*ug/L*		*95.2*	*50-140*			
Surrogate: Terphenyl-d14	*18.0*		*ug/L*		*90.0*	*50-140*			
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	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-Dichloroethylene, total	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						
Hexane	ND	1.0	ug/L						

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12261 Project Description: PE2709

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	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						
1,2,4-Trichlorobenzene	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						
1,3,5-Trimethylbenzene	ND	0.5	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	*37.9*		*ug/L*		*118*	*50-140*			
Surrogate: Dibromofluoromethane	*25.4*		*ug/L*		*79.4*	*50-140*			
Surrogate: Toluene-d8	*34.7*		*ug/L*		*108*	*50-140*			

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client PO: 12261 Project Description: PE2709

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*38.4*		*ug/L*	*ND*	*120*	*50-140*			
Surrogate: Dibromofluoromethane	*35.1*		*ug/L*	*ND*	*110*	*50-140*			
Surrogate: Toluene-d8	*35.3*		*ug/L*	*ND*	*110*	*50-140*			

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client PO: 12261 Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1910	25	ug/L	ND	95.7	68-117			
F2 PHCs (C10-C16)	1230	100	ug/L	ND	76.7	60-140			
F3 PHCs (C16-C34)	3300	100	ug/L	ND	82.5	60-140			
F4 PHCs (C34-C50)	2390	100	ug/L	ND	99.6	60-140			
Semi-Volatiles									
Acenaphthene	3.44	0.05	ug/L	ND	68.9	50-140			
Acenaphthylene	3.49	0.05	ug/L	ND	69.7	50-140			
Anthracene	3.55	0.01	ug/L	ND	71.0	50-140			
Benzo [a] anthracene	3.88	0.01	ug/L	ND	77.6	50-140			
Benzo [a] pyrene	3.44	0.01	ug/L	ND	68.9	50-140			
Benzo [b] fluoranthene	4.66	0.05	ug/L	ND	93.2	50-140			
Benzo [g,h,i] perylene	3.22	0.05	ug/L	ND	64.3	50-140			
Benzo [k] fluoranthene	4.86	0.05	ug/L	ND	97.3	50-140			
Biphenyl	3.54	0.05	ug/L	ND	70.8	50-140			
Chrysene	4.10	0.05	ug/L	ND	82.1	50-140			
Dibenzo [a,h] anthracene	3.90	0.05	ug/L	ND	78.0	50-140			
Fluoranthene	4.20	0.01	ug/L	ND	84.1	50-140			
Fluorene	4.02	0.05	ug/L	ND	80.4	50-140			
Indeno [1,2,3-cd] pyrene	3.04	0.05	ug/L	ND	60.8	50-140			
1-Methylnaphthalene	3.13	0.05	ug/L	ND	62.6	50-140			
2-Methylnaphthalene	3.44	0.05	ug/L	ND	68.8	50-140			
Naphthalene	3.70	0.05	ug/L	ND	74.1	50-140			
Phenanthrene	3.89	0.05	ug/L	ND	77.8	50-140			
Pyrene	4.41	0.01	ug/L	ND	88.2	50-140			
Surrogate: 2-Fluorobiphenyl	*17.8*		*ug/L*		*89.1*	*50-140*			
Volatiles									
Acetone	75.4	5.0	ug/L	ND	75.4	50-140			
Benzene	43.2	0.5	ug/L	ND	108	50-140			
Bromodichloromethane	42.0	0.5	ug/L	ND	105	50-140			
Bromoform	38.1	0.5	ug/L	ND	95.2	50-140			
Bromomethane	30.1	0.5	ug/L	ND	75.3	50-140			
Carbon Tetrachloride	41.2	0.2	ug/L	ND	103	50-140			
Chlorobenzene	43.1	0.5	ug/L	ND	108	50-140			
Chloroethane	42.2	1.0	ug/L	ND	106	50-140			
Chloroform	43.5	0.5	ug/L	ND	109	50-140			
Chloromethane	34.1	3.0	ug/L	ND	85.2	50-140			
Dibromochloromethane	40.1	0.5	ug/L	ND	100	50-140			
Dichlorodifluoromethane	43.5	1.0	ug/L	ND	109	50-140			
1,2-Dibromoethane	36.9	0.2	ug/L	ND	92.2	50-140			
1,2-Dichlorobenzene	32.1	0.5	ug/L	ND	80.3	50-140			
1,3-Dichlorobenzene	32.4	0.5	ug/L	ND	80.9	50-140			
1,4-Dichlorobenzene	33.9	0.5	ug/L	ND	84.8	50-140			
1,1-Dichloroethane	46.0	0.5	ug/L	ND	115	50-140			
1,2-Dichloroethane	40.8	0.5	ug/L	ND	102	50-140			
1,1-Dichloroethylene	27.7	0.5	ug/L	ND	69.2	50-140			
cis-1,2-Dichloroethylene	35.0	0.5	ug/L	ND	87.6	50-140			
trans-1,2-Dichloroethylene	34.6	0.5	ug/L	ND	86.4	50-140			
1,2-Dichloropropane	41.1	0.5	ug/L	ND	103	50-140			

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12261 Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
cis-1,3-Dichloropropylene	33.9	0.5	ug/L	ND	84.8	50-140			
trans-1,3-Dichloropropylene	44.0	0.5	ug/L	ND	110	50-140			
Ethylbenzene	36.4	0.5	ug/L	ND	91.1	50-140			
Hexane	43.3	1.0	ug/L	ND	108	50-140			
Methyl Ethyl Ketone (2-Butanone)	62.5	5.0	ug/L	ND	62.5	50-140			
Methyl Butyl Ketone (2-Hexanone)	67.9	10.0	ug/L	ND	67.9	50-140			
Methyl Isobutyl Ketone	63.7	5.0	ug/L	ND	63.7	50-140			
Methyl tert-butyl ether	72.8	2.0	ug/L	ND	72.8	50-140			
Methylene Chloride	34.3	5.0	ug/L	ND	85.8	50-140			
Styrene	29.9	0.5	ug/L	ND	74.8	50-140			
1,1,1,2-Tetrachloroethane	42.6	0.5	ug/L	ND	107	50-140			
1,1,2,2-Tetrachloroethane	49.5	0.5	ug/L	ND	124	50-140			
Tetrachloroethylene	43.0	0.5	ug/L	ND	108	50-140			
Toluene	40.0	0.5	ug/L	ND	100	50-140			
1,2,4-Trichlorobenzene	43.2	0.5	ug/L	ND	108	50-140			
1,1,1-Trichloroethane	41.4	0.5	ug/L	ND	104	50-140			
1,1,2-Trichloroethane	37.5	0.5	ug/L	ND	93.8	50-140			
Trichloroethylene	36.9	0.5	ug/L	ND	92.4	50-140			
Trichlorofluoromethane	34.8	1.0	ug/L	ND	87.0	50-140			
1,3,5-Trimethylbenzene	28.6	0.5	ug/L	ND	71.5	50-140			
Vinyl chloride	43.7	0.5	ug/L	ND	109	50-140			
m,p-Xylenes	89.0	0.5	ug/L	ND	111	50-140			
o-Xylene	39.6	0.5	ug/L	ND	98.9	50-140			

Certificate of Analysis

Report Date: 24-Jul-2012
Order Date:20-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12261 Project Description: PE2709

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

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p: 1-800-749-1947
e: paracel@paracellabs.com
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Chain of Custody
(Lab Use Only)
Nº 94393

Page 1 of 1

Client Name: Paterson Group INC	Project Reference: PE2709	TAT: [ ] Regular [ ] 3 Day
Contact Name: Mark D'Arcy	Quote #	[ ] 2 Day [X] 1 Day
Address: 154 Colonnade Road South	PO # 12261	Date Required:
Telephone: (613)226-7381	Email Address: MDArcy@PatersonGroup.ca	

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

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

Required Analyses

Paracel Order Number: 1229249

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP/MS	Hg	CrVI	B (HWS)							
1	BH1-GW1	GW		2	July 20 2012		X	X												✓
2	BH2-GW1	GW		4	July 20, 2012		X	X	X											✓
3	BH4-GW1	GW		3	July 20 2012		X	X	X	→				no PAH analysis per Sean.						✓
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments: Unable to recover enough sample for 2x vials & 5 cont for BH1-GW1, please just do what you can for PHCs & VOCs. -Thanks, Sean Moggridge Decant where necessary per Sean.

Method of Delivery: Walk in

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Sean Moggridge	Date/Time:	Date/Time: July 20/12 11:01a	Date/Time: July 20/12 12:28
Date/Time: July 20, 2012, 1/1n	Temperature: _____ °C	Temperature: 22.4 °C	pH Verified [ ] By: N/A

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Certificate of Analysis

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

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

Client PO: 12263
Project: PE2709
Custody: 94819

Report Date: 26-Jul-2012
Order Date: 25-Jul-2012
Order #: 1230199

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

Paracel ID	Client ID
1230199-01	BH4-GW2
1230199-02	BH2-GW2

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 26-Jul-2012
Order Date:25-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12263 Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME PHC F1	CWS Tier 1 - P&T GC-FID	26-Jul-12	26-Jul-12
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	26-Jul-12	26-Jul-12
VOCs	EPA 624 - P&T GC-MS	26-Jul-12	26-Jul-12

Certificate of Analysis

Report Date: 26-Jul-2012
Order Date:25-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12263 Project Description: PE2709

	Client ID:	BH4-GW2	BH2-GW2	-	-
	Sample Date:	25-Jul-12	25-Jul-12	-	-
	Sample ID:	1230199-01	1230199-02	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Acetone	5.0 ug/L	104	1020	-	-
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroethane	1.0 ug/L	<1.0	<1.0	-	-
Chloroform	0.5 ug/L	3.1	9.9	-	-
Chloromethane	3.0 ug/L	<3.0	<3.0	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Hexane	1.0 ug/L	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	26.1	-	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-

