



Geotechnical
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Materials Testing

Building Science

Phase II Environmental Site Assessment

1354 and 1376 Carling Avenue
Ottawa, Ontario

Prepared For

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EXECUTIVE SUMMARY

Assessment

Paterson Group was retained by Holloway Lodging Limited Partnership, to prepare an updated Phase II Environmental Site Assessment for the property addressed 1354 and 1376 Carling Avenue, in the City of Ottawa, Ontario.

This report updates the findings of a 2016 Phase II ESA report (Report PE3896-2), the purpose of which was to address areas of potential environmental concern (APECs) identified on the property during the 2016 Phase I ESA carried out by Paterson. It should be noted that the Phase I ESA was updated in 2021, at which time an additional APEC was identified on the Phase II Property: an underground storage tank was identified on the north-central portion of the site.

This report incorporates the findings of the 2016 Phase II ESA report as well as the findings of more recent subsurface investigations at the Phase II Property.

The initial 2016 Phase II ESA, carried out in conjunction with a Geotechnical Investigation, consisted of drilling 13 boreholes of which six were completed with monitoring well installations. A supplemental Geotechnical Investigation was carried out in 2017. At this time five additional borehole were drilled; BH5-17, the only environmental borehole, was installed with a groundwater monitoring well. In 2021 two additional boreholes with monitoring well installations were advanced on the Phase II Property, as well as 26 test pits. The test pits were carried out for delineation purposes as well as to confirm the soil quality for off-site disposal purposes in accordance with O.Reg. 406/19.

Soil samples obtained from the boreholes were screened using visual observations and vapour measurements. Site stratigraphy general consists of topsoil or pavement structure over fill material, underlain by native silty clay, followed by glacial till (consisting of a silty clay matrix over a sandy silt to silty sand matrix). The fill material beneath the pavement structure generally consists of brown silty sand or clay with gravel and traces of topsoil at some locations and was considered to be reworked native material.

Poor quality fill material, darker in colour and with occasional fragments of building debris or asphalt was noted at BH10 and BH5. Pieces of what appeared to be coal or slag material were also identified in the fill material recovered from BH10.

The results of the combustible vapour screening identified readings ranging from less than 5 to 35 ppm, which are not indicative of volatile substances. There were however hydrocarbon odours detected in samples recovered from BH5 and BH10 as well as a suspect odour in samples recovered from BH2.

Based on the screening results in combination with field observations, soil samples from various boreholes and test pits were submitted for analytical testing of a combination of volatile organic compounds (VOCs), benzene, ethylbenzene, toluene and xylene (BTEX), petroleum hydrocarbons (PCHs, F₁-F₄), polycyclic aromatic hydrocarbons (PAHs), metals (including arsenic, antimony and selenium), mercury and hexavalent chromium. Electrical conductivity and sodium adsorption ratio were also analysed for off-site disposal purposes.

Based on the analytical test results, petroleum hydrocarbon fractions (F₂, F₃, and/or F₄) exceeding MECP Table 3 standards were identified in samples BH10-SS3 and BH5-SS2 and B111. Various PAH parameters exceeding MECP Table 3 standards were identified in Sample BH10-SS2. Barium, cobalt and/or vanadium concentrations exceeding the MECP Table 3 standards were identified in soil samples TP2-21-G2, TP7-21-G1, TP9-21-G3, TP14-G2, TP14-G4 and TP18-G2; these concentrations are considered to be naturally occurring and do not represent an environmental concern to the Phase II Property. Remaining metal parameter concentrations were identified in all soil samples at concentrations below the MECP Table 3 standards.

Concentrations of PHCs and/or PAH parameters were also identified in Samples BH1-SS6, BH4-SS5, BH5-SS2, BH5-SS3, BH10-SS3, TP6-21-G4, TP9-21-G1, B111 and GS1 at concentrations below the MECP Table 3 standards. No VOC or BTEX concentrations were identified in any of the samples analysed.

Groundwater samples were collected from the monitoring wells installed in BH1, BH2, BH4, BH11, BH12, BH5-17, BH1-21 and BH2-21 and submitted for analysis of VOC, BTEX, PHC (F₁-F₄) and/or PAH parameters. No parameter concentrations were identified above the method detection limits in any of the groundwater samples submitted for analysis. The groundwater beneath the Phase II Property complies with the MECP Table 3 standards.

Recommendations

Soil

A soil remediation program was recommended and has since been carried out at the Phase II Property. The findings of the UST removal and soil remediation program will be presented under separate cover. Note that the remediation report will ultimately be appended to the Phase II ESA report.

Groundwater

The existing monitoring wells should be kept viable until they are no longer required for sampling purposes, at which time they should be decommissioned by a licenced contractor in accordance with Ontario Regulation 903.

Excess Soil

Excess soil for the second development phase must be handled in accordance with O.Reg.406/19.

1.0 INTRODUCTION

At the request of Holloway Lodging Limited Partnership (Holloway), Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment (ESA) for the property addressed 1354 and 1376 Carling Avenue, in the City of Ottawa, Ontario (the Phase II Property).

This report updates the findings of a 2016 Phase II ESA report (Report PE3896-2), the purpose of which was to address areas of potential environmental concern (APECs) identified on the property during the 2016 Phase I ESA carried out by Paterson. It should be noted that the Phase I ESA was updated in 2021, at which time an additional APEC was identified on the Phase II Property.

This report incorporates the findings of the 2016 Phase II ESA report as well as the findings of more recent subsurface investigations at the Phase II Property.

1.1 Site Description

Address: 1354 and 1376 Carling Avenue, Ottawa, Ontario.

Legal Description: Part Blocks 6 and 7 Registered Plan 221 and Part of Road Allowance between Concession 1 (Ottawa Front) and Concession A (Rideau Front) closed by by-law 231-66, Instrument 511589, Geographic Township of Nepean, City of Ottawa.

Property Identification Numbers: 04002-0019 (LT) and 04002-0020 (LT)

Location: The Phase II Property is located on the south side of Carling Avenue between Meath Street and Archibald Street in the City of Ottawa, Ontario. The location of the Phase II Property is shown on Figure 1 - Key Plan following the body of this report.

Latitude and Longitude: 45° 23' 04" N, 75° 44' 12" W.

Configuration: Irregular

Site Area: 0.93 hectares (approximate)

1.2 Property Ownership

The subject property is currently owned by Holloway Lodging Limited Partnership. Paterson was engaged to complete the Phase II ESA by Mr. Marty Ounanian, with Holloway. The head offices of Holloway Lodging Limited Partnership are located at 106-145 Hobsons Lake Drive, Halifax, NS, B3S 0H9. Mr. Armoyan can be reached by telephone at 514-333-8800 ext.1929.

1.3 Current and Proposed Future Uses

The western portion of the Phase II Property is currently occupied by a hotel, while the eastern portion of the Phase II Property is currently undergoing redevelopment with 2 multi-storey residential buildings. During the second phase of the proposed development, the western portion the Phase II Property will be redeveloped with 3 multi-storey residential buildings. There will be 1 to 2 stories of underground parking across the majority of the Phase II Property.

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 Table 3 Standards are based on the following considerations:

- Coarse-grained soil conditions.
- Surface soil and groundwater conditions.
- Non-potable groundwater conditions.
- Residential land use.

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that the property relies upon municipal drinking water.

Section 41 of O.Reg. 153/04 does not apply to the Phase II Property, as the property is not within 30m of an environmentally sensitive area and the pH of the surface and subsurface soils is between 5 and 9.

Section 43.1 of the Regulation does not apply as the Phase II Property is not a Shallow Soil Property.

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

Grain-size analysis was not conducted as part of this assessment. As such, the more stringent coarse-grained standards have been applied.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is comprised of two parcels of land addressed 1354 and 1376 Carling Avenue, located along the south side of Carling Avenue between Meath Street and Archibald Street in the City of Ottawa. The Phase II property is situated in an urban mixed-use area.

The western portion of the Phase II Property (1376 Carling Avenue) is occupied by a 1 to 3-storey hotel building with associated access laneways and parking areas. The eastern portion of the Phase II Property (1354 Carling Avenue) is currently undergoing redevelopment.

The Phase II Property is at grade with the adjacent roadways and gently slopes

2.2 Past Investigations

During the 2016 Phase I ESA, it was reported by the property owner representative at the time, that no previous Phase I or Phase II ESA reports had been completed for the subject land.

A Phase I ESA was conducted by Paterson in October of 2016. Based on the findings of the Phase I-ESA, eight (8) areas of potential environmental concern (APECs) were identified on the subject property. A Phase II ESA was recommended to assess the soil and/or groundwater within the APECs.

During the 2016 Phase II ESA, petroleum hydrocarbons (PHCs) and polycyclic aromatic hydrocarbons (PAHs) impacted soil was identified on the eastern portion of the Phase II Property. Based on the findings of the 2016 investigation and a supplemental monitoring well installation (BH5-17) completed in 2017, groundwater beneath the site was determined to comply with the MECP Table 3 standards.

Based on the findings of an updated 2021 Phase I ESA, an additional PCA was identified on the Phase II Property. As such the table of APECs was updated and is presented in Section 3.3 of this report. Additional subsurface investigation was recommended to further address previously identified or assess new APECs.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The initial Phase II-ESA was carried out during the interim of October 25 through October 31, 2016, in conjunction with a Geotechnical Investigation for the proposed development. The field program consisted of drilling 13 boreholes across the Phase II Property (including 2 interior boreholes). Six of the boreholes were completed with monitoring well installations to access the groundwater table.

A supplemental Geotechnical Investigation carried out in August of 2017 consisted of the placement of five boreholes. Four of the boreholes were carried out for geotechnical purposes (BH1-17 through BH4-17). Borehole BH5-17 was placed in the vicinity previously identified impacts and was completed with a groundwater monitoring well to determine if soil impacts had migrated to the water table.

The 2021 subsurface investigation consisted of the excavation of 27 test pits for delineation purposes as well as the characterization of excess soil in accordance with O.Reg. 406/19. Soil sampling was also carried out in the vicinity of an underground storage tank identified near the central portion of the Phase II Property.

Two additional monitoring wells (BH1-21/MW1 and BH2-21/MW2) were drilled on the interior and exterior of the Phase II Property, within the former pump island on the northwestern portion of the site, and in the immediate vicinity of the recently identified UST on the central portion of the site.

Further details of the subsurface investigations are provided in Section 4.0.

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 (CPCs) identified in the Phase I-ESAs, in conjunction with the findings of the field program.

The CPCs for the soil and/or groundwater within the APECs identified on the Phase II Property, include benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons, fractions 1 through 4 (PHCs F₁-F₄), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), metals including arsenic (As), antimony (Sb) and selenium (Se), mercury (Hg) and hexavalent chromium (CrVI).

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, bedrock in the area of the Phase I Property consists of interbedded limestone and dolomite of the Gull River Formation. Overburden is reported to consist of Glacial Till ranging in depth from 5 to 10 m over the majority of the site and 10 to 15 m on the southwestern portion of the site. This information is generally consistent with the findings of the previous subsurface investigations.

Based on the findings of the 2016 Phase II ESA, groundwater beneath the Phase I ESA property was determined to flow in a westerly direction.

Existing Buildings and Structures

The portion of Phase I Property addressed 1376 Carling Avenue is currently occupied by an operational hotel. The hotel building ranges from 1 to 3 above-grade stories and has a full basement level beneath the entire building footprint. No other buildings or above-grade structures are currently present on the Phase I Property.

A former hotel tower and parking garage structure occupied the eastern portion of the Phase I Property addressed 1354 Carling Avenue. The tower and parking structure were demolished in conjunction with the redevelopment of this portion of the Phase I Property. The approximate locations of the existing and former buildings and structures are shown on Drawing PE3929-1R – Site Plan.

Underground Utilities and Below Grade Structures

Underground utilities include natural gas, telephone, fibre optic, cable, electricity and municipal water and sewers. Private electrical services and sewers are also present on the subject property.

Below grade structures include the basement level of the existing hotel building at 1376 Carling Avenue as well as the crane base and foundations of the buildings under construction at 1354 Carling Avenue.

As previously noted, an underground storage tank (UST) was identified during construction activities at 1354 Carling Avenue. The UST was located adjacent to the north face of the eastern corner of the existing building. The UST was subsequently decommissioned and removed off-site. The approximate location of the former UST is shown on Drawing PE3929-1R – Site Plan.

Based on the findings of the subsurface investigations, underground utilities and subsurface structures were not considered to have affected contaminant distribution at the Phase I Property.

Areas of Natural Significance

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

Water Bodies

No natural waterbodies are present on the Phase I Property or within the Phase I Study Area.

Drinking Water Wells

Records of historical potable wells were identified for the Phase I Property and properties within the Phase I Study Area. These wells are considered to have been abandoned and no longer in use; the Phase I Property and properties within the Phase I Study Area are currently provided with municipal services.

Groundwater Monitoring Wells

Groundwater monitoring wells were observed on the Phase I Property at the time of the site visit.

Records of groundwater monitoring wells were identified for several properties within the Phase I Study Area: 1400 Carling, 1447 Carling Avenue, 848 Merivale Road and Thames Street. As discussed in the body of the updated Phase I ESA report, these properties are not considered to represent APECs on the Phase I Property.

Neighbouring Land Use

Historically neighbouring land use in the Phase I Study Area was primarily residential with commercial properties along Carling Avenue. Several off-site historical PCAs considered to result in APECs on the RSC Property, include former retail fuel outlets and/or automotive service garages present to the north and northeast of the site, across Carling Avenue, and east of the site, across Archibald Street.

Current land use within 250m of the Phase I Property remains a combination of residential and commercial. No existing off-site PCAs are considered to result in APECs on the RSC Property. Land use is shown on Drawing PE3929-2 - Surrounding Land Use Plan.

Potentially Contaminating Activities and Areas of Potential Environmental Concerns

Nine potentially contaminating activities (PCAs) considered to result in areas of potential concern (APECs) on the Phase I Property are described in Table 1 and shown on Drawing PE3929-1R-Site Plan.

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
APEC 1A (former retail fuel outlet pump island)	Northwestern 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 1B (former retail fuel outlet tank nest)	Northwestern 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

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
APEC 2 (on-site diesel generator)	Northwestern portion of 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 retail fuel outlet pump island/tank nest)	Northeastern portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater
APEC 4 (former automotive service garage)	Northeastern portion of Phase I Property	Item 52 - Storage, maintenance, fuelling and repair of equipment, vehicles and material used to maintain transportation systems	On-site	BTEX PHCs (F ₁ -F ₄) VOCs PAHs	Soil Groundwater
APEC 5 (former off-site USTs)	Northwestern portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater
APEC 6 (former off-site retail fuel outlet)	Northeastern portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater
APEC 7 (former off-site retail fuel outlet)	Northeastern portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater
APEC 8: (imported fill material)	Eastern portion of Phase I Property	Item 30 - Importation of Fill Material of Unknown Quality	On-site	Metals As, Sb, Se Hg, CrVI PAHs	Soil
APEC 9 (on-site UST)	North central portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater
APEC 10 (de-icing salt for safety purposes)	Across Phase I Property (outside of building footprint)	Other – use of road salt for safety purposes	On-site	EC SAR Sodium Chloride	Soil Groundwater

In accordance with Section 49.1 of Ontario Regulation 153/04 standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined, based on a phase two environmental site assessment, that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both.

Contaminants of Potential Concern

The contaminants of concern (CPCs) identified for the Phase I Property include BTEX, PHCs (F1-F4), VOCS, PAHs and/or Metals (including As, Sb, Se), Mercur (Hg) and Hexavalent Chromium (CrVI) in the soil and/or groundwater.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I ESA Update is considered to be sufficient to conclude that there are potentially contaminating activities (PCAs) on the Phase I ESA property that have resulted in areas of potential environmental concern (APECs).

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

3.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan for this project is included in Appendix 1 of this report. A trip blank was not conducted during the 2016 groundwater sampling event when groundwater samples were obtained for VOC analysis; no VOC concentrations were detected in any of the groundwater samples analyzed and therefore the lack of trip blank is not considered to affect QA/QC for this project. Otherwise, there were no deviations from the Sampling and Analysis Plan.

3.5 Impediments

Physical impediments encountered during the Phase II-ESA include the subject buildings and structures as well as on-site services.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigations

2016 Investigation

The initial subsurface investigation was conducted in conjunction with a Geotechnical Investigation during the interim of October 25 through October 31, 2016 and consisted of drilling 13 boreholes (BH1 to BH13), six of which were completed with groundwater monitoring well installations.

The boreholes, completed to depths ranging from approximately 5.9 to 10.1m below ground surface, were placed to address APECs identified in the Phase I ESA and to provide geotechnical information for the new development. Dynamic cone penetration tests (DCPTs) were conducted at BH2 and BH4, where inferred bedrock was encountered at approximately 10.1 m below grade.

2017 Investigation

Five additional boreholes (BH1-17 to BH5-17) drilled during the interim of August 15 through August 16, 2017 were carried out primarily to obtain additional geotechnical information and confirm bedrock depths. The geotechnical boreholes were completed to depths ranging from approximately 10.2 to 13.7m below grade. Bedrock was cored at each location. Borehole BH5-17 was completed with a monitoring well installation, at a depth of approximately 4.6m below grade, for the purpose of assessing the groundwater quality in the vicinity of previously identified soil impacts.

2021 Investigations

Boreholes BH1-21/MW1 and borehole BH2-21/MW2 were drilled on the interior of and exterior of the subject property to provide additional coverage of APECs identified on the Phase II Property. The boreholes were completed on May 14 and June 3, 2021, respectively. Borehole BH1-21/MW1 was drilled through the concrete floor slab in the basement to a depth of approximately 2.7m below the concrete floor slab, or approximately 7.0m below ground surface. Borehole BH2-21/MW2 was drilled to a depth of 4.6m, or approximately 7.7m below original grade.

The drilling contractors were George Downing Estate Drilling (Downing) of Hawkesbury, Ontario and CCC Environmental and Geotechnical Drilling Ltd.

(CCC) of Ottawa, Ontario. The exterior boreholes conducted by Downing were advanced using a track-mounted low-clearance drill rig under the full-time supervision by Paterson personnel; one of the exterior boreholes (BH2-20/MW2) was conducted by CCC using a truck-mounted drill rig. The interior boreholes conducted by CCC were advanced using portable equipment, also under the full-time supervision of Paterson personnel.

All borehole locations (with the exception of BH1-17 through BH4-17) are identified on the attached Drawing PE3929-3 - Test Hole Location Plan.

During the interim of March 1 through July 7, 2021, a total of 27 test pits were excavated on the Phase II Property. As previously noted, the test pits were placed for delineation of previously identified soil impacts, assessment of soils underlying the former UST, and/or for excess soil testing purposes. The test pits were dug to depths ranging from approximately 0.5 to 5.0 m below the existing surface grade, or up to depths of approximately 11m below original grade. Note that test pits identified TPTi1 through TPTi6 were very shallow test pits which could be considered as grab samples.

During the interim of May 17 through May 18, 2021, a total of four grab samples were taken from beneath the former UST and spill location. Test pits and analysed grab sample locations are identified on the attached Drawing PE3929-3 - Test Hole Location Plan.

4.2 Soil Sampling

A total of 167 soil samples were obtained from the boreholes by means of split spoon sampling with the sampling of shallow soils directly from auger flights. Split spoon samples from the exterior boreholes were taken at approximate 0.76 to 1.52 m intervals, while continuous samples were taken from the interior boreholes advanced with portable equipment. The depths at which split spoon and auger flight samples were obtained from the boreholes are shown as “**SS**” and “**AU**” respectively on the Soil Profile and Test Data Sheets, appended to this report.

A total of 87 soil samples were obtained from test pits by means of grab sampling. The depths at which the samples were obtained from are shown as “**GS**” on the Soil Profile and Test Data Sheets, appended to this report.

The site stratigraphy generally consists of a pavement structure consisting of asphaltic concrete and crushed stone overlying fill material, followed by native silty clay over Glacial Till. The upper till material consists of silty clay to clayey silt with gravel and occasional cobbles, while at depth, the till material becomes a sandy silt to silty sand with gravel and trace cobbles.

The fill material encountered beneath the pavement structure generally consists of brown, silty sand or silty clay with gravel, as well as some topsoil. Fill material identified at the majority of the boreholes across the Phase II Property is considered to consist of re-worked native material and is not considered to represent an area of potential environmental concern on the property.

However, occasional brick fragments were identified in the fill material at BH3, BH4, TP1-21, TP2-21, TP3-21, TP5-21, TP6-21, TP7-21 and TP9-21 while larger pieces of brick were identified at BH10 and BH5. Pieces of glass and what appeared to be pieces of coal or slag, were also identified in the fill material at BH10. Rebar was identified in the fill material at TP8-21.

Traces of asphalt were identified in the fill material at BH1, BH4 and BH9. It is considered likely that the asphalt in BH4 and BH9 is a result of the augering process, while that observed in BH1 is considered to be remnant asphalt from the original location of Carling Avenue prior to its realignment.

Specific details of the soil profile at each test hole location are presented on the Soil Profile and Test Data sheets appended to this report.

4.3 Field Screening Measurements

All soil samples collected were submitted to a preliminary screening procedure, which included visual screening for colour and evidence of metals, as well as a soil vapour screening with an RKI Eagle gas detector with methane elimination and calibrated to hexane and/or a MiniRae photoionization detector with detection limit of 0.1 ppm and a precision of +/- 0.1 ppm

The soil vapours were measured by inserting the analyzer probe into the nominal headspace above the soil sample. Samples were then agitated/manipulated gently as the measurements were taken. The peak reading registered within the first 15 seconds was recorded as the vapour measurement.

The parts per million (ppm) scale is used to measure concentrations of hydrocarbon vapours that are too low to register on the Lower Explosive Limit (LEL) scale. The explosive point, 100% LEL, represents the leanest mixture which will burn (or explode) if ignited.

The combustible vapour readings reported by the RKI Eagle were found to range from 0 ppm to 30 ppm, while those detected by the PID were less than 1 ppm. The readings are not indicative of volatile substances such as gasoline. It should be noted however that combustible vapours cannot be used to identify heavier products such as waste oil.

Please refer to the Soil Profile and Test Data sheets provided in Appendix 1, for soil sample headspace results.

Soil samples were selected for analytical testing based on visual and olfactory observations in combination with the results of the vapour screening and depth relative to the groundwater table and/or previously identified impacts.

4.4 Groundwater Monitoring Well Installation

Five groundwater monitoring wells were installed by Downing and four groundwater monitoring wells were installed by CCC, under full-time supervision by Paterson personnel. The monitoring wells consisted of 50 mm diameter (exterior boreholes) or 32 mm (interior boreholes) Schedule 40 threaded PVC risers and screens. A sand pack consisting of silica sand was placed around the screen, and a bentonite seal was placed above the screen to minimize cross-contamination. Monitoring well construction details are provided on the Soil Profile and Test Data Sheets in Appendix 1. A summary of monitoring well construction details is provided below in Table 2.

Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1	75.28	6.1	3.1-6.1	2.4-6.1	0.3-2.4	PVC riser
BH2	75.13	6.1	3.1-6.1	2.4-6.1	0.3-2.4	PVC riser
BH4	74.48	6.1	3.1-6.1	2.4-6.1	0.3-2.4	PVC riser
BH9	74.28	6.1	3.1-6.1	2.4-6.1	0.3-2.4	PVC riser
BH11	72.67	4.3	1.3-4.3	0.8-4.3	0.3-0.8	PVC riser
BH12	71.49	2.8	1.3-2.8	0.8-2.8	0.3-0.8	PVC riser
BH5-17	74.09	4.6	1.5-4.6	1.3-4.6	0.3-1.3	PVC riser
BH1-21/MW1	71.03	2.8	1.3-2.8	0.7-2.8	0.1-0.7	PVC riser
BH2-21/MW2	71.57	4.6	1.5-4.6	1.2-4.6	0.3-1.2	PVC riser

4.5 Groundwater Sampling

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

4.6 Analytical Testing

Based on the guidelines outlined in the Sampling and Analysis Plan appended to this report, soil and groundwater samples submitted for analysis are presented in Tables 3 and 4 below.

Sample ID	Sample Depth (below ground surface / original grade) and Stratigraphic Unit	Parameters Analyzed							Rationale
		BTEX	VOCs	PHCs (F1-F4)	PAHs	Metals	Hg, CrVI	EC/SAR	
BH1-SS6	3.8-4.6m bgs; native silty clay	X		X					To address potential PHC impacts from off-site; sample closest to water table.
BH2-S5/SS6	3.0-4.2m bgs; native silty clay		X						Odours detected in sample; sample combined due to low recovery.
BH4-SS5	3.0-3.6m bgs; native silty clay	X		X					Location of former tank nest; highest vapour reading and near water table.
BH5-SS2	1.8-2.4m bgs; fill material		X	X	X				Petroleum hydrocarbon odours detected; fill material dark in colour with building debris fragments (brick).

Table 3 Continued: Soil Samples Submitted for Analysis									
Sample ID	Sample Depth (below ground surface / original grade) and Stratigraphic Unit	Parameters Analyzed						Rationale	
		BTEX	VOCs	PHCs (F1-F4)	PAHs	Metals	Hg, CrVI		EC/SAR
BH5-SS3*	2.6-3.2m bgs; fill material and native silty clay			X**					To delineate vertical extent of PHC impacts identified in BH5-SS2.
BH7-AU1	0.3-0.6m bgs; fill material					X	X	X	To confirm the quality of the reworked fill material.
BH8-AU1	0.3-0.6m bgs; fill material					X	X	X	To confirm the quality of the reworked fill material.
BH10-SS2	0.8-1.4m bgs; fill material				X	X	X		Fill material dark in colour with building debris (brick and glass) as well as fragments of coal or slag.
BH10-SS3	1.5-2.1 m bgs; fill material		X	X					PHC odours.
BH10-SS5*	3.0-3.6m bgs; native silty clay			X**	X				To delineate vertical extent of PAH and PHC impacts identified in SS2 and SS3.
BH11-SS2	1.2-1.8m bgs; native till		X	X					Highest vapour reading; closest sample to water table.
BH12-SS3	1.2-1.8m bgs; native till	X		X					Highest vapour reading; sample in water table.
BH13-SS3	1.2-1.8m bgs; native till	X		X					Highest vapour reading; sample in water table.
TP1-21-G6	2.3-2.5m bgs; native silty clay	X		X					Horizontal delineation of previously identified impacts; selected based on depth, and/or characterization for off-site disposal.
TP2-21-G2	0.3-0.5m bgs; fill material				X	X	X		
TP2-21-G3	0.6-0.8m bgs; fill material	X		X					
TP3-21-G1	0.1-0.2m bgs; fill material				X	X	X		

Table 3 Continued: Soil Samples Submitted for Analysis									
Sample ID	Sample Depth (below ground surface / original grade) and Stratigraphic Unit	Parameters Analyzed						Rationale	
		BTEX	VOCs	PHCs (F1-F4)	PAHs	Metals	Hg, CrVI		EC/SAR
TP3-21-G2	0.8-0.9m bgs; fill material	X		X					Horizontal delineation of previously identified impacts; selected based on depth, and/or characterization for off-site disposal.
TP6-21-G4	1.2-1.4m bgs; fill material	X		X					
TP7-21-G1	1.9-2.2m bgs; fill material	X		X	X	X	X	X	
TP9-21-G1	1.2-1.4m bgs; fill material	X		X		X	X	X	
TP9-21-G3	2.2-2.4m bgs; native silty clay		X	X	X	X	X	X	
TP10(2)-21-2	6.2-6.3m bgs; native glacial till					X			Siltier glacial till; to support opinion that elevated levels of some metal parameters in silty clay are naturally occurring.
TP11(2)-21-5	8.4-8.6m bgs; native glacial till					X			
TPT-GS1	2.4-2.6m bgs; native silty clay	X		X					To confirm quality of soil beneath UST; based on vapour screening and/or location relative to water table.
GS1	1.6-1.8m bgs; native silty clay	X		X					
TPTi-1-GS1	4.6-4.8m bgs; native glacial till		X	X	X	X	X	X	Characterization of soil for off-site disposal purposes.
TPTi-2-GS1	7.5-7.7m bgs; native glacial till		X	X	X	X	X	X	
TPTi-3-GS1	4.6-4.8m bgs; native glacial till		X	X	X	X	X	X	
TPTi-4-GS1	7.6-7.8m bgs; native glacial till		X	X	X	X	X	X	
TPTi-5-GS1	4.3-4.5m bgs; native glacial till		X	X	X	X	X	X	
TPTi-6-GS1	4.1-4.3m bgs; native glacial till		X	X	X	X	X	X	
TP10-21-G1	6.9-7.1m bgs; native glacial till		X	X	X	X	X	X	
TP10-21-G3	7.9-8.1m bgs; native glacial till		X	X	X	X	X	X	
TP11-21-G5	1.8-2.0m bgs; native glacial till		X	X	X	X	X	X	

Table 3 Continued: Soil Samples Submitted for Analysis									
Sample ID	Sample Depth (below ground surface / original grade) and Stratigraphic Unit	Parameters Analyzed							Rationale
		BTEX	VOCs	PHCs (F ₁ -F ₄)	PAHs	Metals	Hg, CrVI	EC/SAR	
TP12-21-G2	4.7-4.9m bgs; native glacial till		X	X	X	X	X	X	Characterization of soil for off-site disposal purposes.
TP12-21-G5	7.7-8.0m bgs; native glacial till		X	X	X	X	X	X	
TP13-21-G4	7.7-7.8m bgs; native glacial till		X	X	X	X	X	X	
TP14-21-G2	2.8-3.0m bgs; native silty clay		X	X	X	X	X	X	
TP14-21-G4	4.2-4.6m bgs; native silty clay		X	X	X	X	X	X	
TP14-21-G6	3.8-4.4m bgs; native glacial till		X	X	X	X	X	X	
TP15-21-G4	4.3-4.4m bgs; native silty clay		X	X	X	X	X	X	
TP16-21-G2	4.7-5.0m bgs; native silty clay		X	X	X	X	X	X	
TP16-21-G5	7.6-7.7m bgs; native glacial till		X	X	X	X	X	X	
TP17-21-G3	5.6-5.7m bgs; native silty clay		X	X	X	X	X	X	
TP18-21-G2	2.8-3.0m bgs; native silty clay		X	X	X	X	X	X	
TP18-21-G6	6.7-6.8m bgs; native glacial till		X	X	X	X	X	X	
Notes:									
<input type="checkbox"/> Samples denoted * were submitted for vertical delineation purposes. <input type="checkbox"/> Samples denoted ** were submitted for PHC fractions F ₂ -F ₄									

Note that all sample depths are relative to average original grade.

Table 4: Groundwater Samples Submitted for Analysis						
Sample ID	Sample Depth/ Stratigraphic Unit	Parameters Analyzed				Rationale
		BTEX	PHC (F ₁ -F ₄)	VOCs	PAHs	
BH1-GW1	3.1-6.1 m bgs; native silty clay		X	X		Assessment of groundwater quality at the subject site based on potential contaminants of concern. Monitoring wells installed at depths to straddle groundwater table; based on field observations.
BH2-GW1	3.1-6.1 m bgs; native silty clay		X	X		
BH4-GW1	3.1-6.1 m bgs; native silty clay		X	X	X	
BH11-GW1	1.3-4.3 m bgs; native till		X	X		
BH12-GW1	1.3-2.8 m bgs; native till	X	X			
BH5-17-GW1	1.5-4.6 m bgs; native silty clay	X	X		X	
MW1-21-GW1	1.3-2.8 m bgs; native glacial till (silty clay)	X	X			
MW2-21-GW1	1.5-4.6 m bgs; native silty clay	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.

4.7 Residue Management

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

4.8 Elevation Surveying

Borehole elevations were surveyed using a laser level. Ground surface elevations were surveyed relative to a benchmark (BM), consisting of the top spindle of a fire hydrant located at the southeast corner of the intersection of Archibald Street and Carling Avenue.

As per the topographic plan prepared by Annis, O’Sullivan, Vollebekk Ltd., the geodetic elevation is 75.14 m above sea level (ASL). The location of the site benchmark is shown on Drawing PE3929-3 – Test Hole Location Plan. More recent borehole and test pit locations were surveyed using a GPS device and referenced to a known geodetic datum. Borehole and test pit locations are presented on Drawing PE3929-3 - Test Hole Location Plan appended to this report.

4.9 Quality Assurance and Quality Control Measures

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

5.0 REVIEW AND EVALUATION

5.1 Geology

Site geology details are provided in the Soil Profile and Test Data Sheets provided in Appendix 1. Site soils generally consist of a pavement structure (with the exception of BH1, BH12, BH13, BH1-21, BH2-21 locations where topsoil or concrete floor slabs are present) underlain by fill material, followed by native silty clay and glacial till. According to geological mapping of the area, the underlying bedrock consists of interbedded limestone and dolomite of the Gull River Formation. Note that test pits were conducted in conjunction with the excavation program and surface treatments and possibly fill and/or native soils had been removed.

Fill material generally consisted of brown silty sand with some topsoil and clay, generally consistent with native soils and was considered to primarily consist of reworked native material. No signs of potential contamination or deleterious materials were noted in the fill material on the western portion of the site; traces of brick were identified in the fill material on the northeastern portion of the site with more significant quantities of brick identified in the fill material at BH10, along with pieces of glass and fragments of apparent coal or slag.

Occasional pieces of asphalt were also identified in the fill material at BH4 and BH9 and is considered to have resulted from the augering process. Asphalt identified in the fill material at BH1 is considered to be the result of the original location of Carling Avenue, prior to its realignment in the early 1960's.

Bedrock was confirmed at BH1-17 through BH4-17, at depths ranging from approximately 6.2 to 9.1m below grade. Bedrock consisted of grey limestone interbedded with shale.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured using an electronic water level meter and are summarized below in Table 5. All elevations are relative to a known geodetic datum, as discussed above. It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations.

Borehole Location	Ground Surface Elevation (m ASL)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1	75.28	4.25	71.03	November 7, 2016
BH2	75.13	3.84	71.29	
BH4	74.48	2.95	71.53	
BH9	74.28	2.20	72.08	
BH11	72.67	1.31	71.36	
BH12	71.49	0.2	71.29	
BH5-17	74.09	2.4	71.69	August 24, 2017
BH1-21	71.03	0.15	70.88	June 1, 2021
BH2-21	71.57	1.09	70.48	June 10, 2021

Based on the groundwater elevations recorded on November 7, 2016, groundwater contour mapping was completed. Groundwater contours are shown on Drawing PE3986-6 - Groundwater Contour Plan. Based on the contour mapping, groundwater flow at the subject site generally appears to be towards the west. An average horizontal hydraulic gradient of approximately 0.006 m/m was calculated.

5.3 Fine-Medium Soil Texture

Coarse-grained soil standards have been used for the subject site as grain size analysis was not completed.