Certificate of Analysis

Report Date: 26-Jul-2012
Order Date:25-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12263 Project Description: PE2709

	Client ID:	BH4-GW2	BH2-GW2	-	-
	Sample Date:	25-Jul-12	25-Jul-12	-	-
	Sample ID:	1230199-01	1230199-02	-	-
	MDL/Units	Water	Water	-	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	-	-
4-Bromofluorobenzene	Surrogate	110%	108%	-	-
Dibromofluoromethane	Surrogate	110%	109%	-	-
Toluene-d8	Surrogate	112%	106%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-

Certificate of Analysis

Report Date: 26-Jul-2012
Order Date:25-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12263 Project Description: PE2709

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						
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						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	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-Dichloroethylene, total	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						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	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						
1,2,4-Trichlorobenzene	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						
1,3,5-Trimethylbenzene	ND	0.5	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	*37.1*		*ug/L*		*116*	*50-140*			
Surrogate: Dibromofluoromethane	*31.8*		*ug/L*		*99.5*	*50-140*			
Surrogate: Toluene-d8	*38.5*		*ug/L*		*120*	*50-140*			

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Report Date: 26-Jul-2012
Order Date:25-Jul-2012

Client PO: 12263 Project Description: PE2709

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*34.9*		*ug/L*	*ND*	*109*	*50-140*			
Surrogate: Dibromofluoromethane	*35.1*		*ug/L*	*ND*	*110*	*50-140*			
Surrogate: Toluene-d8	*37.2*		*ug/L*	*ND*	*116*	*50-140*			

Certificate of Analysis

Report Date: 26-Jul-2012
Order Date:25-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12263 Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1910	25	ug/L	ND	95.4	68-117			
Volatiles									
Acetone	87.7	5.0	ug/L	ND	87.7	50-140			
Benzene	34.4	0.5	ug/L	ND	86.1	50-140			
Bromodichloromethane	31.0	0.5	ug/L	ND	77.6	50-140			
Bromoform	35.8	0.5	ug/L	ND	89.6	50-140			
Bromomethane	26.3	0.5	ug/L	ND	65.7	50-140			
Carbon Tetrachloride	30.3	0.2	ug/L	ND	75.8	50-140			
Chlorobenzene	42.4	0.5	ug/L	ND	106	50-140			
Chloroethane	37.6	1.0	ug/L	ND	93.9	50-140			
Chloroform	32.3	0.5	ug/L	ND	80.8	50-140			
Chloromethane	30.1	3.0	ug/L	ND	75.2	50-140			
Dibromochloromethane	39.0	0.5	ug/L	ND	97.6	50-140			
Dichlorodifluoromethane	27.9	1.0	ug/L	ND	69.8	50-140			
1,2-Dibromoethane	39.2	0.2	ug/L	ND	98.0	50-140			
1,2-Dichlorobenzene	32.3	0.5	ug/L	ND	80.8	50-140			
1,3-Dichlorobenzene	32.3	0.5	ug/L	ND	80.8	50-140			
1,4-Dichlorobenzene	33.0	0.5	ug/L	ND	82.4	50-140			
1,1-Dichloroethane	43.9	0.5	ug/L	ND	110	50-140			
1,2-Dichloroethane	29.7	0.5	ug/L	ND	74.3	50-140			
1,1-Dichloroethylene	36.2	0.5	ug/L	ND	90.4	50-140			
cis-1,2-Dichloroethylene	29.6	0.5	ug/L	ND	74.1	50-140			
trans-1,2-Dichloroethylene	47.4	0.5	ug/L	ND	119	50-140			
1,2-Dichloropropane	34.1	0.5	ug/L	ND	85.2	50-140			
cis-1,3-Dichloropropylene	49.7	0.5	ug/L	ND	124	50-140			
trans-1,3-Dichloropropylene	46.9	0.5	ug/L	ND	117	50-140			
Ethylbenzene	33.5	0.5	ug/L	ND	83.7	50-140			
Hexane	30.0	1.0	ug/L	ND	75.0	50-140			
Methyl Ethyl Ketone (2-Butanone)	104	5.0	ug/L	ND	104	50-140			
Methyl Butyl Ketone (2-Hexanone)	76.8	10.0	ug/L	ND	76.8	50-140			
Methyl Isobutyl Ketone	74.5	5.0	ug/L	ND	74.5	50-140			
Methyl tert-butyl ether	99.8	2.0	ug/L	ND	99.8	50-140			
Methylene Chloride	37.6	5.0	ug/L	ND	94.1	50-140			
Styrene	29.1	0.5	ug/L	ND	72.7	50-140			
1,1,1,2-Tetrachloroethane	40.3	0.5	ug/L	ND	101	50-140			
1,1,2,2-Tetrachloroethane	51.5	0.5	ug/L	ND	129	50-140			
Tetrachloroethylene	39.5	0.5	ug/L	ND	98.7	50-140			
Toluene	30.0	0.5	ug/L	ND	75.0	50-140			
1,2,4-Trichlorobenzene	27.0	0.5	ug/L	ND	67.6	50-140			
1,1,1-Trichloroethane	30.1	0.5	ug/L	ND	75.2	50-140			
1,1,2-Trichloroethane	30.5	0.5	ug/L	ND	76.2	50-140			
Trichloroethylene	28.5	0.5	ug/L	ND	71.2	50-140			
Trichlorofluoromethane	32.2	1.0	ug/L	ND	80.6	50-140			
1,3,5-Trimethylbenzene	26.0	0.5	ug/L	ND	65.0	50-140			
Vinyl chloride	29.3	0.5	ug/L	ND	73.2	50-140			
m,p-Xylenes	68.0	0.5	ug/L	ND	85.0	50-140			
o-Xylene	36.6	0.5	ug/L	ND	91.5	50-140			
Surrogate: 4-Bromofluorobenzene	*25.8*		*ug/L*		*80.8*	*50-140*			

Certificate of Analysis

Report Date: 26-Jul-2012
Order Date:25-Jul-2012

Client: **Paterson Group Consulting Engineers**

Client PO: 12263 Project Description: PE2709

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

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300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody
(Lab Use Only)
Nº 94819

Page 1 of 1

Client Name: PATERSON GROUP INC.	Project Reference: PE2709	TAT: [ ] Regular [ ] 3 Day
Contact Name: MARK D'ARCY	Quote #	[ ] 2 Day [X] 1 Day
Address: 154 COLONNADE ROAD SOUTH	PO # 12263	Date Required:
Telephone: (613) 226-7381	Email Address: MDARCY@PATERSONGROUP.CA	

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

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

Required Analyses

Paracel Order Number: 1230199

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP/MS	Hg	CrVI	B (HWS)							
1	BH4-GW2	GW			July 25	12:30pm	X	X												
2	BH2-GW2	GW			July 25	10 am	X	X												
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments: PHCs F1 @ BH2-GW2.

Method of Delivery: Walk-in

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab: MJC	Verified By: MJC
	Date/Time:	Date/Time: July 25/12 5:43	Date/Time: July 25/12 6:03
Date/Time:	Temperature: ____ °C	Temperature: 19.8 °C	pH Verified [ ] By: N/A

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p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers
154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

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

Client PO: 15215
Project: PE2709
Custody: 99019

Report Date: 18-Nov-2013
Order Date: 13-Nov-2013
Order #: 1346233

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

Paracel ID	Client ID
1346233-01	BH1-GW2
1346233-02	BH2-GW3
1346233-03	BH4-GW3

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 18-Nov-2013
Order Date:13-Nov-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 15215 Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	15-Nov-13	15-Nov-13

PARACEL LABORATORIES LTD.

Order #: 1346233

Certificate of Analysis

Report Date: 18-Nov-2013
Order Date:13-Nov-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 15215

Project Description: PE2709

	Client ID:	BH1-GW2	BH2-GW3	BH4-GW3	-
	Sample Date:	12-Nov-13	12-Nov-13	12-Nov-13	-
	Sample ID:	1346233-01	1346233-02	1346233-03	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	<5.0	15.3	117	-
Benzene	0.5 ug/L	<0.5	11.7	8.0	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloromethane	3.0 ug/L	<3.0	<3.0	<3.0	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	<0.2	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	5.9	1.2	-
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-

Certificate of Analysis

Report Date: 18-Nov-2013
Order Date:13-Nov-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 15215

Project Description: PE2709

	Client ID:	BH1-GW2	BH2-GW3	BH4-GW3	-
	Sample Date:	12-Nov-13	12-Nov-13	12-Nov-13	-
	Sample ID:	1346233-01	1346233-02	1346233-03	-
	MDL/Units	Water	Water	Water	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	1.4	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	1.2	<0.5	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	1.6	-
o-Xylene	0.5 ug/L	<0.5	<0.5	1.1	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	2.8	-
4-Bromofluorobenzene	Surrogate	103%	98.5%	99.7%	-
Dibromofluoromethane	Surrogate	116%	118%	118%	-
Toluene-d8	Surrogate	98.9%	98.5%	97.9%	-

Certificate of Analysis

Report Date: 18-Nov-2013
Order Date:13-Nov-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 15215 Project Description: PE2709

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	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-Dichloroethylene, total	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						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	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						
1,2,4-Trichlorobenzene	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						
1,3,5-Trimethylbenzene	ND	0.5	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	*83.4*		*ug/L*		*104*	*50-140*			
Surrogate: Dibromofluoromethane	*91.8*		*ug/L*		*115*	*50-140*			
Surrogate: Toluene-d8	*78.0*		*ug/L*		*97.5*	*50-140*			

Certificate of Analysis

Report Date: 18-Nov-2013
Order Date:13-Nov-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 15215 Project Description: PE2709

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	370	5.0	ug/L	336			9.6	30	
Benzene	1.00	0.5	ug/L	ND			0.0	30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			0.0	30	
Chlorobenzene	ND	0.5	ug/L	ND			0.0	30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	2.25	0.5	ug/L	2.27			0.9	30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			0.0	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	1.06	0.5	ug/L	1.01			4.8	30	
Hexane	25.5	1.0	ug/L	22.0			14.4	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND			0.0	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND			0.0	30	
Toluene	254	0.5	ug/L	253			0.3	30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND			0.0	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			0.0	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			0.0	30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	7.88	0.5	ug/L	7.21			8.9	30	
o-Xylene	1.90	0.5	ug/L	1.83			3.8	30	
Surrogate: 4-Bromofluorobenzene	*78.9*		*ug/L*	*ND*	*98.6*	*50-140*			
Surrogate: Dibromofluoromethane	*89.6*		*ug/L*	*ND*	*112*	*50-140*			
Surrogate: Toluene-d8	*76.9*		*ug/L*	*ND*	*96.1*	*50-140*			

Certificate of Analysis

Report Date: 18-Nov-2013
Order Date:13-Nov-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 15215 Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	112	5.0	ug/L	ND	112	50-140			
Benzene	43.0	0.5	ug/L	ND	107	60-130			
Bromodichloromethane	29.3	0.5	ug/L	ND	73.2	60-130			
Bromoform	24.4	0.5	ug/L	ND	60.9	60-130			
Bromomethane	37.0	0.5	ug/L	ND	92.6	50-140			
Carbon Tetrachloride	24.7	0.2	ug/L	ND	61.7	60-130			
Chlorobenzene	39.8	0.5	ug/L	ND	99.4	60-130			
Chloroethane	36.9	1.0	ug/L	ND	92.3	50-140			
Chloroform	33.9	0.5	ug/L	ND	84.8	60-130			
Chloromethane	32.9	3.0	ug/L	ND	82.3	50-140			
Dibromochloromethane	25.4	0.5	ug/L	ND	63.4	60-130			
Dichlorodifluoromethane	37.1	1.0	ug/L	ND	92.6	50-140			
1,2-Dibromoethane	38.2	0.2	ug/L	ND	95.4	60-130			
1,2-Dichlorobenzene	34.5	0.5	ug/L	ND	86.3	60-130			
1,3-Dichlorobenzene	34.8	0.5	ug/L	ND	87.0	60-130			
1,4-Dichlorobenzene	31.7	0.5	ug/L	ND	79.2	60-130			
1,1-Dichloroethane	41.2	0.5	ug/L	ND	103	60-130			
1,2-Dichloroethane	31.1	0.5	ug/L	ND	77.7	60-130			
1,1-Dichloroethylene	41.9	0.5	ug/L	ND	105	60-130			
cis-1,2-Dichloroethylene	45.4	0.5	ug/L	ND	114	60-130			
trans-1,2-Dichloroethylene	49.4	0.5	ug/L	ND	124	60-130			
1,2-Dichloropropane	43.4	0.5	ug/L	ND	109	60-130			
cis-1,3-Dichloropropylene	38.3	0.5	ug/L	ND	95.8	60-130			
trans-1,3-Dichloropropylene	34.0	0.5	ug/L	ND	85.0	60-130			
Ethylbenzene	32.4	0.5	ug/L	ND	80.9	60-130			
Hexane	47.7	1.0	ug/L	ND	119	60-130			
Methyl Ethyl Ketone (2-Butanone)	97.2	5.0	ug/L	ND	97.2	50-140			
Methyl Butyl Ketone (2-Hexanone)	81.8	10.0	ug/L	ND	81.8	50-140			
Methyl Isobutyl Ketone	78.1	5.0	ug/L	ND	78.1	50-140			
Methyl tert-butyl ether	83.6	2.0	ug/L	ND	83.6	50-140			
Methylene Chloride	38.7	5.0	ug/L	ND	96.6	60-130			
Styrene	37.7	0.5	ug/L	ND	94.2	60-130			
1,1,1,2-Tetrachloroethane	29.0	0.5	ug/L	ND	72.4	60-130			
1,1,2,2-Tetrachloroethane	40.8	0.5	ug/L	ND	102	60-130			
Tetrachloroethylene	30.4	0.5	ug/L	ND	75.9	60-130			
Toluene	31.6	0.5	ug/L	ND	79.0	60-130			
1,2,4-Trichlorobenzene	26.1	0.5	ug/L	ND	65.2	60-130			
1,1,1-Trichloroethane	24.3	0.5	ug/L	ND	60.8	60-130			
1,1,2-Trichloroethane	41.2	0.5	ug/L	ND	103	60-130			
Trichloroethylene	37.6	0.5	ug/L	ND	94.1	60-130			
Trichlorofluoromethane	27.0	1.0	ug/L	ND	67.5	60-130			
1,3,5-Trimethylbenzene	28.9	0.5	ug/L	ND	72.2	60-130			
Vinyl chloride	36.2	0.5	ug/L	ND	90.5	50-140			
m,p-Xylenes	77.4	0.5	ug/L	ND	96.8	60-130			
o-Xylene	33.0	0.5	ug/L	ND	82.4	60-130			
Surrogate: 4-Bromofluorobenzene	*72.5*		*ug/L*		*90.6*	*50-140*			

Certificate of Analysis

Report Date: 18-Nov-2013
Order Date:13-Nov-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 15215 Project Description: PE2709

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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p: 1-800-749-1947
e: paracel@paracellabs.com
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Chain of Custody
(Lab Use Only)
Nº 99019

Page 1 of 1

Client Name: Paterson Group Inc.
Contact Name: Karyn Munch
Address: 154 Colonnade Rd S.
Telephone: 613-226-7381

Project Reference: PE2709
Quote #
PO # 15215
Email Address: kmunch@patersongroup.ca

TAT: [X] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

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

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

Required Analyses

Paracel Order Number: 1346233

	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)	Chloride						
1	BH1-GW2	GW		2	Nov.12/13	am		✓						✓						
2	BH2-GW3	GW		↓	↓	↓		✓						✓						
3	BH4-GW3	GW		↓	↓	↓		✓						✓						
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): KMunch.	Received by Driver/Depot: J Clouse	Received at Lab: SUNEEPORN	Verified By: MJ
Relinquished By (Print): KMunch	Date/Time: 13/11/13 2:36 PM	Date/Time: NOV 13 2013 03:47	Date/Time: Nov 13 13 4:36
Date/Time: NOV. 13, 2013.	Temperature: ____ °C	Temperature: 17.8 °C	pH Verified [ ] By: N/A

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Karyn Munch

Client PO: 56980
Project: PE2709
Custody:

Report Date: 14-Mar-2023
Order Date: 9-Mar-2023

Order #: 2310387

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

Paracel ID	Client ID
2310387-01	BH2-23-GW1
2310387-02	BH3-23-GW1
2310387-03	BH5-23-GW1
2310387-04	BH6-23-GW1
2310387-05	DUP1-23-GW1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 56980

Report Date: 14-Mar-2023

Order Date: 9-Mar-2023

Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	10-Mar-23	10-Mar-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	10-Mar-23	13-Mar-23
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	10-Mar-23	10-Mar-23

Certificate of Analysis

Report Date: 14-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2023

Client PO: 56980

Project Description: PE2709

	Client ID:	BH2-23-GW1	BH3-23-GW1	BH5-23-GW1	BH6-23-GW1
	Sample Date:	08-Mar-23 00:00	08-Mar-23 00:00	08-Mar-23 00:00	08-Mar-23 00:00
	Sample ID:	2310387-01	2310387-02	2310387-03	2310387-04
	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	<0.5	0.6	<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	2.5	<0.5	1.0
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	0.7	<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	17.0	<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	3.4	1.0	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Report Date: 14-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2023

Client PO: 56980

Project Description: PE2709

	Client ID:	BH2-23-GW1	BH3-23-GW1	BH5-23-GW1	BH6-23-GW1
	Sample Date:	08-Mar-23 00:00	08-Mar-23 00:00	08-Mar-23 00:00	08-Mar-23 00:00
	Sample ID:	2310387-01	2310387-02	2310387-03	2310387-04
	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	<0.5	3.2	22.0	<0.5
o-Xylene	0.5 ug/L	<0.5	1.0	2.0	<0.5
Xylenes, total	0.5 ug/L	<0.5	4.1	24.0	<0.5
4-Bromofluorobenzene	Surrogate	108%	109%	117%	108%
Dibromofluoromethane	Surrogate	105%	102%	115%	111%
Toluene-d8	Surrogate	110%	110%	108%	110%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	1210	<25
F2 PHCs (C10-C16)	100 ug/L	<100	-	266	<100
F3 PHCs (C16-C34)	100 ug/L	<100	-	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	-	<100	<100

Certificate of Analysis

Report Date: 14-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2023

Client PO: 56980

Project Description: PE2709

	Client ID:	DUP1-23-GW1	-	-	-
	Sample Date:	08-Mar-23 00:00	-	-	-
	Sample ID:	2310387-05	-	-	-
	MDL/Units	Ground Water	-	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	-	-	-
Benzene	0.5 ug/L	0.6	-	-	-
Bromodichloromethane	0.5 ug/L	<0.5	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-
Bromomethane	0.5 ug/L	<0.5	-	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	-	-	-
Chlorobenzene	0.5 ug/L	<0.5	-	-	-
Chloroform	0.5 ug/L	2.6	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	-	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Ethylene dibromide (dibromoethane, 1	0.2 ug/L	<0.2	-	-	-
Hexane	1.0 ug/L	<1.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	-	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	-	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	-	-	-
Methylene Chloride	5.0 ug/L	<5.0	-	-	-
Styrene	0.5 ug/L	<0.5	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	3.5	-	-	-