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in soil vapour readings of 0 ppm to 30 ppm. 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

A total of 44 soil samples were submitted to Paracel Laboratories for analysis of BTEX, PHC (F₁-F₄), VOC, PAH, metal (including As, Sb, Se), Hg, CrVI, EC and SAR parameters. The results of the soil testing are presented in Tables 6 through 9. The results of the EC/SAR testing are not presented in the tables as Section 49.1 of O.Reg.153/04 is being relied upon. The laboratory Certificates of Analysis are provided in Appendix 1. *Note that while confirmatory delineation samples are shown on the drawings, they will be presented and discussed in the remediation report under separate cover.*

Table 6: Soil Analytical Test Results – BTEX and PHCs (F ₁ -F ₄)						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Standards Residential Coarse (µg/g)
		BH1-SS6	BH4-SS5	BH5-SS2 ¹	BH5-SS3	
		Oct. 27, 2016	Oct. 28, 2016	Oct. 31, 2016		
Benzene	0.02	nd	nd	nd	Nt	0.21
Ethylbenzene	0.05	nd	nd	nd	Nt	2
Toluene	0.05	nd	nd	nd	Nt	2.3
Xylenes	0.05	nd	nd	nd	Nt	3.1
PHC F ₁	7	nd	nd	nd	Nt	55
PHC F ₂	4	nd	nd	nd	nd	98
PHC F ₃	8	72	77	<u>525</u>	38	300
PHC F ₄	6	160	53	721	42	2,800
PHC F _{4G}	50	Nt	Nt	575	Nt	2,800

Notes:

- MDL – Method Detection Limit
- nd – not detected above the MDL; Nt – not tested for this parameter
- Bold and underlined** – value exceeds MECP Table 3 standards
- 1 BTEX parameters tested as part of the VOC parameter group

Table 6 Continued: Soil Analytical Test Results – BTEX and PHCs (F ₁ -F ₄)							
Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 3 Standards Residential Coarse (µg/g)
		BH10 ¹ -SS3	BH10 ² -SS5	BH11 ¹ -SS2	BH12-SS3	BH13-SS3	
		Oct. 28, 2016		Oct. 31, 2016			
Benzene	0.02	nd	Nt	nd	nd	nd	0.21
Ethylbenzene	0.05	nd	Nt	nd	nd	nd	2
Toluene	0.05	nd	Nt	nd	nd	nd	2.3
Xylenes	0.05	nd	Nt	nd	nd	nd	3.1
PHC F ₁	7	nd	Nt	nd	nd	nd	55
PHC F ₂	4	<u>181</u>	Nt	nd	nd	nd	98
PHC F ₃	8	<u>7,460</u>	nd	nd	nd	nd	300
PHC F ₄	6	<u>5,460</u>	nd	nd	nd	nd	2,800
PHC F _{4G}	50	<u>6,590</u>	nd	Nt	Nt	Nt	2,800

Notes:

- MDL – Method Detection Limit
- nd – not detected above the MDL; Nt – not tested for this parameter
- Bold and underlined** – value exceeds MECP Table 3 standards
- 1 - BTEX parameters tested as part of the VOC parameter group
- 2 - sample exceeded hold time

Table 6 Continued: Soil Analytical Test Results – BTEX and PHCs (F ₁ -F ₄)									
Parameter	MDL (µg/g)	Soil Samples (µg/g)							MECP Table 3 Standards Residential Coarse (µg/g)
		TP1-21-G6	TP2-21-G3	TP3-21-G2	TP6-21-G4	TP7-21-G1	TP9-21-G1	TP9-21-G3	
		March 29, 2021				April 7, 2021			
Benzene	0.02	nd	nd	nd	nd	nd	nd	nd	0.21
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd	2
Toluene	0.05	nd	nd	nd	nd	nd	nd	nd	2.3
Xylenes	0.05	nd	nd	nd	nd	nd	nd	nd	3.1
PHC F ₁	7	nd	nd	nd	nd	nd	nd	nd	55
PHC F ₂	4	nd	nd	nd	nd	nd	nd	nd	98
PHC F ₃	8	nd	nd	nd	20	nd	12	nd	300
PHC F ₄	6	nd	nd	nd	11	nd	nd	nd	2,800
PHC F _{4G}	50	Nt	Nt	Nt	Nt	Nt	Nt	Nt	2,800

Notes:

- MDL – Method Detection Limit
- nd – not detected above the MDL; Nt – not tested for this parameter

Table 6 Continued: Soil Analytical Test Results – BTEX and PHCs (F ₁ -F ₄)									
Parameter	MDL (µg/g)	Soil Samples (µg/g)							MECP Table 3 Standards Residential Coarse (µg/g)
		B111	GS1	TPT-GS1	TPTi-1-GS1 ¹	TPTi-2-GS1 ¹	TPTi-3-GS1 ¹	TPTi-4-GS1 ¹	
		May 17, 2021	May 18, 2021	May 19, 2021	June 23, 2021				
Benzene	0.02	nd	nd	nd	nd	nd	nd	nd	0.21
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd	2
Toluene	0.05	nd	nd	nd	nd	nd	nd	nd	2.3
Xylenes	0.05	nd	nd	nd	nd	nd	nd	nd	3.1
PHC F ₁	7	nd	nd	nd	nd	nd	nd	nd	55
PHC F ₂	4	<u>165</u>	61	nd	nd	nd	nd	nd	98
PHC F ₃	8	221	108	nd	nd	nd	nd	nd	300
PHC F ₄	6	nd	nd	nd	nd	nd	nd	nd	2,800
PHC F _{4G}	50	Nt	Nt	Nt	Nt	Nt	Nt	Nt	2,800
Notes:									
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL; Nt – not tested for this parameter <input type="checkbox"/> <u>Bold and underlined</u> – value exceeds MECP Table 3 standards <input type="checkbox"/> 1 - BTEX parameters tested as part of the VOC parameter group									

Table 6 Continued: Soil Analytical Test Results – BTEX and PHCs (F ₁ -F ₄)									
Parameter	MDL (µg/g)	Soil Samples (µg/g)							MECP Table 3 Standards Residential Coarse (µg/g)
		TPTi-5-GS1 ¹	TPTi-6-GS1 ¹	TP10-G1 ¹	TP10-G3 ¹	TP11-G5 ¹	TP12-G2 ¹	TP12-G5 ¹	
		June 23, 2021			July 7, 2021				
Benzene	0.02	nd	nd	nd	nd	nd	nd	nd	0.21
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd	2
Toluene	0.05	nd	nd	nd	nd	nd	nd	nd	2.3
Xylenes	0.05	nd	nd	nd	nd	nd	nd	nd	3.1
PHC F ₁	7	nd	nd	nd	nd	nd	nd	nd	55
PHC F ₂	4	nd	nd	nd	nd	nd	nd	nd	98
PHC F ₃	8	nd	nd	nd	nd	nd	nd	nd	300
PHC F ₄	6	nd	nd	nd	nd	nd	nd	nd	2,800
PHC F _{4G}	50	Nt	Nt	Nt	Nt	Nt	Nt	Nt	2,800
Notes:									
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL; Nt – not tested for this parameter <input type="checkbox"/> <u>Bold and underlined</u> – value exceeds MECP Table 3 standards <input type="checkbox"/> 1 - BTEX parameters tested as part of the VOC parameter group									

Table 6 Continued: Soil Analytical Test Results – BTEX and PHCs (F ₁ -F ₄)								
Parameter	MDL (µg/g)	Soil Samples (µg/g)						MECP Table 3 Standards Residential Coarse (µg/g)
		TP13-G4 ¹	TP14-G2 ¹	TP14-G4 ¹	TP14-G6 ¹	TP15-G4 ¹	TP16-G2 ¹	
		July 7, 2021						
Benzene	0.02	nd	nd	nd	nd	nd	nd	0.21
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd	2
Toluene	0.05	nd	nd	nd	nd	nd	nd	2.3
Xylenes	0.05	nd	nd	nd	nd	nd	nd	3.1
PHC F ₁	7	nd	nd	nd	nd	nd	nd	55
PHC F ₂	4	nd	nd	nd	nd	nd	nd	98
PHC F ₃	8	nd	nd	nd	nd	nd	nd	300
PHC F ₄	6	nd	nd	nd	nd	nd	nd	2,800
PHC F _{4G}	50	Nt	Nt	Nt	Nt	Nt	Nt	2,800

Notes:

- MDL – Method Detection Limit
- nd – not detected above the MDL; Nt – not tested for this parameter
- Bold and underlined** – value exceeds MECP Table 3 standards
- 1 - BTEX parameters tested as part of the VOC parameter group

Table 6 Continued: Soil Analytical Test Results – BTEX and PHCs (F ₁ -F ₄)								
Parameter	MDL (µg/g)	Soil Samples (µg/g)						MECP Table 3 Standards Residential Coarse (µg/g)
		TP16-G5 ¹	TP17-G3 ¹	TP18-G2 ¹	TP18-G6 ¹	TPJ-G3 ^{1,3}	TPL-G5 ^{1,4}	
		July 7, 2021						
Benzene	0.02	nd	nd	nd	nd	nd	nd	0.21
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd	2
Toluene	0.05	nd	nd	nd	nd	nd	nd	2.3
Xylenes	0.05	nd	nd	nd	nd	nd	nd	3.1
PHC F ₁	7	nd	nd	nd	nd	nd	nd	55
PHC F ₂	4	nd	nd	nd	nd	nd	nd	98
PHC F ₃	8	nd	nd	nd	nd	nd	nd	300
PHC F ₄	6	nd	nd	nd	nd	nd	nd	2,800
PHC F _{4G}	50	Nt	Nt	Nt	Nt	Nt	Nt	2,800

Notes:

- MDL – Method Detection Limit
- nd – not detected above the MDL; Nt – not tested for this parameter
- Bold and underlined** – value exceeds MECP Table 3 standards
- 1 - BTEX parameters tested as part of the VOC parameter group
- 3 – duplicate of Sample TP10-G3
- 4 – duplicate of Sample TP12-G5

No BTEX parameters were identified in any of the soil samples submitted for analysis. Petroleum hydrocarbon fractions F₂, F₃ and/or F₄ were identified in soil Samples BH1-SS6, BH4-SS5, BH5-SS2, TP6-21-G4, TP9-21-G1 and GS1 at concentrations below the MECP Table 3 standards. The PHC concentrations identified in soil Samples BH5-SS2, BH10-SS3 and B111 exceed the MECP Table 3 standards. No PHC concentrations were identified in the remaining samples analysed.

Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Residential Standards (µg/g)
		BH2-SS5/SS6	BH5-SS2	BH10-SS3	BH11-SS2	
		Oct. 27, 2016	Oct. 31, 2016	Oct. 28, 2016	Oct. 31, 2016	
Acetone	0.50	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	3.5
1,2-dichloroethane	0.05	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	0.05
Cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	3.4
Trans-1,2-dichloroethylene	0.05	nd	nd	nd	nd	0.084
1,2-dichloropropane	0.05	nd	nd	nd	nd	0.05
Cis-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	N/V
Trans-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	N/V
1,3-Dichloropropene, total	0.05	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	2
Ethylene dibromide	0.05	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	2.8
Methyl Ethyl ketone	0.05	nd	nd	nd	nd	16
Methyl Isobutyl ketone	0.05	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	0.28
Trichlorofluoromethane	0.05	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	0.02
Xylenes	0.05	nd	nd	nd	nd	3.1

Notes:

- MDL – Method Detection Limit
- nd – not detected above the MDL
- N/V – no value provided by the MECP

Table 7 Continued: Soil Analytical Test Results – VOCs								
Parameter	MDL (µg/g)	Soil Samples (µg/g)						MECP Table 3 Residential Standards (µg/g)
		TPTi-1-GS1	TPTi-2-GS1	TPTi-3-GS1	TPTi-4-GS1	TPTi-5-GS1	TPTi-6-GS1	
		June 23, 2021						
Acetone	0.50	nd	nd	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	nd	nd	3.5
1,2-dichloroethane	0.05	nd	nd	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	nd	nd	0.05
Cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	nd	nd	3.4
Trans-1,2-dichloroethylene	0.05	nd	nd	nd	nd	nd	nd	0.084
1,2-dichloropropane	0.05	nd	nd	nd	nd	nd	nd	0.05
Cis-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	nd	nd	N/V
Trans-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	nd	nd	N/V
1,3-Dichloropropene, total	0.05	nd	nd	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd	2
Ethylene dibromide	0.05	nd	nd	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	nd	nd	2.8
Methyl Ethyl ketone	0.05	nd	nd	nd	nd	nd	nd	16
Methyl Isobutyl ketone	0.05	nd	nd	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	nd	nd	0.28
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	nd	nd	0.02
Xylenes	0.05	nd	nd	nd	nd	nd	nd	3.1

Notes:

- MDL – Method Detection Limit
- nd – not detected above the MDL
- N/V – no value provided by the MECP

Table 7 Continued: Soil Analytical Test Results – VOCs						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Residential Standards (µg/g)
		TP10-G1	TP10-G3	TP11-G5	TP12-G2	
		July 7, 2021				
Acetone	0.50	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	3.5
1,2-dichloroethane	0.05	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	0.05
Cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	3.4
Trans-1,2-dichloroethylene	0.05	nd	nd	nd	nd	0.084
1,2-dichloropropane	0.05	nd	nd	nd	nd	0.05
Cis-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	N/V
Trans-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	N/V
1,3-Dichloropropene, total	0.05	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	2
Ethylene dibromide	0.05	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	2.8
Methyl Ethyl ketone	0.05	nd	nd	nd	nd	16
Methyl Isobutyl ketone	0.05	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.058
1,1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	0.28
Trichlorofluoromethane	0.05	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	0.02
Xylenes	0.05	nd	nd	nd	nd	3.1
Notes:						
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> N/V – no value provided by the MECP						

Table 7 Continued: Soil Analytical Test Results – VOCs						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Residential Standards (µg/g)
		TP12-G5	TP13-G4	TP14-G2	TP14-G4	
		July 7, 2021				
Acetone	0.50	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	3.5
1,2-dichloroethane	0.05	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	0.05
Cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	3.4
Trans-1,2-dichloroethylene	0.05	nd	nd	nd	nd	0.084
1,2-dichloropropane	0.05	nd	nd	nd	nd	0.05
Cis-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	N/V
Trans-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	N/V
1,3-Dichloropropene, total	0.05	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	2
Ethylene dibromide	0.05	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	2.8
Methyl Ethyl ketone	0.05	nd	nd	nd	nd	16
Methyl Isobutyl ketone	0.05	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	0.28
Trichlorofluoromethane	0.05	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	0.02
Xylenes	0.05	nd	nd	nd	nd	3.1
Notes:						
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> N/V – no value provided by the MECP						

Table 7 Continued: Soil Analytical Test Results – VOCs						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Residential Standards (µg/g)
		TP14-G6	TP15-G4	TP16-G2	TP16-G5	
		July 7, 2021				
Acetone	0.50	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	3.5
1,2-dichloroethane	0.05	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	0.05
Cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	3.4
Trans-1,2-dichloroethylene	0.05	nd	nd	nd	nd	0.084
1,2-dichloropropane	0.05	nd	nd	nd	nd	0.05
Cis-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	N/V
Trans-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	N/V
1,3-Dichloropropene, total	0.05	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	2
Ethylene dibromide	0.05	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	2.8
Methyl Ethyl ketone	0.05	nd	nd	nd	nd	16
Methyl Isobutyl ketone	0.05	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.058
1,1,1,2,3-Tetrachloroethane	0.05	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	0.28
Trichlorofluoromethane	0.05	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	0.02
Xylenes	0.05	nd	nd	nd	nd	3.1
Notes:						
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> N/V – no value provided by the MECP						

Table 7 Continued: Soil Analytical Test Results – VOCs							
Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 3 Residential Standards (µg/g)
		TP17-G3	TP18-G2	TP18-G6	TPJ-G3 ¹	TPL-G5 ²	
		July 7, 2021					
Acetone	0.50	nd	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	nd	3.5
1,2-dichloroethane	0.05	nd	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	nd	0.05
Cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	nd	3.4
Trans-1,2-dichloroethylene	0.05	nd	nd	nd	nd	nd	0.084
1,2-dichloropropane	0.05	nd	nd	nd	nd	nd	0.05
Cis-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	nd	N/V
Trans-1,3-Dichloropropylene	0.05	nd	nd	nd	nd	nd	N/V
1,3-Dichloropropene, total	0.05	nd	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	nd	2
Ethylene dibromide	0.05	nd	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	nd	2.8
Methyl Ethyl ketone	0.05	nd	nd	nd	nd	nd	16
Methyl Isobutyl ketone	0.05	nd	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	nd	0.28
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	nd	0.02
Xylenes	0.05	nd	nd	nd	nd	nd	3.1
Notes:							
<ul style="list-style-type: none"> <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> N/V – no value provided by the MECP <input type="checkbox"/> 1 - duplicate of Sample TP10-G3 <input type="checkbox"/> 2 - duplicate of Sample TP12-G5 							

No VOC parameters were identified in any of the soil samples analysed.

Table 8: Soil Analytical Test Results – PAHs						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Standards Residential Coarse (µg/g)
		BH5-SS2	BH10-SS2	BH10-SS5	TP2-21-G2	
		Oct. 31, 2016	Oct. 28, 2016		March 29, 2021	
Acenaphthene	0.02	nd	1.26	nd	nd	7.9
Acenaphthylene	0.02	0.15	0.12	nd	nd	0.15
Anthracene	0.02	0.10	<u>3.37</u>	nd	nd	0.67
Benzo[a]anthracene	0.02	0.16	<u>5.27</u>	nd	nd	0.5
Benzo[a]pyrene	0.02	0.24	<u>5.74</u>	nd	nd	0.3
Benzo[b]fluoranthene	0.02	0.26	<u>5.16</u>	nd	nd	0.78
Benzo[ghi]perylene	0.02	0.21	3.76	nd	nd	6.6
Benzo[k]fluoranthene	0.02	0.12	<u>3.60</u>	nd	nd	0.78
Chrysene	0.02	0.19	5.49	nd	nd	7
Dibenzo[a,h]anthracene	0.02	0.05	<u>1.01</u>	nd	nd	0.1
Fluoranthene	0.02	0.25	<u>13.5</u>	nd	nd	0.69
Fluorene	0.02	nd	1.55	nd	nd	62
Indeno[1,2,3-cd]pyrene	0.02	0.17	<u>3.25</u>	nd	nd	0.38
Methylnaphthalene	0.04	0.12	0.91	nd	nd	0.99
Naphthalene	0.01	0.05	<u>0.70</u>	nd	nd	0.6
Phenanthrene	0.02	0.07	<u>11.4</u>	nd	nd	6.2
Pyrene	0.02	0.26	11.2	nd	nd	78
Notes:						
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> <u></u> – Value exceeds selected MECP Standard						

Table 8 Continued: Soil Analytical Test Results – PAHs						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Standards Residential Coarse (µg/g)
		TP3-21-G1	TP7-21-G1	TP9-21-G1	TP9-21-G3	
		March 29, 2021	April 7, 2021			
Acenaphthene	0.02	nd	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	0.03	nd	0.5
Benzo[a]pyrene	0.02	nd	nd	0.03	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	nd	nd	0.78
Benzo[ghi]perylene	0.02	nd	nd	0.02	nd	6.6
Benzo[k]fluoranthene	0.02	nd	nd	nd	nd	0.78
Chrysene	0.02	nd	nd	0.04	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	0.05	nd	0.69
Fluorene	0.02	nd	nd	nd	nd	62
Indeno[1,2,3-cd]pyrene	0.02	nd	nd	nd	nd	0.38
Methylnaphthalene	0.04	nd	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	0.02	nd	6.2
Pyrene	0.02	nd	nd	0.05	nd	78
Notes: <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL						

Table 8 Continued: Soil Analytical Test Results – PAHs								
Parameter	MDL (µg/g)	Soil Samples (µg/g)						MECP Table 3 Standards Residential Coarse (µg/g)
		TPTi -1- GS1	TPTi -2- GS1	TPTi -3- GS1	TPTi -4- GS1	TPTi -5- GS1	TPTi -6- GS1	
		June 23, 2021						
Acenaphthene	0.02	nd	nd	nd	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	nd	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	nd	nd	nd	nd	0.5
Benzo[a]pyrene	0.02	nd	nd	nd	nd	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	nd	nd	nd	nd	0.78
Benzo[ghi]perylene	0.02	nd	nd	nd	nd	nd	nd	6.6
Benzo[k]fluoranthene	0.02	nd	nd	nd	nd	nd	nd	0.78
Chrysene	0.02	nd	nd	nd	nd	nd	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	nd	nd	nd	nd	0.69
Fluorene	0.02	nd	nd	nd	nd	nd	nd	62
Indeno[1,2,3-cd]pyrene	0.02	nd	nd	nd	nd	nd	nd	0.38
Methylnaphthalene	0.04	nd	nd	nd	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	nd	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	nd	nd	nd	nd	6.2
Pyrene	0.02	nd	nd	nd	nd	nd	nd	78
Notes: <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL								

Table 8 Continued: Soil Analytical Test Results – PAHs						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Standards Residential Coarse (µg/g)
		TP10- G1	TP10- G3	TP11- G5	TP12- G2	
		July 7, 2021				
Acenaphthene	0.02	nd	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	nd	nd	0.5
Benzo[a]pyrene	0.02	nd	nd	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	nd	nd	0.78
Benzo[ghi]perylene	0.02	nd	nd	nd	nd	6.6
Benzo[k]fluoranthene	0.02	nd	nd	nd	nd	0.78
Chrysene	0.02	nd	nd	nd	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	nd	nd	0.69
Fluorene	0.02	nd	nd	nd	nd	62
Indeno[1,2,3-cd]pyrene	0.02	nd	nd	nd	nd	0.38
Methylnaphthalene	0.04	nd	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	nd	nd	6.2
Pyrene	0.02	nd	nd	nd	nd	78
Notes: <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL						

Table 8 Continued: Soil Analytical Test Results – PAHs						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Standards Residential Coarse (µg/g)
		TP12- G5	TP13- G4	TP14- G2	TP14- G4	
		July 7, 2021				
Acenaphthene	0.02	nd	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	nd	nd	0.5
Benzo[a]pyrene	0.02	nd	nd	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	nd	nd	0.78
Benzo[ghi]perylene	0.02	nd	nd	nd	nd	6.6
Benzo[k]fluoranthene	0.02	nd	nd	nd	nd	0.78
Chrysene	0.02	nd	nd	nd	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	nd	nd	0.69
Fluorene	0.02	nd	nd	nd	nd	62
Indeno[1,2,3-cd]pyrene	0.02	nd	nd	nd	nd	0.38
Methylnaphthalene	0.04	nd	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	nd	nd	6.2
Pyrene	0.02	nd	nd	nd	nd	78
Notes: <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL						

Table 8 Continued: Soil Analytical Test Results – PAHs						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Standards Residential Coarse (µg/g)
		TP14- G6	TP15- G4	TP16- G2	TP16- G5	
		July 7, 2021				
Acenaphthene	0.02	nd	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	nd	nd	0.5
Benzo[a]pyrene	0.02	nd	nd	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	nd	nd	0.78
Benzo[ghi]perylene	0.02	nd	nd	nd	nd	6.6
Benzo[k]fluoranthene	0.02	nd	nd	nd	nd	0.78
Chrysene	0.02	nd	nd	nd	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	nd	nd	0.69
Fluorene	0.02	nd	nd	nd	nd	62
Indeno[1,2,3-cd]pyrene	0.02	nd	nd	nd	nd	0.38
Methylnaphthalene	0.04	nd	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	nd	nd	6.2
Pyrene	0.02	nd	nd	nd	nd	78
Notes:						
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL						

Table 8 Continued: Soil Analytical Test Results – PAHs							
Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 3 Standards Residential Coarse (µg/g)
		TP17 -G3	TP18 -G2	TP18 -G6	TPJ- G3	TPL- G5	
		July 7, 2021					
Acenaphthene	0.02	nd	nd	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	nd	nd	nd	0.5
Benzo[a]pyrene	0.02	nd	nd	nd	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	nd	nd	nd	0.78
Benzo[ghi]perylene	0.02	nd	nd	nd	nd	nd	6.6
Benzo[k]fluoranthene	0.02	nd	nd	nd	nd	nd	0.78
Chrysene	0.02	nd	nd	nd	nd	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	nd	nd	nd	0.69
Fluorene	0.02	nd	nd	nd	nd	nd	62
Indeno[1,2,3-cd]pyrene	0.02	nd	nd	nd	nd	nd	0.38
Methylnaphthalene	0.04	nd	nd	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	nd	nd	nd	6.2
Pyrene	0.02	nd	nd	nd	nd	nd	78
Notes: <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL							

Various PAH parameters were identified in soil Samples BH10-SS2 and TP9-21-G1. All PAH concentrations detected in soil Sample TP9-21-G1 comply with the MECP Table 3 standards, while 10 PAH parameters identified in soil Sample BH10-SS2 exceed the MECP Table 3 standards. No PAH parameters were identified in the remaining soil samples submitted for analytical testing.

Table 9: Soil Analytical Test Results – Metals, As, Sb, Se, Hg and CrVI							
Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 3 Standards Residential Coarse
		BH7-AU1	BH9-AU1	BH10-SS2	TP2-21-G2	TP3-21-G1	
		Oct. 28, 2016			March 29, 2021		
Antimony	0.2	nd	nd	nd	nd	nd	7.5
Arsenic	1.0	nd	nd	nd	3.3	2.6	18
Barium	0.5	132	96.3	246	<u>421</u>	193	390
Beryllium	0.2	nd	nd	nd	0.8	nd	4
Boron	5.0	17.9	14.2	10.3	6.4	16.9	120
Boron, available	0.5	nd	nd	0.7	Nt	Nt	1.5
Cadmium	0.1	nd	nd	1.2	nd	nd	1.2
Chromium (total)	1.0	10.5	14.0	45.5	118	23.1	160
Chromium (VI)	0.2	nd ¹	nd ¹	nd ¹	1.0	nd	8
Cobalt	0.1	5.1	5.4	10.7	<u>23.7</u>	8.5	22
Copper	0.5	35.8	13.9	34.2	51.0	15.8	140
Lead	1.0	18.6	10.6	101	7.5	15.1	120
Mercury	0.05	nd ¹	nd ¹	nd ¹	nd	nd	0.27
Molybdenum	0.5	nd	nd	nd	1.4	nd	6.9
Nickel	0.5	10.9	12.0	23.5	64.1	18.4	100
Selenium	0.5	nd	nd	nd	nd	nd	2.4
Silver	0.2	nd	nd	nd	nd	nd	20
Thallium	0.05	nd	nd	nd	nd	nd	1
Uranium	0.05	nd	nd	nd	nd	nd	23
Vanadium	5.0	12.0	19.8	42.0	<u>112</u>	23.7	86
Zinc	5.0	10.7	16.7	101	126	31.4	340
Notes: <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL; Nt – not tested for this parameter <input type="checkbox"/> <u>Bold and underlined</u> – value exceeds MECP Table 3 standards <input type="checkbox"/> 1 – Holding time for Chromium (VI) and Mercury had been exceeded upon receipt of the sample at the laboratory.							

Table 9: Soil Analytical Test Results – Metals							
Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 3 Standards Residential Coarse
		TP7-21-G1	TP9-21-G1	TP9-21-G3	TP10-2	TP11-4	
		April 7, 2021			April 14, 2021		
Antimony	0.2	nd	1.4	nd	nd	nd	7.5
Arsenic	1.0	3.6	8.2	4.6	1.6	1.5	18
Barium	0.5	357	167	438	93.3	82.0	390
Beryllium	0.2	0.8	0.5	1.2	nd	nd	4
Boron	5.0	nd	6.0	6.2	7.7	8.8	120
Boron, available	0.5	Nt	Nt	Nt	Nt	Nt	1.5
Cadmium	0.1	nd	nd	nd	nd	nd	1.2
Chromium (total)	1.0	102	54.5	119	13.7	12.0	160
Chromium (VI)	0.2	0.7	nd	0.6	Nt	Nt	8
Cobalt	0.1	20.4	10.4	34.2	5.3	4.7	22
Copper	0.5	41.2	21.5	38.6	9.6	8.2	140
Lead	1.0	9.9	113	10.5	4.6	3.9	120
Mercury	0.05	nd	nd	nd	Nt	Nt	0.27
Molybdenum	0.5	nd	nd	1.5	nd	nd	6.9
Nickel	0.5	54.2	25.9	65.2	9.1	8.3	100
Selenium	0.5	nd	nd	nd	nd	nd	2.4
Silver	0.2	nd	nd	nd	nd	nd	20
Thallium	0.05	nd	nd	nd	nd	nd	1
Uranium	0.05	nd	3.0	1.6	nd	nd	23
Vanadium	5.0	107	51.6	136	20.8	18.4	86
Zinc	5.0	108	137	135	nd	nd	340
Notes:							
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> Nt – not tested for this parameter <input type="checkbox"/> <u>Bold and underlined</u> – value exceeds MECP Table 3 standards							

Table 9: Soil Analytical Test Results – Metals							
Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 3 Standards Residential Coarse
		TPTi-1-GS1	TPTi-2-GS1	TPTi-3-GS1	TPTi-4-GS1	TPTi-5-GS1	
		June 23, 2021					
Antimony	0.2	nd	nd	nd	nd	nd	7.5
Arsenic	1.0	2.1	2.1	1.8	1.9	1.6	18
Barium	0.5	245	197	246	118	96.7	390
Beryllium	0.2	0.6	0.5	0.5	nd	nd	4
Boron	5.0	5.8	5.7	6.5	6.2	10.5	120
Boron, available	0.5	Nt	Nt	Nt	Nt	Nt	1.5
Cadmium	0.1	nd	nd	nd	nd	nd	1.2
Chromium (total)	1.0	45.1	34.1	36.2	24.7	15.9	160
Chromium (VI)	0.2	nd	nd	nd	nd	nd	8
Cobalt	0.1	12.9	9.8	10.0	7.5	5.5	22
Copper	0.5	25.8	20.9	20.5	16.5	9.6	140
Lead	1.0	6.1	5.0	5.2	4.6	4.7	120
Mercury	0.05	nd	nd	nd	nd	nd	0.27
Molybdenum	0.5	nd	nd	nd	nd	nd	6.9
Nickel	0.5	26.4	19.6	20.7	15.0	10.6	100
Selenium	0.5	nd	nd	nd	nd	nd	2.4
Silver	0.2	nd	nd	nd	nd	nd	20
Thallium	0.05	nd	nd	nd	nd	nd	1
Uranium	0.05	nd	nd	nd	1.1	nd	23
Vanadium	5.0	62.9	53.3	53.3	40.6	23.3	86
Zinc	5.0	67.5	49.8	51.9	34.1	nd	340
Notes: <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> Nt – not tested for this parameter <input type="checkbox"/> <u> </u> – value exceeds MECP Table 3 standards							

Table 9: Soil Analytical Test Results – Metals						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Standards Residential Coarse
		TPTi-6-GS1	TP10-G1	TP10-G3	TP11-G5	
		June 23, 2021			July 7, 2021	
Antimony	0.2	nd	3.2	1.5	nd	7.5
Arsenic	1.0	1.4	1.3	1.3	1.2	18
Barium	0.5	85.8	53.1	48.2	64.4	390
Beryllium	0.2	nd	nd	nd	nd	4
Boron	5.0	8.1	6.8	5.8	6.4	120
Boron, available	0.5	Nt	Nt	Nt	Nt	1.5
Cadmium	0.1	nd	nd	nd	nd	1.2
Chromium (total)	1.0	14.5	11.1	11.5	9.5	160
Chromium (VI)	0.2	nd	nd	nd	nd	8
Cobalt	0.1	5.6	4.7	5.0	3.8	22
Copper	0.5	11.1	9.4	8.7	7.4	140
Lead	1.0	4.3	3.3	3.3	2.1	120
Mercury	0.05	nd	nd	nd	nd	0.27
Molybdenum	0.5	nd	1.6	nd	nd	6.9
Nickel	0.5	10.0	8.3	8.4	6.1	100
Selenium	0.5	nd	nd	nd	nd	2.4
Silver	0.2	nd	nd	nd	nd	20
Thallium	0.05	nd	nd	nd	nd	1
Uranium	0.05	nd	nd	nd	nd	23
Vanadium	5.0	23.7	23.3	24.6	18.9	86
Zinc	5.0	22.0	24.8	23.9	nd	340
Notes: <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> Nt – not tested for this parameter <input type="checkbox"/> <u> </u> – value exceeds MECP Table 3 standards						

Table 9: Soil Analytical Test Results – Metals						
Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Standards Residential Coarse
		TP12-G2	TP12-G5	TP13-G4	TP14-G2	
		July 7, 2021				
Antimony	0.2	nd	nd	nd	nd	7.5
Arsenic	1.0	1.7	1.5	1.6	3.6	18
Barium	0.5	84.9	52.4	117	423	390
Beryllium	0.2	nd	nd	nd	0.8	4
Boron	5.0	8.9	nd	7.4	5.5	120
Boron, available	0.5	Nt	Nt	Nt	Nt	1.5
Cadmium	0.1	nd	nd	nd	nd	1.2
Chromium (total)	1.0	12.6	8.9	19.1	120	160
Chromium (VI)	0.2	nd	nd	nd	0.3	8
Cobalt	0.1	5.3	4.2	6.4	25.8	22
Copper	0.5	10.6	8.2	12.3	54.4	140
Lead	1.0	3.8	2.5	3.6	6.1	120
Mercury	0.05	nd	nd	nd	nd	0.27
Molybdenum	0.5	nd	nd	nd	1.1	6.9
Nickel	0.5	9.3	5.5	11.7	66.9	100
Selenium	0.5	nd	nd	nd	nd	2.4
Silver	0.2	nd	nd	nd	nd	20
Thallium	0.05	nd	nd	nd	nd	1
Uranium	0.05	nd	1.0	nd	nd	23
Vanadium	5.0	19.7	21.0	29.4	121	86
Zinc	5.0	nd	20.0	25.1	139	340
Notes: <input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> Nt – not tested for this parameter <input type="checkbox"/> <u>Bold and underlined</u> – value exceeds MECP Table 3 standards						

Table 9: Soil Analytical Test Results – Metals							
Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 3 Standards Residential Coarse
		TP14-G4	TP14-G6	TP15-G4	TP16-G2	TP16-G5	
		July 7, 2021					
Antimony	0.2	nd	nd	nd	nd	nd	7.5
Arsenic	1.0	2.7	1.8	2.6	2.6	2.0	18
Barium	0.5	332	123	343	297	198	390
Beryllium	0.2	0.8	nd	0.6	0.9	nd	4
Boron	5.0	8.6	11.6	7.7	8.7	nd	120
Boron, available	0.5	Nt	Nt	Nt	Nt	Nt	1.5
Cadmium	0.1	nd	nd	nd	nd	nd	1.2
Chromium (total)	1.0	66.0	15.2	46.9	64.0	32.3	160
Chromium (VI)	0.2	nd	nd	nd	nd	nd	8
Cobalt	0.1	17.3	5.3	13.4	16.9	9.5	22
Copper	0.5	34.3	9.3	28.0	33.9	19.7	140
Lead	1.0	6.1	4.1	5.6	6.3	4.1	120
Mercury	0.05	nd	nd	nd	nd	nd	0.27
Molybdenum	0.5	1.1	nd	nd	nd	nd	6.9
Nickel	0.5	37.4	10.3	27.0	37.1	19.3	100
Selenium	0.5	nd	nd	nd	nd	nd	2.4
Silver	0.2	nd	nd	nd	nd	nd	20
Thallium	0.05	nd	nd	nd	nd	nd	1
Uranium	0.05	nd	nd	nd	1.0	nd	23
Vanadium	5.0	<u>86.3</u>	22.4	68.6	83.7	49.8	86
Zinc	5.0	102	nd	75.3	102	48.3	340

Notes:

- MDL – Method Detection Limit
- nd – not detected above the MDL
- Nt – not tested for this parameter
- Bold and underlined** – value exceeds MECP Table 3 standards

Table 9: Soil Analytical Test Results – Metals							
Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 3 Standards Residential Coarse
		TP17-G3	TP18-G2	TP18-G6	TPJ-G3	TPL-G5	
		July 7, 2021					
Antimony	0.2	nd	nd	nd	nd	nd	7.5
Arsenic	1.0	2.6	2.8	1.9	1.4	1.4	18
Barium	0.5	285	367	129	47.1	43.5	390
Beryllium	0.2	0.7	0.8	nd	nd	nd	4
Boron	5.0	7.5	5.4	7.0	6.7	nd	120
Boron, available	0.5	Nt	Nt	Nt	Nt	Nt	1.5
Cadmium	0.1	nd	nd	nd	nd	nd	1.2
Chromium (total)	1.0	60.7	111	29.9	12.0	8.8	160
Chromium (VI)	0.2	nd	nd	nd	nd	nd	8
Cobalt	0.1	15.5	<u>23.5</u>	8.9	4.5	4.0	22
Copper	0.5	30.8	51.3	18.2	8.8	8.5	140
Lead	1.0	5.7	6.5	3.9	3.7	2.3	120
Mercury	0.05	nd	nd	nd	nd	nd	0.27
Molybdenum	0.5	1.0	1.0	nd	nd	nd	6.9
Nickel	0.5	35.5	63.1	17.7	8.2	5.8	100
Selenium	0.5	nd	nd	nd	nd	nd	2.4
Silver	0.2	nd	nd	nd	nd	nd	20
Thallium	0.05	nd	nd	nd	nd	nd	1
Uranium	0.05	1.3	nd	nd	nd	nd	23
Vanadium	5.0	79.0	<u>110</u>	42.1	25.5	20.7	86
Zinc	5.0	92.8	128	42.7	24.0	nd	340
Notes:							
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> Nt – not tested for this parameter <input type="checkbox"/> <u>Bold and underlined</u> – value exceeds MECP Table 3 standards							

Barium, cobalt and/or vanadium parameter concentrations in soil samples TP2-21-G2, TP7-21-G3, TP9-21-G3 TP14-G2, TP14-G4 and TP18-G2 exceed the MECP Table 3 Standards. As further discussed below in the CSM, these exceedances are considered to be naturally occurring and are not considered to pose a concern to the Phase II Property. All remaining metal parameters identified in each of the soil samples analysed comply with the MECP Table 3 standards.

Table 10: Maximum Soil Concentrations			
Parameter	Maximum Concentration	Borehole	Depth Interval (m BGS)
PHC F ₂	181	BH10-SS3	1.5-2.1
PHC F ₃	<u>7,460</u>	BH10-SS3	1.5-2.1
PHC F ₄	<u>5,460</u>	BH10-SS3	1.5-2.1
PHC F _{4G}	<u>6,590</u>	BH10-SS3	1.5-2.1
Acenaphthene	1.26	BH10-SS2	0.8-1.4
Acenaphthylene	0.15	BH5-SS2	1.8-2.4
Anthracene	<u>3.37</u>	BH10-SS2	0.8-1.4
Benzo[a]anthracene	<u>5.27</u>	BH10-SS2	0.8-1.4
Benzo[a]pyrene	<u>5.74</u>	BH10-SS2	0.8-1.4
Benzo[b]fluoranthene	<u>5.16</u>	BH10-SS2	0.8-1.4
Benzo[ghi]perylene	3.76	BH10-SS2	0.8-1.4
Benzo[k]fluoranthene	<u>3.60</u>	BH10-SS2	0.8-1.4
Chrysene	5.49	BH10-SS2	0.8-1.4
Dibenzo[a,h]anthracene	<u>1.01</u>	BH10-SS2	0.8-1.4
Fluoranthene	<u>13.5</u>	BH10-SS2	0.8-1.4
Fluorene	1.55	BH10-SS2	0.8-1.4
Indeno[1,2,3-cd]pyrene	<u>3.25</u>	BH10-SS2	0.8-1.4
Methylnaphthalene	0.91	BH10-SS2	0.8-1.4
Naphthalene	<u>0.70</u>	BH10-SS2	0.8-1.4
Phenanthrene	<u>11.4</u>	BH10-SS2	0.8-1.4
Pyrene	11.2	BH10-SS2	0.8-1.4
Antimony	3.2	TP10-21-G1	6.9-7.1
Arsenic	8.2	TP9-21-G1	1.2-1.4
Barium	<u>438</u>	TP9-21-G3	2.2-2.4
Beryllium	0.9	TP16-21-G2	4.7-5.0
Boron	17.9	BH10-SS2	0.8-1.4
Boron (available)	0.7	BH10-SS2	0.8-1.4
Cadmium	1.2	BH10-SS2	0.8-1.4
Chromium (VI)	1.0	TP2-21-G2	0.3-0.5
Chromium (Total)	120	TP14-21-G2	2.8-3.0
Cobalt	<u>34.2</u>	TP9-21-G3	2.2-2.4
Copper	54.4	TP14-21-G2	2.8-3.0
Lead	113	TP9-21-G1	1.2-1.4
Molybdenum	1.6	TP10-21-G1	6.9-7.1
Nickel	66.9	TP14-21-G2	2.8-3.0
Uranium	3.0	TP9-21-G1	1.2-1.4
Vanadium	<u>121</u>	TP14-21-G2	2.8-3.0
Zinc	139	TP14-21-G2	2.8-3.0
Notes:			
☐ <u>Bold and underlined</u> – value exceeds MECP Table 3 standards			

All other parameters analysed were not detected above the method detection limits.

5.6 Groundwater Quality

Groundwater samples from the monitoring wells installed in BH1A, BH2A, BH4A, BH11, BH12, BH5-17, BH1-21 and BH2-21 were submitted for laboratory analysis of a VOC, BTEX, PHC (F₁-F₄) and/or PAH parameters. The groundwater samples were obtained from the screened intervals noted on Table 2. The results of the analytical testing are presented in Tables 11, 12 and 13. The laboratory certificates of analysis are provided in Appendix 1.

Table 11: Groundwater Analytical Test Results - BTEX/PHC (F₁ – F₄)							
Parameter	MDL (µg/L)	Groundwater Samples (µg/L)					MECP Table 3 Residential Standards (µg/L)
		BH1-GW1	BH2-GW1	BH4-GW1	BH11-GW1	BH12-GW1	
		November 7, 2016					
Benzene	0.5	nd ¹	nd ¹	nd ¹	nd ¹	nd	44
Ethylbenzene	0.5	nd ¹	nd ¹	nd ¹	nd ¹	nd	2,300
Toluene	0.5	nd ¹	nd ¹	nd ¹	nd ¹	nd	18,000
Xylenes (total)	0.5	nd ¹	nd ¹	nd ¹	nd ¹	nd	4,200
PHC F ₁	25	nd	nd	nd	nd	nd	750
PHC F ₂	100	nd	nd	nd	nd	nd	150
PHC F ₃	100	nd	nd	nd	nd	nd	500
PHC F ₄	100	nd	nd	nd	nd	nd	500

Notes:

- ☐ MDL – Method Detection Limit
- ☐ nd – not detected above the MDL
- ☐ 1 – tested as part of the VOC parameter group

Table 11 Cont.: Groundwater Analytical Test Results - BTEX/PHC (F₁ – F₄)					
Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			MECP Table 3 Residential Standards (µg/L)
		BH5-17-GW1	MW1-21-GW1	MW2-21-GW1	
		Aug. 24, 2017	June 1, 2021	June 10, 2021	
Benzene	0.5	nd	nd	nd	44
Ethylbenzene	0.5	nd	nd	nd	2,300
Toluene	0.5	nd	nd	nd	18,000
Xylenes (total)	0.5	nd	nd	nd	4,200
PHC F ₁	25	nd	nd	nd	750
PHC F ₂	100	nd	nd	nd	150
PHC F ₃	100	nd	nd	nd	500
PHC F ₄	100	nd	nd	nd	500

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

No BTEX or PHC parameters were identified above the method detection limits in any of the samples submitted for analytical testing. The results are in compliance with MECP Table 3 standards.

Table 12: Analytical Test Results – Groundwater - VOCs							
Parameter	MDL (µg/L)	Groundwater Samples (µg/L)					MECP Table 3 Residential Standards (µg/L)
		BH1-GW1	BH2-GW1	BH4-GW1	BH11-GW1	GW1 (MW1-21)	
		November 7, 2016				May 20, 2021	
Acetone	5.0	nd	nd	nd	Nt	130,000	
Benzene	0.5	nd	nd	nd	Nt	44	
Bromodichloromethane	0.5	nd	nd	nd	nd	85,000	
Bromoform	0.5	nd	nd	nd	Nt	380	
Bromomethane	0.5	nd	nd	nd	Nt	5.6	
Carbon Tetrachloride	0.2	nd	nd	nd	Nt	0.79	
Chlorobenzene	0.5	nd	nd	nd	Nt	630	
Chloroform	0.5	nd	nd	nd	nd	2.4	
Dibromochloromethane	0.5	nd	nd	nd	Nt	82,000	
Dichlorodifluoromethane	1.0	nd	nd	nd	Nt	4,400	
1,2-Dichlorobenzene	0.5	nd	nd	nd	Nt	4,600	
1,3-Dichlorobenzene	0.5	nd	nd	nd	Nt	9,600	
1,4-Dichlorobenzene	0.5	nd	nd	nd	Nt	8	
1,1-Dichloroethane	0.5	nd	nd	nd	Nt	320	
1,2-dichloroethane	0.5	nd	nd	nd	Nt	1.6	
1,1-Dichloroethylene	0.5	nd	nd	nd	Nt	1.6	
Cis-1,2-Dichloroethylene	0.5	nd	nd	nd	Nt	1.6	
Trans-1,2-dichloroethylene	0.5	nd	nd	nd	Nt	1.6	
1,2-dichloropropane	0.5	nd	nd	nd	Nt	16	
Cis-1,3-Dichloropropylene	0.5	nd	nd	nd	Nt	N/V	
Trans-1,3-Dichloropropylene	0.5	nd	nd	nd	Nt	N/V	
1,3-Dichloropropene, total	0.5	nd	nd	nd	Nt	5.2	
Ethylbenzene	0.5	nd	nd	nd	Nt	2,300	
Ethylene dibromide	0.2	nd	nd	nd	Nt	0.25	
Hexane	1.0	nd	nd	nd	Nt	51	
Methyl Ethyl ketone	5.0	nd	nd	nd	Nt	470,000	
Methyl Isobutyl ketone	5.0	nd	nd	nd	Nt	140,000	
Methyl tert-butyl ether	2.0	nd	nd	nd	Nt	190	
Methylene Chloride	5.0	nd	nd	nd	Nt	610	
Styrene	0.5	nd	nd	nd	Nt	1,300	
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	Nt	3.3	
1,1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	Nt	3.2	
Tetrachloroethylene	0.5	nd	nd	nd	Nt	1.6	
Trichlorofluoromethane	1.0	nd	nd	nd	Nt	2,500	
Vinyl Chloride	0.5	nd	nd	nd	Nt	0.5	
Xylenes	0.5	nd	nd	nd	Nt	4,200	
Notes:							
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL; Nt - not tested for this parameter <input type="checkbox"/> N/V – no value provided by the MECP							

No VOC parameters were identified above the method detection limits in any of the groundwater samples submitted for analytical testing. The results are therefore in compliance with the MECP Table 3 standards.

Table 13: Groundwater Analytical Test Results – PAHs					
Parameter	MDL (µg/L)	Groundwater Sample (µg/L)			MECP Table 3 Standards Residential Coarse (µg/L)
		BH4-GW1	BH5-17-GW1	DUP1 ¹	
		Nov. 7, 2016	August 24, 2017		
Acenaphthene	0.05	nd	nd	nd	600
Acenaphthylene	0.05	nd	nd	nd	1.8
Anthracene	0.01	nd	nd	nd	2.4
Benzo[a]anthracene	0.01	nd	nd	nd	4.7
Benzo[a]pyrene	0.01	nd	nd	nd	0.81
Benzo[b]fluoranthene	0.05	nd	nd	nd	0.75
Benzo[ghi]perylene	0.05	nd	nd	nd	0.2
Benzo[k]fluoranthene	0.05	nd	nd	nd	0.4
Chrysene	0.05	nd	nd	nd	1
Dibenzo[a,h]anthracene	0.05	nd	nd	nd	0.52
Fluoranthene	0.01	nd	nd	nd	130
Fluorene	0.05	nd	nd	nd	400
Indeno[1,2,3-cd]pyrene	0.05	nd	nd	nd	0.2
Methylnaphthalene	0.10	nd	nd	nd	1800
Naphthalene	0.05	nd	nd	nd	1400
Phenanthrene	0.05	nd	nd	nd	580
Pyrene	0.01	nd	nd	nd	68
Notes:					
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> 1 – duplicate sample of BH5-17-GW1					

No PAH parameters were identified in the groundwater samples recovered from BH4A and BH5-21. The results are therefore in compliance with MECP Table 3 standards.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of this assessment 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 submitted for analytical testing: Samples DUP and DUP1 were submitted for analytical testing of metal parameters and Samples TPJ-G3 and TPL-G5 were submitted for analytical testing of BTEX, PHCs, VOCs, PAHs, Metals and Hg and CrVI. Samples SW1 and WW6 and their duplicates were collected during the soil remediation program, the findings of which are provided under separate cover.

Metals test results for the original and duplicate soil samples are provided below. No BTEX, PHC, VOC or PAH parameters were detected in Samples TPJ-G3 or TPL-G5 and their respective original samples.

Parameter	MDL (µg/g)	Soil Samples (µg/g)		RDP (%)	QA/QC REsults
		SW1	DUP		
Arsenic	1.0	1.8	1.9	5.4	Within the acceptable range
Barium	0.5	21.1	62.5	99	Outside the acceptable range
Chromium (total)	1.0	8.5	8.7	2.3	Within the acceptable range
Cobalt	0.1	3.8	3.5	8.2	Within the acceptable range
Copper	0.5	8.2	11.4	32.7	Outside the acceptable range
Lead	1.0	3.8	6.6	53.8	Outside the acceptable range
Nickel	0.5	6.1	6.4	4.8	Within the acceptable range
Vanadium	24.6	20.9	17.1	20	Within the acceptable range
Notes:					
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> where parameter concentration nd, MDL is used for calculation					

Three of the QA/QC results are outside of the acceptable limits for SW1 and DUP. This is considered to have occurred based on the heterogenous nature of the upper fill material from which these samples were collected.

Given all parameters comply with the MECP Table 3 standards; as such, the quality of the data is considered to be sufficient to meet the overall objectives of this assessment.

Table 14B: Soil Analytical Test Results – Metals, Hg and CrVI					
Parameter	MDL (µg/g)	Soil Samples (µg/g)		RDP (%)	QA/QC Results
		WW6	DUP1		
Arsenic	1.0	1.8	1.3	32.2	Outside the acceptable range
Barium	0.5	37.9	22.4	51.4	Outside the acceptable range
Chromium (total)	1.0	13.2	7.8	51.4	Outside the acceptable range
Cobalt	0.1	3.9	2.7	36.4	Outside the acceptable range
Copper	0.5	8.5	6.1	32.9	Outside the acceptable range
Lead	1.0	17.9	9.9	57.5	Outside the acceptable range
Nickel	0.5	7.2	nd (5.0)	36.1	Outside the acceptable range
Vanadium	24.6	28.3	18.1	44	Outside the acceptable range
Notes:					
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> where parameter concentration nd, MDL is used for calculation					

All of the QA/QC results are outside of the acceptable limits for WW6 and DUP1. This is considered to have occurred based on the heterogenous nature of the upper fill material from which these samples were collected. Given all parameters comply with the MECP Table 3 standards; as such, the quality of the data is considered to be sufficient to meet the overall objectives of this assessment.

Table 14C: Soil Analytical Test Results – Metals, Hg and CrVI					
Parameter	MDL (µg/g)	Soil Samples (µg/g)		RDP (%)	QA/QC Results
		TP10-G3	TPJ-G3		
Antimony	0.2	1.5	nd (1.0)	40	Outside the acceptable range
Arsenic	1.0	1.3	1.4	7.4	Within the acceptable range
Barium	0.5	48.2	47.1	2.3	Outside the acceptable range
Boron	5.0	5.8	6.7	14.4	Within the acceptable range
Chromium (total)	1.0	11.5	12.0	4.2	Within the acceptable range
Cobalt	0.1	5.0	4.5	10.5	Within the acceptable range
Copper	0.5	8.7	8.8	9.1	Within the acceptable range
Lead	1.0	3.3	3.7	11.4	Within the acceptable range
Nickel	0.5	8.4	8.2	7.2	Within the acceptable range
Vanadium	24.6	79.0	25.5	102.4	Outside the acceptable range
Zinc	23.9	92.8	24.0	117.8	Outside the acceptable range
Notes:					
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> where parameter concentration nd, MDL is used for calculation					

Four of the QA/QC results are outside of the acceptable limits for TP10-G3 and TPJ-G3. These samples were collected from the native glacial till at depths well below the base of the remedial excavations and the results comply with the MECP Table 3 standards, the results are not considered to affect the quality of data and overall objectives of this assessment.

Table 14D: Soil Analytical Test Results – Metals					
Parameter	MDL (µg/g)	Soil Samples (µg/g)		RDP (%)	QA/QC Results
		TP12-G5	TPL-G5		
Arsenic	1.0	1.5	1.4	6.9	Within the acceptable range
Barium	0.5	52.4	43.5	18.6	Within the acceptable range
Chromium (total)	1.0	8.9	8.8	1.1	Within the acceptable range
Cobalt	0.1	4.2	4.0	4.9	Within the acceptable range
Copper	0.5	8.2	8.5	3.6	Within the acceptable range
Lead	1.0	2.5	2.3	8.3	Within the acceptable range
Nickel	0.5	5.5	5.8	5.3	Within the acceptable range
Uranium	1.0	1.0	nd (1.0)	0	Within the acceptable range
Vanadium	24.6	21.0	20.7	1.4	Within the acceptable range
Zinc	23.9	20.0	nd (20.)	0	Within the acceptable range
Notes:					
<input type="checkbox"/> MDL – Method Detection Limit <input type="checkbox"/> nd – not detected above the MDL <input type="checkbox"/> where parameter concentration nd, MDL is used for calculation					

All of the QA/QC results are within the acceptable limit.

One duplicate groundwater sample collected from BH5-17 was submitted for laboratory analysis of PAHs. The duplicate was 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. No parameter concentrations were detected in either the original sample or its duplicate. The RPD values are therefore considered to be 0% and therefore meet the 20% target.

5.8 Phase II Conceptual Site Model

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

Site Description

The Phase II Property is located on the south side of Carling Avenue between Meath Street and Archibald Street, in the City of Ottawa, Ontario. The Phase II Property has an area of approximately 0.93 hectares, with approximately 170 m of frontage along Carling Avenue, 120 m of frontage along Meath Street and 105 m of frontage along Archibald Street. At the time of the most recent Phase II ESA work, the western portion of the Phase II Property was occupied by 1 to 3-storey operation hotel, paved access lanes and parking areas, as well as landscaped areas fronting along Carling Avenue. The eastern portion of the Phase II Property was under construction with the first phase of the proposed development.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Based on the findings of the Phase I and Phase II ESAs completed for the Phase II Property, nine on or off-site potentially contaminating activities (PCAs) were considered to result in 11 areas of potential environmental concern (APECs) on the Phase II Property, as present in the table below.

Table of Areas of Potential Environmental Concern 1354 and 1376 Carling Avenue - Ottawa					
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
APEC 1A (former retail fuel outlet pump island)	Northwestern 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 1B (former retail fuel outlet tank nest)	Northwestern 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 2 (on-site diesel generator)	Northwestern portion of 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 retail fuel outlet pump island/tank nest)	Northeastern portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater
APEC 4 (former automotive service garage)	Northeastern portion of Phase I Property	Item 52 - Storage, maintenance, fuelling and repair of equipment, vehicles and material used to maintain transportation systems	On-site	BTEX PHCs (F ₁ -F ₄) VOCs PAHs	Soil Groundwater
APEC 5 (former off-site USTs)	Northwestern portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater
APEC 6 (former off-site retail fuel outlet)	Northeastern portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater
APEC 7 (former off-site retail fuel outlet)	Northeastern portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater

Table of Areas of Potential Environmental Concern 1354 and 1376 Carling Avenue - Ottawa					
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
APEC 8 (imported fill material)	Eastern portion of Phase I Property	Item 30 - Importation of Fill Material of Unknown Quality	On-site	Metals As, Sb, Se Hg, CrVI PAHs	Soil
APEC 9 (on-site UST)	North central portion of Phase I Property	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHCs (F ₁ -F ₄)	Soil Groundwater
APEC 10¹ (de-icing salt for safety purposes)	Across Phase I Property (outside of building footprint)	Other – use of road salt for safety purposes	On-site	EC SAR Sodium Chloride	Soil Groundwater
1 – In accordance with Section 49.1 of Ontario Regulation 153/04 standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined, based on a phase two environmental site assessment, that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both.					

APEC 1A – Based on a 1956 Fire Insurance Plan (FIP), a former retail fuel outlet (RFO) was situated on the northwestern portion of the Phase II Property; the pump island was depicted on the north-central portion of the former RFO property. The pump island can be seen at this location in the 1958 and 1965 aerial photographs.

APEC 1B – The 1956 FIP depicts three underground storage tanks (USTs) near the southwest corner of the former RFO property on the northwest portion of the Phase II Property.

APEC 2 - A small diesel generator with a sub-base diesel tank, was present in the mechanical room of the former Beachcomber restaurant/bar. Minor staining was observed on the concrete floor in the vicinity of the generator; the concrete floor slab was in good condition with no potential migratory pathways nearby.

APEC 3 – Based on the 1956 FIP, a former RFO was situated on the northeastern portion of the Phase II Property. The FIP depicts two USTs on the north-central portion of the former RFO property.

Based on the configuration of the RFO shown on the FIP, it is expected that the pump island was situated in the immediate vicinity of the tank nest. Aerial photographs from 1958 and 1965 were reviewed, however details of the former RFO could not be clearly distinguished.

APEC 4 – The 1956 FIP identifies the building associated with the aforementioned RFO (APEC 3), as “greasing”. As such, this building is considered to have operated as an automotive service garage. City directory listings confirm the presence of an automotive service garage on this portion of the Phase II Property.

APEC 5 – Based on a review of 1956 FIPs and city directories, the Ontario Department of Highways was located north of the Phase II Property, across Carling Avenue. The FIPs depict two USTs further north of Carling Avenue.

APEC 6 – The 1956 FIPs identify a former retail fuel outlet and automotive service garage at the southeast corner of the intersection of Carling Avenue and Archibald Street. Two USTs are depicted along Archibald Street.

APEC 7 - The 1956 FIPs identify a former retail fuel outlet, automotive service garage and bulk storage of fuel on the properties at the northeast corner of the intersection of Carling Avenue and Archibald Street. Two USTs were depicted immediately north of Carling Avenue.

APEC 8 - Poor quality fill material was identified on the eastern portion of the Phase II Property during the 2016 subsurface investigations.

APEC 9 – A UST was identified on the north-central portion of the Phase II Property during construction activities on the eastern portion of the site.

APEC 10 - Based on the findings of the Phase I ESA, road salt was applied to the surface of the parking lot and access lanes at the RSC Property for the safety of vehicular and pedestrian traffic under conditions of ice and/or snow.

Salt parameters (EC and SAR) were analysed in accordance with O.Reg.406/19 for off-site disposal purposes. EC and SAR concentrations exceeding the MECP Table 3 standards were identified across the Phase II Property.

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.

The APECs are shown on Drawing PE3929-1R - Site Plan appended to the updated Phase I ESA Report and Drawing PE3929-3 – Test Hole Location Plan.

Off-site PCAs within the Phase I Study Area are shown on Drawing PE3929-2R – Surrounding Land Use Plan appended to the updated Phase I ESA Report.

During the 2021 Phase I ESA Update, a 1993 record of a former off-site UST was identified at the Embassy West Hotel property to the west of the Phase II Property, across Meath Street. Based on a review of aerial photographs, an apparent excavation was carried out on the southern portion of this property circa 2007, in the vicinity of existing vent and fill pipes. It is considered like that a former UST was removed and as oil remediation program was completed, prior to replacing the UST with an interior AST. A groundwater monitoring program is considered to have been carried out in 2016-2017 based on the findings of the well records search.

In 2019, Paterson conducted an environmental investigation for a property neighbouring the Embassy West Hotel. At this time, Paterson had a brief discussion with a representative from Embassy West Senior Living. The representative indicated that an excavation had taken place on the south side of the property in approximately the location identified in the aerial photographs and site visit, to remove a furnace oil tank. According to the representative, the work was completed by a TSSA licensed contractor and all the analytical test results were in compliance with the MECP Standards.

Based on the information above, in combination with the separation distance of the remedial excavation from the Phase I Property (approximately 30m), the down-gradient orientation of the Embassy West property relative to the subject land, in combination with the low permeability of the native silty clay soils, the former UST and existing interior AST are not considered to represent an area of potential environmental concern on the Phase II Property.

Remaining off-site PCAs identified within the 250m study area are also not considered to represent APECs on the subject land based on their significant separation distances and/or orientations relative to the Phase II Property.

Contaminants of Potential Concern

Based on the findings of the Phase II ESA, contaminants of concern in the soil and/or groundwater include the following:

- Benzene, toluene, ethylbenzene and xylenes (BTEX);
- Petroleum hydrocarbons (PHCs) fractions F₁, F₂, F₃ and F₄;
- Volatile Organic Compounds (VOCs);
- Polycyclic aromatic hydrocarbons (PAHs);
- Metals (including As, Sb, Se);
- Mercury and Hexavalent Chromium.

As discussed above, in accordance with Section 49.1 of O.Reg. 153/04, EC and SAR concentrations are deemed to be in accordance with the MECP Table 3 standards and are not presented on the figures.

Subsurface Structures and Utilities

The Phase II Property is occupied by one multi-storey building structure with a full basement level on the west portion of the site. Two access stairwells are present on the western portion of the Phase II Property along Meath Street. A buried storm water tank is present on the southwestern portion of the Phase II Property, immediately south of the building structure. The eastern portion of the site is currently under construction with the first phase of the proposed development. A crane base is present within the excavation and the foundation has been poured for the northern-most building structure.

During the Phase II ESA, a buried UST was identified on the north-central portion of the site, adjacent to the northeast corner of the remaining subject structure. Monitoring wells previously installed on the Phase II Property also remain present on site. With the exception of buried utilities, discussed below, no other subsurface structures are present on the Phase II Property.

Based on underground service locates conducted at the time of the Phase II ESAs, natural gas, fibre optics, electricity and telephone services are buried on the northern portion of the subject property. A municipal sewer easement also runs along the northern portion of the Phase II Property, approximately parallel to Carling Avenue. Private electrical, water and sewer lines are also present over the remainder of the property. The approximate location of the sewer easement is shown on Drawing: PE3929-3 - Test Hole Location Plan.

Based on standard practice for subsurface utility installation, service trenches are expected to be present approximately 1 to 2 m below existing grade. In general, trench backfill may provide a preferential pathway for contaminant transport if the water table is at or above the base of the trenches.

The findings of the Phase II-ESA identified the water table within the native silty clay below the fill. During seasonal fluctuations over time, the groundwater table may have risen sufficiently so, that existing or previous service trenches created preferential pathways for contaminants, particularly in the vicinity of BH5 and BH10 where impacted fill material was identified during the 2016 Phase II ESA. Based on the findings of the Phase II ESA groundwater across the Phase II Property was in compliance with MECP Table 3 standards. Existing or previous service trenches were not considered to have created preferential pathways for the migration of contamination.

Physical Setting

Site Stratigraphy

Site stratigraphy is provided in the Soil Profile and Test Data Sheets provided in Appendix 1 and illustrated on Drawings PE3929-4A and 4B through PE3929-7A and 7B – Cross Sections A-A' and B-B`. A general description of the site stratigraphy consists of the following:

- **Pavement Structure** consisting of 0.05 m of asphaltic concrete over crushed stone and silt, to depths ranging from approximately 0.6 to 1.0 m below ground surface; it should be noted that no pavement structure was encountered at BH1 (topsoil) or BH12, BH13, BH1-21 and BH2-21 (concrete floor slab) or any of the test pit locations.

- ❑ **Fill Material** was encountered beneath the pavement structure at all boreholes locations on the exterior of the property (including BH11, within the parking structure, which has been referred to as an interior borehole). The fill material extended to depths ranging from approximately 1 to 2.8 m below grade. The fill generally consisted of brown silty sand with gravel and traces of clay, or brown silty clay with traces of sand and gravel and was largely considered to consist of reworked native material. Further details pertaining to the fill material are provided below.
- ❑ **Native Silty Clay** – with the exception of BH6, BH11 and BH13, silty clay was encountered beneath the fill material at each of the borehole locations. The clay extended to depths ranging from 4.1 to 6.1 m below ground surface.
- ❑ **Glacial Till** - till material consisting of grey silty clay and/or sandy silt to silty sand with gravel and trace cobbles was identified beneath the silty clay material, at all boreholes with the exception of BH9, where sand was identified beneath the native silty clay. This was the deepest unit investigated at the time of the Phase II ESA. Boreholes were terminated on inferred bedrock at depths ranging from approximately 6.1 to 10.1 m below ground surface.
- ❑ **Bedrock** - Bedrock was confirmed at BH1-17 through BH4-17, during a supplemental Geotechnical Investigation, at depths ranging from approximately 6.2 to 9.1m below grade. Bedrock consisted of grey limestone interbedded with shale.

Hydrogeological Characteristics

Groundwater levels were measured at the Phase II Property on November 7, 2016. More recent water levels were recorded at BH5-17 in August of 2017 and at BH1-21 and BH2-21 in June of 2021. The water table at the Phase II Property was encountered in the overburden material.

The groundwater levels were measured at depths between approximately 2.2 and 4.3 m below the exterior grade. The groundwater levels were measured at depths between approximately 0 and 1.09 m below basement grade. It is noted that water levels fluctuate with seasonal variations.

Based on the groundwater elevations recorded during the November, 2016 monitoring event, groundwater contour mapping was completed. Groundwater contours are shown on Drawing PE3929-6 - Groundwater Contour Plan. Based on the contour mapping, groundwater flow at the subject site appears to be in a westerly direction. An average horizontal hydraulic gradient of approximately 0.006 m/m was calculated.

Approximate Depth to Bedrock

Bedrock was confirmed at BH1-17 through BH4-17, during a supplemental Geotechnical Investigation, at depths ranging from approximately 6.2 to 9.1m below grade. Bedrock consisted of grey limestone interbedded with shale.

Approximate Depth to Water Table

Depth to water table at the subject site varies between approximately 2.2 and 4.3 m below existing grade.

Section 35 of the Regulation

Section 35 of the Regulation applies to the RSC Property as follows:

- The property, and all other properties located, in whole or in part, within 250 metres of the boundaries of the property, are supplied by a municipal drinking water system, as defined in the Safe Drinking Water Act, 2002.
- The Phase II Property is not an agricultural or other use.
- The Phase II Property is not located in an area designated in the municipal official plan as a well-head protection area or other designation identified by the municipality for the protection of groundwater.
- Neither the Phase II Property nor any of the properties in the Phase I Study Area area has a well used or intended for use as a source of water for human consumption or agriculture.

The QP will give the clerk of the municipality written notice of intention to apply the standards in prior to submission of a Record of Site Condition for the property.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) and Section 43.1 do not apply to the subject site as the Phase II Property is not a shallow soil property and the Phase II Property is not within 30 m of a body of water.

Fill Placement

Fill material was encountered beneath the pavement structure at all boreholes locations on the exterior or the property (including BH11, within the parking structure, which has been referred to as an interior borehole). The fill material extended to depths ranging from approximately 1 to 2.8 m below grade.

The fill generally consisted of brown silty sand with gravel and traces of clay, or brown silty clay with traces of sand and gravel and **was considered to be reworked native material.**

Topsoil was identified within the fill material at BH1 through BH5, BH7 and BH8. A 0.3 m layer of topsoil was noted in BH7 at a depth of approximately 1.8 to 2.1 m below grade. Occasional fragments of asphalt were noted in the fill material at BH1, BH4 and BH9. Asphalt fragments were considered to have resulted from augering through the pavement structure (B4 and BH9) or to be remnants from the realignment of Carling Avenue.

Building debris, including traces of wood and/or brick fragments, were noted in the fill material at BH3, BH5, BH8, BH10, TP7-21 and TP9-21. The pieces of brick were more substantial at BH10 where pieces of glass and possible fragments of coal or slag were also identified. The fill material encountered at BH5 and BH10 was noticeably darker than the fill material at the other borehole locations.

Proposed Buildings and Other Structures

It is our understanding that the Phase II Property will be redeveloped in two phases, with multi-storey residential buildings with one to two levels of underground parking.

Existing Buildings and Structures

The western portion of the Phase II Property is occupied by a 1 to 3-storey hotel building with a full basement level. The building is heated with natural gas-fired equipment. Two access stairwells leading to the basement of the subject structure are present to the west, along Meath Street. A signpost is also present on the northwestern portion of the Phase II Property.

The eastern portion of the Phase II Property is currently under construction. A building foundation has been poured on the northern portion of the excavated area. A crane base is also present on this portion of the site. The approximate locations of the buildings and structure are shown on Drawing PE3929-3 – Test Hole Location Plan.

Water Bodies

No bodies of water are present on the Phase I Property or within the Phase I Study Area.

Areas of Natural Significance

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

Environmental Condition

Areas Where Contaminants are Present

Based on the findings of the Phase II ESA impacted soil exceeding the MECP Table 3 standards is present on the east-central portion of the site, at the locations of BH5 and BH10. Impacted soil was also identified on the north-central portion of the site in the vicinity of the UST identified during construction activities; the impacted soil resulted from a small release to the excavation base at the time the tank was encountered.

Analytical test results and estimated areas where contaminants are present, are shown on Drawings PE3929-4 through PE3929-7 – Analytical Testing Plans for soil.

Groundwater beneath the Phase II Property complies with the MECP Table 3 standards.

Types of Contaminants

Based on the PCAs identified at the RSC Property prior to remediation, the Contaminants of Concern (COCs) identified in the soil at the RSC Property include the following:

- Petroleum hydrocarbons (PHCs) fractions F₂, F₃ and F₄; and
- Polycyclic aromatic hydrocarbons (PAHs): anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenzo[a,h]anthracene, fluoranthene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene. .

The following metal parameters were also identified at concentrations exceeding the MECP Table 3 standards: barium, cobalt and vanadium. These parameter concentrations are considered to be representative of naturally occurring elevated levels in Champlain Sea Clay deposits within the Ottawa region for the reasons provided below:

- No potential sources of barium, cobalt or vanadium were identified on the subject land during the Phase I ESA.
- Concentrations of barium, cobalt and vanadium identified in the fill material overlying the clay layer were not elevated and comply with the applicable MECP Table 3 standards.
- The concentrations of barium, cobalt and vanadium within the silty sand/sandy silt Glacial Till layer underlying the silty clay layer comply with the applicable standards.

As such, it is the opinion of the QP that barium, cobalt and vanadium are not contaminants of concern at the Phase II Property.

Groundwater at the Phase II Property complies with MECP Table 3 standards.

Contaminated Media

Based on analytical test results, overburden material on the northeastern and north-central portion so the Phase II Property are impacted with PHC and/or PAH parameter concentrations exceeding the MECP Table 3 standards.

Groundwater beneath the Phase II Property was determined to comply with the MECP Table 3 standards.

What is Known About the Area Where Contaminants Are Present

Based on the findings of the Phase II ESA, visually impacted fill material was identified on the eastern portion of the site, in the vicinity of a former automotive service garage. The PHC and PAH parameters identified at BH5 and BH10 are expected to have resulted from the poor-quality fill material and/or activities associated with the former automotive service garage.

A PHC F₂ concentration identified in the native soils on the north-central portion of the Phase II Property are considered to have resulted from the small amount of furnace oil that was released to the ground surface upon finding a UST during construction activities.

Distribution of Contaminants

Full delineation was achieved during a soil remediation program (the findings of which will be presented under separate cover). The approximate horizontal distribution of contaminants on the Phase II Property is shown on Drawings PE3929-5 – Analytical Testing Plan – Soil (PHCs) and PE3929-7 – Analytical Testing Plan – Soil (PAHs).

The approximate vertical distribution of contaminants in soil shown is on Drawings PE3929-5A and 5B – Cross-Section A-A' and Cross-Section B-B' and Drawings PE3929-7A and 7B – Cross-Section A-A' and Cross-Section B-B'.

Discharge of Contaminants

The PHC impacted soil identified at BH10 is expected to have been related to operations at the former on-site automotive service garage. Based on the shallow depth of the impacted soil and the nature of the impact, which suggests a heavier product such as motor oil, contaminants may have been released by spillage directly to the ground surface or through leaks in underground equipment. No information pertaining to the former automotive service garage was available for review during the Phase I ESAs.

The impacted soil identified at BH5 is located further south of the former garage building; hydrocarbon product may have been released directly to the ground surface as a result of improper waste disposal methods associated with the operation of the former garage, or from vehicles on the property.

The PHC impacted soil identified at B111 is considered to have been residual contamination related to the fuel oil spilled to the excavation base upon discovery of the UST which has since been removed.

The PAH impacts identified in the fill material at BH10 are considered to be associated with the apparent coal or slag material and/or the heavy petroleum hydrocarbon product also identified in the soil recovered from BH10, as discussed above.

Migration of Contaminants

Given that the property was largely covered with a building structure or paved areas, the potential for downward leaching is considered to be low. Based on the findings of the Phase II ESA, groundwater beneath the Phase II Property complies with the MECP Table 3 standards. As such, no significant migration of contaminants is considered to have occurred on 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. Downward leaching is not considered to have affected contaminant distribution at the Phase II Property as the site is largely developed or paved and based on analytical test results the groundwater is in compliance with MECP Table 3 standards. Fluctuations in the groundwater level and groundwater flow are also not considered to have affected contaminant distribution based on the analytical test results which indicated that contaminant concentrations were not identified in any of the samples, above the laboratory method detection limits.

Potential for Vapour Intrusion

Given the location of PHC F₃ impacted soil outside the building footprint in the shallow fill material and the low-volatility nature of PAHs and PHC F₂, F₃ and F₄, the potential for vapours within the subject structure is considered to have been very low.

Impacted soil has since been removed from the Phase II Property. As such, there is no anticipated potential for future vapour intrusion at the Phase II Property.

Contaminant Transport Diagram

Please refer to Drawing PE3929-9 which illustrates and provides narrative notes explaining the contaminant release mechanisms, contaminant transport pathways, human and ecological receptors, receptor exposure points, and routes of exposure at the Phase II Property.

6.0 CONCLUSIONS

Assessment

Paterson Group was retained by Holloway Lodging Limited Partnership, to prepare an updated Phase II Environmental Site Assessment for the property addressed 1354 and 1376 Carling Avenue, in the City of Ottawa, Ontario.

This report updates the findings of a 2016 Phase II ESA report (Report PE3896-2), the purpose of which was to address areas of potential environmental concern (APECs) identified on the property during the 2016 Phase I ESA carried out by Paterson. It should be noted that the Phase I ESA was updated in 2021, at which time an additional APEC was identified on the Phase II Property: an underground storage tank was identified on the north-central portion of the site.

This report incorporates the findings of the 2016 Phase II ESA report as well as the findings of more recent subsurface investigations at the Phase II Property.

The initial 2016 Phase II ESA, carried out in conjunction with a Geotechnical Investigation, consisted of drilling 13 boreholes of which six were completed with monitoring well installations. A supplemental Geotechnical Investigation was carried out in 2017. At this time five additional borehole were drilled; BH5-17, the only environmental borehole, was installed with a groundwater monitoring well. In 2021 two additional boreholes with monitoring well installations were advanced on the Phase II Property, as well as 26 test pits. The test pits were carried out for delineation purposes as well as to confirm the soil quality for off-site disposal purposes in accordance with O.Reg. 406/19.

Soil samples obtained from the boreholes were screened using visual observations and vapour measurements. Site stratigraphy general consists of topsoil or pavement structure over fill material, underlain by native silty clay, followed by glacial till (consisting of a silty clay matrix over a sandy silt to silty sand matrix). The fill material beneath the pavement structure generally consists of brown silty sand or clay with gravel and traces of topsoil at some locations and was considered to be reworked native material.

Poor quality fill material, darker in colour and with occasional fragments of building debris or asphalt was noted at BH10 and BH5. Pieces of what appeared to be coal or slag material were also identified in the fill material recovered from BH10.

The results of the combustible vapour screening identified readings ranging from less than 5 to 35 ppm, which are not indicative of volatile substances. There were however hydrocarbon odours detected in samples recovered from BH5 and BH10 as well as a suspect odour in samples recovered from BH2.

Based on the screening results in combination with field observations, soil samples from various boreholes and test pits were submitted for analytical testing of a combination of volatile organic compounds (VOCs), benzene, ethylbenzene, toluene and xylene (BTEX), petroleum hydrocarbons (PCHs, F₁-F₄), polycyclic aromatic hydrocarbons (PAHs), metals (including arsenic, antimony and selenium), mercury and hexavalent chromium. Electrical conductivity and sodium adsorption ratio were also analysed for off-site disposal purposes.

Based on the analytical test results, petroleum hydrocarbon fractions (F₂, F₃, and/or F₄) exceeding MECP Table 3 standards were identified in samples BH10-SS3 and BH5-SS2 and B111. Various PAH parameters exceeding MECP Table 3 standards were identified in Sample BH10-SS2. Barium, cobalt and/or vanadium concentrations exceeding the MECP Table 3 standards were identified in soil samples TP2-21-G2, TP7-21G1, TP9-21-G3, TP14-G2, TP14-G4 and TP18-G2; these concentrations are considered to be naturally occurring and do not represent an environmental concern to the Phase II Property. Remaining metal parameter concentrations were identified in all soil samples at concentrations below the MECP Table 3 standards.

Concentrations of PHCs and/or PAH parameters were also identified in Samples BH1-SS6, BH4-SS5, BH5-SS2, BH5-SS3, BH10-SS3, TP6-21-G4, TP9-21-G1, B111 and GS1 at concentrations below the MECP Table 3 standards. No VOC or BTEX concentrations were identified in any of the samples analysed.

Groundwater samples were collected from the monitoring wells installed in BH1, BH2, BH4, BH11, BH12, BH5-17, BH1-21 and BH2-21 and submitted for analysis of VOC, BTEX, PHC (F₁-F₄) and/or PAH parameters. No parameter concentrations were identified above the method detection limits in any of the groundwater samples submitted for analysis. The groundwater beneath the Phase II Property complies with the MECP Table 3 standards.

Recommendations

Soil

A soil remediation program was recommended and has since been carried out at the Phase II Property. The findings of the UST removal and soil remediation program will be presented under separate cover and will ultimately be appended to the Phase II ESA report prior to the submission of a Record of Site Condition for the Phase II ESA Property.

Groundwater

The existing monitoring wells should be kept viable until they are no longer required for sampling purposes, at which time they should be decommissioned by a licenced contractor in accordance with Ontario Regulation 903.

Excess Soil

Excess soil for the second development phase must be handled in accordance with O.Reg.406/19.

7.0 STATEMENT OF LIMITATIONS

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

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

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

This report was prepared for the sole use of Holloway Lodging Limited Partnership. Permission and notification from Holloway and Paterson will be required to release this report to any other party.

Paterson Group Inc.



Jeremy Camposarcone, B.Eng.