Certificate of Analysis

Report Date: 14-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2023

Client PO: 56980

Project Description: PE2709

	Client ID:	DUP1-23-GW1	-	-	-
	Sample Date:	08-Mar-23 00:00	-	-	-
	Sample ID:	2310387-05	-	-	-
	MDL/Units	Ground Water	-	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	-	-	-
Trichloroethylene	0.5 ug/L	<0.5	-	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	3.2	-	-	-
o-Xylene	0.5 ug/L	1.0	-	-	-
Xylenes, total	0.5 ug/L	4.2	-	-	-
4-Bromofluorobenzene	Surrogate	112%	-	-	-
Dibromofluoromethane	Surrogate	108%	-	-	-
Toluene-d8	Surrogate	109%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	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	*87.8*		*ug/L*		*110*	*50-140*			
Surrogate: Dibromofluoromethane	*82.0*		*ug/L*		*102*	*50-140*			
Surrogate: Toluene-d8	*88.8*		*ug/L*		*111*	*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	ND	0.5	ug/L	ND			NC	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	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*87.6*		*ug/L*		*109*	*50-140*			
Surrogate: Dibromofluoromethane	*85.5*		*ug/L*		*107*	*50-140*			
Surrogate: Toluene-d8	*87.9*		*ug/L*		*110*	*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)	1950	25	ug/L	ND	97.6	68-117			
F2 PHCs (C10-C16)	1780	100	ug/L	ND	111	60-140			
F3 PHCs (C16-C34)	4660	100	ug/L	ND	119	60-140			
F4 PHCs (C34-C50)	2500	100	ug/L	ND	101	60-140			
Volatiles									
Acetone	103	5.0	ug/L	ND	103	50-140			
Benzene	44.3	0.5	ug/L	ND	111	60-130			
Bromodichloromethane	48.2	0.5	ug/L	ND	120	60-130			
Bromoform	44.0	0.5	ug/L	ND	110	60-130			
Bromomethane	33.6	0.5	ug/L	ND	84.0	50-140			
Carbon Tetrachloride	44.1	0.2	ug/L	ND	110	60-130			
Chlorobenzene	44.0	0.5	ug/L	ND	110	60-130			
Chloroform	33.5	0.5	ug/L	ND	83.7	60-130			
Dibromochloromethane	41.9	0.5	ug/L	ND	105	60-130			
Dichlorodifluoromethane	49.9	1.0	ug/L	ND	125	50-140			
1,2-Dichlorobenzene	40.8	0.5	ug/L	ND	102	60-130			
1,3-Dichlorobenzene	39.6	0.5	ug/L	ND	99.0	60-130			
1,4-Dichlorobenzene	38.1	0.5	ug/L	ND	95.3	60-130			
1,1-Dichloroethane	41.9	0.5	ug/L	ND	105	60-130			
1,2-Dichloroethane	44.8	0.5	ug/L	ND	112	60-130			
1,1-Dichloroethylene	46.7	0.5	ug/L	ND	117	60-130			
cis-1,2-Dichloroethylene	41.4	0.5	ug/L	ND	104	60-130			
trans-1,2-Dichloroethylene	39.0	0.5	ug/L	ND	97.4	60-130			
1,2-Dichloropropane	50.2	0.5	ug/L	ND	126	60-130			
cis-1,3-Dichloropropylene	47.6	0.5	ug/L	ND	119	60-130			
trans-1,3-Dichloropropylene	41.8	0.5	ug/L	ND	104	60-130			
Ethylbenzene	47.0	0.5	ug/L	ND	117	60-130			
Ethylene dibromide (dibromoethane, 1,2-	47.4	0.2	ug/L	ND	119	60-130			
Hexane	41.0	1.0	ug/L	ND	102	60-130			
Methyl Ethyl Ketone (2-Butanone)	128	5.0	ug/L	ND	128	50-140			
Methyl Isobutyl Ketone	139	5.0	ug/L	ND	139	50-140			
Methyl tert-butyl ether	107	2.0	ug/L	ND	107	50-140			
Methylene Chloride	39.6	5.0	ug/L	ND	99.0	60-130			
Styrene	40.4	0.5	ug/L	ND	101	60-130			
1,1,1,2-Tetrachloroethane	43.4	0.5	ug/L	ND	108	60-130			
1,1,2,2-Tetrachloroethane	43.3	0.5	ug/L	ND	108	60-130			
Tetrachloroethylene	39.4	0.5	ug/L	ND	98.4	60-130			
Toluene	47.1	0.5	ug/L	ND	118	60-130			
1,1,1-Trichloroethane	46.4	0.5	ug/L	ND	116	60-130			
1,1,2-Trichloroethane	49.0	0.5	ug/L	ND	122	60-130			
Trichloroethylene	43.8	0.5	ug/L	ND	110	60-130			
Trichlorofluoromethane	49.8	1.0	ug/L	ND	125	60-130			
Vinyl chloride	34.1	0.5	ug/L	ND	85.2	50-140			
m,p-Xylenes	87.7	0.5	ug/L	ND	110	60-130			
o-Xylene	44.9	0.5	ug/L	ND	112	60-130			
Surrogate: 4-Bromofluorobenzene	*85.5*		*ug/L*		*107*	*50-140*			
Surrogate: Dibromofluoromethane	*67.1*		*ug/L*		*83.9*	*50-140*			
Surrogate: Toluene-d8	*84.3*		*ug/L*		*105*	*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: 2310387

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

Client Name: Paterson
Contact Name: Karyn Munch
Address: 9 Auriga Drive
Telephone: 613 226 7381

Project Ref: PE 2709
Quote #:
PO #: 56980
E-mail: kMunch@patersongroup.ca
sBerube@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)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
1	BH2-23-GW1	GW		3	March 8, 2023		X	X										
2	BH3-23-GW1			2				X										
3	BH5-23-GW1			3			X	X										
4	BH6-23-GW1			3			X	X										
5	DUP1-23-GW1			2				X										
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: M. LOUISE	Received at Lab:	Verified By:
Relinquished By (Print): Bryce Lee	Date/Time: 09/03/23 1519	Date/Time: Mar 9/23 434	Date/Time: Mar 10 2023 8:19
Date/Time: March 9 2023	Temperature: °C	Temperature: 2.8	pH Verified: ☐ By: NA

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Sam Berube

Client PO: 57092
Project: PE2709
Custody:

Report Date: 29-Mar-2023
Order Date: 24-Mar-2023

Order #: 2312554

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

Paracel ID	Client ID
2312554-01	BH3-23-GW2
2312554-02	BH5-23-GW2

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 57092

Report Date: 29-Mar-2023

Order Date: 24-Mar-2023

Project Description: PE2709

Analysis Summary Table

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

Certificate of Analysis

Report Date: 29-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 24-Mar-2023

Client PO: 57092

Project Description: PE2709

	Client ID:	BH3-23-GW2	BH5-23-GW2	-	-
	Sample Date:	23-Mar-23 09:00	23-Mar-23 09:00	-	-
	Sample ID:	2312554-01	2312554-02	-	-
	MDL/Units	Ground Water	Ground Water	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	-	-	-
Benzene	0.5 ug/L	<0.5	-	-	-
Bromodichloromethane	0.5 ug/L	<0.5	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-
Bromomethane	0.5 ug/L	<0.5	-	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	-	-	-
Chlorobenzene	0.5 ug/L	<0.5	-	-	-
Chloroform	0.5 ug/L	<0.5	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	-	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	-	-	-
Hexane	1.0 ug/L	<1.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	-	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	-	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	-	-	-
Methylene Chloride	5.0 ug/L	<5.0	-	-	-
Styrene	0.5 ug/L	<0.5	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	-	-	-

Certificate of Analysis

Report Date: 29-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 24-Mar-2023