Karyn Munch, P.Eng., QP_{ESA}



Report Distribution:

- Holloway Lodging Limited Partnership
- Paterson Group

FIGURES

FIGURE 1 - KEY PLAN

DRAWING PE3929-3– TEST HOLE LOCATION PLAN

DRAWING PE3929-4 – ANALYTICAL TESTING PLAN - SOIL (BTEX, VOCS)

DRAWING PE3929-4A – CROSS-SECTION A-A' - SOIL (BTEX, VOCS)

DRAWING PE3929-4B – CROSS-SECTION B-B' - SOIL (BTEX, VOCS)

DRAWING PE3929-5 – ANALYTICAL TESTING PLAN - SOIL (PHCS)

DRAWING PE3929-5A – CROSS-SECTION A-A' - SOIL (PHCS)

DRAWING PE3929-5B – CROSS-SECTION B-B' - SOIL (PHCS)

DRAWING PE3929-6 – ANALYTICAL TESTING PLAN - SOIL (METALS)

DRAWING PE3929-6A – CROSS-SECTION A-A' - SOIL (METALS)

DRAWING PE3929-6B – CROSS-SECTION B-B' - SOIL (METALS)

DRAWING PE3929-7 – ANALYTICAL TESTING PLAN - SOIL (PAHS)

DRAWING PE3929-7A – CROSS-SECTION A-A' - SOIL (PAHS)

DRAWING PE3929-7B – CROSS-SECTION B-B' - SOIL (PAHS)

**DRAWING PE3929-8 – ANALYTICAL TESTING PLAN –
GROUNDWATER**

DRAWING PE3929-9 – CONTAMINANT DISTRIBUTION DIAGRAM

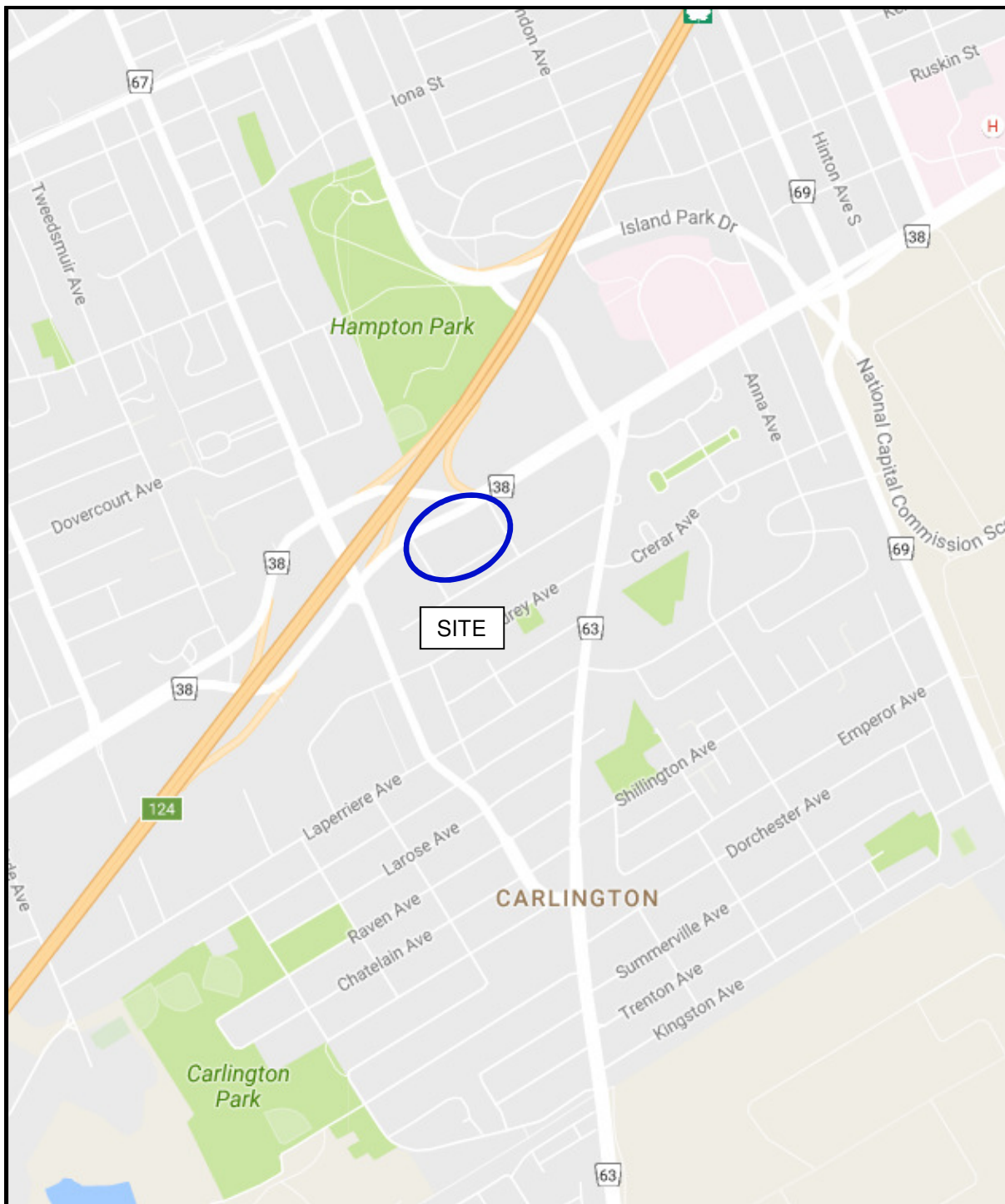
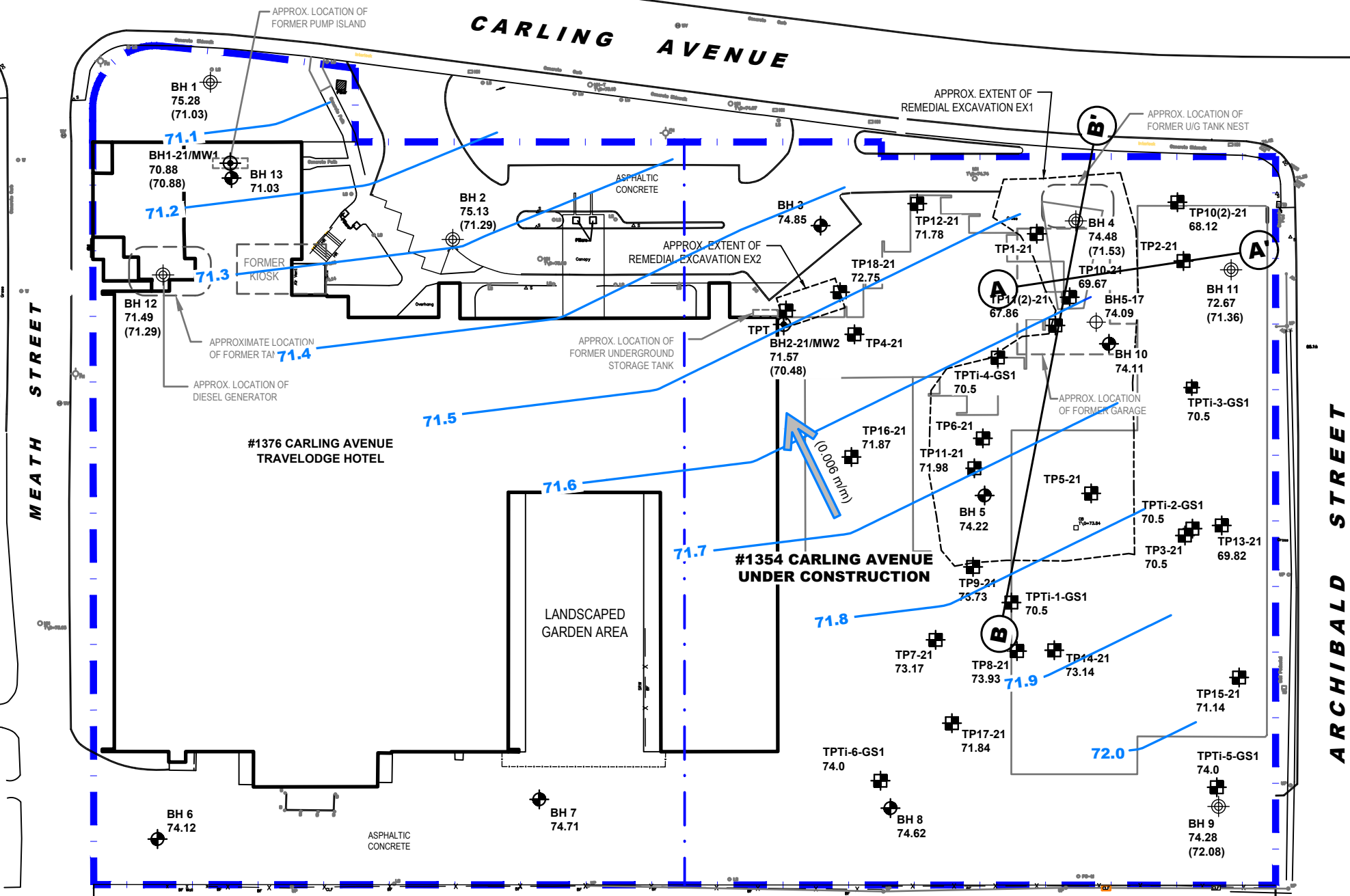


FIGURE 1
KEY PLAN



LEGEND:

- BOREHOLE LOCATION WITH MONITORING WELL, CURRENT INVESTIGATION
- TEST PIT LOCATION, CURRENT INVESTIGATION
- BOREHOLE LOCATION, PATERSON GROUP PE3896, 2017
- BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PE3896, 2017
- BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PG3736, 2017
- 71.57 GROUND SURFACE ELEVATION (m)
- (70.48) GROUNDWATER SURFACE ELEVATION (m)
- PHASE I, PHASE II AND RSC PROPERTY
- CROSS-SECTION LOCATION
- 71.5 GROUNDWATER CONTOUR
- APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

GROUND SURFACE ELEVATIONS REFERENCED TO A GEODETIC DATUM.

SCALE: 1:750

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NO.	REVISIONS	DATE	INITIAL

HOLLOWAY LODGING CORP.
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1354 TO 1376 CARLING AVE.

OTTAWA, ONTARIO

TEST HOLE LOCATION PLAN

Scale:	1:750	Date:	10/2021
Drawn by:	MPG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-3
Approved by:	MSD	Revision No.:	0

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

CARLING AVENUE

MEATH STREET

ARCHIBALD STREET

LEGEND:

SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

-  BOREHOLE LOCATION WITH MONITORING WELL, CURRENT INVESTIGATION
-  TEST PIT LOCATION, CURRENT INVESTIGATION
-  BOREHOLE LOCATION, PATERSON GROUP PE3896, 2017
-  BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PE3896, 2017
-  BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PG3736, 2017
-  ANALYZED SOIL SAMPLE LOCATION
- 71.57 GROUND SURFACE ELEVATION (m)
- (70.48) GROUNDWATER SURFACE ELEVATION (m)
-  PHASE I, PHASE II AND RSC PROPERTY

GROUND SURFACE ELEVATIONS REFERENCED TO A GEODETIC DATUM.

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NO.	REVISIONS	DATE	INITIAL
0			

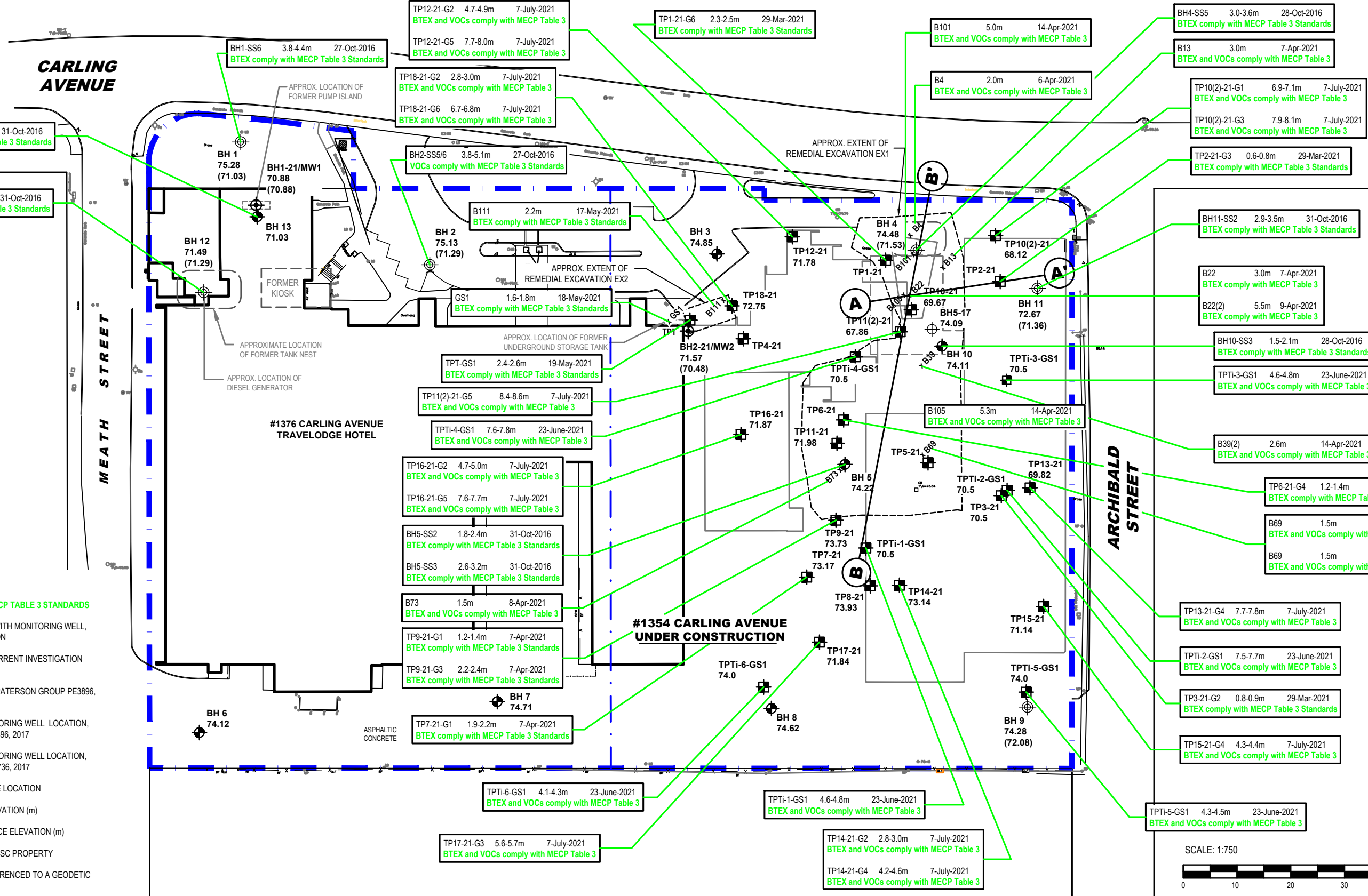
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Title:

ANALYTICAL TESTING PLAN - SOIL (BTEX & VOCs)

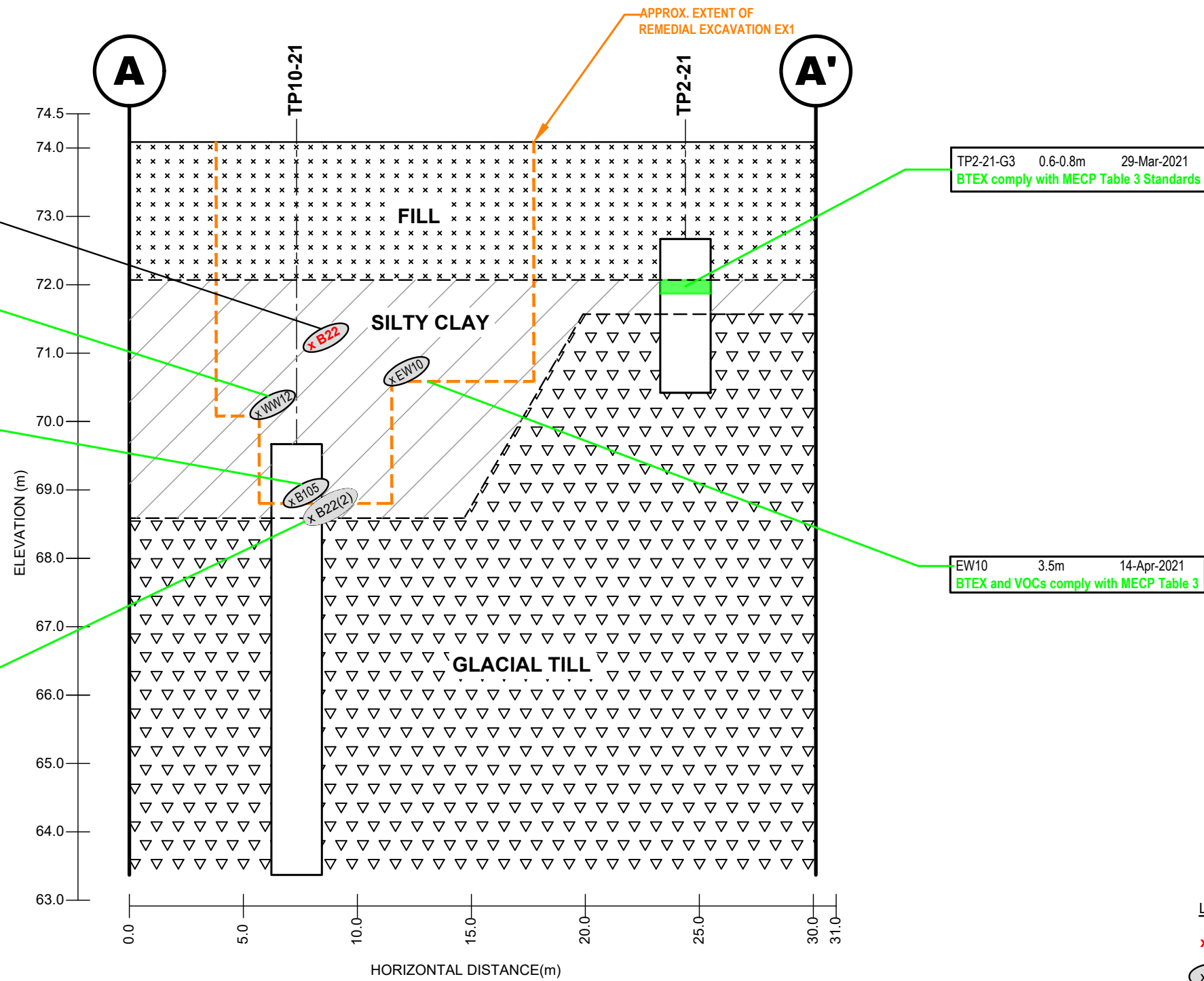
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Scale:	1:750	Date:	10/2021
Drawn by:	RCG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-4
Approved by:	MSD	Revision No.:	0



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LEGEND:

- x B22** IMPACTED SOIL REMOVED
- x B39** ANALYZED SOIL SAMPLE LOCATION
- SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS**
- SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS**

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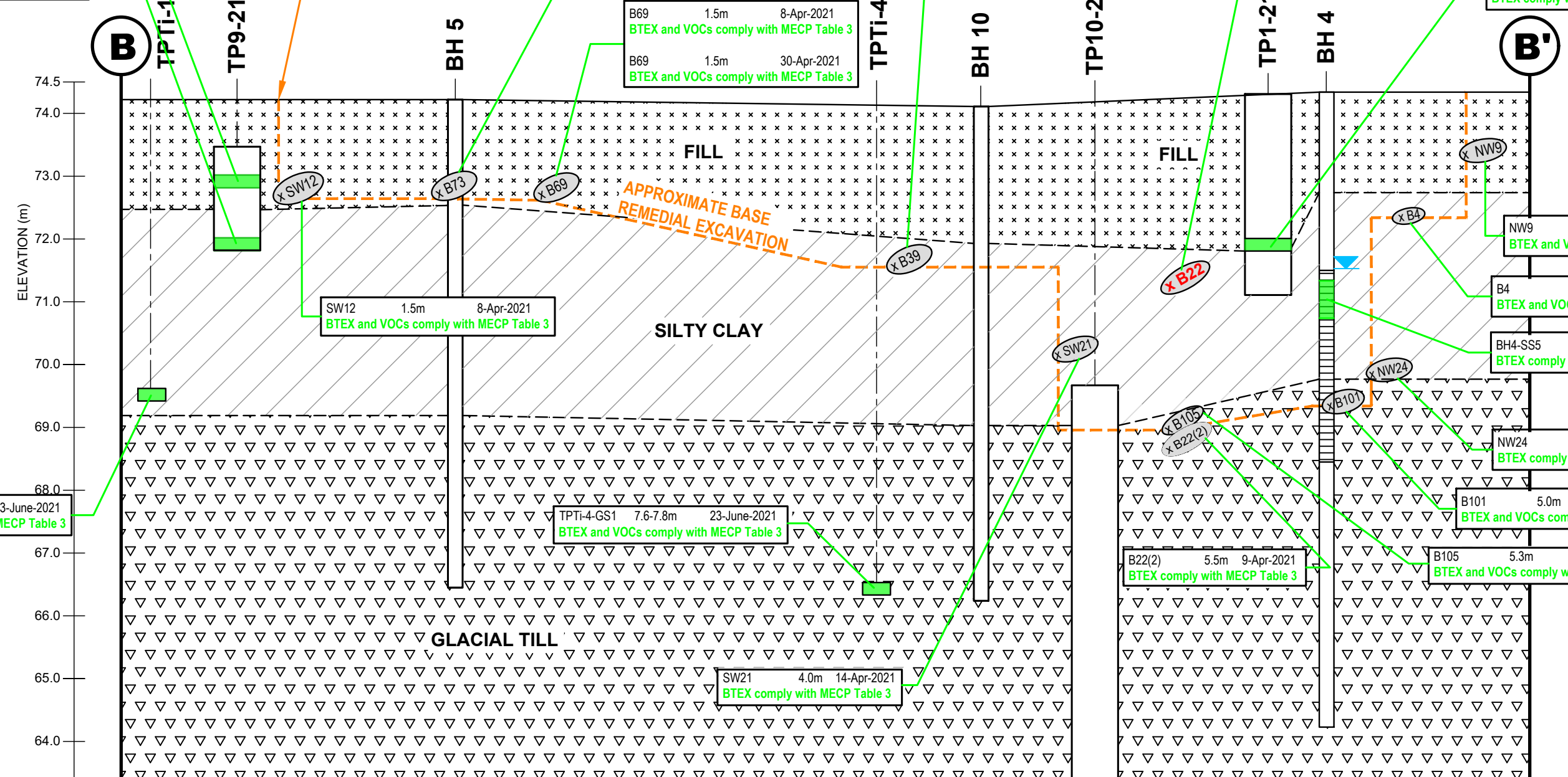
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HOLLOWAY LODGING CORP.
ENVIRONMENTAL SITE REMEDIATION
1354 TO 1376 CARLING AVENUE
OTTAWA, ONTARIO
Title: **CROSS SECTION A-A' - SOIL (BTEX & VOCs)**

Scale:	AS SHOWN	Date:	10/2021
Drawn by:	RCG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-4A
Approved by:	MSD	Revision No.:	

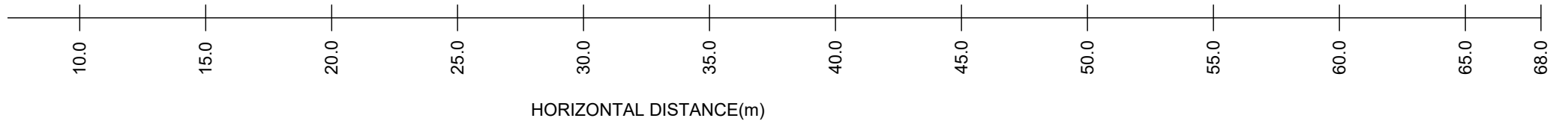
TP9-21-G1 1.2-1.4m 7-Apr-2021
 BTEX comply with MECP Table 3 Standards

TP9-21-G3 2.2-2.4m 7-Apr-2021
 BTEX comply with MECP Table 3 Standards



LEGEND:

- x B22 IMPACTED SOIL REMOVED
- ANALYZED SOIL SAMPLE LOCATION
- SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS
- SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS



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 OTTAWA, ONTARIO

Title: **CROSS SECTION B-B' - SOIL (BTEX & VOCs)**

Scale:	AS SHOWN	Date:	10/2021
Drawn by:	RCG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-4B
Approved by:	MSD	Revision No.:	



CARLING AVENUE

MEATH STREET

ARCHIBALD STREET

LEGEND:

SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

- BOREHOLE LOCATION WITH MONITORING WELL, CURRENT INVESTIGATION
 - TEST PIT LOCATION, CURRENT INVESTIGATION
 - BOREHOLE LOCATION, PATERSON GROUP PE3896, 2017
 - BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PE3896, 2017
 - BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PG3736, 2017
 - ANALYZED SOIL SAMPLE LOCATION
 - 71.57 GROUND SURFACE ELEVATION (m)
 - (70.48) GROUNDWATER SURFACE ELEVATION (m)
 - PHASE I, PHASE II AND RSC PROPERTY
- GROUND SURFACE ELEVATIONS REFERENCED TO A GEODETIC DATUM.

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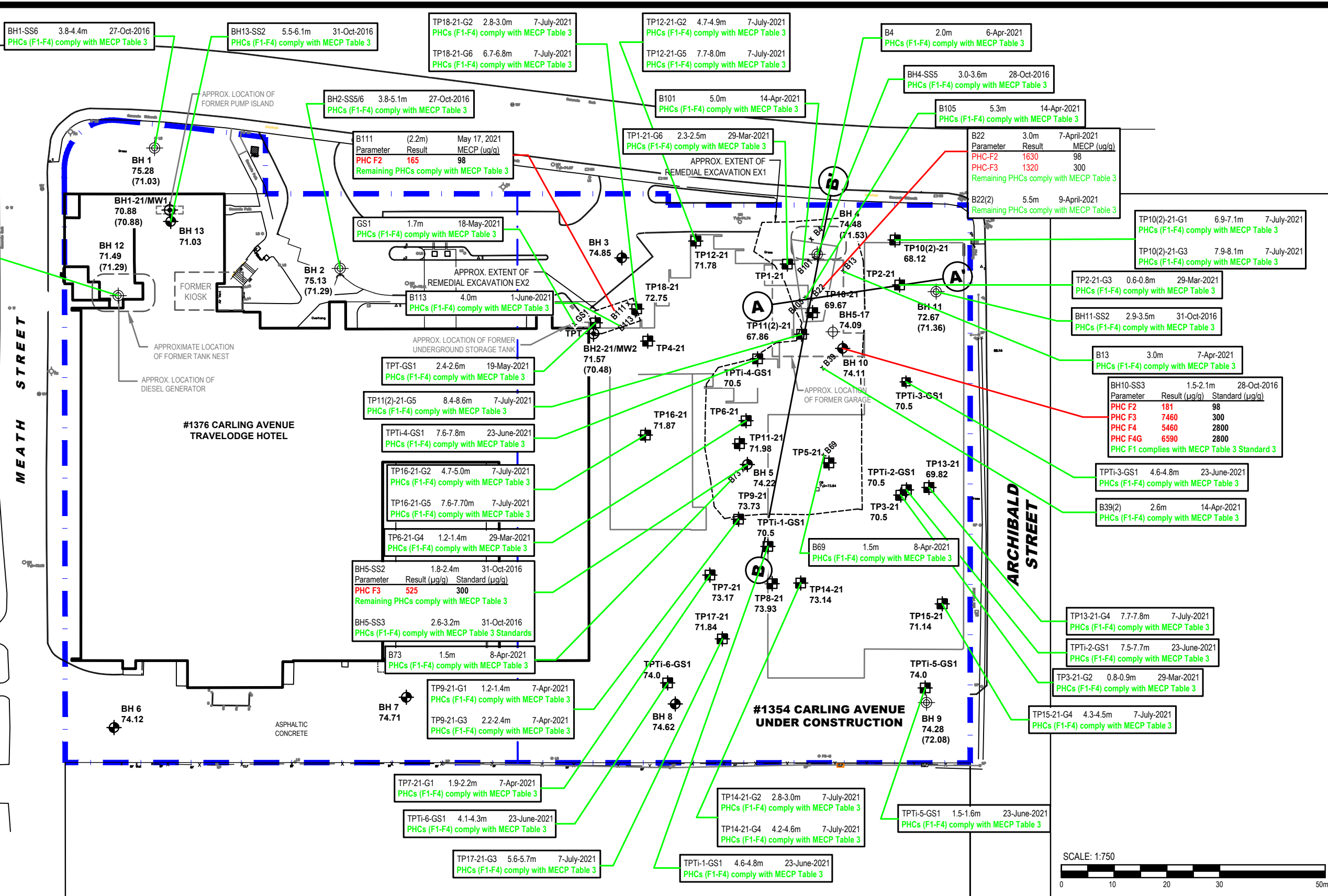
NO.	REVISIONS	DATE	INITIAL

HOLLOWAY LODGING CORP.
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1354 TO 1376 CARLING AVE.

OTTAWA, ONTARIO

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

Scale:	1:750	Date:	10/2021
Drawn by:	MPG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-5
Approved by:	MSD	Revision No.:	0



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B22	3.0m	7-April-2021
Parameter	Result	MECP (ug/g)
PHC-F2	1630	98
PHC-F3	1320	300
Remaining PHCs comply with MECP Table 3		

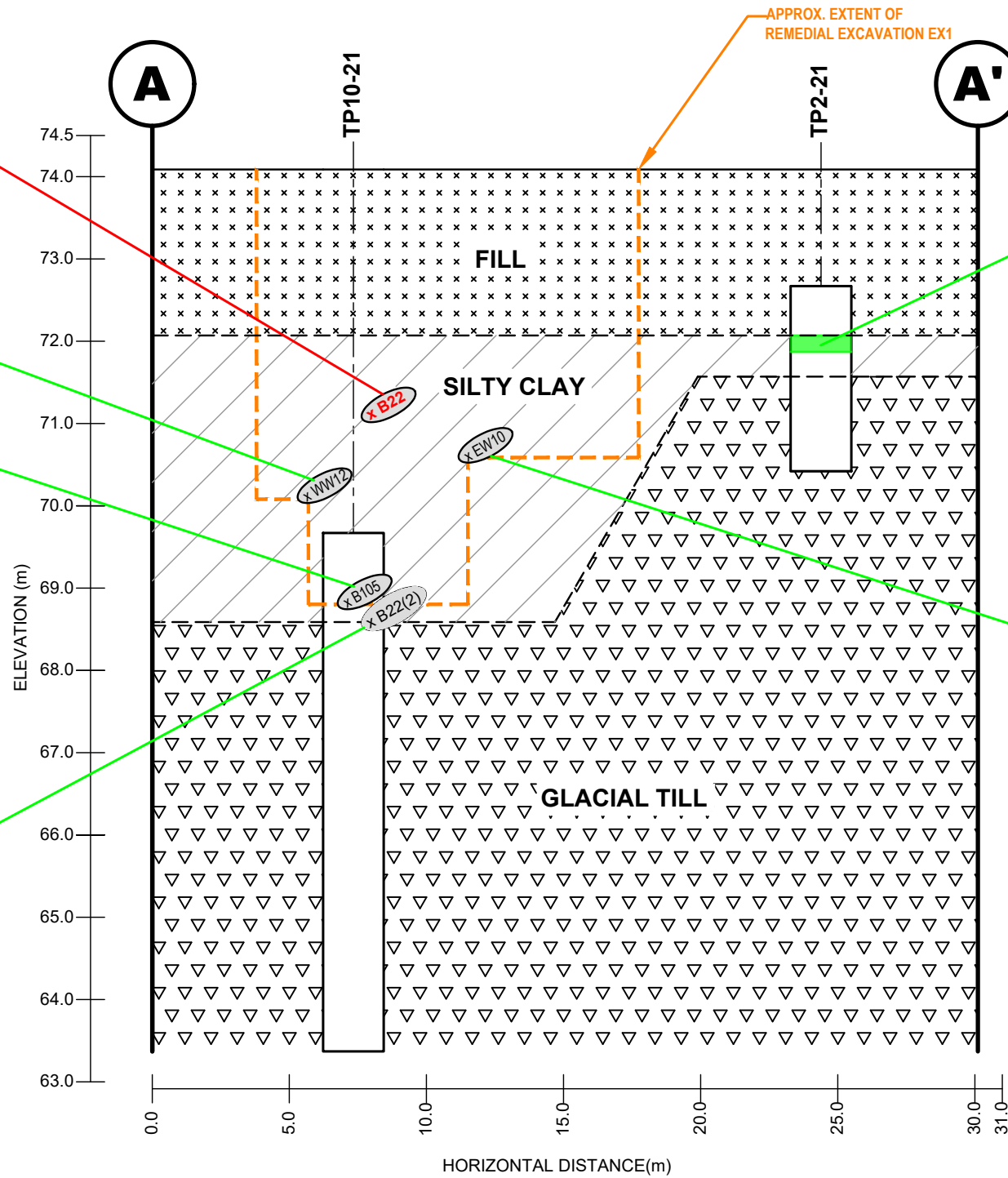
WW12	4.0m	14-Apr-2021
PHCs (F1-F4) comply with MECP Table 3		

B105	5.3m	14-Apr-2021
PHCs (F1-F4) comply with MECP Table 3		

TP2-21-G3	0.6-0.8m	29-Mar-2021
PHCs (F1-F4) comply with MECP Table 3		

EW10	3.5m	14-Apr-2021
PHCs (F1-F4) comply with MECP Table 3		

B22(2)	5.5m	9-April-2021
Remaining PHCs comply with MECP Table 3		



- LEGEND:**
- x B22 IMPACTED SOIL REMOVED
 - x B39 ANALYZED SOIL SAMPLE LOCATION
 - SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS
 - SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

HOLLOWAY LODGING CORP.
ENVIRONMENTAL SITE REMEDIATION
1354 TO 1376 CARLING AVENUE

OTTAWA, ONTARIO

Title: **CROSS SECTION A-A' - SOIL (PHCs)**

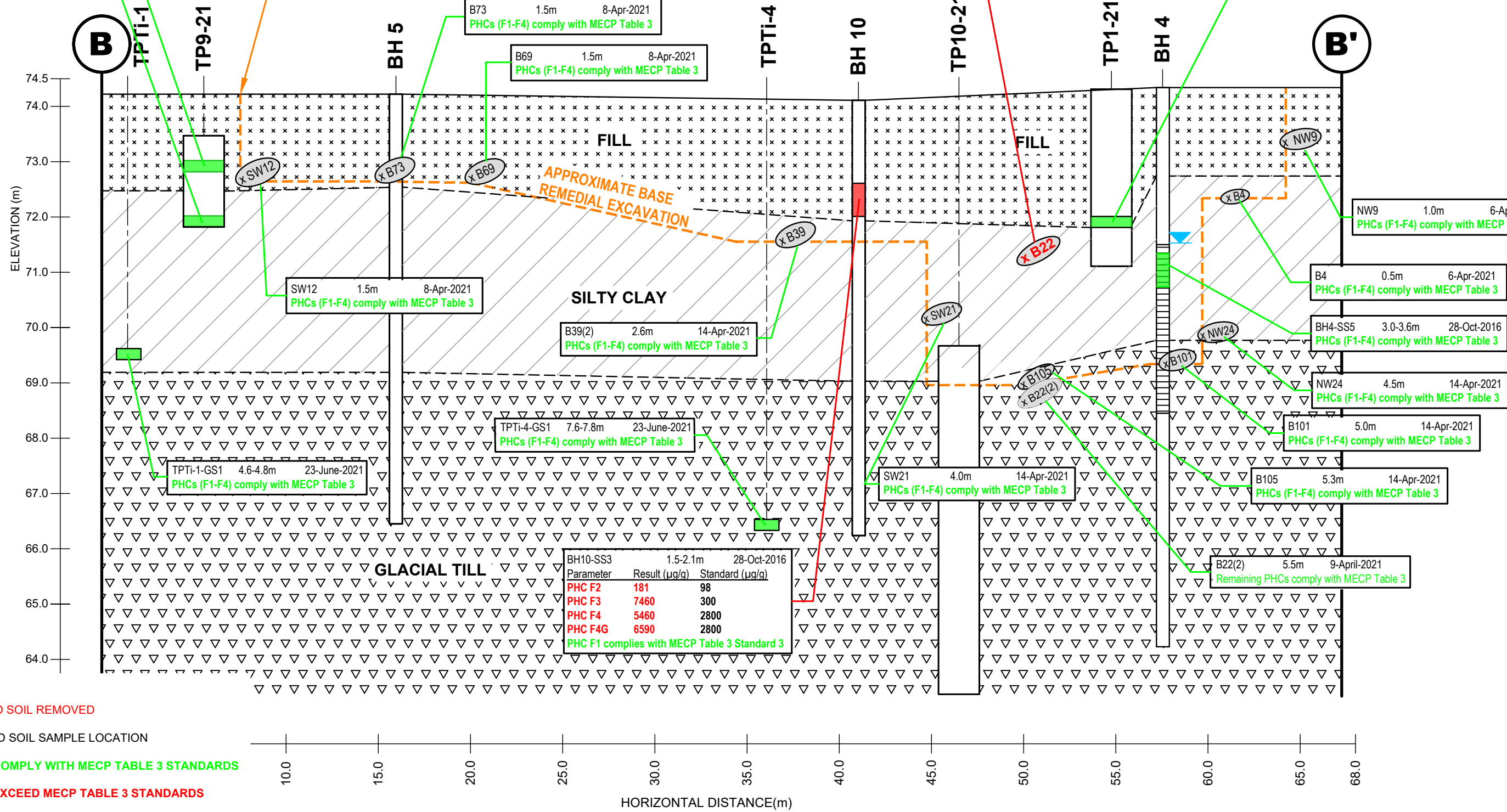
Scale:	AS SHOWN	Date:	10/2021
Drawn by:	RCG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-5A
Approved by:	MSD	Revision No.:	

TP9-21-G1 1.2-1.4m 7-Apr-2021
 PHCs (F1-F4) comply with MECP Table 3

TP9-21-G3 2.2-2.4m 7-Apr-2021
 PHCs (F1-F4) comply with MECP Table 3

B22 3.0m 7-April-2021
 Parameter Result MECP (ug/g)
 PHC-F2 1630 98
 PHC-F3 1320 300
 Remaining PHCs comply with MECP Table 3

TP1-21-G6 2.3-2.5m 29-Mar-2021
 PHCs (F1-F4) comply with MECP Table 3



LEGEND:

- x B22 IMPACTED SOIL REMOVED
- ANALYZED SOIL SAMPLE LOCATION
- SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS
- SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

HOLLOWAY LODGING CORP.
ENVIRONMENTAL SITE REMEDIATION
1354 TO 1376 CARLING AVENUE

OTTAWA, ONTARIO

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

Scale:	AS SHOWN	Date:	10/2021
Drawn by:	RCG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-5B
Approved by:	MSD	Revision No.:	



CARLING AVENUE

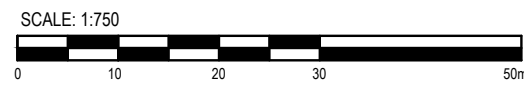
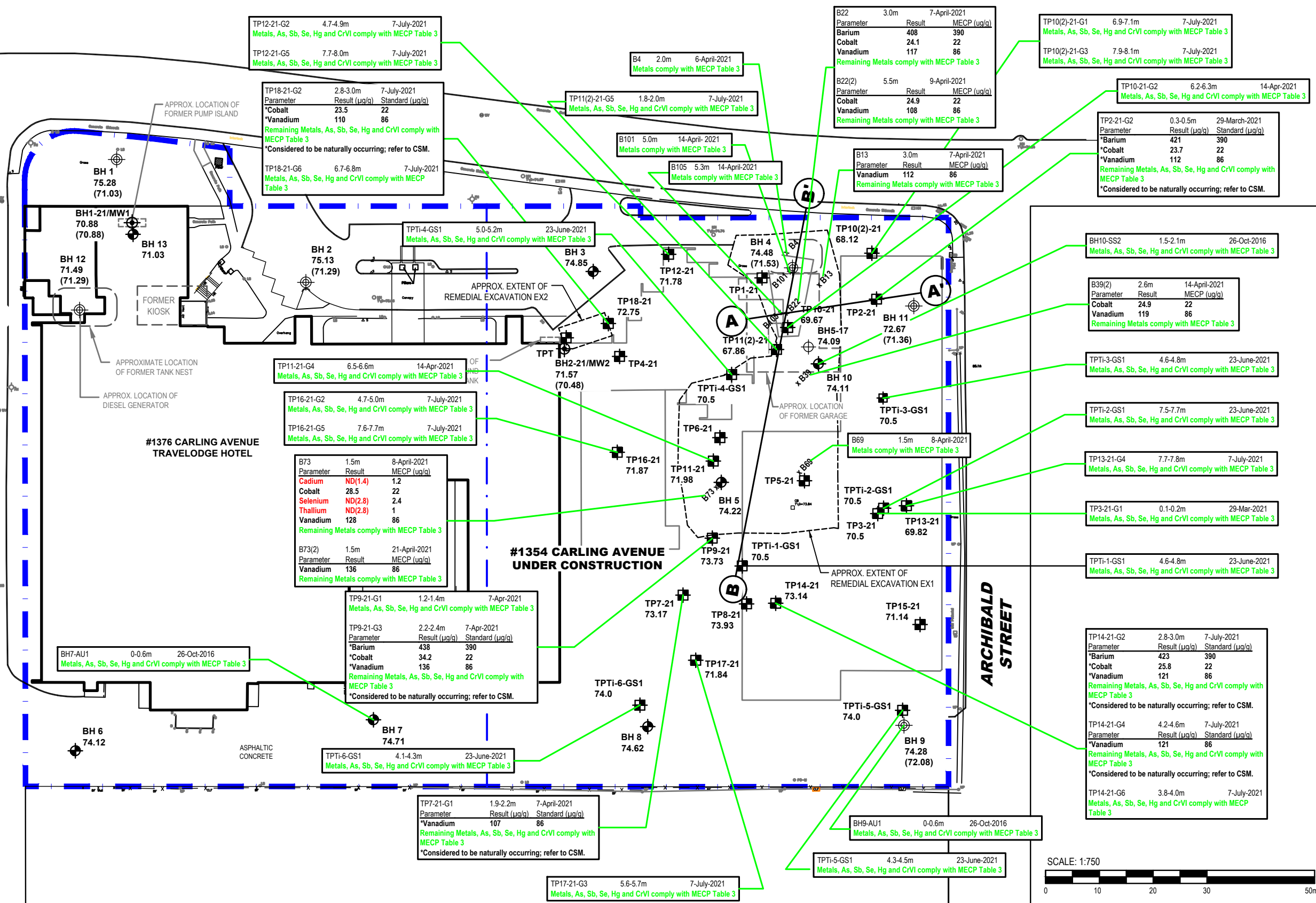
MEATH STREET

ARCHIBALD STREET

**#1376 CARLING AVENUE
TRAVELodge HOTEL**

**#1354 CARLING AVENUE
UNDER CONSTRUCTION**

- LEGEND:**
- SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS
 - SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS
 - BOREHOLE LOCATION WITH MONITORING WELL, CURRENT INVESTIGATION
 - TEST PIT LOCATION, CURRENT INVESTIGATION
 - BOREHOLE LOCATION, PATERSON GROUP PE3896, 2017
 - BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PE3896, 2017
 - BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PG3736, 2017
 - ANALYZED SOIL SAMPLE LOCATION
 - 71.57 GROUND SURFACE ELEVATION (m)
 - (70.48) GROUNDWATER SURFACE ELEVATION (m)
 - PHASE I, PHASE II AND RSC PROPERTY
- GROUND SURFACE ELEVATIONS REFERENCED TO A GEODETIC DATUM.



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HOLLOWAY LODGING CORP.
ENVIRONMENTAL SITE REMEDIATION
1354 TO 1376 CARLING AVENUE

OTTAWA, ONTARIO

Title: ANALYTICAL TESTING PLAN - SOIL (METALS, As, Sb, Se, Hg & CrVI)

Scale:	1:750	Date:	10/2021
Drawn by:	MPG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-6
Approved by:	MSD	Revision No.:	0

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B22	3.0m	7-April-2021
Parameter	Result	MECP (ug/g)
Barium	408	390
Cobalt	24.1	22
Vanadium	117	86
Remaining Metals comply with MECP Table 3		

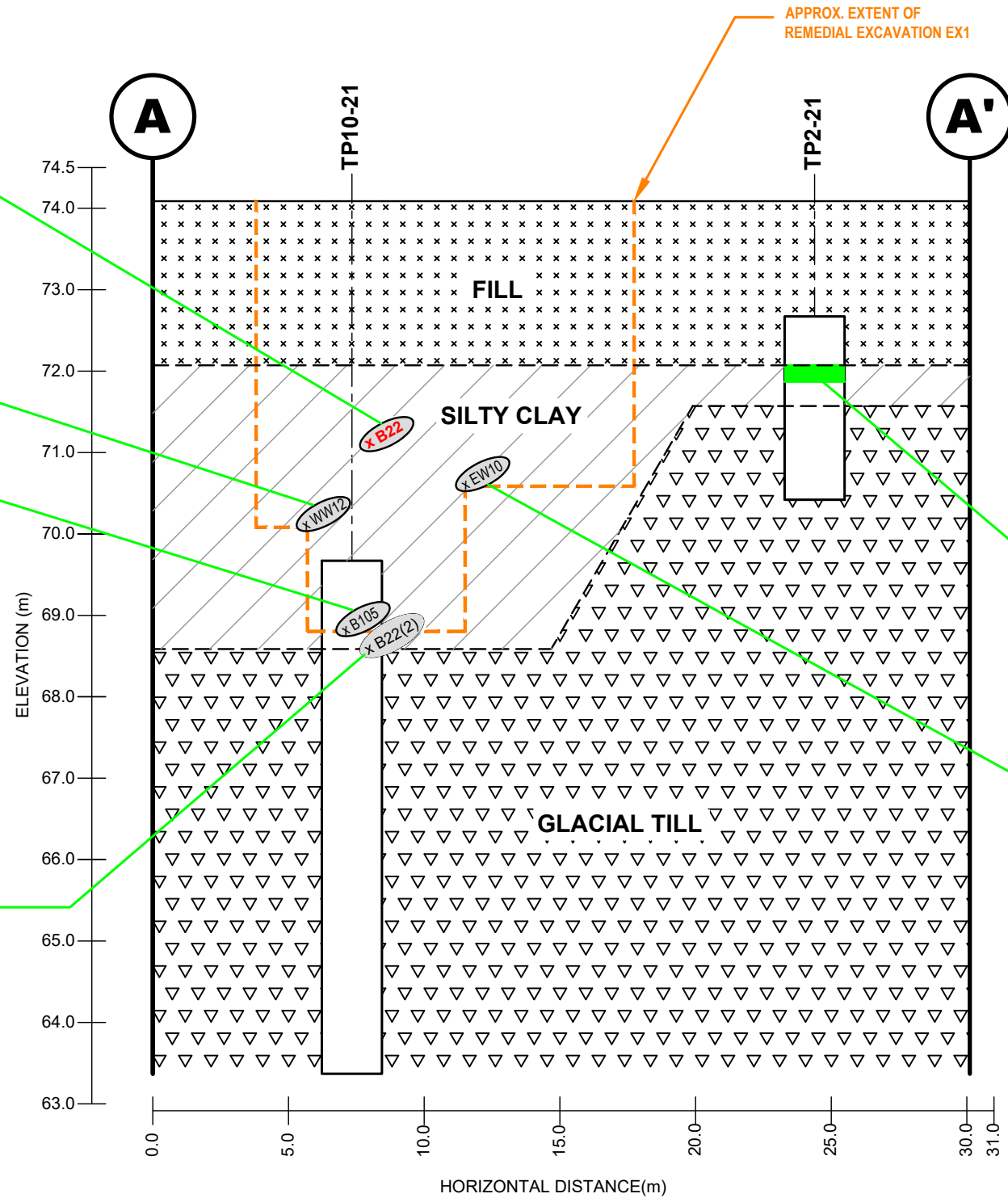
WW12 4.0m 14-April-2021
Metals comply with MECP Table 3

B105 5.3m 14-April-2021
Metals comply with MECP Table 3

B22(2)	5.5m	9-April-2021
Parameter	Result	MECP (ug/g)
Cobalt	24.9	22
Vanadium	108	86
Remaining Metals comply with MECP Table 3		

TP2-21-G2	0.3-0.5m	29-March-2021
Parameter	Result (ug/g)	Standard (ug/g)
*Barium	421	390
*Cobalt	23.7	22
*Vanadium	112	86
Remaining Metals, As, Sb, Se, Hg and CrVI comply with MECP Table 3		
*Considered to be naturally occurring; refer to CSM.		

EW10 3.5m 14-April-2021
Metals comply with MECP Table 3



LEGEND:

- x B22 IMPACTED SOIL REMOVED
- x B39 ANALYZED SOIL SAMPLE LOCATION
- SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS
- SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

HOLLOWAY LODGING CORP.
ENVIRONMENTAL SITE REMEDIATION
1354 TO 1376 CARLING AVENUE
OTTAWA, ONTARIO

**ANALYTICAL TESTING PLAN - SOIL
(METALS, As, Sb, Se, Hg & CrVI)**

Scale:	AS SHOWN	Date:	10/2021
Drawn by:	RCG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-6A
Approved by:	MSD	Revision No.:	

TP9-21-G1	1.2-1.4m	7-Apr-2021
Metals, As, Sb, Se, Hg and CrVI comply with MECP Table 3		
TP9-21-G3	2.2-2.4m	7-Apr-2021
Parameter	Result (µg/g)	Standard (µg/g)
*Barium	438	390
*Cobalt	34.2	22
*Vanadium	136	86
Remaining Metals, As, Sb, Se, Hg and CrVI comply with MECP Table 3		
*Considered to be naturally occurring; refer to CSM.		

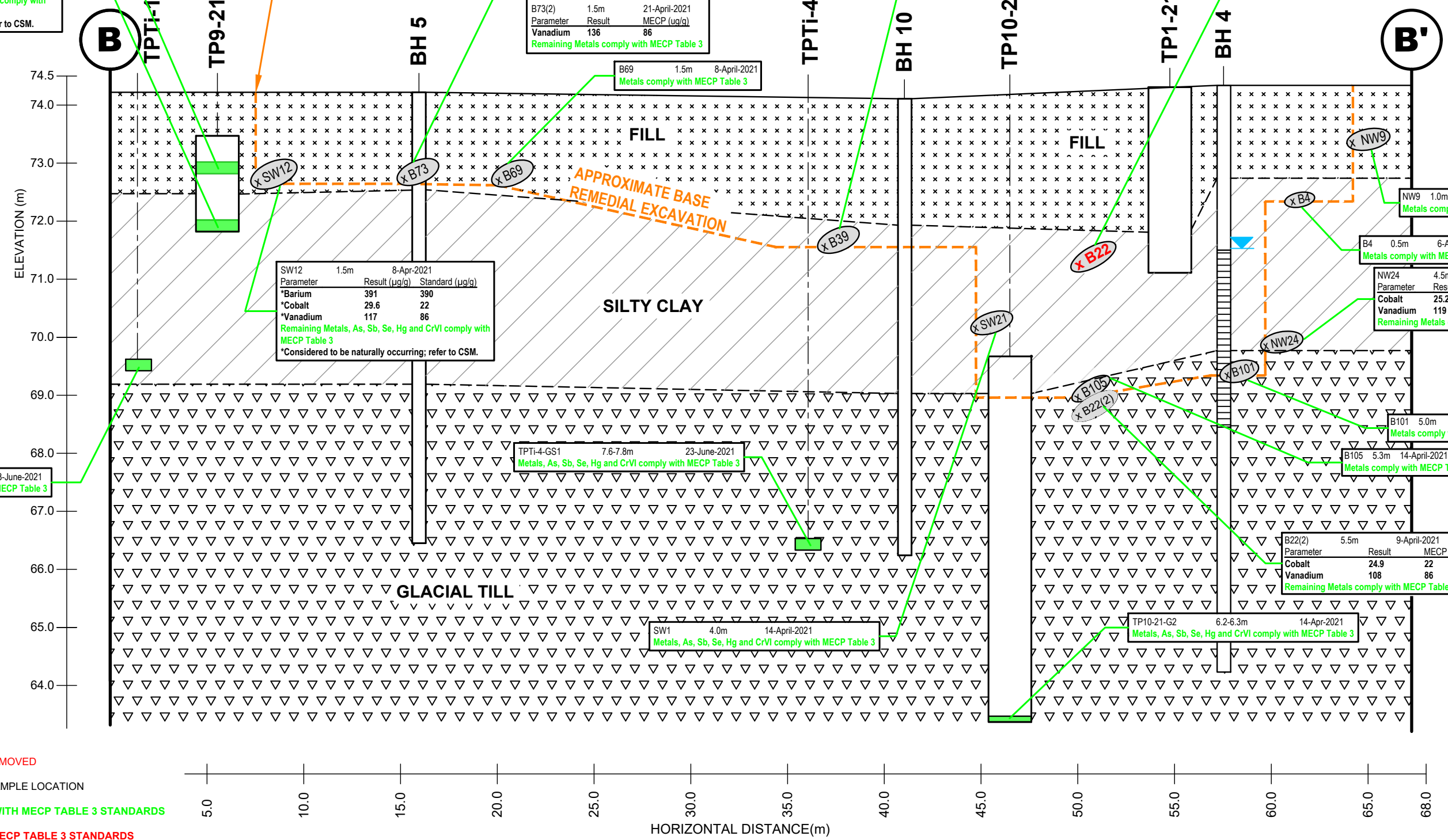
B73	1.5m	8-April-2021
Parameter	Result	MECP (ug/g)
Cadium	ND(1.4)	1.2
Cobalt	28.5	22
Selenium	ND(2.8)	2.4
Thallium	ND(2.8)	1
Vanadium	128	86
Remaining Metals comply with MECP Table 3		
B73(2)	1.5m	21-April-2021
Parameter	Result	MECP (ug/g)
Vanadium	136	86
Remaining Metals comply with MECP Table 3		

B39(2)	2.6m	14-April-2021
Parameter	Result	MECP (ug/g)
Cobalt	24.9	22
Vanadium	119	86
Remaining Metals comply with MECP Table 3		

B22	3.0m	7-April-2021
Parameter	Result	MECP (ug/g)
Barium	408	390
Cobalt	24.1	22
Vanadium	117	86
Remaining Metals comply with MECP Table 3		

APPROX. EXTENT OF REMEDIAL EXCAVATION EX1

APPROXIMATE BASE REMEDIAL EXCAVATION



SW12	1.5m	8-Apr-2021
Parameter	Result (µg/g)	Standard (µg/g)
*Barium	391	390
*Cobalt	29.6	22
*Vanadium	117	86
Remaining Metals, As, Sb, Se, Hg and CrVI comply with MECP Table 3		
*Considered to be naturally occurring; refer to CSM.		

TPTi-4-GS1	7.6-7.8m	23-June-2021
Metals, As, Sb, Se, Hg and CrVI comply with MECP Table 3		

SW1	4.0m	14-April-2021
Metals, As, Sb, Se, Hg and CrVI comply with MECP Table 3		

TP10-21-G2	6.2-6.3m	14-Apr-2021
Metals, As, Sb, Se, Hg and CrVI comply with MECP Table 3		

- LEGEND:
- x B22 IMPACTED SOIL REMOVED
 - ANALYZED SOIL SAMPLE LOCATION
 - SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS
 - SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

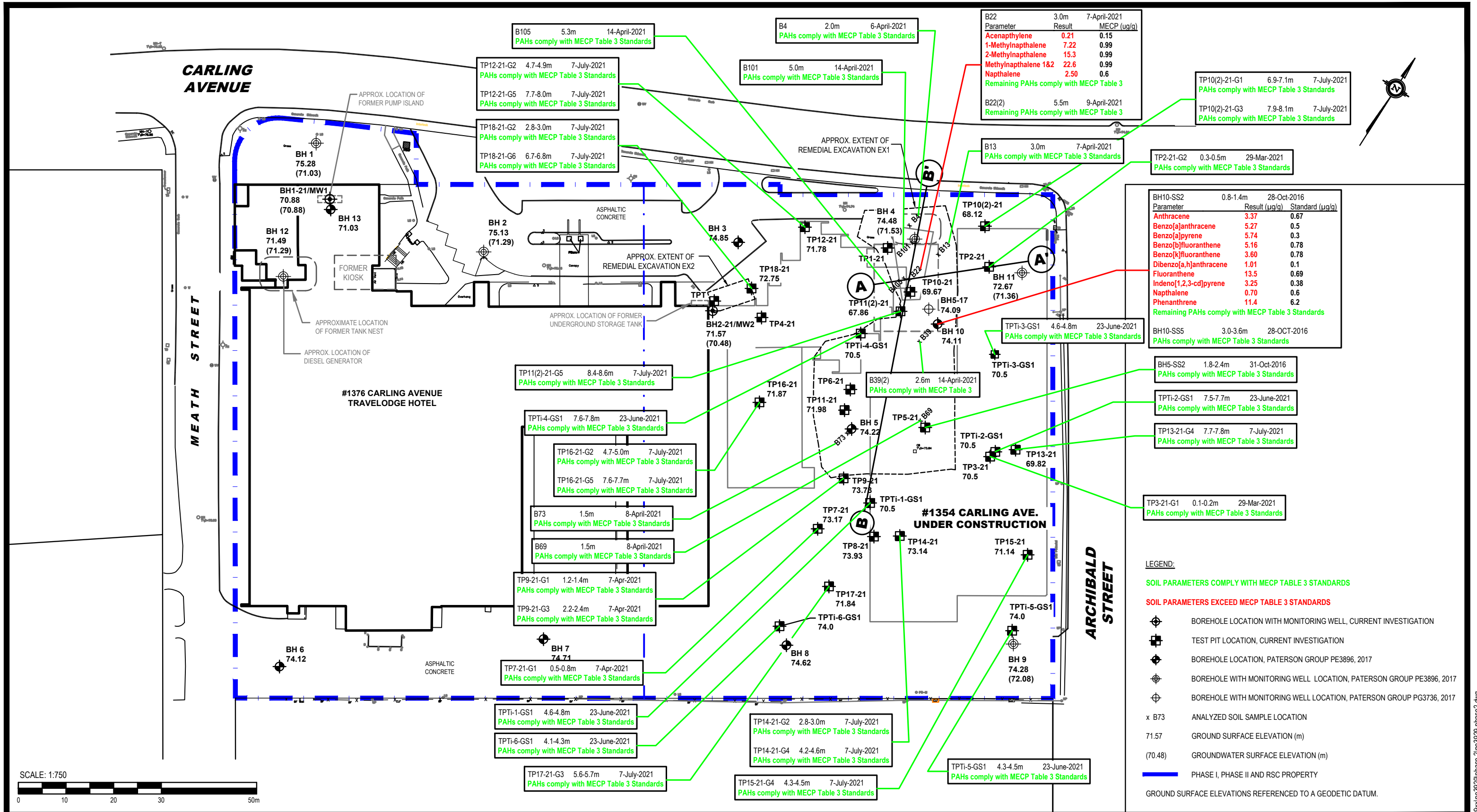
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NO.	REVISIONS	DATE	INITIAL

HOLLOWAY LODGING CORP.
ENVIRONMENTAL SITE REMEDIATION
1354 TO 1376 CARLING AVENUE
OTTAWA, ONTARIO
Title: **ANALYTICAL TESTING PLAN - SOIL (METALS, As, Sb, Se, Hg & CrVI)**

Scale:	AS SHOWN	Date:	10/2021
Drawn by:	RCG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-6B
Approved by:	MSD	Revision No.:	



B22	3.0m	7-April-2021
Parameter	Result	MECP (µg/g)
Acenaphthylene	0.21	0.15
1-Methylnaphthalene	7.22	0.99
2-Methylnaphthalene	15.3	0.99
Methylnaphthalene 1&2	22.6	0.99
Naphthalene	2.50	0.6
Remaining PAHs comply with MECP Table 3		

BH10-SS2	0.8-1.4m	28-Oct-2016
Parameter	Result (µg/g)	Standard (µg/g)
Anthracene	3.37	0.67
Benzo[a]anthracene	5.27	0.5
Benzo[a]pyrene	5.74	0.3
Benzo[b]fluoranthene	5.16	0.78
Benzo[k]fluoranthene	3.60	0.78
Dibenzo[a,h]anthracene	1.01	0.1
Fluoranthene	13.5	0.69
Indeno[1,2,3-cd]pyrene	3.25	0.38
Naphthalene	0.70	0.6
Phenanthrene	11.4	6.2
Remaining PAHs comply with MECP Table 3 Standards		

BH10-SS5	3.0-3.6m	28-OCT-2016
PAHs comply with MECP Table 3 Standards		

TP3-21-G1	0.1-0.2m	29-Mar-2021
PAHs comply with MECP Table 3 Standards		

- LEGEND:**
- SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS
 - SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS
 - ⊕ BOREHOLE LOCATION WITH MONITORING WELL, CURRENT INVESTIGATION
 - ⊕ TEST PIT LOCATION, CURRENT INVESTIGATION
 - ⊕ BOREHOLE LOCATION, PATERSON GROUP PE3896, 2017
 - ⊕ BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PE3896, 2017
 - ⊕ BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP PG3736, 2017
 - x B73 ANALYZED SOIL SAMPLE LOCATION
 - 71.57 GROUND SURFACE ELEVATION (m)
 - (70.48) GROUNDWATER SURFACE ELEVATION (m)
 - PHASE I, PHASE II AND RSC PROPERTY
 - GROUND SURFACE ELEVATIONS REFERENCED TO A GEODETIC DATUM.



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HOLLOWAY LODGING CORP.
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1354 TO 1376 CARLING AVE.

OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - SOIL (PAHs)**

Scale:	1:750	Date:	10/2021
Drawn by:	MPG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-7
Approved by:	MSD	Revision No.:	0

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B22		
Parameter	3.0m	7-April-2021
Result	MECP (ug/g)	
Acenaphthylene	0.21	0.15
1-Methylnaphthalene	7.22	0.99
2-Methylnaphthalene	15.3	0.99
Methylnaphthalene 1&2	22.6	0.99
Napthalene	2.50	0.6
Remaining PAHs comply with MECP Table 3		

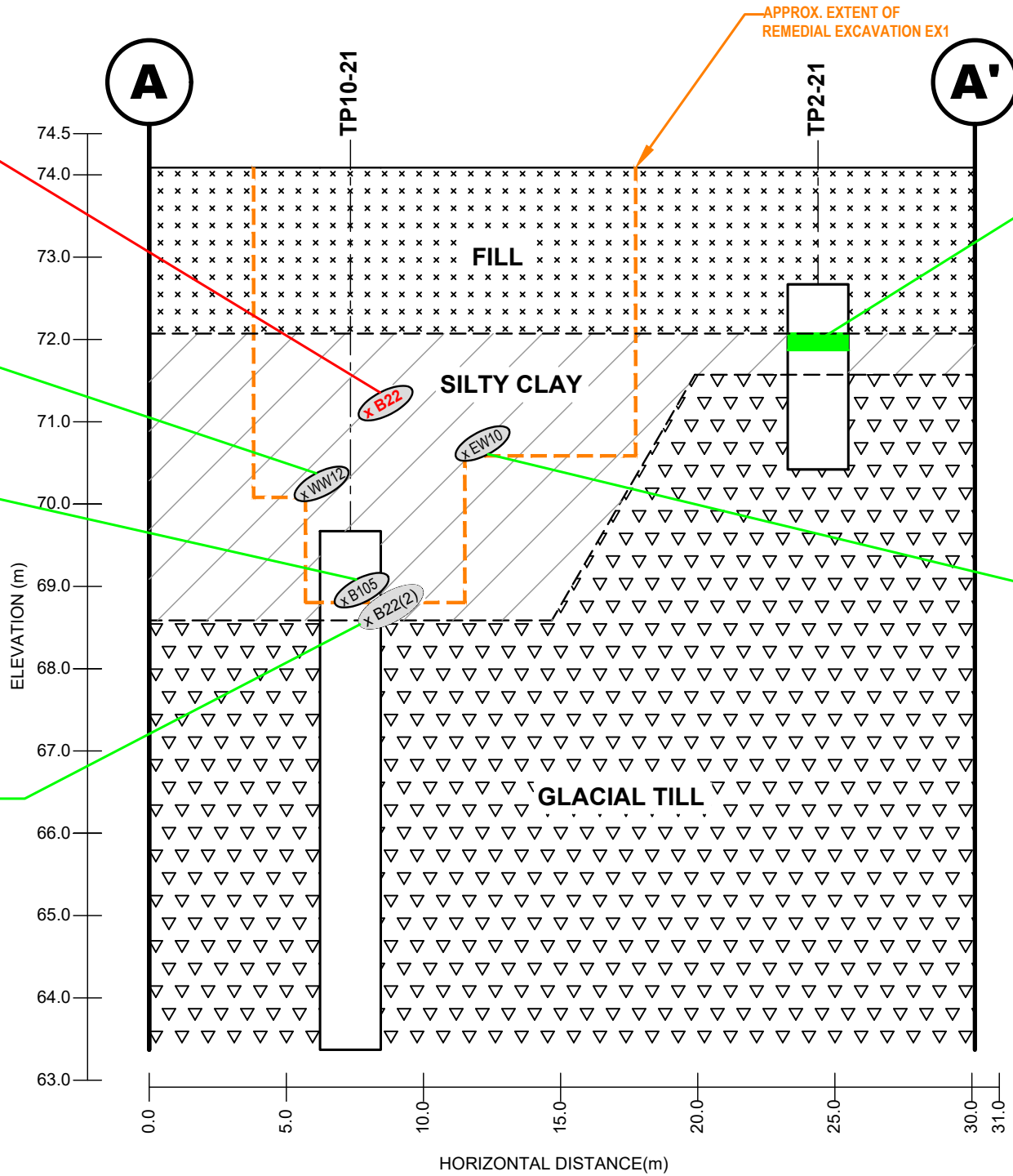
WW12 4.0m 14-April-2021
PAHs comply with MECP Table 3 Standards

B105 5.3m 14-April-2021
PAHs comply with MECP Table 3 Standards

B22(2) 5.5m 9-April-2021
Remaining PAHs comply with MECP Table 3

TP2-21-G2 0.3-0.5m 29-Mar-2021
PAHs comply with MECP Table 3 Standards

EW10 3.5m 14-April-2021
PAHs comply with MECP Table 3 Standards



LEGEND:

- x B22 IMPACTED SOIL REMOVED
- x B39 ANALYZED SOIL SAMPLE LOCATION
- SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS
- SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

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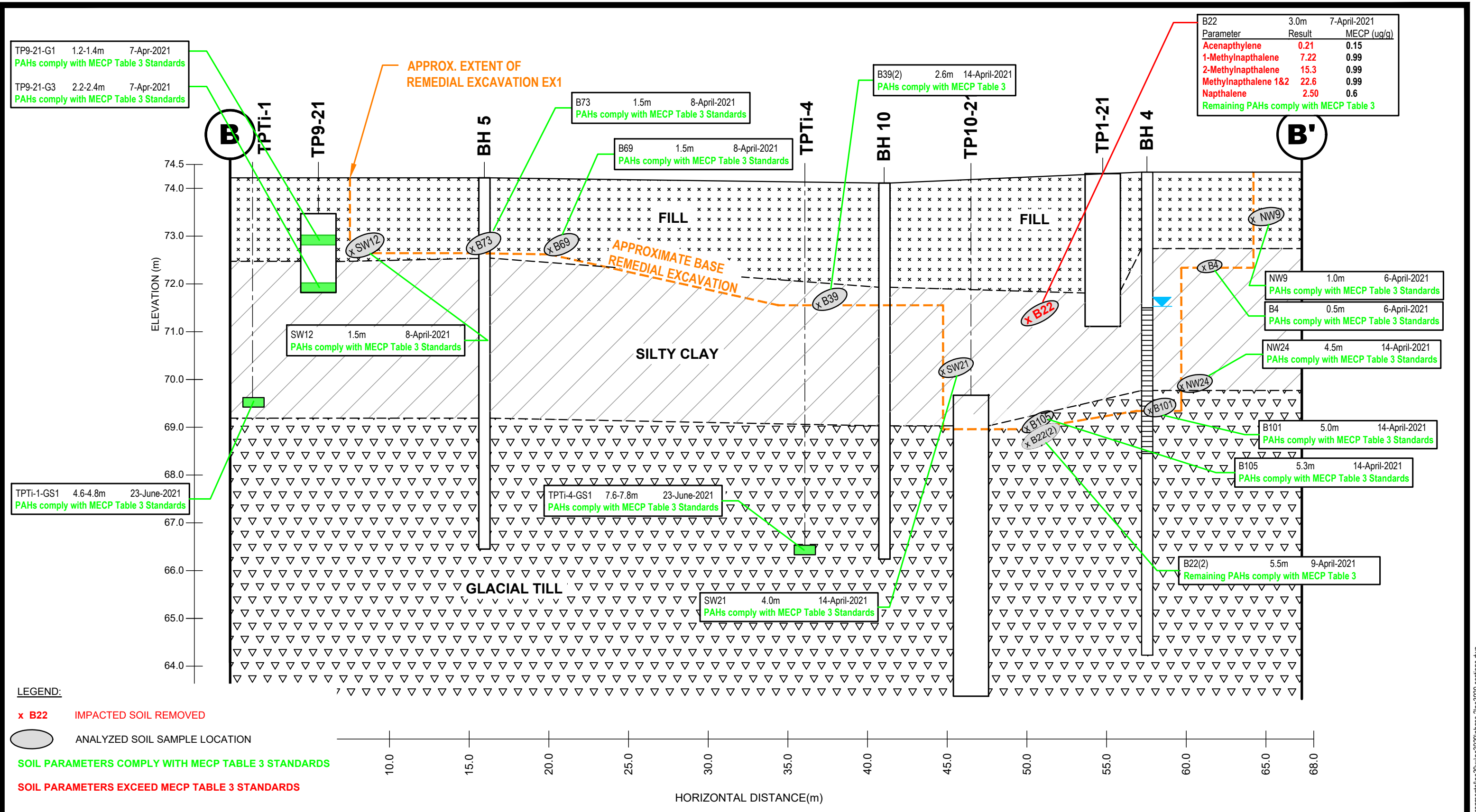
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NO.	REVISIONS	DATE	INITIAL

HOLLOWAY LODGING CORP.
ENVIRONMENTAL SITE REMEDIATION
1354 TO 1376 CARLING AVENUE
OTTAWA, ONTARIO

Title: **CROSS SECTION A-A' - SOIL (PAHs)**

Scale:	AS SHOWN	Date:	10/2021
Drawn by:	RCG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-7A
Approved by:	MSD	Revision No.:	



Parameter	Result	MECP (ug/g)
Acenaphthylene	0.21	0.15
1-Methylnaphthalene	7.22	0.99
2-Methylnaphthalene	15.3	0.99
Methylnaphthalene 1&2	22.6	0.99
Napthalene	2.50	0.6
Remaining PAHs comply with MECP Table 3		

TP9-21-G1 1.2-1.4m 7-Apr-2021
PAHs comply with MECP Table 3 Standards

TP9-21-G3 2.2-2.4m 7-Apr-2021
PAHs comply with MECP Table 3 Standards

B73 1.5m 8-April-2021
PAHs comply with MECP Table 3 Standards

B69 1.5m 8-April-2021
PAHs comply with MECP Table 3 Standards

B39(2) 2.6m 14-April-2021
PAHs comply with MECP Table 3

SW12 1.5m 8-April-2021
PAHs comply with MECP Table 3 Standards

TPTi-4-GS1 7.6-7.8m 23-June-2021
PAHs comply with MECP Table 3 Standards

SW21 4.0m 14-April-2021
PAHs comply with MECP Table 3 Standards

NW9 1.0m 6-April-2021
PAHs comply with MECP Table 3 Standards

B4 0.5m 6-April-2021
PAHs comply with MECP Table 3 Standards

NW24 4.5m 14-April-2021
PAHs comply with MECP Table 3 Standards

B101 5.0m 14-April-2021
PAHs comply with MECP Table 3 Standards

B105 5.3m 14-April-2021
PAHs comply with MECP Table 3 Standards

B22(2) 5.5m 9-April-2021
Remaining PAHs comply with MECP Table 3

TPTi-1-GS1 4.6-4.8m 23-June-2021
PAHs comply with MECP Table 3 Standards

- LEGEND:**
- x B22 IMPACTED SOIL REMOVED
 - ANALYZED SOIL SAMPLE LOCATION
 - SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS
 - SOIL PARAMETERS EXCEED MECP TABLE 3 STANDARDS

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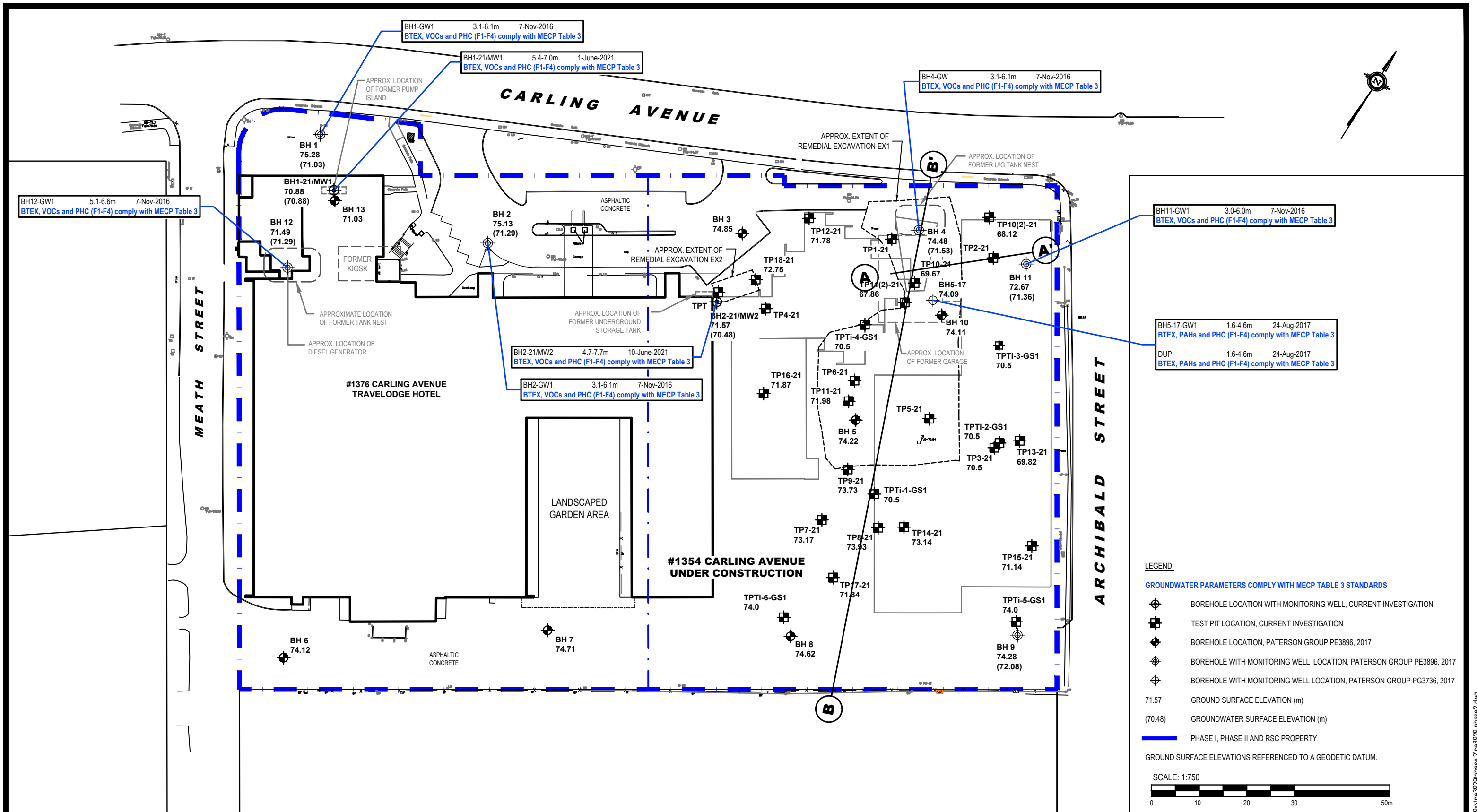
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NO.	REVISIONS	DATE	INITIAL

HOLLOWAY LODGING CORP.
ENVIRONMENTAL SITE REMEDIATION
1354 TO 1376 CARLING AVENUE
OTTAWA, ONTARIO

Title: **CROSS SECTION B-B' - SOIL (PAHs)**

Scale:	AS SHOWN	Date:	10/2021
Drawn by:	RCG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-7B
Approved by:	MSD	Revision No.:	



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NO.	REVISIONS	DATE	INITIAL
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HOLLOWAY LODGING CORP.
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1354 TO 1376 CARLING AVE.

OTTAWA,

ONTARIO

Title:

ANALYTICAL TESTING PLAN - GROUNDWATER

Scale: 1:750

Date: 10/2021

Drawn by: MPG

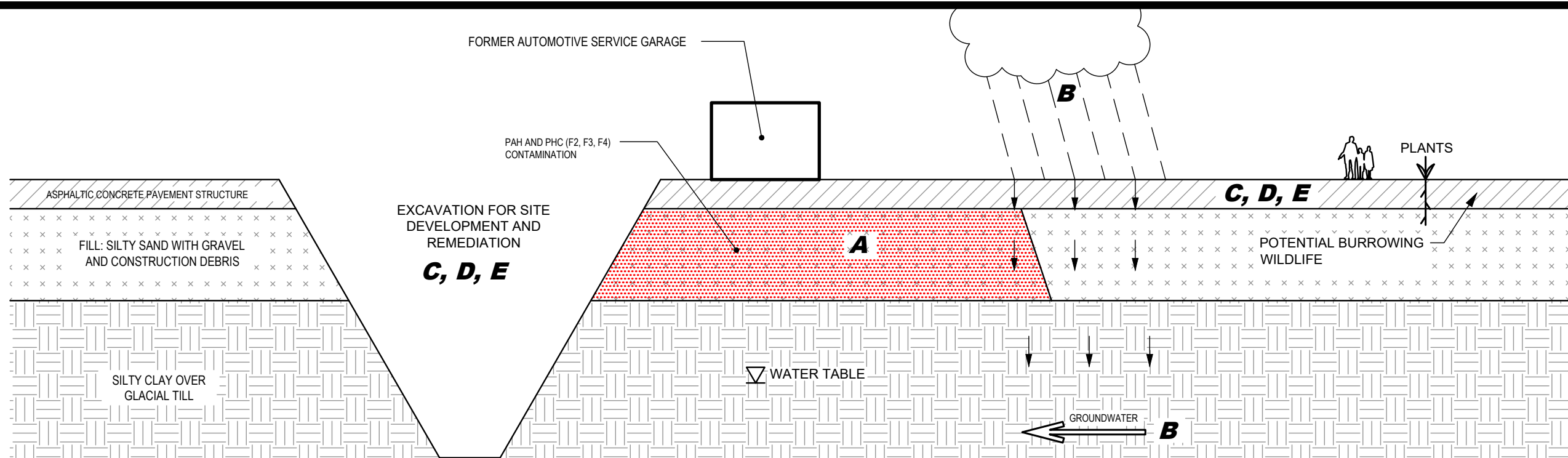
Report No.: PE3929

Checked by: KM

Dwg. No.: PE3929-8

Approved by: MSD

Revision No.: 0



NARRATIVE NOTES:

CONTAMINANT RELEASE MECHANISMS

A PAH and PHC (F2, F3, F4) impacts exceeding MOECC Table 3 standards were identified in the fill material at two locations on the Phase II property. The groundwater considered to be in compliance with MOECC Table 3 Standards.

The PHC and PAH impacts are considered to be associated with the former automotive service garage located on this portion of the site.

CONTAMINANT TRANSPORT PATHWAYS

- B**
1. PHYSICAL TRANSPORT - A potential contaminant transport pathway is the physical transport from one location to another of contaminated soil. It is considered possible that impacted soil/fill was moved at the time the former garage was demolished or when the existing tower was developed.
 2. PRECIPITATION/INFILTRATION/LEACHING - Due to the RSC property having been largely developed or paved, precipitation and infiltration are not considered to have significantly contributed to contaminant transport. PHC and PAH parameters are not considered to have migrated beyond the fill to the groundwater table based on groundwater testing in the area.
 3. DIFFUSION AND DISPERSION - These contaminant transport pathways are not considered to apply to the Phase II Property, as the groundwater is in compliance with Table 3 Standards.

HUMAN AND ECOLOGICAL RECEPTORS

- C**
1. HUMAN RECEPTORS - Although the subject site is occupied and open to the general public, it is covered in asphalt which greatly reduces the chances for humans to act as receptors. Potential human receptors are limited to construction workers and environmental professionals who may contact the soil/groundwater during site remediation or redevelopment.
 2. ECOLOGICAL RECEPTORS - Traditionally, ecological receptors include plants and wildlife which may come into contact with the contaminated soil. In the case of this subject site, there are no significant plants on the property and no viable soil in which wildlife may burrow into.

RECEPTOR EXPOSURE POINTS

- D**
1. HUMAN RECEPTORS - Exposure points for humans consist of remedial excavation, excavation for site building.
 2. ECOLOGICAL RECEPTORS - Given the location of the subject site in a built-up area, there are limited ecological receptor exposure points in the general vicinity of the site.