Client PO: 57092

Project Description: PE2709

	Client ID:	BH3-23-GW2	BH5-23-GW2	-	-
	Sample Date:	23-Mar-23 09:00	23-Mar-23 09:00	-	-
	Sample ID:	2312554-01	2312554-02	-	-
	MDL/Units	Ground Water	Ground Water	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	-	-	-
Trichloroethylene	0.5 ug/L	<0.5	-	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
4-Bromofluorobenzene	Surrogate	131%	-	-	-
Dibromofluoromethane	Surrogate	96.5%	-	-	-
Toluene-d8	Surrogate	121%	-	-	-
Benzene	0.5 ug/L	-	<0.5	-	-
Ethylbenzene	0.5 ug/L	-	9.2	-	-
Toluene	0.5 ug/L	-	2.4	-	-
m,p-Xylenes	0.5 ug/L	-	11.5	-	-
o-Xylene	0.5 ug/L	-	1.4	-	-
Xylenes, total	0.5 ug/L	-	12.9	-	-
Toluene-d8	Surrogate	-	115%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	742	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
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	*106*		*ug/L*		*133*	*50-140*			
Surrogate: Dibromofluoromethane	*76.8*		*ug/L*		*96.0*	*50-140*			
Surrogate: Toluene-d8	*100*		*ug/L*		*125*	*50-140*			
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*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	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	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	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*99.7*		*ug/L*		*125*	*50-140*			
Surrogate: Dibromofluoromethane	*77.2*		*ug/L*		*96.6*	*50-140*			
Surrogate: Toluene-d8	*100*		*ug/L*		*126*	*50-140*			
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*100*		*ug/L*		*126*	*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)	1950	25	ug/L	ND	97.4	68-117			
F2 PHCs (C10-C16)	1870	100	ug/L	ND	117	60-140			
F3 PHCs (C16-C34)	4600	100	ug/L	ND	117	60-140			
F4 PHCs (C34-C50)	2530	100	ug/L	ND	102	60-140			
Volatiles									
Acetone	120	5.0	ug/L	ND	120	50-140			
Benzene	33.2	0.5	ug/L	ND	83.0	60-130			
Bromodichloromethane	34.5	0.5	ug/L	ND	86.2	60-130			
Bromoform	41.8	0.5	ug/L	ND	104	60-130			
Bromomethane	36.1	0.5	ug/L	ND	90.2	50-140			
Carbon Tetrachloride	35.9	0.2	ug/L	ND	89.7	60-130			
Chlorobenzene	38.6	0.5	ug/L	ND	96.6	60-130			
Chloroform	36.5	0.5	ug/L	ND	91.2	60-130			
Dibromochloromethane	42.2	0.5	ug/L	ND	105	60-130			
Dichlorodifluoromethane	40.9	1.0	ug/L	ND	102	50-140			
1,2-Dichlorobenzene	33.3	0.5	ug/L	ND	83.4	60-130			
1,3-Dichlorobenzene	36.1	0.5	ug/L	ND	90.3	60-130			
1,4-Dichlorobenzene	31.6	0.5	ug/L	ND	79.1	60-130			
1,1-Dichloroethane	38.0	0.5	ug/L	ND	95.1	60-130			
1,2-Dichloroethane	34.7	0.5	ug/L	ND	86.8	60-130			
1,1-Dichloroethylene	36.8	0.5	ug/L	ND	92.0	60-130			
cis-1,2-Dichloroethylene	35.1	0.5	ug/L	ND	87.8	60-130			
trans-1,2-Dichloroethylene	33.9	0.5	ug/L	ND	84.8	60-130			
1,2-Dichloropropane	30.3	0.5	ug/L	ND	75.8	60-130			
cis-1,3-Dichloropropylene	30.2	0.5	ug/L	ND	75.6	60-130			
trans-1,3-Dichloropropylene	32.1	0.5	ug/L	ND	80.3	60-130			
Ethylbenzene	36.7	0.5	ug/L	ND	91.7	60-130			
Ethylene dibromide (dibromoethane, 1,2-	38.9	0.2	ug/L	ND	97.3	60-130			
Hexane	35.4	1.0	ug/L	ND	88.4	60-130			
Methyl Ethyl Ketone (2-Butanone)	107	5.0	ug/L	ND	107	50-140			
Methyl Isobutyl Ketone	83.5	5.0	ug/L	ND	83.5	50-140			
Methyl tert-butyl ether	90.6	2.0	ug/L	ND	90.6	50-140			
Methylene Chloride	34.4	5.0	ug/L	ND	86.0	60-130			
Styrene	37.1	0.5	ug/L	ND	92.7	60-130			
1,1,1,2-Tetrachloroethane	40.6	0.5	ug/L	ND	102	60-130			
1,1,2,2-Tetrachloroethane	45.4	0.5	ug/L	ND	114	60-130			
Tetrachloroethylene	39.4	0.5	ug/L	ND	98.6	60-130			
Toluene	41.4	0.5	ug/L	ND	103	60-130			
1,1,1-Trichloroethane	34.1	0.5	ug/L	ND	85.3	60-130			
1,1,2-Trichloroethane	30.2	0.5	ug/L	ND	75.4	60-130			
Trichloroethylene	33.6	0.5	ug/L	ND	84.1	60-130			
Trichlorofluoromethane	37.9	1.0	ug/L	ND	94.7	60-130			
Vinyl chloride	42.6	0.5	ug/L	ND	107	50-140			
m,p-Xylenes	77.0	0.5	ug/L	ND	96.3	60-130			
o-Xylene	38.7	0.5	ug/L	ND	96.7	60-130			
Surrogate: 4-Bromofluorobenzene	*77.8*		*ug/L*		*97.3*	*50-140*			
Surrogate: Dibromofluoromethane	*75.8*		*ug/L*		*94.8*	*50-140*			
Surrogate: Toluene-d8	*81.7*		*ug/L*		*102*	*50-140*			

Certificate of Analysis

Report Date: 29-Mar-2023

Client: Paterson Group Consulting Engineers

Order Date: 24-Mar-2023

Client PO: 57092

Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	33.2	0.5	ug/L	ND	83.0	60-130			
Ethylbenzene	36.7	0.5	ug/L	ND	91.7	60-130			
Toluene	41.4	0.5	ug/L	ND	103	60-130			
m,p-Xylenes	77.0	0.5	ug/L	ND	96.3	60-130			
o-Xylene	38.7	0.5	ug/L	ND	96.7	60-130			
Surrogate: Toluene-d8	*81.7*		*ug/L*		*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

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 ID: 2312554

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
231554	

Client Name: Paterson	Project Ref: PE 2709	Page 1 of 1
Contact Name: Sam Berube	Quote #:	Turnaround Time
Address: 9 Auriga Drive	PO #: 57092	☐ 1 day ☐ 3 day
	E-mail: SBerube@patersongroup.ca	☐ 2 day ☑ Regular
Telephone: 613 226 7381		Date Required:

☑ REG 153/04 ☐ REG 406/19	Other Regulation	Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)	Required Analysis
☐ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO		
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA		
☑ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm		
☐ Table ___	Mun:		
For RSC: ☐ Yes ☐ No	☐ Other:		

	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	BH3-23-GW2	GW		3	March 23, 2023		X	X											
2	BH5-23-GW2	↓		↓	↓		X												
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Swift Courier

Relinquished By (Sign): Blue	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Bryce Lee	Date/Time: 23/03/24 6pm	Date/Time:	Date/Time: March 23, 2023 9:08
Date/Time: March 24, 2023	Temperature: 8.2 °C	Temperature:	pH Verified: ☐ By: NA

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Sam Berube

Client PO: 57798
Project: PE2709
Custody: 140789

Report Date: 7-Jul-2023
Order Date: 28-Jun-2023

Order #: 2326362

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

Paracel ID	Client ID
2326362-01	BH5-23-GW3

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57798**

Report Date: 07-Jul-2023

Order Date: 28-Jun-2023

Project Description: PE2709

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	2-Jul-23	2-Jul-23
PHC F1	CWS Tier 1 - P&T GC-FID	30-Jun-23	2-Jul-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	5-Jul-23	6-Jul-23

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57798**

Report Date: 07-Jul-2023

Order Date: 28-Jun-2023

Project Description: PE2709

	Client ID:	BH5-23-GW3	-	-	-
	Sample Date:	27-Jun-23 09:00	-	-	-
	Sample ID:	2326362-01	-	-	-
	MDL/Units	Ground Water	-	-	-
Volatiles					
Benzene	0.5 ug/L	1.2	-	-	-
Ethylbenzene	0.5 ug/L	10.7	-	-	-
Toluene	0.5 ug/L	1.0	-	-	-
m,p-Xylenes	0.5 ug/L	12.4	-	-	-
o-Xylene	0.5 ug/L	0.9	-	-	-
Xylenes, total	0.5 ug/L	13.2	-	-	-
Toluene-d8	Surrogate	104%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	1050	-	-	-
F2 PHCs (C10-C16)	100 ug/L	398	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57798**

Report Date: 07-Jul-2023

Order Date: 28-Jun-2023

Project Description: PE2709

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*84.9*		*ug/L*		*106*	*50-140*			

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: **57798**

Report Date: 07-Jul-2023

Order Date: 28-Jun-2023

Project Description: PE2709

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*84.4*		*ug/L*		*106*	*50-140*			

Certificate of Analysis
Client: **Paterson Group Consulting Engineers**
Client PO: **57798**

Report Date: 07-Jul-2023
Order Date: 28-Jun-2023
Project Description: PE2709

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1740	25	ug/L	ND	87.1	68-117			
F2 PHCs (C10-C16)	1930	100	ug/L	ND	121	60-140			
F3 PHCs (C16-C34)	4280	100	ug/L	ND	109	60-140			
F4 PHCs (C34-C50)	2420	100	ug/L	ND	97.6	60-140			
Volatiles									
Benzene	25.7	0.5	ug/L	ND	64.4	60-130			
Ethylbenzene	33.8	0.5	ug/L	ND	84.4	60-130			
Toluene	32.8	0.5	ug/L	ND	82.1	60-130			
m,p-Xylenes	67.5	0.5	ug/L	ND	84.4	60-130			
o-Xylene	32.5	0.5	ug/L	ND	81.2	60-130			
Surrogate: Toluene-d8	*80.0*		*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 crite
- When reported, data for F4G has been processed using a silica gel cleanup.

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Paracel ID: 2326362

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2326362	№ 140789

Client Name: Paterson Group Inc.	Project Ref: PE2709	Page 1 of 1
Contact Name: Samuel Berube	Quote #:	Turnaround Time
Address: 9 Auriga Drive	PO #: 57798	☐ 1 day ☐ 3 day ☐ 2 day ☑ Regular
Telephone: 613-226-7381	E-mail: sberube@patersongroup.ca	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	BHS-23-GW3	GW		3	June 27/23		✓											
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SD	Verified By: SD
Relinquished By (Print): Samuel Berube	Date/Time:	Date/Time: June 28, 2023	Date/Time: June 29, 2023 9:14am
Date/Time:	Temperature: °C	Temperature: 18.9 °C 3:35pm	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Sam Berube

Client PO: 58284
Project: PE2709
Custody:

Report Date: 8-Sep-2023
Order Date: 1-Sep-2023

Order #: 2335491

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

Paracel ID	Client ID
2335491-01	BH8-23-GW1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	7-Sep-23	7-Sep-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	6-Sep-23	6-Sep-23
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	7-Sep-23	7-Sep-23

	Client ID:	BH8-23-GW1	-	-	-	-	-
	Sample Date:	31-Aug-23 09:00	-	-	-	-	-
	Sample ID:	2335491-01	-	-	-		
	Matrix:	Ground Water	-	-	-		
	MDL/Units						
Volatiles							
Acetone	5 ug/L	<5.0	-	-	-	-	-
Benzene	0.5 ug/L	<0.5	-	-	-	-	-
Bromodichloromethane	0.5 ug/L	<0.5	-	-	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-	-	-
Bromomethane	0.5 ug/L	<0.5	-	-	-	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	-	-	-	-	-
Chlorobenzene	0.5 ug/L	<0.5	-	-	-	-	-
Chloroform	0.5 ug/L	9.6	-	-	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-	-	-
Dichlorodifluoromethane	1 ug/L	<1.0	-	-	-	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	-	-	-	-	-
Ethylene dibromide (dibromoethane,	0.2 ug/L	<0.2	-	-	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-	-	-
Hexane	1 ug/L	<1.0	-	-	-	-	-

	Client ID:	BH8-23-GW1	-	-	-	-	-
	Sample Date:	31-Aug-23 09:00	-	-	-	-	-
	Sample ID:	2335491-01	-	-	-		
	Matrix:	Ground Water	-	-	-		
	MDL/Units						
Volatiles							
Methyl Ethyl Ketone (2-Butanone)	5 ug/L	<5.0	-	-	-	-	-
Methyl Isobutyl Ketone	5 ug/L	<5.0	-	-	-	-	-
Methyl tert-butyl ether	2 ug/L	<2.0	-	-	-	-	-
Methylene Chloride	5 ug/L	<5.0	-	-	-	-	-
Styrene	0.5 ug/L	<0.5	-	-	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	-	-	-	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	-	-	-	-	-
Trichloroethylene	0.5 ug/L	<0.5	-	-	-	-	-
Trichlorofluoromethane	1 ug/L	<1.0	-	-	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-	-	-
4-Bromofluorobenzene	Surrogate	112%	-	-	-	-	-
Dibromofluoromethane	Surrogate	112%	-	-	-	-	-
Toluene-d8	Surrogate	95.0%	-	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<476 [1]	-	-	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<476 [1]	-	-	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<476 [1]	-	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	25	ug/L					
F2 PHCs (C10-C16)	ND	100	ug/L					
F3 PHCs (C16-C34)	ND	100	ug/L					
F4 PHCs (C34-C50)	ND	100	ug/L					
Volatiles								
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					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*90.5*		*%*	*113*	*50-140*			
Surrogate: Dibromofluoromethane	*87.8*		*%*	*110*	*50-140*			
Surrogate: Toluene-d8	*77.5*		*%*	*96.9*	*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	1.81	0.5	ug/L	1.40			25.5	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	3.48	0.5	ug/L	2.81			21.3	30	
Dibromochloromethane	1.95	0.5	ug/L	1.84			5.8	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	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*98.8*		*%*		*123*	*50-140*			
Surrogate: Dibromofluoromethane	*102*		*%*		*128*	*50-140*			
Surrogate: Toluene-d8	*79.9*		*%*		*99.9*	*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)	1840	25	ug/L	ND	92.1	85-115			
F2 PHCs (C10-C16)	1540	100	ug/L	ND	96.2	60-140			
F3 PHCs (C16-C34)	4720	100	ug/L	ND	120	60-140			
F4 PHCs (C34-C50)	2710	100	ug/L	ND	109	60-140			
Volatiles									
Acetone	98.3	5.0	ug/L	ND	98.3	50-140			
Benzene	36.7	0.5	ug/L	ND	91.8	60-130			
Bromodichloromethane	38.0	0.5	ug/L	ND	95.0	60-130			
Bromoform	45.1	0.5	ug/L	ND	113	60-130			
Bromomethane	45.5	0.5	ug/L	ND	114	50-140			
Carbon Tetrachloride	38.3	0.2	ug/L	ND	95.6	60-130			
Chlorobenzene	39.5	0.5	ug/L	ND	98.7	60-130			
Chloroform	38.9	0.5	ug/L	ND	97.3	60-130			
Dibromochloromethane	43.3	0.5	ug/L	ND	108	60-130			
Dichlorodifluoromethane	39.8	1.0	ug/L	ND	99.6	50-140			
1,2-Dichlorobenzene	44.2	0.5	ug/L	ND	111	60-130			
1,3-Dichlorobenzene	42.8	0.5	ug/L	ND	107	60-130			
1,4-Dichlorobenzene	42.9	0.5	ug/L	ND	107	60-130			
1,1-Dichloroethane	34.9	0.5	ug/L	ND	87.4	60-130			
1,2-Dichloroethane	35.0	0.5	ug/L	ND	87.6	60-130			
1,1-Dichloroethylene	44.5	0.5	ug/L	ND	111	60-130			
cis-1,2-Dichloroethylene	42.6	0.5	ug/L	ND	106	60-130			
trans-1,2-Dichloroethylene	42.1	0.5	ug/L	ND	105	60-130			
1,2-Dichloropropane	33.7	0.5	ug/L	ND	84.2	60-130			
cis-1,3-Dichloropropylene	41.2	0.5	ug/L	ND	103	60-130			
trans-1,3-Dichloropropylene	42.8	0.5	ug/L	ND	107	60-130			
Ethylbenzene	36.0	0.5	ug/L	ND	90.0	60-130			
Ethylene dibromide (dibromoethane, 1,2-)	41.7	0.2	ug/L	ND	104	60-130			
Hexane	47.5	1.0	ug/L	ND	119	60-130			
Methyl Ethyl Ketone (2-Butanone)	95.4	5.0	ug/L	ND	95.4	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl Isobutyl Ketone	84.4	5.0	ug/L	ND	84.4	50-140			
Methyl tert-butyl ether	92.8	2.0	ug/L	ND	92.8	50-140			
Methylene Chloride	49.4	5.0	ug/L	ND	123	60-130			
Styrene	37.1	0.5	ug/L	ND	92.8	60-130			
1,1,1,2-Tetrachloroethane	39.5	0.5	ug/L	ND	98.8	60-130			
1,1,2,2-Tetrachloroethane	33.9	0.5	ug/L	ND	84.7	60-130			
Tetrachloroethylene	45.0	0.5	ug/L	ND	113	60-130			
Toluene	37.3	0.5	ug/L	ND	93.2	60-130			
1,1,1-Trichloroethane	39.6	0.5	ug/L	ND	99.0	60-130			
1,1,2-Trichloroethane	38.3	0.5	ug/L	ND	95.8	60-130			
Trichloroethylene	38.1	0.5	ug/L	ND	95.2	60-130			
Trichlorofluoromethane	42.0	1.0	ug/L	ND	105	60-130			
Vinyl chloride	42.8	0.5	ug/L	ND	107	50-140			
m,p-Xylenes	74.5	0.5	ug/L	ND	93.1	60-130			
o-Xylene	34.5	0.5	ug/L	ND	86.2	60-130			
Surrogate: 4-Bromofluorobenzene	*78.8*		*%*		*98.5*	*50-140*			
Surrogate: Dibromofluoromethane	*87.4*		*%*		*109*	*50-140*			
Surrogate: Toluene-d8	*86.6*		*%*		*108*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

1: Elevated Reporting Limits due to limited sample volume.

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: 2335491

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2335491	

Client Name: Paterson Group	Project Ref: PE2709
Contact Name: Samuel Berube	Quote #:
Address: 9 Auriga Dr, Ottawa	PO #: 58284
Telephone: 613 226 7381	E-mail: sberube@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)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
1	BH8-23-GW1	GW		3	Aug 31/23		X	X										
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Walk-in

Relinquished By (Sign): Trudy Blair	Received By Driver/Depot:	Received at Lab: HP	Verified By: SD
Relinquished By (Print): Trudy Blair	Date/Time:	Date/Time: Sept 1, 23 16:11	Date/Time: Sept 1, 2023 4:41pm
Date/Time: Sept 1 2023	Temperature: °C	Temperature: 10.7°C	pH Verified: ☐ By:

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Certificate of Analysis

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

Client PO: 60290
Project: PE6422
Custody:

Report Date: 31-May-2024
Order Date: 27-May-2024

Order #: 2422099

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

Paracel ID	Client ID
2422099-01	BH1-24-GW1
2422099-02	BH3-24-GW1
2422099-03	BH4-24-GW1

Approved By:

Dale Robertson, BSc
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	28-May-24	28-May-24
Chromium, hexavalent - water	MOE E3056 - colourimetric	28-May-24	28-May-24
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	28-May-24	28-May-24
Metals, ICP-MS	EPA 200.8 - ICP-MS	28-May-24	29-May-24
PHC F1	CWS Tier 1 - P&T GC-FID	28-May-24	28-May-24
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	30-May-24	31-May-24
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	30-May-24	31-May-24

Certificate of Analysis

Report Date: 31-May-2024

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

Order Date: 27-May-2024

Client PO: **60290**

Project Description: PE6422

	Client ID:	BH1-24-GW1	BH3-24-GW1	BH4-24-GW1	-	-	-
	Sample Date:	22-May-24 12:20	22-May-24 12:30	22-May-24 12:40	-		
	Sample ID:	2422099-01	2422099-02	2422099-03	-		
	Matrix:	Ground Water	Ground Water	Ground Water	-		
	MDL/Units						
Metals							
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	-	-	-
Antimony	0.5 ug/L	0.5	0.8	0.7	-	-	-
Arsenic	1 ug/L	<1	<1	1	-	-	-
Barium	1 ug/L	831	882	377	-	-	-
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	-	-	-
Boron	10 ug/L	403	164	172	-	-	-
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	-	-	-
Chromium (VI)	10 ug/L	<10	<10	<10	-	-	-
Chromium	1 ug/L	<1	<1	<1	-	-	-
Cobalt	0.5 ug/L	<0.5	<0.5	<0.5	-	-	-
Copper	0.5 ug/L	2.3	2.7	2.6	-	-	-
Lead	0.1 ug/L	1.1	0.4	0.6	-	-	-
Molybdenum	0.5 ug/L	5.7	9.7	12.1	-	-	-
Nickel	1 ug/L	1	2	1	-	-	-
Selenium	1 ug/L	<1	<1	4	-	-	-
Silver	0.1 ug/L	<0.1	<0.1	<0.1	-	-	-
Sodium	200 ug/L	908000	1430000	783000	-	-	-
Thallium	0.1 ug/L	0.1	0.1	0.1	-	-	-
Uranium	0.1 ug/L	1.6	3.9	2.5	-	-	-
Vanadium	0.5 ug/L	1.2	0.6	0.7	-	-	-
Zinc	5 ug/L	<5	<5	<5	-	-	-
Volatiles							
Benzene	0.5 ug/L	<0.5	-	-	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-	-	-