ROUTES OF EXPOSURE

- E**
1. HUMAN RECEPTORS - Routes of exposure for human receptors (construction workers and environmental professionals) include dermal contact, accidental ingestion, and inhalation (PHC vapours, or particulate dust containing PAH).
 2. ECOLOGICAL RECEPTORS - Routes of exposure for ecological receptors include ingestion, dermal contact, and inhalation.

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HOLLOWAY LODGING CORP.
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1354 TO 1376 CARLING AVENUE

OTTAWA, ONTARIO

Title: **CONTAMINANT DISTRIBUTION DIAGRAM**

Scale:	N.T.S.	Date:	10/2021
Drawn by:	MPG	Report No.:	PE3929
Checked by:	KM	Dwg. No.:	PE3929-9
Approved by:	MSD	Revision No.:	0

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS



Geotechnical
Engineering

Environmental
Engineering

Hydrogeology

Geological
Engineering

Materials Testing

Building Science

Archaeological
Services

Sampling & Analysis Plan

Phase II Environmental Site Assessment
1354 and 1376 Carling Avenue
Ottawa, Ontario

Prepared For

Holloway Lodging Corporation

March 2021

Report: PE3929-SAP

Paterson Group Inc.

Consulting Engineers
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Canada K2E 7J5

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www.patersongroup.ca

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3.3	Monitoring Well Sampling Procedure	9
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6.0	PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN	13

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Holloway Lodging Limited Partnership to conduct a Phase II-Environmental Site Assessment (ESA) for the property addressed 1354 and 1376 Carling Avenue in the City of Ottawa, Ontario. This Sampling and Analysis Plan updates the 2016 plan appended to Report: PE3896-2R dated December 5, 2016, however 2016 borehole locations are included.

Test Hole	Location & Rationale	Proposed Depth & Rationale
BH1	Locate to address potential soil and/or groundwater impacts from former USTs associated with the Department of Highways previously located north of the Phase I Property.	To a depth of at least 1.5 m below the groundwater table, for the installation of a monitoring well.
BH2	Locate for geotechnical purposes and to provide general coverage of the site.	To 10 m or practical auger refusal on inferred bedrock.
BH3	Locate for geotechnical purposes and to provide general coverage of the site.	
BH4	Locate to address potential soil and groundwater impacts from former USTs on northeastern portion of the Phase II Property.	
BH5	Locate for geotechnical purposes and to provide general coverage of the site.	
BH6	Locate for geotechnical purposes and to provide general coverage of the site.	
BH7	Locate for geotechnical purposes and to provide general coverage of the site.	To 10 m or practical auger refusal on inferred bedrock.
BH8	Locate for geotechnical purposes and to provide general coverage of the site.	
BH9	Locate for geotechnical purposes and to provide general coverage of the site.	
BH10	Locate to address potential soil and/or groundwater impacts associated with the former automotive service garage on the northeastern portion of the site.	To a depth of at least 1.5 m below the groundwater table, for the installation of a monitoring well.
BH11	Locate to address potential soil and/or groundwater impacts from former off-site retail fuel outlets east and northeast of the Phase II Property.	To 10 m or practical auger refusal on inferred bedrock.
BH12	Locate to address potential soil and/or groundwater impacts associated with the former on-site retail fuel outlet and existing diesel generator.	To a depth of at least 1.5 m below the groundwater table, for the installation of a monitoring well.
BH13		
BH1-17	Locate to provide coverage of the proposed buildings.	To obtain confirmation of bedrock for Geotechnical purposes.
BH2-17		
BH3-17		

Test Hole	Location & Rationale	Proposed Depth & Rationale
BH4-17	Locate to provide coverage of the proposed buildings.	To obtain confirmation of bedrock for Geotechnical purposes.
BH5-17	Locate within area of previously identified soil impacts in the vicinity of BH10 and BH5.	Drill to a maximum depth of 6m for monitoring well installation to access the water table.
BH1-21/MW1	Locate on the interior of the Beachcomber, near BH13, within the former pump island.	Drill to a depth of approximately 2m below the concrete slab and install a monitoring well to access the groundwater table.
BH2-21/MW2	Locate in the immediate vicinity of a UST identified during construction.	Drill to a maximum depth of 6m below original grade and install a monitoring well to access the groundwater table.
TP1-21	Locate to horizontally delineate impacted soil identified during 2016 investigation	Excavate test pit to a maximum depth of 5m below grade (impacts were anticipated to be within the upper 3.0m based on 2016 findings.
TP2-21		
TP3-21		
TP4-21		
TP5-21		
TP6-21		
TP7-21		
TP8-21		
TP9-21		
TP10-21	Locate to provide coverage of the eastern portion of the site.	Excavate to approximately 5 to 8m below original grade, to obtain vertical coverage of soils to construction base elevations.
TP10(2)-21	Locate with the northern portion of the construction excavation within area of proposed deep foundation.	Excavate to approximately 6 to 8m below original grade to obtain a sample of the silty sand-sandy silt glacial till material.
TP11-21	Locate to provide coverage of the eastern portion of the site.	Excavate to approximately 5 to 8m below original grade, to obtain vertical coverage of soils to construction base elevations.
TP11(2)-21	Locate with the northern portion of the construction excavation within area of proposed deep foundation.	Excavation to approximately 6 to 8m below original grade to obtain a sample of the silty sand-sandy silt glacial till material.
TP12-21	Locate to provide coverage of the eastern portion of the site.	Excavate to approximately 5 to 8m below original grade, to obtain vertical coverage of soils to construction base elevations.
TP13-21		
TP14-21		
TP15-21		
TP16-21		
TP17-21		
TP18-21		
GS1	Locate within the former tank nest.	Recover sample from directly beneath the UST, once removed.

Test Hole	Location & Rationale	Proposed Depth & Rationale
TPT	Locate within the former tank nest.	Excavate to approximately 3 to 4m below the UST.
B111	Locate within spill area to confirm soil conditions prior to removal of spilled furnace oil.	Collect from construction base once furnace oil and surficial impacted soil has been excavated.
TPTi-1	Locate to provide coverage of the till material across the eastern portion of the site.	Excavate to reach till material if not already exposed.
TPTi-2		
TPTi-3		
TPTi-4		
TPTi-5		
TPTi-6		

Borehole, test pits and grab sample locations are shown on the Test Hole Location Plan appended to the main report.

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

Following borehole drilling, monitoring wells will be installed in each borehole (as above).

2.0 ANALYTICAL TESTING PROGRAM

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

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

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

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

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

The purpose of environmental boreholes or test pits 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 or Test Pit Locations

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

After drilling or test pit excavation is completed, a plan with the test hole 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 test hole 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 F1, a soil core from each soil sample which may be analyzed must be taken and placed in the laboratory-provided methanol vial.
- Note all and any odours or discolouration of samples.
- Split spoon samplers must be washed between samples.
- If obvious contamination is encountered, continue sampling until vertical extent of contamination is delineated.
- As a general rule, environmental boreholes should be deep enough to intercept the groundwater table (unless this is impossible/impractical - call project manager to discuss).
- If at all possible, soil samples should be submitted to a preliminary screening procedure on site, either using a RKI Eagle, PID, etc. depending on type of suspected contamination.

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

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

3.2 Monitoring Well Installation Procedure

Equipment

- 1.5 m x 50 mm threaded sections of Schedule 40 PVC slotted well screen (1.5 m x 31 mm if installing in cored hole in bedrock)
- 1.5 m x 50 mm threaded sections of Schedule 40 PVC riser pipe (1.5 m x 31 mm if installing in cored hole in bedrock)
- Threaded end-cap
- Slip-cap or J-plug
- Asphalt cold patch or concrete
- Silica Sand
- Bentonite chips (Holeplug)
- Steel flushmount casing

Procedure

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

- Install flushmount casing. Seal space between flushmount and borehole annulus with concrete, cold patch, or holeplug to match surrounding ground surface.

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

- Locate well and use socket wrench or Allan key to open metal flush mount protector cap. Remove plastic well cap.
- Measure water level, with respect to existing ground surface, using water level meter or interface probe. If using interface probe on suspected NAPL site, measure the thickness of free product.
- Measure total depth of well.
- Clean water level tape or interface probe using methanol and water. Change gloves between wells.
- Calculate volume of standing water within well and record.
- Insert polyethylene tubing into well and attach to peristaltic pump. Turn on peristaltic pump and purge into graduated bucket. Purge at least three well volumes of water from the well. Measure and record field chemistry. Continue to purge, measuring field chemistry after every well volume purged, until appearance or field chemistry stabilizes.
- Note appearance of purge water, including colour, opacity (clear, cloudy, silty), sheen, presence of LNAPL, and odour. Note any other unusual features (particulate matter, effervescence (bubbling) of dissolved gas, etc.).

-
- Fill required sample bottles. If sampling for metals, attach 75-micron filter to discharge tube and filter metals sample. If sampling for VOCs, use low flow rate to ensure continuous stream of non-turbulent flow into sample bottles. Ensure no headspace is present in VOC vials.
 - Replace well cap and flushmount casing cap.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

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

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

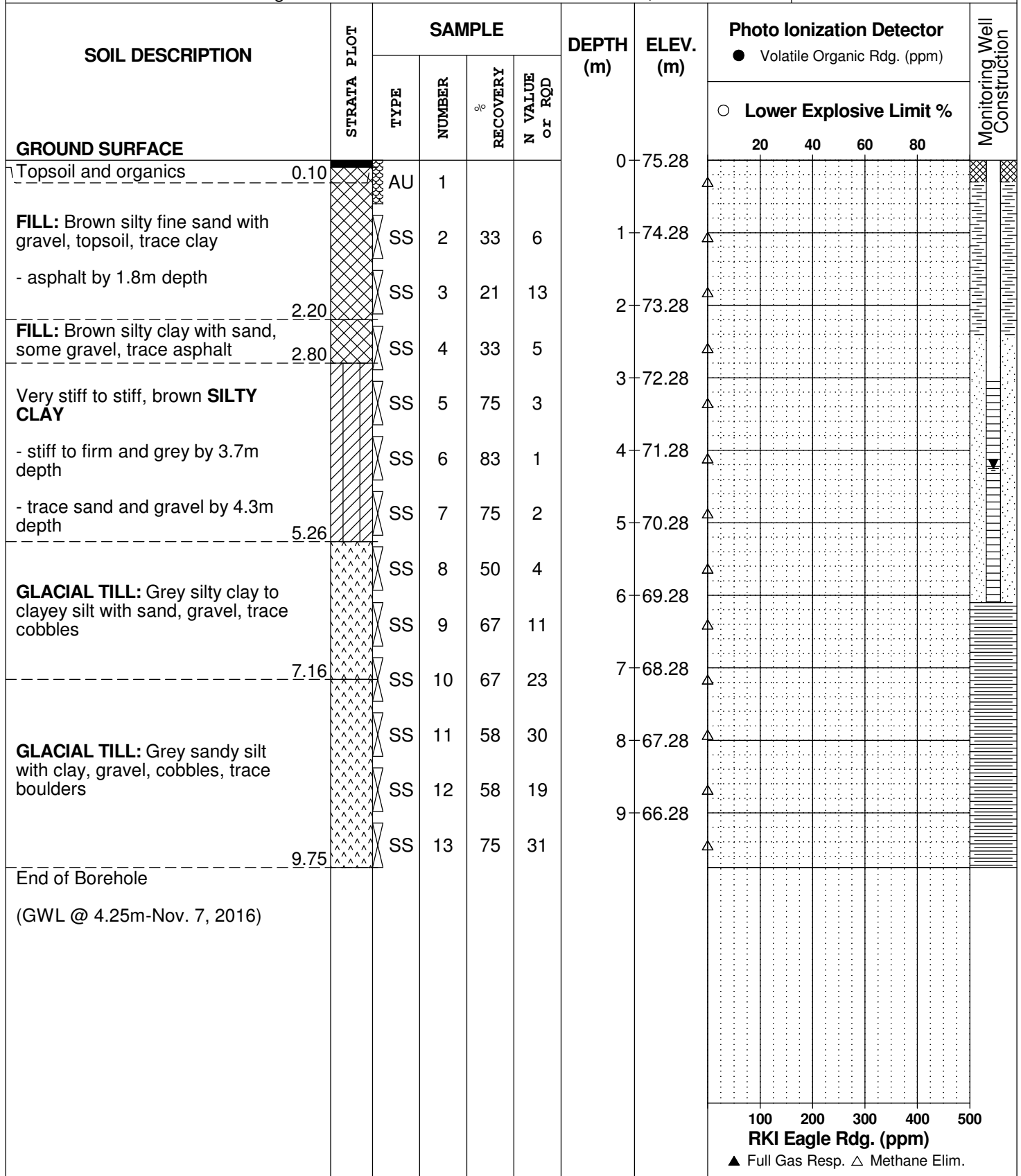
DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO. PE3896

HOLE NO. BH 1

BORINGS BY CME 55 Power Auger

DATE October 27, 2016



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

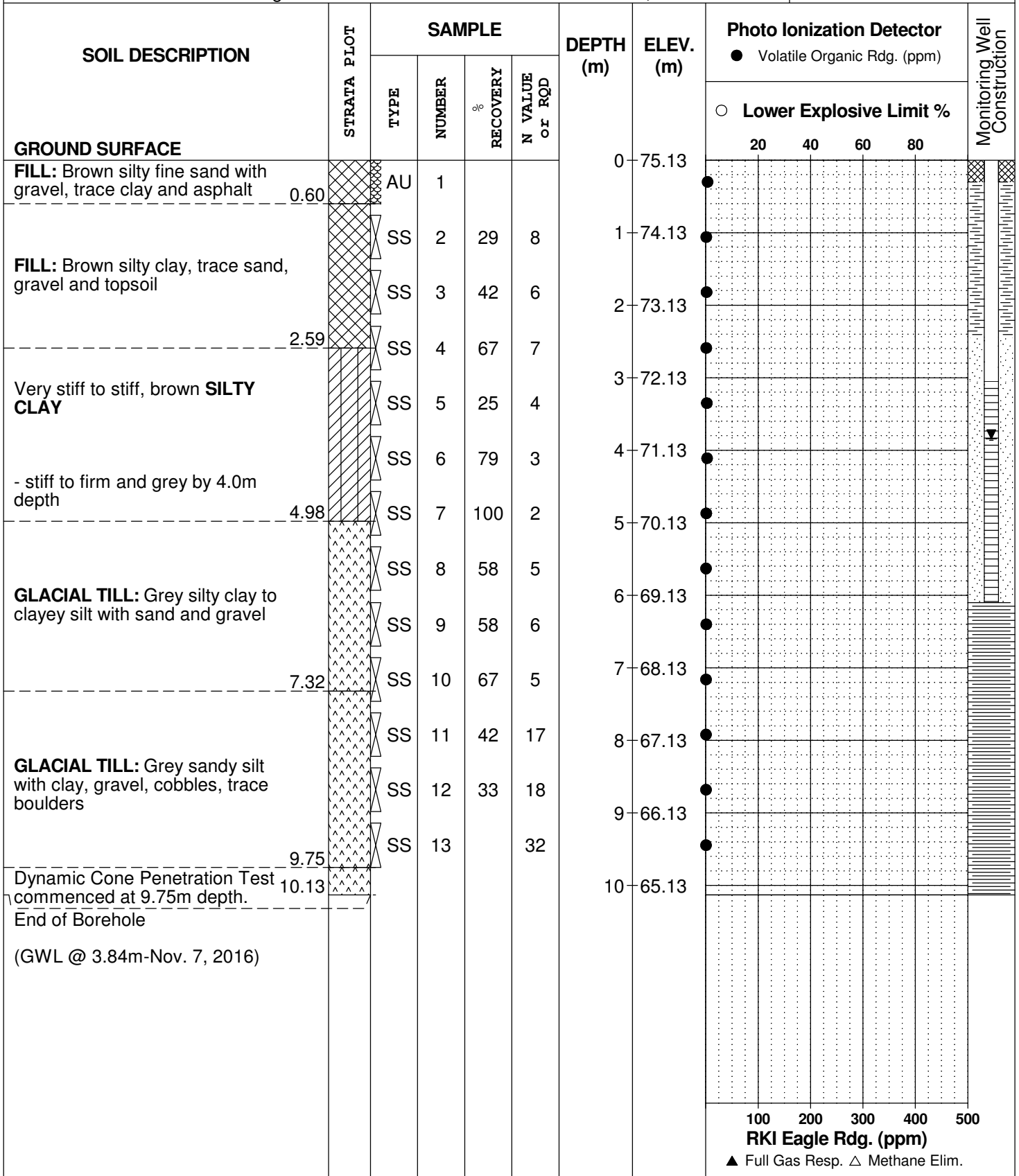
DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO. PE3896

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger

DATE October 27, 2016



DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO. PE3896

HOLE NO. BH 3

BORINGS BY CME 55 Power Auger

DATE October 28, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)					
GROUND SURFACE								○ Lower Explosive Limit %					
								20	40	60	80		
FILL: 50mm Asphaltic concrete over red-brown silty fine sand with crushed stone and gravel, trace brick		AU	1			0	74.85						
	1.22	SS	2	33	7	1	73.85						
FILL: Brown silty clay, trace sand and gravel		SS	3	75	9	2	72.85						
- some sand, brick and topsoil by 1.5m depth	2.13	SS	4	67	5	3	71.85						
Very stiff to stiff, brown SILTY CLAY		SS	5	83	2	4	70.85						
- firm by 3.0m depth		SS	6	83	2	5	69.85						
- grey by 3.8m depth		SS	7	92	2	6	68.85						
	5.49	SS	8	83	4	7	67.85						
GLACIAL TILL: Grey silty clay to clayey silt, some sand, trace gravel	5.70	SS	9	92	10	8	66.85						
GLACIAL TILL: Grey sandy silt with clay, gravel, trace cobbles and boulders	6.80	SS	10	73	50+	9	65.85						
		SS	11	83	40	10	64.85						
GLACIAL TILL: Grey silty fine sand with gravel, some cobbles and boulders		SS	12	56	50+	11	63.85						
- some running sand from 6.9 to 8.1m depth		SS	13	55	57	12	62.85						
	9.70					13	61.85						
End of Borehole													
Practical refusal to augering at 9.70m depth													

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

DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO. PE3896

HOLE NO. BH 4

BORINGS BY CME 55 Power Auger

DATE October 28, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)					
GROUND SURFACE								○ Lower Explosive Limit %					
								20	40	60	80		
FILL: 50mm Asphaltic concrete over brown silty fine sand with crushed stone and gravel 0.76		AU	1			0	74.48						
FILL: Red-brown sand, some asphalt 1.12		SS	2	67	3	1	73.48						
FILL: Brown silty clay, some sand, topsoil, trace gravel 1.62		SS	3	67	10	2	72.48						
Very stiff to stiff, brown SILTY CLAY - firm and grey by 3.8m depth - trace sand by 4.3m depth		SS	4	75	3	3	71.48						
		SS	5	33	2	4	70.48						
		SS	6	83	1	4	70.48						
GLACIAL TILL: Grey silty clay to clayey silt, some sand, trace gravel 4.57		SS	7	33	8	5	69.48						
		SS	8	67	21	6	68.48						
GLACIAL TILL: Grey silty fine to medium sand with gravel, trace cobbles - some running sand from 6.2 to 9.75m depth		SS	9	46	24	6	68.48						
		SS	10	100	43	7	67.48						
		SS	11	75	33	8	66.48						
		SS	12	83	30	8	66.48						
		SS	13				9	65.48					
Dynamic Cone Penetration Test commenced at 9.75m depth. End of Borehole 10.11 (GWL @ 2.95m-Nov. 7, 2016)						10	64.48						

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

DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO. PE3896

HOLE NO. BH 5

BORINGS BY CME 55 Power Auger

DATE October 31, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)					
GROUND SURFACE								○ Lower Explosive Limit %					
								20	40	60	80		
FILL: 50mm Asphaltic concrete over red-brown silty fine sand with crushed stone and gravel 0.60		AU	1			0	74.22						
FILL: Brown silty sand with clay, gravel, some topsoil, trace wood 1.68		SS	2	42	7	1	73.22						
		SS	3	58	7	2	72.22						
Very stiff to stiff, brown SILTY CLAY - firm and grey by 3.0m depth		SS	4	67	2	3	71.22						
		SS	5	100	2	4	70.22						
		SS	6	100	1	5	69.22						
GLACIAL TILL: Grey silty clay to clayey silt with sand, some gravel, trace cobbles 6.25		SS	7	50	6	6	68.22						
GLACIAL TILL; Grey sandy silt with gravel, trace cobbles and boulders 7.77		SS	8	33	37	7	67.22						
- some running sand from 6.25 to 6.7m depth		SS	9	54	40								
- some running sand from 6.25 to 6.7m depth		SS	10	100	50+								
End of Borehole													
Practical refusal to augering at 7.77m depth													

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

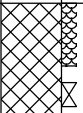
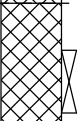


DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO. PE3896

HOLE NO. BH 6

BORINGS BY CME 55 Power Auger

DATE October 26, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rgd. (ppm)					
GROUND SURFACE								○ Lower Explosive Limit %					
								20	40	60	80		
FILL: 50mm Asphaltic concrete over brown silty fine to medium sand with crushed stone and gravel		AU	1			0	74.12						
1.07		SS	2	22	50+	1	73.12						
FILL: Brown silty clay with sand, gravel and cobbles		SS	3	67	8	2	72.12						
2.21		SS	4	21	4	3	71.12						
GLACIAL TILL: Brown silty clay with sand, gravel, trace cobbles		SS	5	29	5	4	70.12						
- grey by 3.7m depth		SS	6	83	7	5	69.12						
4.72		SS	7	71	28	6	68.12						
GLACIAL TILL: Compact, grey sandy silt to silty sand with gravel, cobbles, trace boulders		SS	8	76	50+	7	68.12						
6.15		SS	9	50	50+	8	68.12						
End of Borehole													
Practical refusal to augering at 6.15m depth													

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

DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO. PE3896

HOLE NO. BH 7

BORINGS BY CME 55 Power Auger

DATE October 26, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)					
GROUND SURFACE								○ Lower Explosive Limit %					
								20	40	60	80		
FILL: 50mm Asphaltic concrete over brown silty fine sand with crushed stone, gravel, trace cobbles	0.69	AU	1			0	74.71						
FILL: Brown to green silty clay, trace topsoil, sand and gravel		SS	2	67	8	1	73.71						
- some topsoil by 1.5m depth	1.83	SS	3	67	4	2	72.71						
TOPSOIL	2.13												
		SS	4	42	2								
Stiff, brown SILTY CLAY		SS	5	100	W	3	71.71						
- firm and grey by 3.35m depth	4.11	SS	6	100	W	4	70.71						
GLACIAL TILL: Grey silty clay to clayey silt with gravel	5.18	SS	7	71	6	5	69.71						
GLACIAL TILL: Compact, sandy silt to silty fine sand with gravel, cobbles, trace boulders	5.94	SS	8	50	23								
End of Borehole													
Practical refusal to augering at 5.94m depth													

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

DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO. PE3896

HOLE NO. BH 8

BORINGS BY CME 55 Power Auger

DATE October 26, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)					
GROUND SURFACE								○ Lower Explosive Limit %					
								20	40	60	80		
FILL: 50mm Asphaltic concrete over brown silty fine sand, some crushed stone and gravel 0.76		AU	1			0	74.62						
FILL: Brown silty clay with sand, gravel, trace wood, cobbles and topsoil 1.83		SS	2	50	11	1	73.62						
		SS	3	54	9	2	72.62						
Very stiff to stiff, brown SILTY CLAY - stiff to firm and grey by 3.2m depth 4.70		SS	4	54	5	3	71.62						
		SS	5	67	3	4	70.62						
		SS	6	92	2	5	69.62						
GLACIAL TILL: Grey silty clay to clayey silt, some gravel 6.78		SS	7	42	2	6	68.62						
		SS	8	17	6	9	67.62						
		SS	9	17	6	7	67.62						
GLACIAL TILL: Compact, grey sandy silt to silty fine sand with gravel, cobbles, trace boulders 7.32 End of Borehole		SS	10	35	50+								
Practical refusal to augering at 7.32m depth													

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

DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO. PE3896

HOLE NO. BH 9

BORINGS BY CME 55 Power Auger

DATE October 27, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rgd. (ppm)				
GROUND SURFACE								○ Lower Explosive Limit %				
								20	40	60	80	
FILL: 50mm Asphaltic concrete over brown silty fine sand with crushed stone and gravel	0.60	AU	1			0	74.28					
FILL: Brown silty clay with sand, trace gravel and asphalt	0.97	SS	2	42	9	1	73.28					
Very stiff to stiff, brown SILTY CLAY - firm and grey by 3.0m depth		SS	3	67	9	2	72.28					
		SS	4	88	3	3	71.28					
		SS	5	100	W	4	70.28					
		SS	6	100	W	5	69.28					
		SS	7	100	2	6	68.28					
		SS	8	67		7	67.28					
Grey fine to medium SAND , some gravel	6.10	SS	9	58	4	6	68.28					
	7.32	SS	10	83	36	7	67.28					
End of Borehole (GWL @ 2.20m-Nov. 7, 2016)												

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

DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO. PE3896

HOLE NO. BH10

BORINGS BY CME 55 Power Auger

DATE October 28, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)					
GROUND SURFACE								○ Lower Explosive Limit %					
								20	40	60	80		
FILL: 50mm Asphaltic concrete over crushed stone with silty sand and clay		AU	1			0	74.11						
0.90													
FILL: Brown silty sand with clay, some brick, glass, trace coal or slag		SS	2	50	6	1	73.11						
		SS	3	42	5	2	72.11						
2.18													
		SS	4	58	1	3	71.11						
Very stiff to stiff, brown SILTY CLAY		SS	5	92	W	4	70.11						
- firm to stiff and grey by 3.0m depth													
		SS	6	92	1	5	69.11						
5.08													
		SS	7	67	24	6	68.11						
GLACIAL TILL: Grey silty clay to clayey silt with sand, gravel, trace cobbles and boulders		SS	8	42	12	7	67.11						
5.26													
		SS	9	58	12	8	66.11						
GLACIAL TILL: Grey sandy silt with clay, gravel, cobbles and boulders		SS	10	58	20	9	65.11						
6.02													
		SS	11	80	50+	10	64.11						
GLACIAL TILL: Grey silty fine to medium sand with gravel, cobbles, trace clay and boulders		SS	11	80	50+	11	63.11						
- some running sand													
7.87													
End of Borehole													
Practical refusal to augering at 7.87m depth													

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 - 1376 Carling Avenue
Ottawa, Ontario



DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO. PE3896

HOLE NO. BH11

BORINGS BY Portable Drill

DATE October 31, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
								20	40	60	80	
GROUND SURFACE						0	72.67					
FILL: 50mm Asphaltic concrete over crushed stone		AU	1									
	0.76					1	71.67					
GLACIAL TILL: Grey silty clay to clayey silt with sand, gravel, cobbles, trace boulders		SS	2									
		SS	3			2	70.67					
		SS	4			3	69.67					
		SS	5			4	68.67					
		SS	6			4	68.67					
End of Borehole (GWL @ 1.31m-Nov. 7, 2016)	4.27											
								100	200	300	400	500

RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 - 1376 Carling Avenue
Ottawa, Ontario

DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO. PE3896

HOLE NO. BH12

BORINGS BY Portable Drill

DATE November 1, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)					
								○ Lower Explosive Limit %					
								20	40	60	80		
GROUND SURFACE													
Concrete slab	0.10	AU	1			0	71.49						
FILL: Gravel, cobbles with sandy silt and clay	0.60												
Grey SILTY CLAY	0.97	SS	2	1000		1	70.49						
GLACIAL TILL: Grey silty clay to clayey silt with sand, trace gravel and cobbles		SS	3	7									
		SS	4	83		2	69.49						
	2.80	SS	5										
End of Borehole													
Practical split spoon refusal at 2.80m depth (GWL @ 0.20m-Nov. 7, 2016)													
								100	200	300	400	500	
								RKI Eagle Rdg. (ppm)					
								▲ Full Gas Resp. △ Methane Elim.					

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 - 1376 Carling Avenue
Ottawa, Ontario

DATUM BM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO. PE3896

HOLE NO. BH13

BORINGS BY Portable Drill

DATE November 1, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)					
								○ Lower Explosive Limit %					
								20	40	60	80		
GROUND SURFACE													
Concrete slab	0.10	AU	1			0	71.03						
FILL: Crushed stone	0.60												
GLACIAL TILL: Grey silty clay to clayey silt with sand, trace gravel and cobbles		SS	2	50		1	70.03						
		SS	3	58									
		SS	4	100		2	69.03						
		SS	5	100									
End of Borehole	2.74												
Practical split spoon refusal at 2.74m depth													

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

DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH 1-17

BORINGS BY CME 55 Power Auger

DATE August 15, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
GROUND SURFACE								20	40	60	80		
Asphaltic concrete	0.09					0	75.22						
FILL: Crushed stone with silt and sand	0.33	AU	1			1	74.22						
FILL: Brown silty sand, some clay, trace organics	1.65												
Compact, brown SILTY SAND	1.98	SS	2	75	12	2	73.22						
Brown to grey SILTY CLAY , trace sand		SS	3	100	2	3	72.22						
	3.81												
		SS	4	33	P	5	70.22						
GLACIAL TILL: Grey silty clay, some sand, trace gravel, possible cobbles and boulders		SS	5	54	9	6	69.22						
		RC	1	33		8	67.22						
	9.22												
		RC	2	71	34	10	65.22						
BEDROCK: Grey limestone interbedded with shale		RC	3	100	67	11	64.22						
		RC	4	100	93	12	63.22						
	13.18					13	62.22						
End of Borehole (GWL @ 3.72m - August 24, 2017)													

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH 2-17

BORINGS BY CME 55 Power Auger

DATE August 15, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
Asphaltic concrete	0.06					0	74.65						
FILL: Crushed stone with silt and sand	0.20	AU	1										
	1.07					1	73.65						
FILL: Brown silty sand, trace gravel, cobbles and boulders		SS	2	50	4								
Brown SILTY CLAY , trace sand	2.29					2	72.65						
		SS	3	54	9								
		SS	4	46	11								
GLACIAL TILL: Grey silty clay, trace gravel, cobbles, possible boulders						3	71.65						
		SS	4	46	11								
	6.20					6	68.65						
		RC	1	89	37								
BEDROCK: Grey limestone interbedded with shale		RC	2	100	77								
		RC	3	100	90								
	10.21					10	64.65						
End of Borehole (GWL @ 2.82m - August 24, 2017)													

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

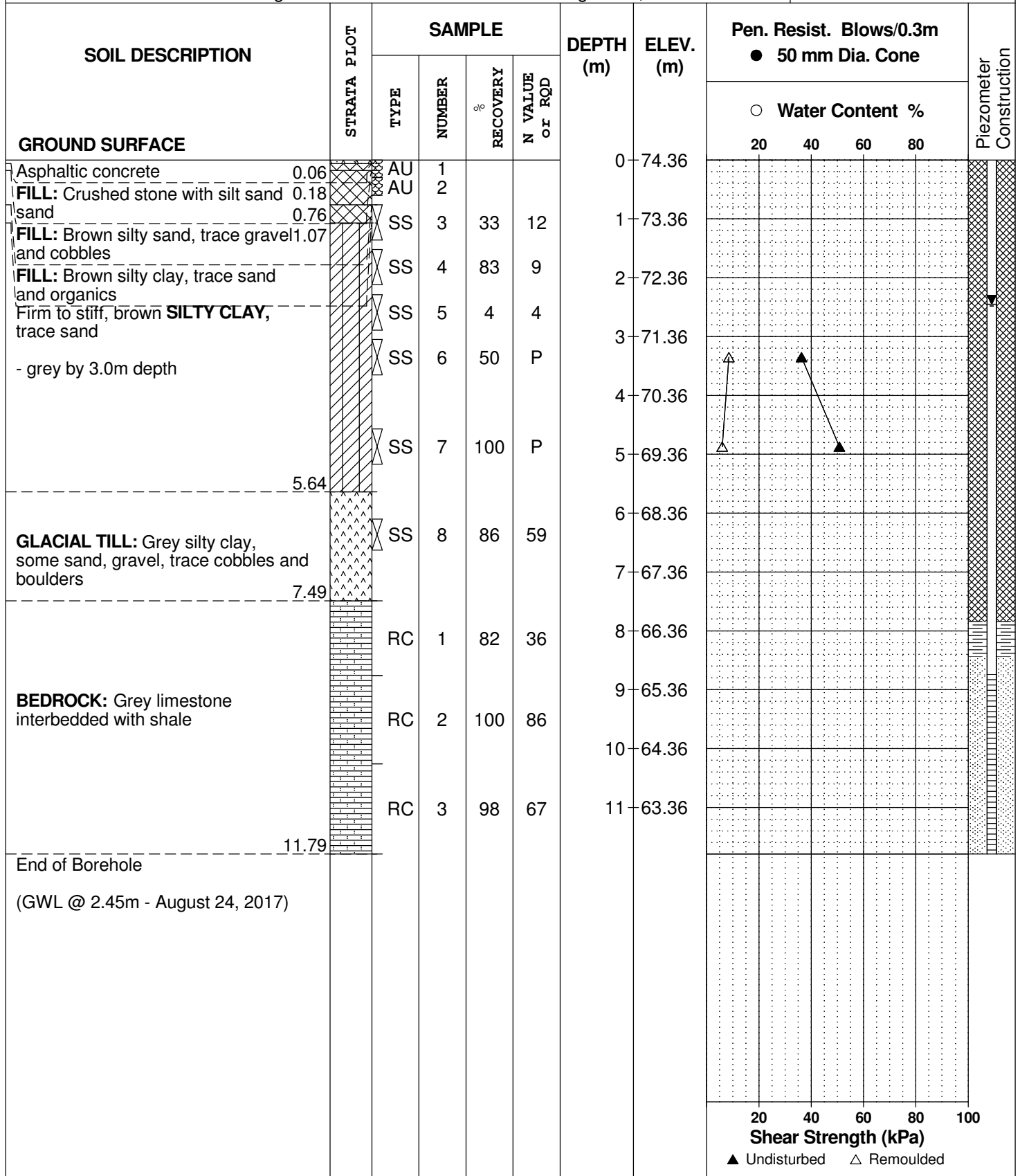
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH 4-17

BORINGS BY CME 55 Power Auger

DATE August 16, 2017



SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Multi-Storey Redevelopment - 1354-1376 Carling Ave.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH 5-17

BORINGS BY CME 55 Power Auger

DATE August 16, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY	N VALUE or RQD			○ Water Content %					
GROUND SURFACE								20	40	60	80		
Asphaltic concrete	0.06	AU	1			0	74.09						
FILL: Crushed stone with silt and sand	0.30	AU	2										
FILL: Brown silty sand, trace clay and construction debris		AU	3			1	73.09						
	2.44	AU	4			2	72.09						
Grey SILTY CLAY , trace sand		AU	5			3	71.09						
	4.57	AU	6			4	70.09						
End of Borehole (GWL @ 2.37m - August 24, 2017)													

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

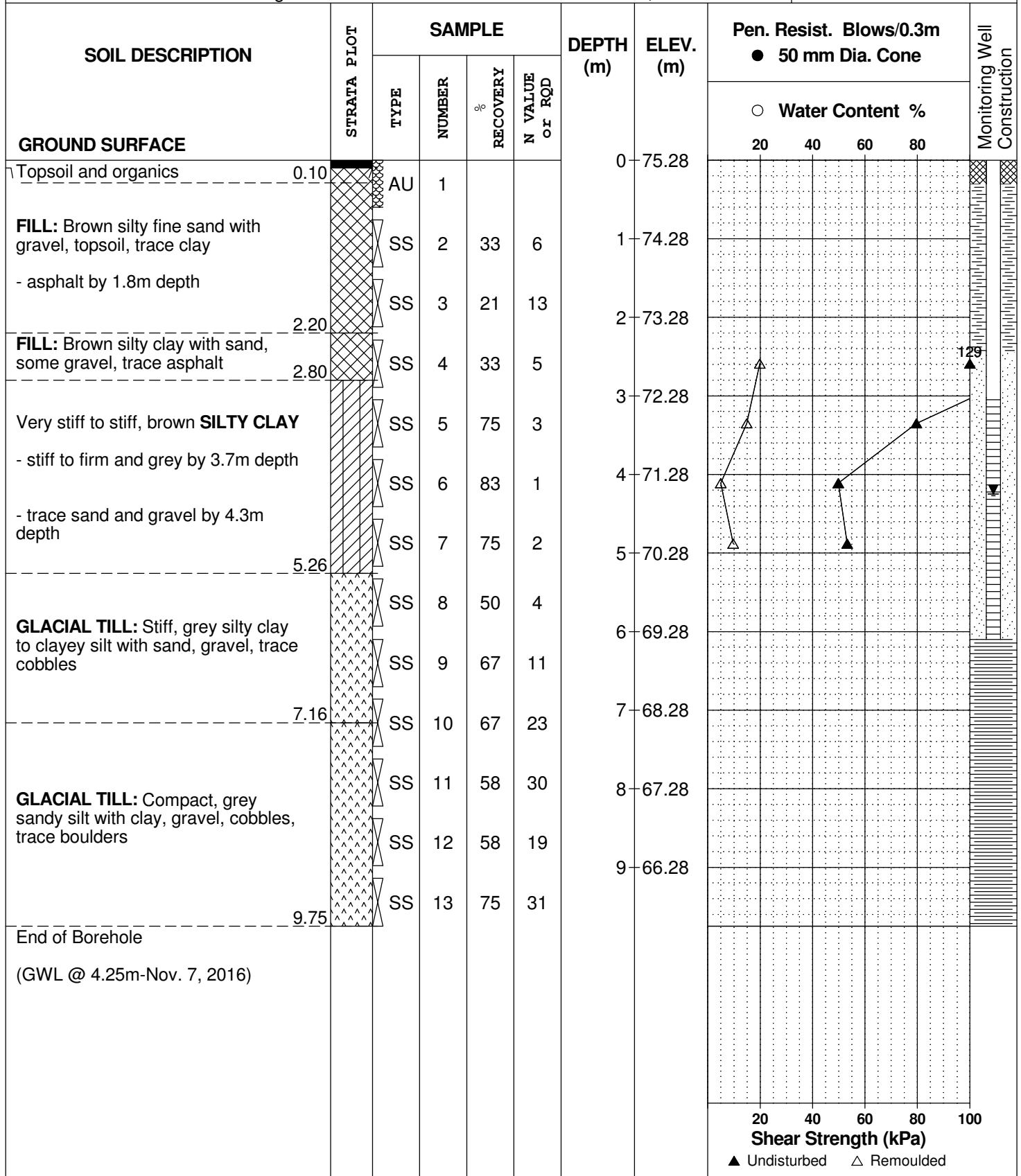
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH 1

BORINGS BY CME 55 Power Auger

DATE October 27, 2016



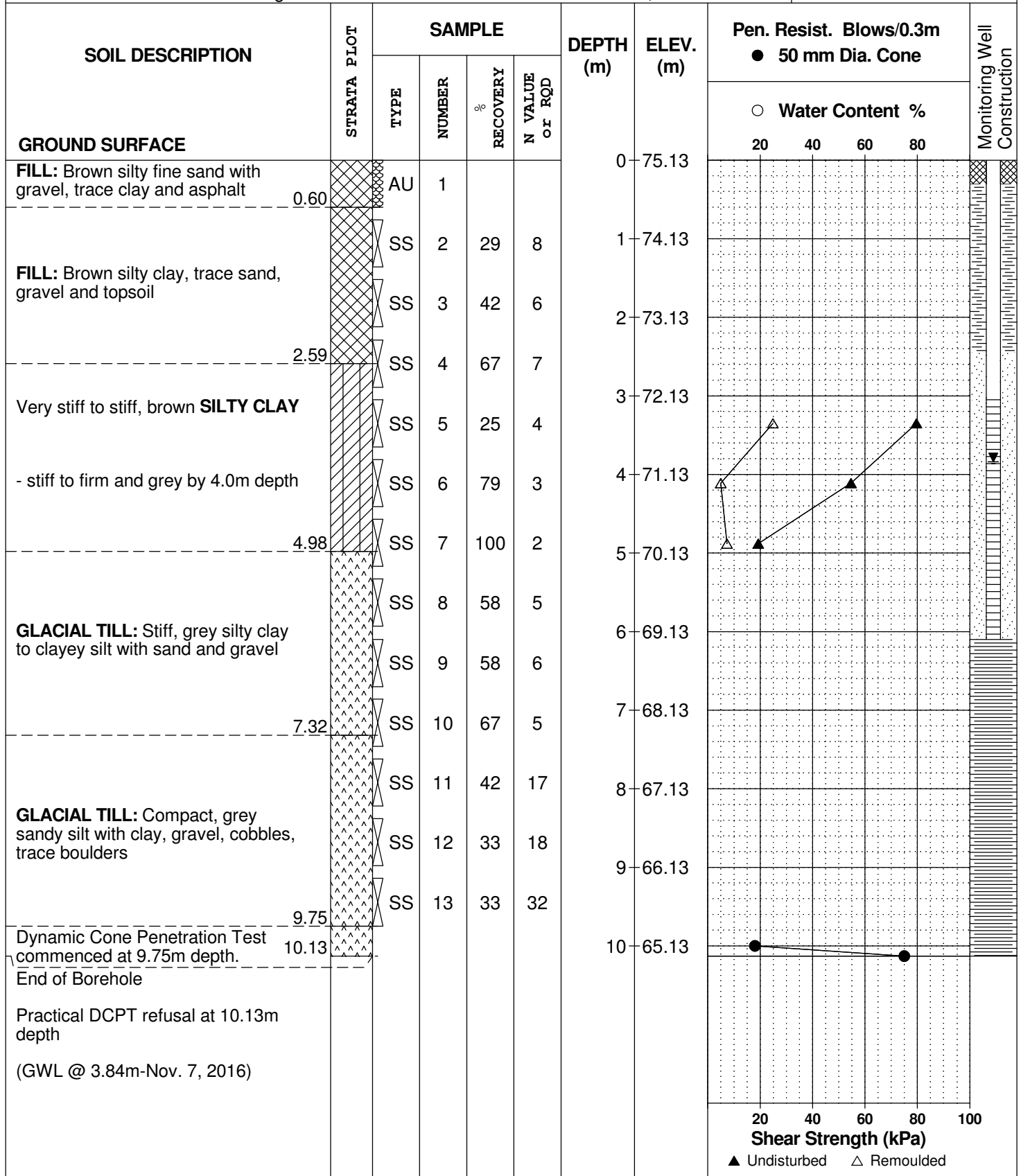
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO. PG3736

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger

DATE October 27, 2016



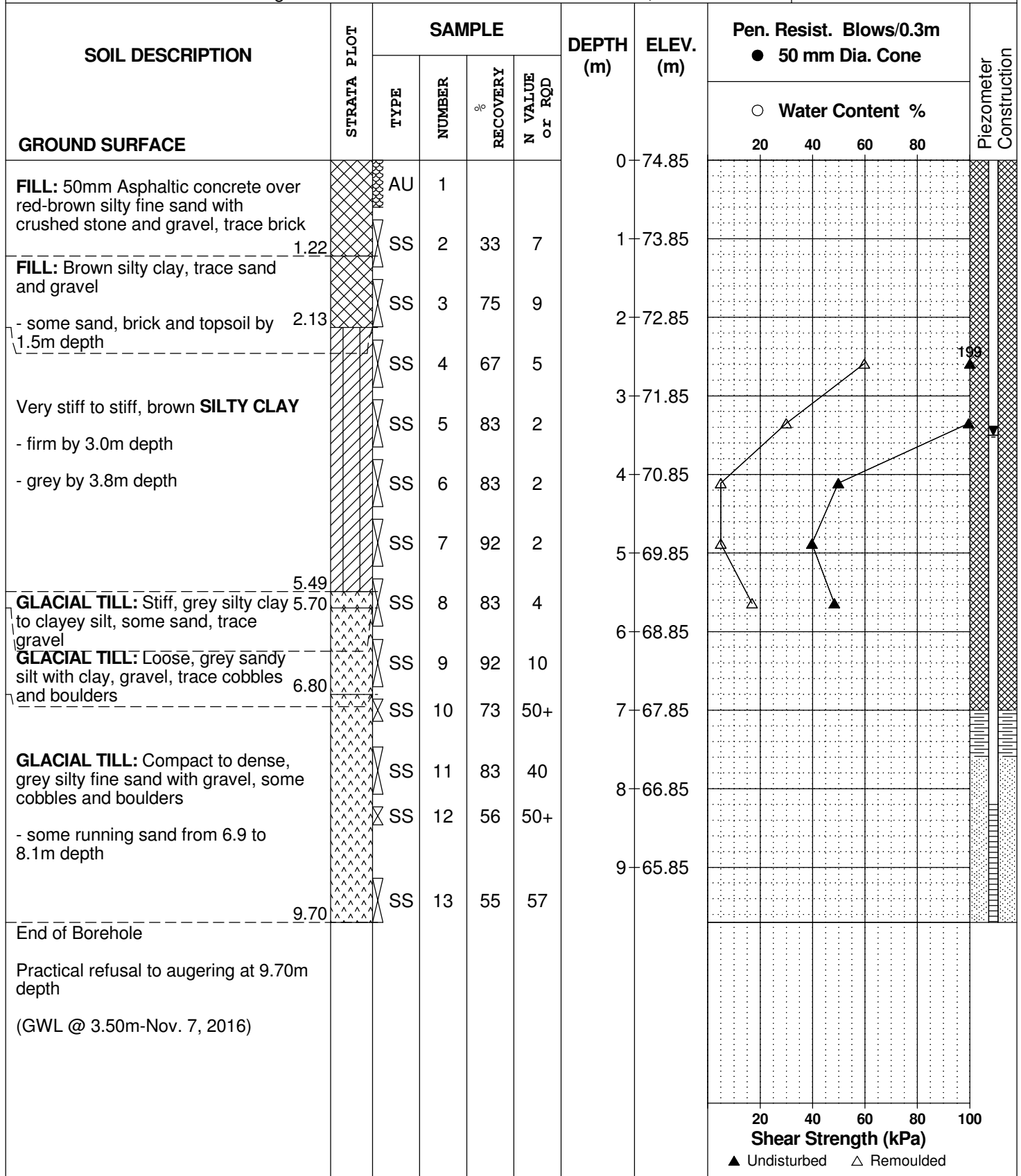
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH 3

BORINGS BY CME 55 Power Auger

DATE October 28, 2016



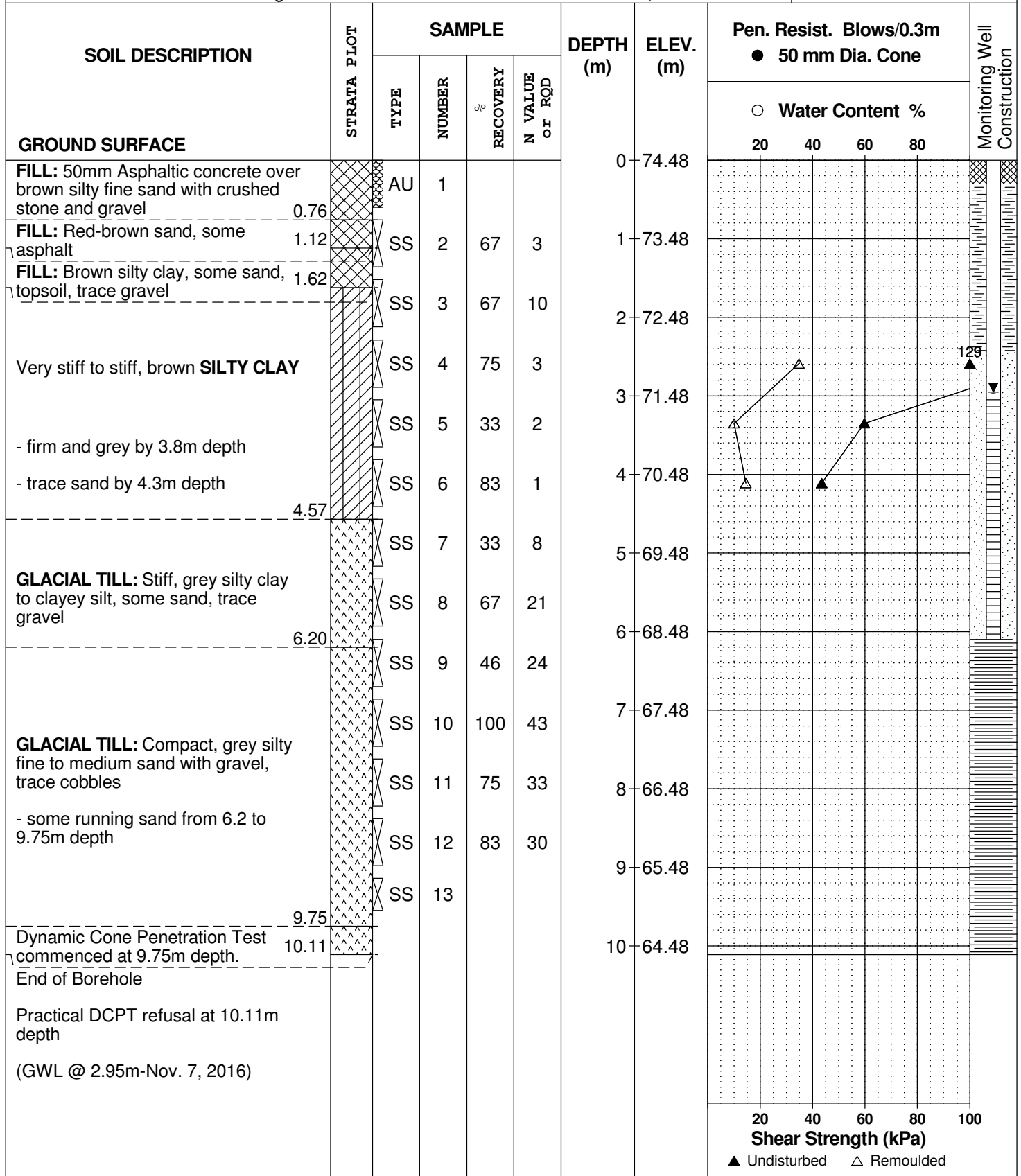
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO. PG3736

HOLE NO. BH 4

BORINGS BY CME 55 Power Auger

DATE October 28, 2016



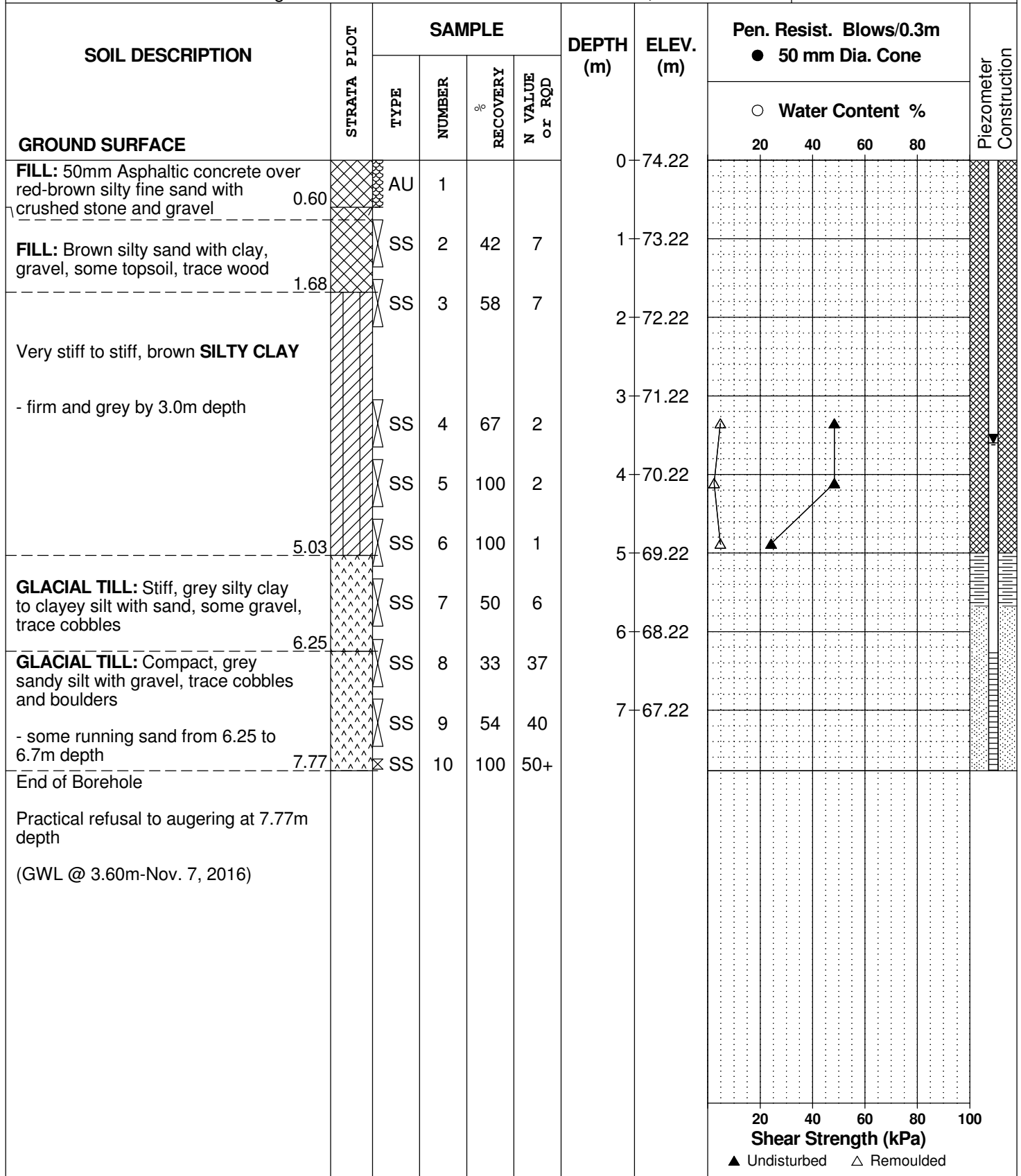
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO.
PG3736

HOLE NO.
BH 5

BORINGS BY CME 55 Power Auger

DATE October 31, 2016



20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH 6

BORINGS BY CME 55 Power Auger

DATE October 26, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			20	40	60	80		
GROUND SURFACE													
FILL: 50mm Asphaltic concrete over brow silty fine to medium sand with crushed stone and gravel		AU	1			0	74.12						
	1.07	SS	2	22	50+	1	73.12						
FILL: Brown silty clay with sand, gravel and cobbles		SS	3	67	8	2	72.12						
	2.21	SS	4	21	4	3	71.12						
GLACIAL TILL: Stiff, brown silty clay with sand, gravel, trace cobbles		SS	5	29	5	4	70.12						
- grey by 3.7m depth		SS	6	83	7	5	69.12						
	4.72	SS	7	71	28	6	68.12						
GLACIAL TILL: Compact to dense, grey sandy silt to silty sand with gravel, cobbles, trace boulders		SS	8	76	50+								
	6.15	SS	9	50	50+								
End of Borehole													
Practical refusal to augering at 6.15m depth (GWL @ 2.62m-Nov. 7, 2016)													

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

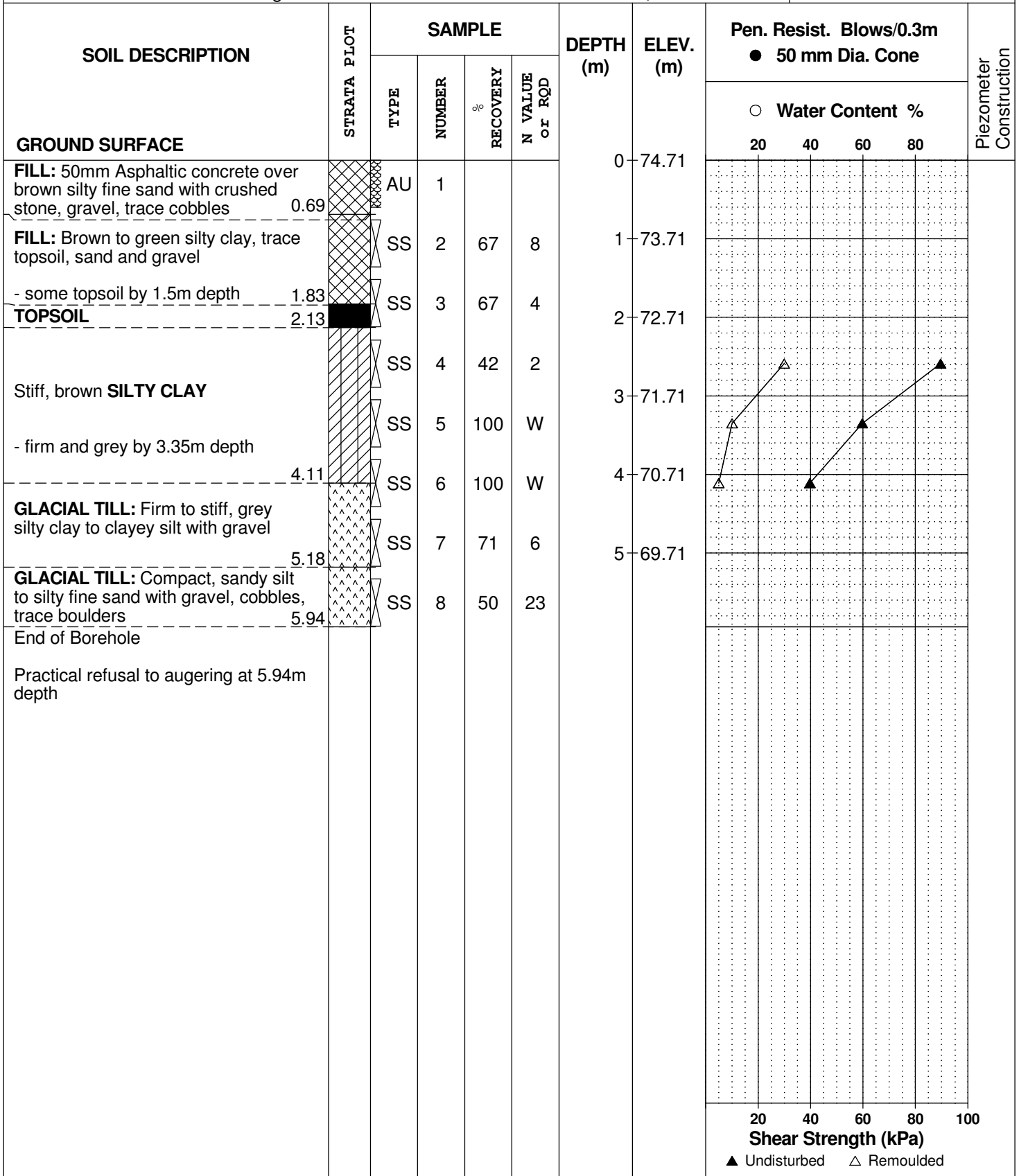
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH 7

BORINGS BY CME 55 Power Auger

DATE October 26, 2016



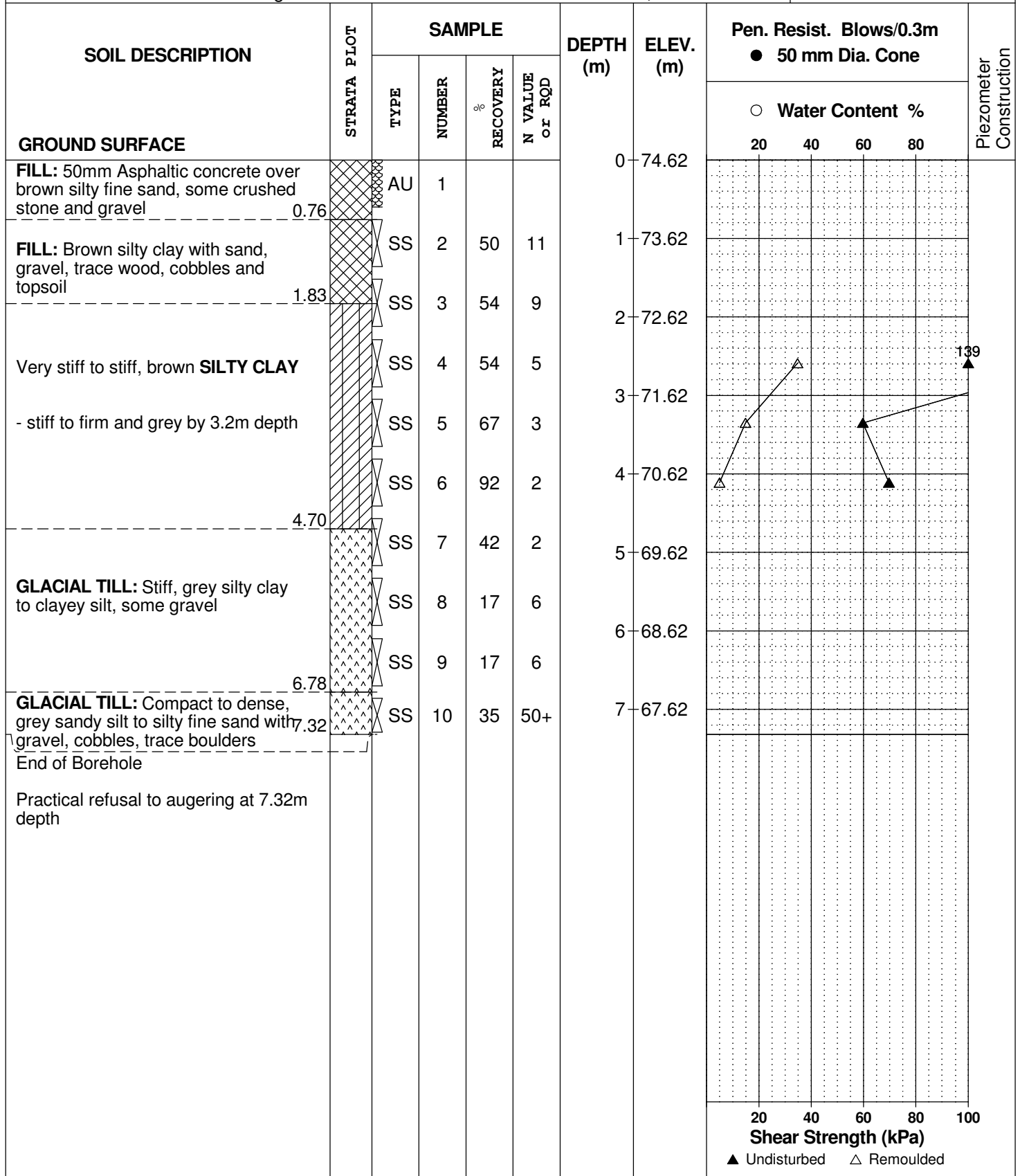
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH 8

BORINGS BY CME 55 Power Auger

DATE October 26, 2016



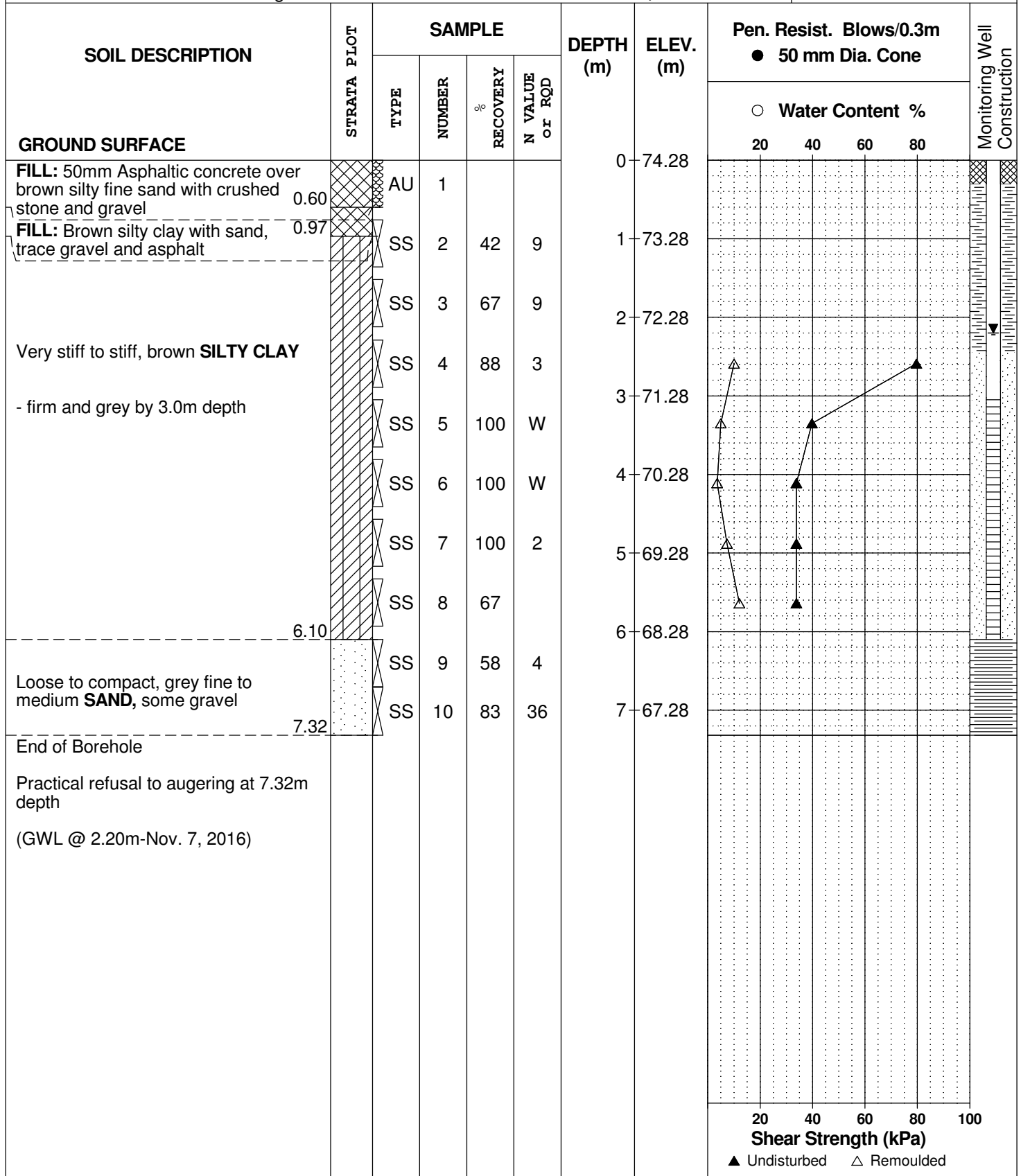
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO.
PG3736

HOLE NO.
BH 9

BORINGS BY CME 55 Power Auger

DATE October 27, 2016



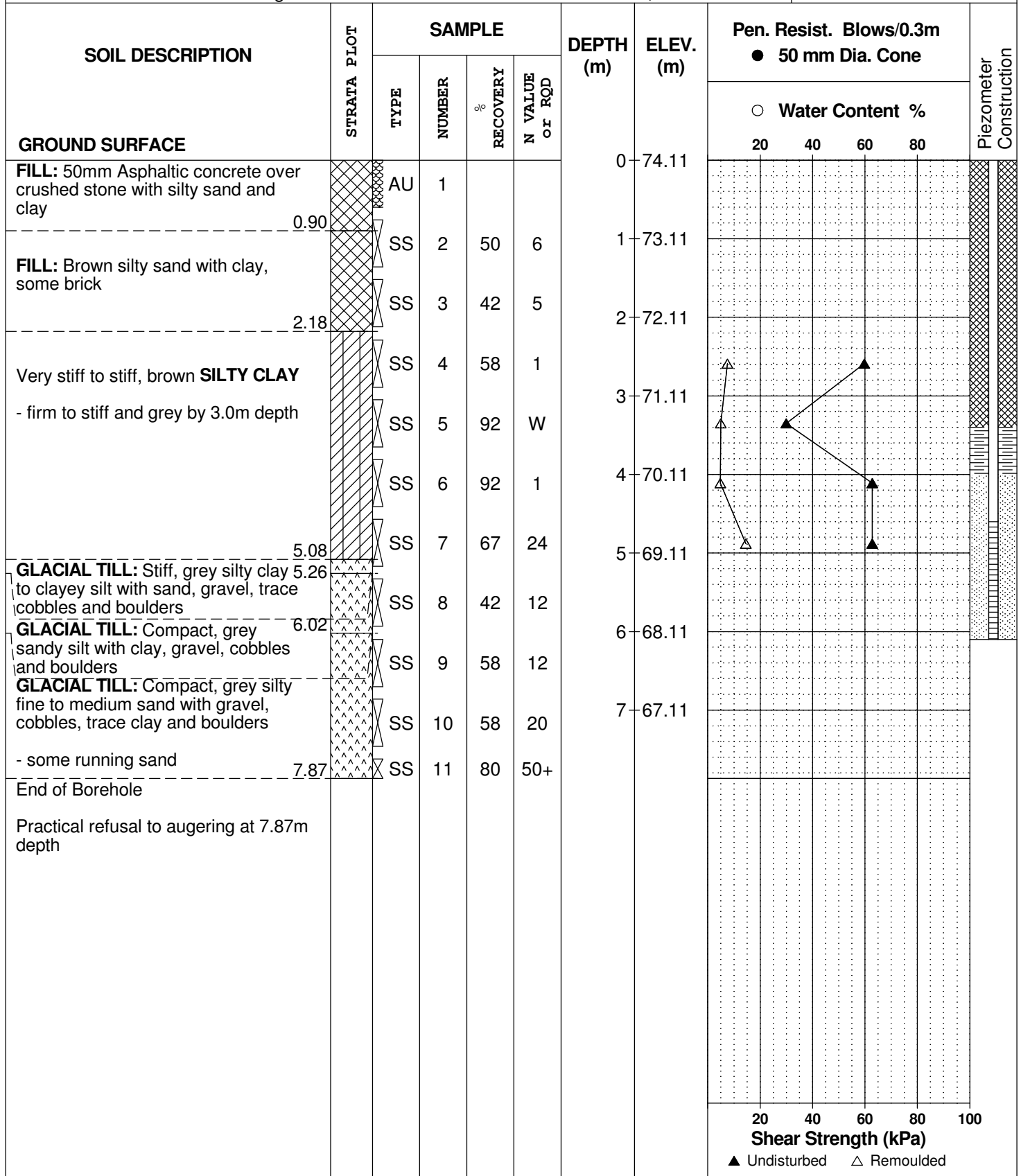
DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebakk Ltd.

FILE NO.
PG3736

HOLE NO.
BH10

BORINGS BY CME 55 Power Auger

DATE October 28, 2016





DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO. PG3736

HOLE NO. BH11

BORINGS BY Portable Drill

DATE October 31, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			20	40	60	80		
GROUND SURFACE						0	72.67						
FILL: 50mm Asphaltic concrete over crushed stone		AU	1										
	0.76					1	71.67						
GLACIAL TILL: Stiff, grey silty clay to clayey silt with sand, gravel, cobbles, trace boulders		SS	2			2	70.67						
		SS	3			3	69.67						
		SS	4			4	68.67						
		SS	5										
		SS	6										
End of Borehole (GWL @ 1.31m-Nov. 7, 2016)	4.27					4	68.67						
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Multi-Storey Redevelopment - 1354-1376 Carling Ave.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH12

BORINGS BY Portable Drill

DATE November 1, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			20	40	60	80		
GROUND SURFACE													
Concrete slab	0.10					0	71.49						
FILL: Gravel, cobbles with sandy silt and clay	0.60	AU	1										
Grey SILTY CLAY	0.97	SS	2	100		1	70.49						
GLACIAL TILL: Stiff, grey silty clay to clayey silt with sand, trace gravel and cobbles		SS	3	7									
		SS	4	83		2	69.49						
		SS	5										
End of Borehole	2.80												
Practical split spoon refusal at 2.80m depth (GWL @ 0.20m-Nov. 7, 2016)													

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Multi-Storey Redevelopment - 1354-1376 Carling Ave.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the southeast corner of the intersection of Archibald St. & Carling Avenue. Geodetic elevation = 75.14m, as per plan prepared by Annis, O'Sullivan, Vollebek Ltd.

FILE NO.
PG3736

HOLE NO.
BH13

BORINGS BY Portable Drill

DATE November 1, 2016

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
GROUND SURFACE								20	40	60	80		
Concrete slab	0.10					0	71.03						
FILL: Crushed stone	0.60	AU	1										
GLACIAL TILL: Stiff, grey silty clay to clayey silt with sand, trace gravel and cobbles		SS	2	50		1	70.03						
		SS	3	58									
		SS	4	100		2	69.03						
		SS	5	100									
End of Borehole	2.74												
Practical split spoon refusal at 2.74m depth													
								20	40	60	80	100	
								Shear Strength (kPa)					
								▲ Undisturbed △ Remoulded					

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 strength of cohesionless soils is the relative density, 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.

Relative Density	'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 vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

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 is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

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 NXL size core. However, it can be used on smaller core sizes, such as BX, 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
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture 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 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 = $(D_{30})^2 / (D_{10} \times D_{60})$
Cu	-	Uniformity coefficient = D_{60} / D_{10}

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		Overconsolidation 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.
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SYMBOLS AND TERMS (continued)

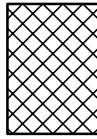
STRATA PLOT



Topsoil



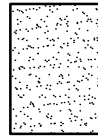
Asphalt



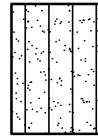
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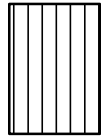
Peat



Sand



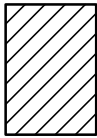
Silty Sand



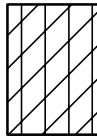
Silt



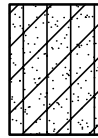
Sandy Silt



Clay



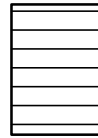
Silty Clay



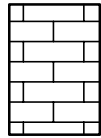
Clayey Silty Sand



Glacial Till



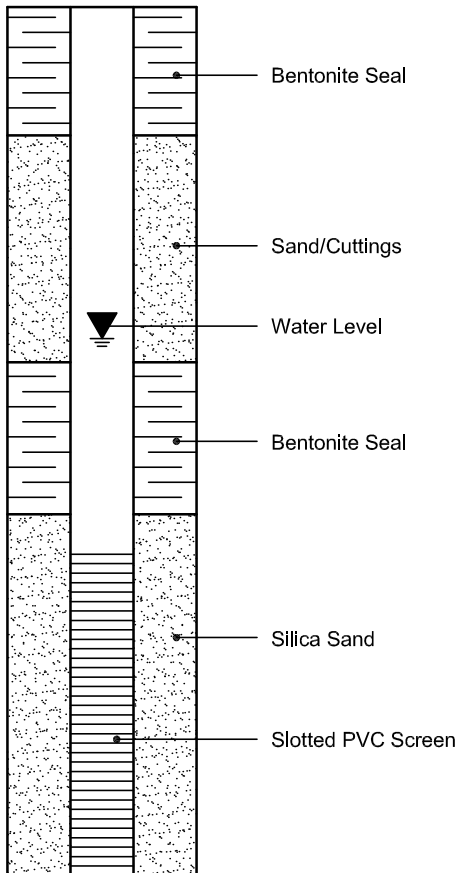
Shale



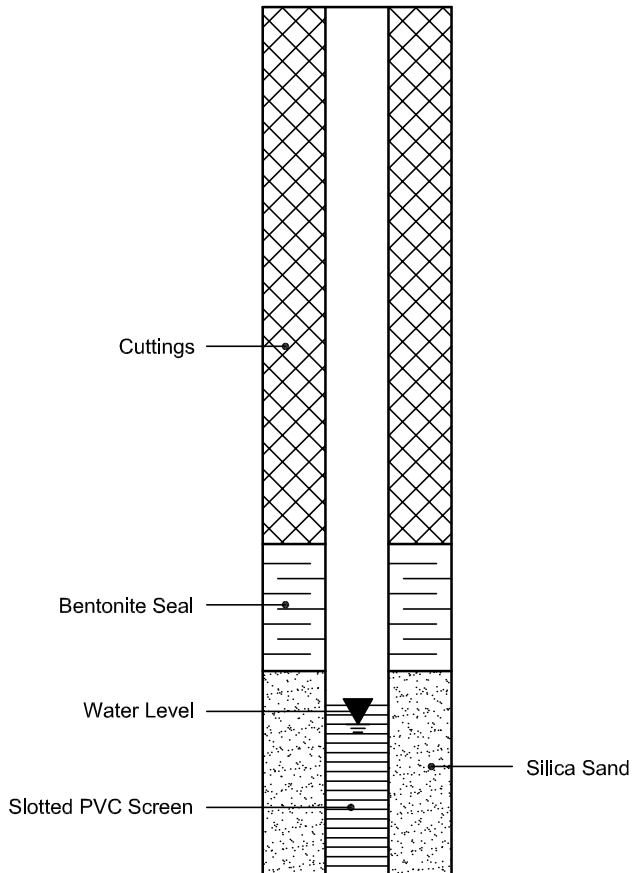
Bedrock

MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 21322

Report Date: 30-Nov-2016

Order Date: 25-Nov-2016

Project Description: PG3736

Client ID:	BH3-SS4	-	-	-
Sample Date:	28-Oct-16	-	-	-
Sample ID:	1648457-01	-	-	-
MDL/Units	Soil	-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	67.5	-	-	-
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General Inorganics

pH	0.05 pH Units	7.61	-	-	-
Resistivity	0.10 Ohm.m	8.99	-	-	-

Anions

Chloride	5 ug/g dry	700	-	-	-
Sulphate	5 ug/g dry	423 [1]	-	-	-

APPENDIX 2

FIGURE 1 - KEY PLAN

FIGURES 2 AND 3 - SEISMIC SHEAR WAVE VELOCITY PROFILES

DRAWING PG3736-1 - TEST HOLE LOCATION PLAN

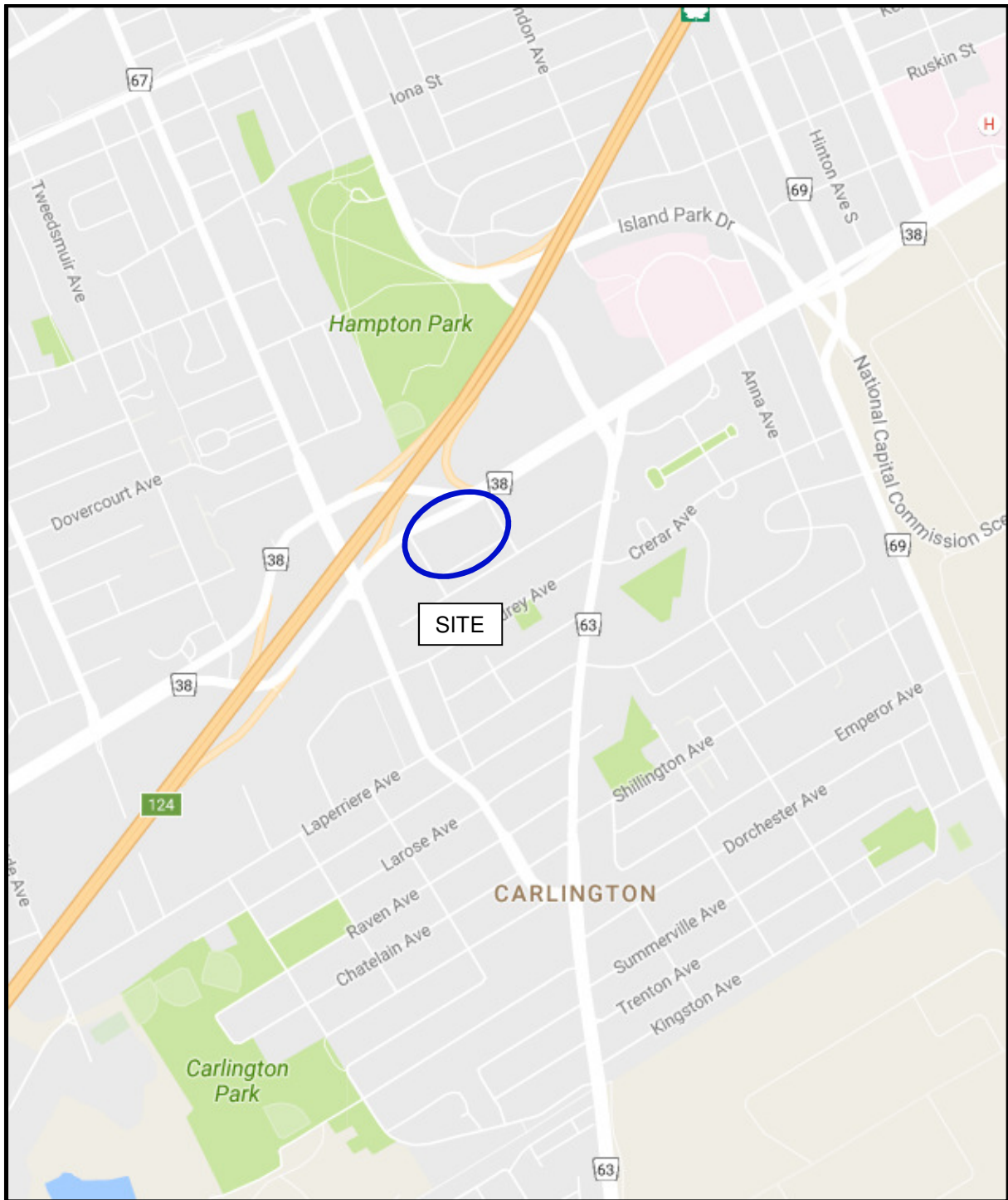


FIGURE 1
KEY PLAN

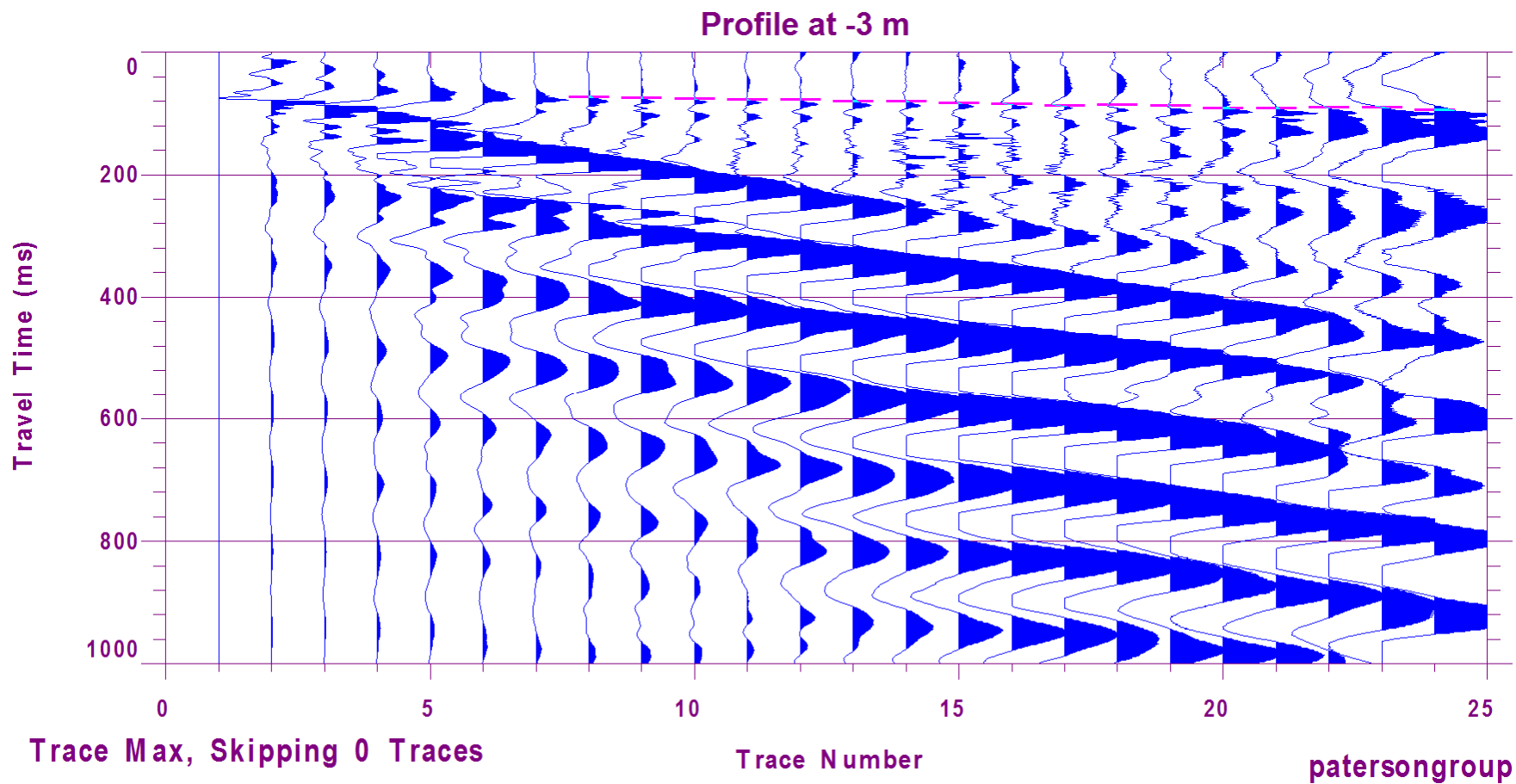


Figure 2 – Shear Wave Velocity Profile at Shot Location -3 m

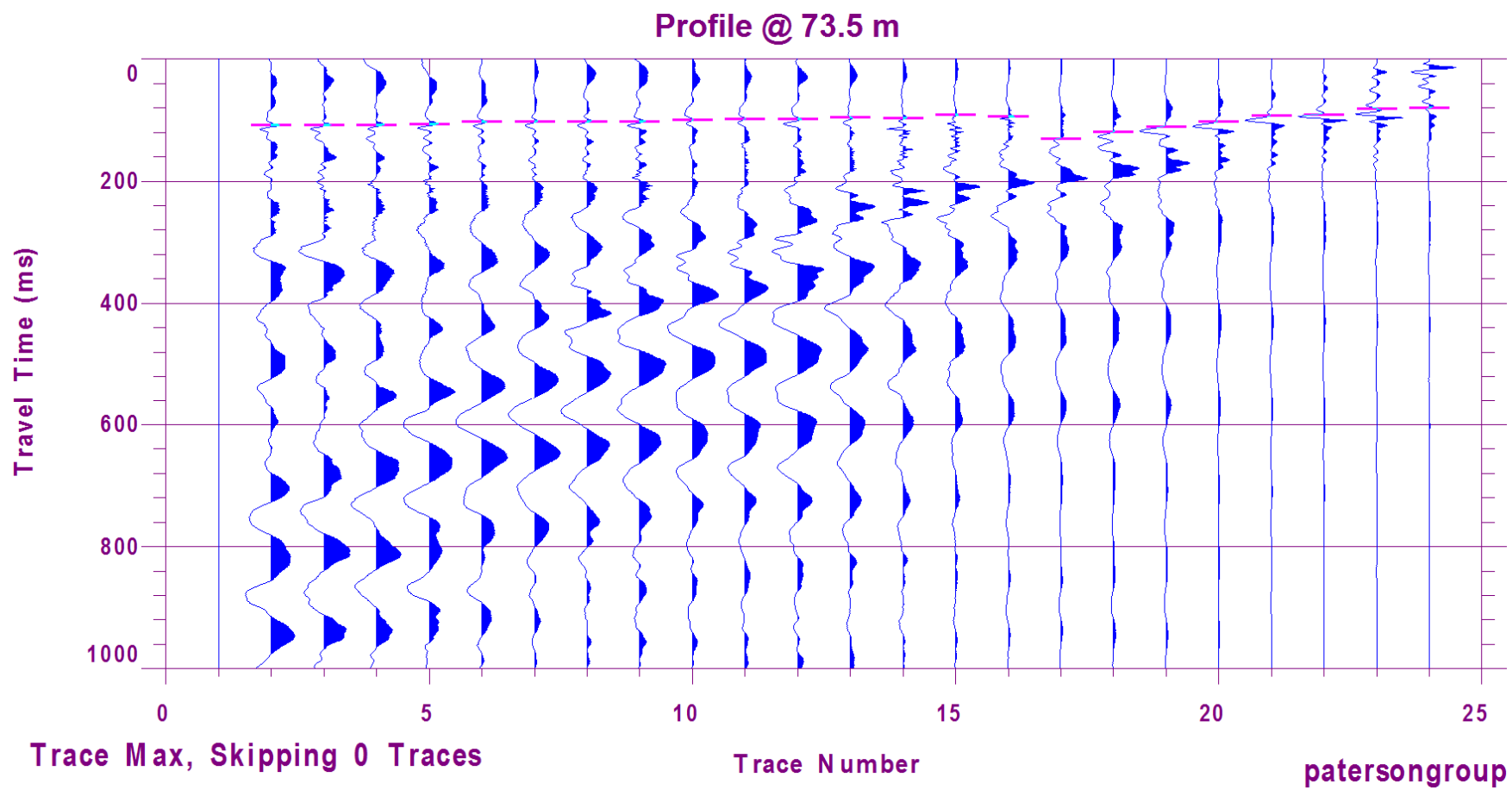


Figure 3 – Shear Wave Velocity Profile at Shot Location 73.5 m

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. **PE3929**

REMARKS

HOLE NO. **BH1-21/MW1**

BORINGS BY Portable Drill

DATE May 14, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE								20	40	60	80	
Concrete slab	0.10					0	71.03					
FILL: Brown silty sand with gravel and crushed stone	0.84	SS	1									
GLACIAL TILL: Grey silty clay, some sand, gravel, cobbles and boulders		SS	2			1	70.03					
		SS	3									
		SS	4			2	69.03					
End of Borehole (GWL @ 0.15m - June 1, 2021)	2.80											

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

DATUM Geodetic


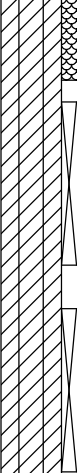


REMARKS

BORINGS BY Portable Drill

DATE June 3, 2021

FILE NO. **PE3929**

HOLE NO. **BH2-21/MW2**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE								20	40	60	80	
Concrete						0	71.57					
	0.38											
Stiff to firm, grey SILTY CLAY , trace sand and gravel		AU	1			1	70.57					
		SS	2	33	2							
		SS	3	83	1	2	69.57					
	2.13											
GLACIAL TILL: Grey silty clay with sand and gravel		SS	4	50	11	3	68.57					
		SS	5	33	2							
		SS	6	62	18	4	67.57					
	3.66											
GLACIAL TILL: Compact, grey silty sand with gravel, occasional cobbles												
	4.57											
End of Borehole (GWL @ 1.09m - June 10, 2021)												

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

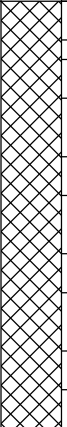

REMARKS

BORINGS BY Excavator

DATE March 29, 2021

FILE NO. **PE3929**

HOLE NO. **TP 1-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %				
GROUND SURFACE								20	40	60	80		
FILL: Brown silty sand, some clay layers, brick, asphalt		G	1			0							
		G	2										
		G	3				1						
		G	4										
		G	5				2						
Brown SILTY CLAY		G	6										
		G	7			3							
End of Test Pit													

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

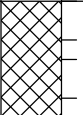
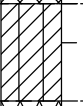
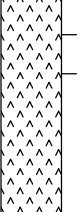
FILE NO. **PE3929**

REMARKS

HOLE NO. **TP 2-21**

BORINGS BY Excavator

DATE March 29, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE								20	40	60	80	
FILL: Brown silty clay, some crushed stone, trace asphalt and brick		G	1			0						
		G	2									
Brown SILTY CLAY		G	3									
		G	4									
GLACIAL TILL: Grey silty clay, some sand, gravel, cobbles and boulders						1						
						2						
End of Test Pit						2.25						

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic



FILE NO. **PE3929**

REMARKS

HOLE NO. **TP 3-21**

BORINGS BY Excavator

DATE March 29, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %				
GROUND SURFACE						0		20	40	60	80		
FILL: Brown silty clay, some crushed stone, trace brick and wood 1.05		G	1										
		G	2										
		G	3				1						
Brown SILTY CLAY 1.40		G	4										
End of Test Pit													

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. **PE3929**

REMARKS

HOLE NO. **TP 4-21**

BORINGS BY Excavator

DATE March 29, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE							20	40	60	80		
FILL: Grey silty clay and crushed stone	0.20	G	1			0						
Grey SILTY CLAY	0.70	G	2									
End of Test Pit												

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. Δ Methane Elim.

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE March 29, 2021

FILE NO. **PE3929**

HOLE NO. **TP 5-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE								20	40	60	80	
Asphaltic concrete	0.20					0						
FILL: Crushed stone with sand	0.40	G	1									
FILL: Brown silty clay, some sand, gravel, trace brick	0.90	G	2									
Brown SILTY CLAY		G	3			1						
		G	4			2						
End of Test Pit	2.60											

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
 1354 to 1376 Carling Avenue
 Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE March 29, 2021

FILE NO. **PE3929**

HOLE NO. **TP 6-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			<input type="radio"/> Volatile Organic Rdg. (ppm) <input type="radio"/> Lower Explosive Limit %				
GROUND SURFACE						0						
FILL: Brown silty clay with sand, some gravel, asphalt, trace brick		G	1									
		G	2									
		G	3									
		G	4									
Brown SILTY CLAY		G	5			1.65						
End of Test Pit						1.95						

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

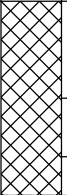

FILE NO. **PE3929**

REMARKS

HOLE NO. **TP 7-21**

BORINGS BY Excavator

DATE April 7, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE						0	73.17	20	40	60	80	
FILL: Brown silty sand, some clay, fragments of concrete and brick, trace asphalt		G	1									
	1.00					1	72.17					
Brown SILTY CLAY		G	2									
	1.50	G	3									
End of Test Pit												

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. **PE3929**

REMARKS

HOLE NO. **TP 8-21**

BORINGS BY Excavator

DATE April 7, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE							20	40	60	80		
Asphaltic concrete	0.10				0	73.93						
FILL: Brown silty sand with crushed stone, occasional pieces of concrete and rebar	1.00	G	1									
		G	2		1	72.93						
Brown SILTY CLAY	1.50	G	3									
End of Test Pit												

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

FILE NO. **PE3929**

REMARKS

HOLE NO. **TP 9-21**

BORINGS BY Excavator

DATE April 7, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE							20	40	60	80		
Asphaltic concrete	0.10				0	73.73						
FILL: Brown silty sand, some clay, cobbles, brick fragments, trace asphalt	0.50	G	1				▲					
FILL: Brown silty sand with clay	1.00	G	2		1	72.73	▲					
Brown SILTY CLAY	1.50	G	3				▲					
End of Test Pit												

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
 1354 to 1376 Carling Avenue
 Ottawa, Ontario

DATUM Geodetic

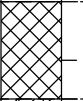
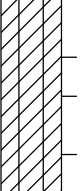
REMARKS

BORINGS BY Excavator

DATE May 19, 2021

FILE NO. PE3929

HOLE NO. TP T-21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE						0						
FILL: Brown silty sand with clay		G	1			2.00 2.50						
Brown SILTY CLAY		G	2			3.00						
End of Test Pit		G	3			3.50						

2.00

2.50

3.50

0

1

2

3

20

40

60

80

100

200

300

400

500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE July 7, 2021

FILE NO. **PE3929**

HOLE NO. **TP10(2)-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE						0	68.12	20	40	60	80	
GLACIAL TILL: Grey silty sand with gravel, some cobbles and boulders		G	1									
		G	2			1	67.12					
		G	3									
		G	4			2	66.12					
End of Test Pit												

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

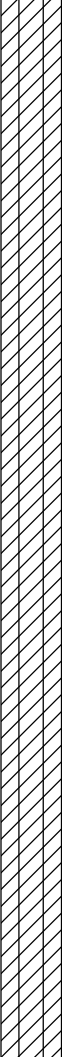

FILE NO. **PE3929**

REMARKS

HOLE NO. **TP10-21**

BORINGS BY Excavator

DATE April 14, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rgd. (ppm)	○ Lower Explosive Limit %				
GROUND SURFACE								20	40	60	80		
Brown SILTY CLAY						0	69.67						
						1	68.67						
						2	67.67						
						3	66.67						
						4	65.67						
				5	64.67								
				6	63.67								
GLACIAL TILL: Brown silty clay with boulders		G	1										
		G	2										
End of Test Pit													

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE July 7, 2021

FILE NO. **PE3929**

HOLE NO. **TP11(2)-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %				
GROUND SURFACE						0	67.86	20	40	60	80		
GLACIAL TILL: Grey silty sand, some clay, gravel, cobbles and boulders		G	1										
		G	2			1	66.86						
		G	3										
		G	4										
		G	5										
End of Test Pit	2.00					2	65.86						
								100	200	300	400	500	
								RKI Eagle Rdg. (ppm)					
								▲ Full Gas Resp. △ Methane Elim.					

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic



REMARKS

BORINGS BY Excavator

DATE April 14, 2021

FILE NO. **PE3929**

HOLE NO. **TP11-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE								20	40	60	80	
Brown SILTY CLAY		G	1			0	71.98					
		G	2			1	70.98					
GLACIAL TILL: Brown silty clay with boulders		G	3			2	69.98					
		G	4			3	68.98					
End of Test Pit						4	67.98					

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

DATUM Geodetic



REMARKS

BORINGS BY Excavator

DATE July 3, 2021

FILE NO. **PE3929**

HOLE NO. **TP12-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rgd. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE								20	40	60	80	
Brown SILTY CLAY - grey by 1.5m depth		G	1			0	71.78					
GLACIAL TILL: Grey silty clay, some sand, gravel, cobbles and boulders		G	2			1	70.78					
GLACIAL TILL: Grey silty sand, some gravel, cobbles and boulders		G	3			2	69.78					
		G	4			3	68.78					
		G	5			4	67.78					
End of Test Pit		G				5	66.78					

100 200 300 400 500

RKI Eagle Rgd. (ppm)

▲ Full Gas Resp. △ Methane Elim.

DATUM Geodetic

FILE NO. **PE3929**

REMARKS

HOLE NO. **TP13-21**

BORINGS BY Excavator

DATE July 3, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE						0	69.82	20	40	60	80	
GLACIAL TILL: Grey silty clay, some gravel, cobbles and boulders		G	1									
		G	2			1	68.82					
	1.20											
GLACIAL TILL: Grey silty sand, some gravel, cobbles and boulders		G	3			2	67.82					
		G	4			3	66.82					
		G	5			4	65.82					
End of Test Pit	4.00											

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

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE July 3, 2021

FILE NO. **PE3929**

HOLE NO. **TP14-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE						0	73.14	20	40	60	80	
FILL: Brown sand and crushed stone	[Cross-hatched pattern]											
	0.90											
Brown SILTY CLAY - grey by 2.2m depth	[Diagonal lines pattern]	G	1			1	72.14					
		G	2									
		G	3			2	71.14					
		G	4									
	3.20					3	70.14					
GLACIAL TILL: Grey silty clay, some gravel, cobbles and boulders	[Triangular pattern]	G	5									
		G	6									
	4.00					4	69.14					
End of Test Pit												

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

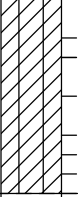
REMARKS

BORINGS BY Excavator

DATE July 3, 2021

FILE NO. **PE3929**

HOLE NO. **TP15-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE								20	40	60	80	
Grey SILTY CLAY		G	1			0	71.14					
		G	2									
		G	3									
		G	1				1	70.14				
End of Test Pit	1.00											

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic




REMARKS

BORINGS BY Excavator

DATE July 3, 2021

FILE NO. **PE3929**

HOLE NO. **TP16-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rgd. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE								20	40	60	80	
FILL: Crushed stone and sand						0	71.87					
	1.00	G	1			1	70.87					
		G	2			2	69.87					
Grey SILTY CLAY		G	3			3	68.87					
	4.00	G	4			4	67.87					
GLACIAL TILL: Grey silty clay, some sand, gravel, cobbles and boulders		G	5			5	66.87					
End of Test Pit	5.00											

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

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

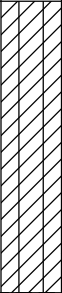
REMARKS

BORINGS BY Excavator

DATE July 3, 2021

FILE NO. **PE3929**

HOLE NO. **TP17-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE						0	71.84	20	40	60	80	
Grey SILTY CLAY		G	1									
		G	2			1	70.84					
		G	3									
End of Test Pit	1.50											
								100	200	300	400	500

RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1354 to 1376 Carling Avenue
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE July 3, 2021

FILE NO. **PE3929**

HOLE NO. **TP18-21**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)	○ Lower Explosive Limit %			
GROUND SURFACE								20	40	60	80	
FILL: Crushed stone and sand	0.50	G	1			0	72.75					
FILL: Brown sand	1.10	G	2			1	71.75					
Brown SILTY CLAY - grey by 2.2m depth	3.50	G	3			2	70.75					
		G	4			3	69.75					
GLACIAL TILL: Grey silty clay, some sand, gravel, cobbles and boulders	4.50	G	5			4	68.75					
GLACIAL TILL: Grey silty sand, some gravel, cobbles and boulders	5.00	G	6			5	67.75					
End of Test Pit												

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

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

The standard terminology to describe the strength of cohesionless soils is the relative density, 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.

Relative Density	'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 vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

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 is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

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 NXL size core. However, it can be used on smaller core sizes, such as BX, 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
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture 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 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 = $(D_{30})^2 / (D_{10} \times D_{60})$
Cu	-	Uniformity coefficient = D_{60} / D_{10}

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		Overconsolidation 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.
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SYMBOLS AND TERMS (continued)

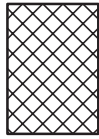
STRATA PLOT



Topsoil



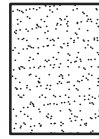
Asphalt



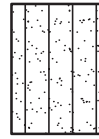
Fill



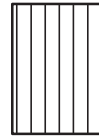
Peat



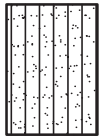
Sand



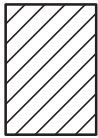
Silty Sand



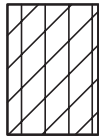
Silt



Sandy Silt



Clay



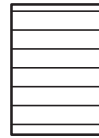
Silty Clay



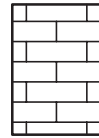
Clayey Silty Sand



Glacial Till



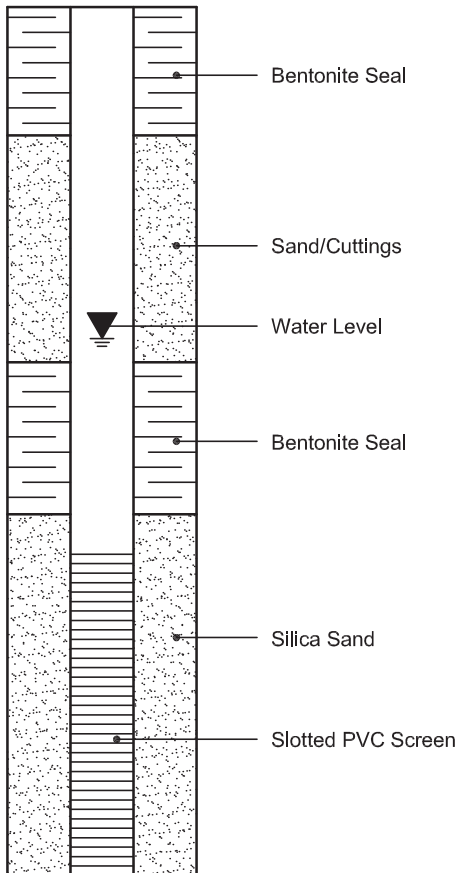
Shale



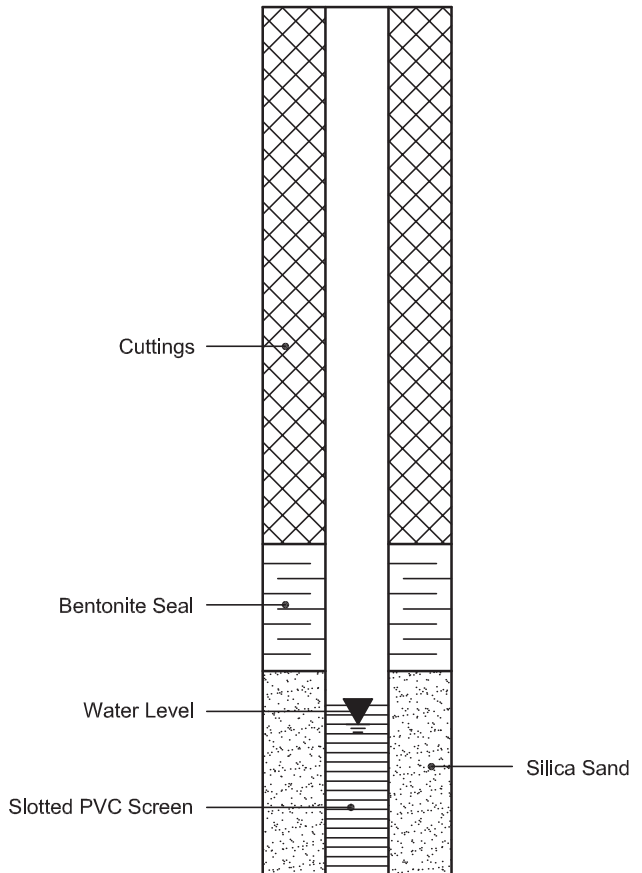
Bedrock

MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 20920
Project: PE3896
Custody: 28919

Report Date: 4-Nov-2016
Order Date: 31-Oct-2016

Order #: 1645106

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

Parcel ID	Client ID
1645106-01	BH4-SS5
1645106-02	BH10-SS3
1645106-03	BH10-SS2
1645106-04	BH2-SS5/SS6

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20920

Report Date: 04-Nov-2016
 Order Date: 31-Oct-2016
Project Description: PE3896

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Boron, available	MOE (HWE), EPA 200.7 - ICP-OES	2-Nov-16	2-Nov-16
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	2-Nov-16	3-Nov-16
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	1-Nov-16	4-Nov-16
Mercury by CVAA	EPA 7471B - CVAA, digestion	2-Nov-16	2-Nov-16
PHC F1	CWS Tier 1 - P&T GC-FID	2-Nov-16	3-Nov-16
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	4-Nov-16	4-Nov-16
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	1-Nov-16	3-Nov-16
REG 153: Metals by ICP/OES, soil	based on MOE E3470, ICP-OES	2-Nov-16	2-Nov-16
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	1-Nov-16	2-Nov-16
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	2-Nov-16	3-Nov-16
Solids, %	Gravimetric, calculation	1-Nov-16	1-Nov-16

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20920

Report Date: 04-Nov-2016

Order Date: 31-Oct-2016

Project Description: PE3896

Client ID:	BH4-SS5	BH10-SS3	BH10-SS2	BH2-SS5/SS6
Sample Date:	28-Oct-16	28-Oct-16	28-Oct-16	27-Oct-16
Sample ID:	1645106-01	1645106-02	1645106-03	1645106-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	57.1	78.6	81.0	75.4
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Metals

Antimony	1.0 ug/g dry	-	-	<1.0	-
Arsenic	1.0 ug/g dry	-	-	<1.0	-
Barium	1.0 ug/g dry	-	-	246	-
Beryllium	1.0 ug/g dry	-	-	<1.0	-
Boron	1.0 ug/g dry	-	-	10.3	-
Boron, available	0.5 ug/g dry	-	-	0.7	-
Cadmium	0.5 ug/g dry	-	-	1.2	-
Chromium	1.0 ug/g dry	-	-	45.5	-
Chromium (VI)	0.2 ug/g dry	-	-	<0.2	-
Cobalt	1.0 ug/g dry	-	-	10.7	-
Copper	1.0 ug/g dry	-	-	34.2	-
Lead	1.0 ug/g dry	-	-	101	-
Mercury	0.1 ug/g dry	-	-	<0.1	-
Molybdenum	1.0 ug/g dry	-	-	<1.0	-
Nickel	1.0 ug/g dry	-	-	23.5	-
Selenium	1.0 ug/g dry	-	-	<1.0	-
Silver	0.5 ug/g dry	-	-	<0.5	-
Thallium	1.0 ug/g dry	-	-	<1.0	-
Uranium	1.0 ug/g dry	-	-	<1.0	-
Vanadium	1.0 ug/g dry	-	-	42.0	-
Zinc	1.0 ug/g dry	-	-	101	-

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
Dichlorodifluoromethane	0.05 ug/g dry	-	<0.05	-	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	-	<0.05	-	<0.05

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20920

Report Date: 04-Nov-2016

Order Date: 31-Oct-2016

Project Description: PE3896

	Client ID:	BH4-SS5	BH10-SS3	BH10-SS2	BH2-SS5/SS6
	Sample Date:	28-Oct-16	28-Oct-16	28-Oct-16	27-Oct-16
	Sample ID:	1645106-01	1645106-02	1645106-03	1645106-04
	MDL/Units	Soil	Soil	Soil	Soil
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)	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	-	98.2%	-	96.2%
Dibromofluoromethane	Surrogate	-	106%	-	96.9%
Toluene-d8	Surrogate	-	88.5%	-	88.2%
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-

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	Client ID: Sample Date: Sample ID:	BH4-SS5 28-Oct-16 1645106-01 Soil	BH10-SS3 28-Oct-16 1645106-02 Soil	BH10-SS2 28-Oct-16 1645106-03 Soil	BH2-SS5/SS6 27-Oct-16 1645106-04 Soil
	MDL/Units				
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	90.5%	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	181	-	-
F3 PHCs (C16-C34)	8 ug/g dry	77	7460	-	-
F4 PHCs (C34-C50)	6 ug/g dry	53	5460 [1]	-	-
F4G PHCs (gravimetric)	50 ug/g dry	-	6590	-	-

Semi-Volatiles

Acenaphthene	0.02 ug/g dry	-	-	1.26	-
Acenaphthylene	0.02 ug/g dry	-	-	0.12	-
Anthracene	0.02 ug/g dry	-	-	3.37	-
Benzo [a] anthracene	0.02 ug/g dry	-	-	5.27	-
Benzo [a] pyrene	0.02 ug/g dry	-	-	5.74	-
Benzo [b] fluoranthene	0.02 ug/g dry	-	-	5.16	-
Benzo [g,h,i] perylene	0.02 ug/g dry	-	-	3.76	-
Benzo [k] fluoranthene	0.02 ug/g dry	-	-	3.60	-
Chrysene	0.02 ug/g dry	-	-	5.49	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	-	1.01	-
Fluoranthene	0.02 ug/g dry	-	-	13.5	-
Fluorene	0.02 ug/g dry	-	-	1.55	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	-	3.25	-
1-Methylnaphthalene	0.02 ug/g dry	-	-	0.39	-
2-Methylnaphthalene	0.02 ug/g dry	-	-	0.53	-
Methylnaphthalene (1&2)	0.04 ug/g dry	-	-	0.91	-
Naphthalene	0.01 ug/g dry	-	-	0.70	-
Phenanthrene	0.02 ug/g dry	-	-	11.4	-
Pyrene	0.02 ug/g dry	-	-	11.2	-
2-Fluorobiphenyl	Surrogate	-	-	107%	-
Terphenyl-d14	Surrogate	-	-	99.7%	-

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Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
F4G PHCs (gravimetric)	ND	50	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	1.0	ug/g						
Boron, available	ND	0.5	ug/g						
Boron	ND	1.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	1.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	1.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	1.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.5	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	1.0	ug/g						
Zinc	ND	1.0	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	1.31		ug/g		98.6	50-140			
Surrogate: Terphenyl-d14	1.43		ug/g		107	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						

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Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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)	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	8.00		ug/g		100	50-140			
Surrogate: Dibromofluoromethane	8.56		ug/g		107	50-140			
Surrogate: Toluene-d8	7.32		ug/g		91.5	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	7.32		ug/g		91.5	50-140			

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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	
Metals									
Antimony	ND	1.0	ug/g dry	ND				30	
Arsenic	ND	1.0	ug/g dry	ND				30	
Barium	98.8	1.0	ug/g dry	101			2.6	30	
Beryllium	ND	1.0	ug/g dry	ND			0.0	30	
Boron, available	ND	0.5	ug/g dry	0.61			0.0	35	
Boron	10.3	1.0	ug/g dry	11.5			10.6	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium (VI)	ND	0.2	ug/g dry	ND				35	
Chromium	28.3	1.0	ug/g dry	29.1			3.1	30	
Cobalt	8.04	1.0	ug/g dry	8.47			5.2	30	
Copper	19.9	1.0	ug/g dry	20.6			3.5	30	
Lead	70.4	1.0	ug/g dry	86.9			21.0	30	
Mercury	ND	0.1	ug/g dry	ND				30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	17.6	1.0	ug/g dry	17.8			1.2	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.5	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND				30	
Vanadium	31.5	1.0	ug/g dry	32.3			2.4	30	
Zinc	56.2	1.0	ug/g dry	58.0			3.1	30	
Physical Characteristics									
% Solids	85.4	0.1	% by Wt.	86.5			1.3	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND				40	
Anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND				40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND				40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND				40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND				40	
Chrysene	ND	0.02	ug/g dry	ND				40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	ND	0.02	ug/g dry	ND				40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND				40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
Naphthalene	ND	0.01	ug/g dry	ND				40	
Phenanthrene	ND	0.02	ug/g dry	ND				40	
Pyrene	ND	0.02	ug/g dry	ND				40	
Surrogate: 2-Fluorobiphenyl	1.38		ug/g dry		95.9	50-140			
Surrogate: Terphenyl-d14	1.34		ug/g dry		93.2	50-140			
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	
Chloroform	ND	0.05	ug/g dry	ND				50	
Dibromochloromethane	ND	0.05	ug/g dry	ND				50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND				50	

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Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	
Ethylene dibromide (dibromoethane)	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 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	
1,1,1,2,2-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	
1,1,1-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	
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	4.43		ug/g dry		96.9	50-140			
Surrogate: Dibromofluoromethane	5.58		ug/g dry		122	50-140			
Surrogate: Toluene-d8	4.43		ug/g dry		96.9	50-140			
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	4.43		ug/g dry		96.9	50-140			

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Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	208	7	ug/g		104	80-120			
F2 PHCs (C10-C16)	110	4	ug/g	ND	107	60-140			
F3 PHCs (C16-C34)	235	8	ug/g	ND	111	60-140			
F4 PHCs (C34-C50)	159	6	ug/g	ND	112	60-140			
F4G PHCs (gravimetric)	820	50	ug/g		82.0	80-120			
Metals									
Antimony	304		ug/L	ND	122	70-130			
Arsenic	265		ug/L		106	70-130			
Barium	2200		ug/L	2030	70.3	70-130			
Beryllium	279		ug/L	3.04	110	70-130			
Boron, available	5.03	0.5	ug/g	0.61	88.5	70-122			
Boron	488		ug/L	230	103	70-130			
Cadmium	276		ug/L	4.65	109	70-130			
Chromium (VI)	4.4	0.2	ug/g		88.0	70-130			
Chromium	807		ug/L	583	89.7	70-130			
Cobalt	400		ug/L	169	92.2	70-130			
Copper	644		ug/L	413	92.2	70-130			
Lead	1910		ug/L	1740	70.2	70-130			
Mercury	1.30	0.1	ug/g	ND	86.6	70-130			
Molybdenum	252		ug/L	10.3	96.7	70-130			
Nickel	559		ug/L	356	81.3	70-130			
Selenium	252		ug/L	16.3	94.2	70-130			
Silver	187		ug/L	5.45	72.4	70-130			
Thallium	228		ug/L	13.8	85.7	70-130			
Uranium	297		ug/L	ND	119	70-130			
Vanadium	866		ug/L	645	88.5	70-130			
Zinc	1300		ug/L	1160	54.7	70-130			QM-07
Semi-Volatiles									
Acenaphthene	0.119	0.02	ug/g	ND	66.0	50-140			
Acenaphthylene	0.109	0.02	ug/g	ND	60.5	50-140			
Anthracene	0.149	0.02	ug/g	ND	82.6	50-140			
Benzo [a] anthracene	0.117	0.02	ug/g	ND	64.7	50-140			
Benzo [a] pyrene	0.181	0.02	ug/g	ND	100	50-140			
Benzo [b] fluoranthene	0.175	0.02	ug/g	ND	97.2	50-140			
Benzo [g,h,i] perylene	0.206	0.02	ug/g	ND	114	50-140			
Benzo [k] fluoranthene	0.178	0.02	ug/g	ND	99.1	50-140			
Chrysene	0.152	0.02	ug/g	ND	84.2	50-140			
Dibenzo [a,h] anthracene	0.212	0.02	ug/g	ND	117	50-140			
Fluoranthene	0.148	0.02	ug/g	ND	82.0	50-140			
Fluorene	0.130	0.02	ug/g	ND	72.4	50-140			
Indeno [1,2,3-cd] pyrene	0.223	0.02	ug/g	ND	124	50-140			
1-Methylnaphthalene	0.165	0.02	ug/g	ND	91.9	50-140			
2-Methylnaphthalene	0.176	0.02	ug/g	ND	97.9	50-140			
Naphthalene	0.126	0.01	ug/g	ND	70.0	50-140			
Phenanthrene	0.142	0.02	ug/g	ND	78.8	50-140			
Pyrene	0.152	0.02	