	Client ID:	BH1-24-GW1	BH3-24-GW1	BH4-24-GW1	-	-	-
	Sample Date:	22-May-24 12:20	22-May-24 12:30	22-May-24 12:40	-		
	Sample ID:	2422099-01	2422099-02	2422099-03	-		
	Matrix:	Ground Water	Ground Water	Ground Water	-		
	MDL/Units						
Volatiles							
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-	-	-
Toluene-d8	Surrogate	100%	-	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-	-	-
F4 PHCs (C34-C50)	100 ug/L	282	-	-	-	-	-
Semi-Volatiles							
Acenaphthene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Acenaphthylene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Anthracene	0.01 ug/L	<0.01	<0.01	<0.01	-	-	-
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	<0.01	-	-	-
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	<0.01	-	-	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Chrysene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Fluoranthene	0.01 ug/L	<0.01	<0.01	<0.01	-	-	-
Fluorene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-

	Client ID:	BH1-24-GW1	BH3-24-GW1	BH4-24-GW1	-		
	Sample Date:	22-May-24 12:20	22-May-24 12:30	22-May-24 12:40	-	-	-
	Sample ID:	2422099-01	2422099-02	2422099-03	-		
	Matrix:	Ground Water	Ground Water	Ground Water	-		
	MDL/Units						
Semi-Volatiles							
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	<0.10	-	-	-
Naphthalene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Phenanthrene	0.05 ug/L	<0.05	<0.05	<0.05	-	-	-
Pyrene	0.01 ug/L	<0.01	<0.01	<0.01	-	-	-
2-Fluorobiphenyl	Surrogate	63.0%	60.5%	61.4%	-	-	-
Terphenyl-d14	Surrogate	88.3%	93.3%	96.3%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	25	ug/L					
F2 PHCs (C10-C16)	ND	100	ug/L					
F3 PHCs (C16-C34)	ND	100	ug/L					
F4 PHCs (C34-C50)	ND	100	ug/L					
Metals								
Mercury	ND	0.1	ug/L					
Antimony	ND	0.5	ug/L					
Arsenic	ND	1	ug/L					
Barium	ND	1	ug/L					
Beryllium	ND	0.5	ug/L					
Boron	ND	10	ug/L					
Cadmium	ND	0.1	ug/L					
Chromium (VI)	ND	10	ug/L					
Chromium	ND	1	ug/L					
Cobalt	ND	0.5	ug/L					
Copper	ND	0.5	ug/L					
Lead	ND	0.1	ug/L					
Molybdenum	ND	0.5	ug/L					
Nickel	ND	1	ug/L					
Selenium	ND	1	ug/L					
Silver	ND	0.1	ug/L					
Sodium	ND	200	ug/L					
Thallium	ND	0.1	ug/L					
Uranium	ND	0.1	ug/L					
Vanadium	ND	0.5	ug/L					
Zinc	ND	5	ug/L					
Semi-Volatiles								
Acenaphthene	ND	0.05	ug/L					
Acenaphthylene	ND	0.05	ug/L					
Anthracene	ND	0.01	ug/L					
Benzo [a] anthracene	ND	0.01	ug/L					
Benzo [a] pyrene	ND	0.01	ug/L					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzo [b] fluoranthene	ND	0.05	ug/L					
Benzo [g,h,i] perylene	ND	0.05	ug/L					
Benzo [k] fluoranthene	ND	0.05	ug/L					
Chrysene	ND	0.05	ug/L					
Dibenzo [a,h] anthracene	ND	0.05	ug/L					
Fluoranthene	ND	0.01	ug/L					
Fluorene	ND	0.05	ug/L					
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L					
1-Methylnaphthalene	ND	0.05	ug/L					
2-Methylnaphthalene	ND	0.05	ug/L					
Methylnaphthalene (1&2)	ND	0.10	ug/L					
Naphthalene	ND	0.05	ug/L					
Phenanthrene	ND	0.05	ug/L					
Pyrene	ND	0.01	ug/L					
Surrogate: 2-Fluorobiphenyl	*16.4*		*%*	*81.8*	*50-140*			
Surrogate: Terphenyl-d14	*25.1*		*%*	*125*	*50-140*			
Volatiles								
Benzene	ND	0.5	ug/L					
Ethylbenzene	ND	0.5	ug/L					
Toluene	ND	0.5	ug/L					
m,p-Xylenes	ND	0.5	ug/L					
o-Xylene	ND	0.5	ug/L					
Xylenes, total	ND	0.5	ug/L					
Surrogate: Toluene-d8	*78.1*		*%*	*97.6*	*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									
Mercury	ND	0.1	ug/L	ND			NC	20	
Antimony	ND	0.5	ug/L	ND			NC	20	
Arsenic	1.3	1	ug/L	1.3			1.4	20	
Barium	90.7	1	ug/L	86.8			4.4	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	36	10	ug/L	38			3.6	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Chromium (VI)	ND	10	ug/L	ND			NC	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	8.75	0.5	ug/L	9.06			3.5	20	
Copper	ND	0.5	ug/L	ND			NC	20	
Lead	0.23	0.1	ug/L	0.32			NC	20	
Molybdenum	0.50	0.5	ug/L	ND			NC	20	
Nickel	1.9	1	ug/L	1.9			3.0	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	82200	200	ug/L	88500			7.4	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Uranium	0.3	0.1	ug/L	0.3			4.1	20	
Vanadium	2.17	0.5	ug/L	2.19			1.1	20	
Zinc	ND	5	ug/L	ND			NC	20	
Volatiles									
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*79.0*		*%*		*98.8*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1820	25	ug/L	ND	91.0	85-115			
F2 PHCs (C10-C16)	1230	100	ug/L	ND	76.6	60-140			
F3 PHCs (C16-C34)	3360	100	ug/L	ND	85.8	60-140			
F4 PHCs (C34-C50)	2170	100	ug/L	ND	87.5	60-140			
Metals									
Mercury	2.87	0.1	ug/L	ND	95.7	70-130			
Arsenic	53.4	1	ug/L	1.3	104	80-120			
Barium	137	1	ug/L	86.8	99.6	80-120			
Beryllium	50.6	0.5	ug/L	ND	101	80-120			
Boron	80	10	ug/L	38	84.9	80-120			
Cadmium	51.0	0.1	ug/L	ND	102	80-120			
Chromium (VI)	190	10	ug/L	ND	95.0	70-130			
Chromium	53.2	1	ug/L	ND	105	80-120			
Cobalt	59.1	0.5	ug/L	9.06	100	80-120			
Copper	48.5	0.5	ug/L	ND	96.1	80-120			
Lead	43.3	0.1	ug/L	0.32	86.0	80-120			
Molybdenum	46.6	0.5	ug/L	ND	92.3	80-120			
Nickel	51.0	1	ug/L	1.9	98.1	80-120			
Selenium	46.5	1	ug/L	ND	92.1	80-120			
Silver	42.1	0.1	ug/L	ND	84.2	80-120			
Sodium	9910	200	ug/L	ND	99.1	80-120			
Thallium	45.9	0.1	ug/L	ND	91.6	80-120			
Uranium	46.0	0.1	ug/L	0.3	91.4	80-120			
Vanadium	56.8	0.5	ug/L	2.19	109	80-120			
Zinc	46	5	ug/L	ND	90.1	80-120			
Semi-Volatiles									
Acenaphthene	4.43	0.05	ug/L	ND	88.5	50-140			
Acenaphthylene	4.74	0.05	ug/L	ND	94.9	50-140			
Anthracene	5.18	0.01	ug/L	ND	104	50-140			
Benzo [a] anthracene	4.02	0.01	ug/L	ND	80.5	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzo [a] pyrene	3.84	0.01	ug/L	ND	76.9	50-140			
Benzo [b] fluoranthene	3.98	0.05	ug/L	ND	79.5	50-140			
Benzo [g,h,i] perylene	3.87	0.05	ug/L	ND	77.3	50-140			
Benzo [k] fluoranthene	4.99	0.05	ug/L	ND	99.8	50-140			
Chrysene	4.13	0.05	ug/L	ND	82.5	50-140			
Dibenzo [a,h] anthracene	3.83	0.05	ug/L	ND	76.7	50-140			
Fluoranthene	5.06	0.01	ug/L	ND	101	50-140			
Fluorene	4.22	0.05	ug/L	ND	84.4	50-140			
Indeno [1,2,3-cd] pyrene	3.87	0.05	ug/L	ND	77.3	50-140			
1-Methylnaphthalene	4.01	0.05	ug/L	ND	80.3	50-140			
2-Methylnaphthalene	4.00	0.05	ug/L	ND	80.0	50-140			
Naphthalene	4.19	0.05	ug/L	ND	83.8	50-140			
Phenanthrene	4.55	0.05	ug/L	ND	91.0	50-140			
Pyrene	5.12	0.01	ug/L	ND	102	50-140			
Surrogate: 2-Fluorobiphenyl	*15.7*		*%*		*78.5*	*50-140*			
Surrogate: Terphenyl-d14	*22.4*		*%*		*112*	*50-140*			
Volatiles									
Benzene	35.7	0.5	ug/L	ND	89.2	60-130			
Ethylbenzene	37.3	0.5	ug/L	ND	93.3	60-130			
Toluene	37.1	0.5	ug/L	ND	92.8	60-130			
m,p-Xylenes	74.0	0.5	ug/L	ND	92.4	60-130			
o-Xylene	34.4	0.5	ug/L	ND	86.0	60-130			

Qualifier Notes:

QC Qualifiers:

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: 2422099

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2422099	

Client Name: PATERSON	Project Ref: PE 6422	Page 1 of 1
Contact Name: KAMYN MUNCH	Quote #:	Turnaround Time
Address: 9 AURIGA Dr. NEPEAN, ON.	PO #: 60290	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: KMUNCH@PATERSONGROUP.CA	Date Required:

☒ REG 153/04 ☐ REG 406/19

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

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

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	PHC/BTEX(F1-F4)	ICP METALS	Hg	CrVI	PAHs							
1	BH1-24-GW1	GW	—	7	MAY 22/24	12:20p	X	X	X	X	X							
2	~~BH2~~ BH3-24-GW1	↓	—	~~6~~	↓	12:30p		X	X	X	X							
3	BH4-24-GW1	↓	—	4	↓	12:40p		X	X	X	X							
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received at Depot:	Received at Lab: SS	Verified By: SO
Relinquished By (Print): DOMINIC LANDRY	Date/Time:	Date/Time: 27 May 24 1629	Date/Time: May 28, 2024 9:01am
Date/Time: MAY 27 - 2024	Temperature: °C	Temperature: 15.2	pH Verified: ☒ By: SO

Chain of Custody (Blank).xlsx Revision 5.0

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Subcontracted Analysis

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

Paracel Report No.	**2420225**
Client Project(s):	**PE6422**
Client PO:	**60196**
Reference:	**#24-017 Standing Offer 2024**
CoC Number:	

Order Date:	14-May-24
Report Date:	31-May-24

Sample(s) from this project were subcontracted for the listed parameters. A copy of the subcontractor's report is attached

Paracel ID	Client ID	Analysis
2420225-10	BH4-24-SS3	Methyl Mercury - soil

CERTIFICATE OF ANALYSIS

Work Order	: **WT2413665**	Page	: 1 of 2
Client	: **Paracel Laboratories Ltd**	Laboratory	: ALS Environmental - Waterloo
Contact	: Mark Foto	Account Manager	: Costas Farassoglou
Address	: 2319 St. Laurent Blvd. Unit 300 Ottawa ON Canada K1G 4J8	Address	: 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	: 613 731 9577	Telephone	: 613 225 8279
Project	: 2420225	Date Samples Received	: 28-May-2024 12:10
PO	: ----	Date Analysis Commenced	: 02-Jun-2024
C-O-C number	: ----	Issue Date	: 13-Jun-2024 09:08
Sampler	: CLIENT		
Site	: ----		
Quote number	: Standing Offer 2024		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/kg	micrograms per kilogram

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Soil/Solid** (Matrix: **Soil/Solid**)					*Client sample ID*	**BH4-24-SS3**	----	----	----	----
					Client sampling date / time	09-May-2024 09:00	----	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*		**WT2413665-001**	--------	--------	--------	--------
						Result	----	----	----	----
Speciated Metals										
Methylmercury (as MeHg)	22967-92-6	E538/VA	0.050	µg/kg		<0.050	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2413665**	Page	: 1 of 5
Client	: **Paracel Laboratories Ltd**	Laboratory	: ALS Environmental - Waterloo
Contact	: Mark Foto	Account Manager	: Costas Farassoglou
Address	: 2319 St. Laurent Blvd. Unit 300 Ottawa ON Canada K1G 4J8	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 613 731 9577	Telephone	: 613 225 8279
Project	: 2420225	Date Samples Received	: 28-May-2024 12:10
PO	: ----	Issue Date	: 13-Jun-2024 09:08
C-O-C number	: ----		
Sampler	: CLIENT		
Site	: ----		
Quote number	: Standing Offer 2024		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Methylmercury in Soil by GCAFS										
Glass soil jar/Teflon lined cap [ON MECP]										
BH4-24-SS3	E538	09-May-2024	07-Jun-2024	28 days	29 days	× EHT	10-Jun-2024	28 days	3 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Methylmercury in Soil by GCAFS	E538	1479163	1	11	9.0	5.0	✓
Laboratory Control Samples (LCS)							
Methylmercury in Soil by GCAFS	E538	1479163	2	11	18.1	10.0	✓
Method Blanks (MB)							
Methylmercury in Soil by GCAFS	E538	1479163	1	11	9.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Methylmercury in Soil by GCAFS	E538 ALS Environmental - Vancouver	Soil/Solid	DeWild et al. (2004)/EPA 1630 (mod)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Methylmercury Soil Digestion	EP538 ALS Environmental - Vancouver	Soil/Solid	DeWild et al. (2004)	This method follows procedures published by DeWild, Olund, Olsen and Tate (2004) for the US Geological Survey (Techniques and Methods 5A-7). Samples are leached with an acidic copper sulphate solution to solubilize methylmercury for inorganic complexes. The methylmercury is then extracted into dichloromethane and then an aliquot is back extracted into ultra-pure water. The extract is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolized to elemental Hg and quantified by cold vapour atomic flourescence spectroscopy. Results are reported "as MeHg".

QUALITY CONTROL REPORT

Work Order	: **WT2413665**	Page	: 1 of 3
Client	: Paracel Laboratories Ltd	Laboratory	: ALS Environmental - Waterloo
Contact	: Mark Foto	Account Manager	: Costas Farassoglou
Address	: 2319 St. Laurent Blvd. Unit 300 Ottawa ON Canada K1G 4J8	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 613 731 9577	Telephone	: 613 225 8279
Project	: 2420225	Date Samples Received	: 28-May-2024 12:10
PO	: ----	Date Analysis Commenced	: 02-Jun-2024
C-O-C number	: ----	Issue Date	: 13-Jun-2024 09:08
Sampler	: CLIENT		
Site	: ----		
Quote number	: Standing Offer 2024		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Kinny Wu	Lab Analyst	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Speciated Metals (QC Lot: 1479163)											
VA24B0502-001	Anonymous	Methylmercury (as MeHg)	22967-92-6	E538	0.050	µg/kg	0.230	0.133	0.097	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Speciated Metals (QCLot: 1479163)						
Methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 1479163)									
Methylmercury (as MeHg)	22967-92-6	E538	0.05	µg/kg	10 µg/kg	92.1	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Speciated Metals (QCLot: 1479163)									
QC-1479163-003	RM	Methylmercury (as MeHg)	22967-92-6	E538	14.8 µg/kg	108	70.0	130	----

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300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Subcontract Order

SENDING LABORATORY:

Paracel Laboratories Ltd.
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8
Phone: 613-731-9577
Fax: 613-731-9064

RECEIVING LABORATORY:

ALS Laboratory Group (Vancouver)
8081 Lougheed Highway
Burnaby, BC V5A 1W9
Phone: (604) 253-4188
Fax:

INVOICE TO:

Paracel Laboratories Ltd.
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8
Phone: 613-731-9577
Fax: 613-731-9064

Date Requested: **15-May-24**
Project Number: **2420225**
Submitted By: **Sarah Scullion**

Required Regulation	Reg 153
Turnaround Time	Standard

Sample ID	Matrix	Analyses Requested:	Sampled	Comments
BH4-24-SS3	Soil	Methyl Mercury - soil	09-May-24 09:00	

BB 05/29/24
8.4° 10:10

Environmental Division
Waterloo
Work Order Reference
WT2413665

Telephone : +1 519 886 6910

RECEIVED
29-05-2024

AB Sublet

Please email all results to mfoto@paracellabs.com, dbloom@paracellabs.com, drobertson@paracellabs.com

Released By — May 28/24 8:40
Date / Time

Lara R. — 28/05/24
Received By — Date

Temperature prior to Shipping: 10.0

13.5°C → ICE PACK
12:10

PARACEL LABORATORIES LTD.

Paracel ID: 2420225

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2420225	

Client Name: Paterson Group Inc.	Project Ref: PE6422	Page 1 of 2
Contact Name: Jeremy Camposarcone	Quote #:	**Turnaround Time**
Address: 9 AURIGA DRIVE, OTTAWA ON K2E 7T9	PO #: 60196	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: jcamposarcone@patersongroup.ca, kmunch@patersongroup.ca	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	PHC F1-F4 + BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH	EC	SAR		
1	BH1-24-AU1	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
2	BH1-24-SS3	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
3	BH1-24-SS5	S		2	5/8/2024		✔		✔	✔	✔	✔		✔	✔	✔		
4	BH2-24-AU1	S		2	5/8/2024		✔		✔	✔	✔	✔		✔	✔	✔		
5	BH2-24-SS3	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
6	BH3-24-AU1	S		2	5/9/2024		✔		✔	✔	✔	✔			✔	✔		
7	BH3-24-SS5	S		2	5/9/2024		✔			✔				✔	✔	✔		
8	BH4-24-AU1	S		2	5/9/2024		✔		✔	✔	✔	✔			✔	✔		
9	BH4-24-SS2	S		2	5/9/2024		✔		✔	✔	✔	✔			✔	✔		
10	BH4-24-SS3	S		2	5/9/2024					HOLD								

Comments: HOLD - BH4-24-SS3

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SO	Verified By: SS
Relinquished By (Print): Jeremy Camposarcone	Date/Time:	Date/Time: May 14, 2024 4:25pm	Date/Time: 15 May 24 0928
Date/Time: 5/13/2024	Temperature: °C	Temperature: 12.7	pH Verified: ☐ NA By:

PARACEL LABORATORIES LTD.

Paracel ID: 2420225

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2420225	

Client Name: Paterson Group Inc.	Project Ref: PE6422	Page 2 of 2
Contact Name: Jeremy Camposarcone	Quote #:	**Turnaround Time**
Address: 9 AURIGA DRIVE, OTTAWA ON K2E 7T9	PO #: 60196	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: jcamposarcone@patersongroup.ca, kmunch@patersongroup.ca	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	PHC F1-F4 + BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH	EC	SAR		
1	BH4-24-SS6	S		2	5/9/2024		✔			✔					✔	✔		
2	BH5-24-AU1	S		2	5/9/2024		✔		✔	✔	✔	✔		✓	✔	✔		
3	BH5-24-SS2(BOTTOM)	S		~~2~~ 3	5/9/2024		✔			✔					✔	✔		
4	DUP1	S		2	5/8/2024		✔		✔	✔	✔	✔			✔	✔		
5	DUP2	S		2	5/9/2024		✔			✔					✔	✔		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SO	Verified By: SS
Relinquished By (Print): Jeremy Camposarcone	Date/Time:	Date/Time: May 14, 2024 4:25pm	Date/Time: 15 May 24 0928
Date/Time: 5/13/2024	Temperature: °C	Temperature: 12.7	pH Verified: ☐ NA By: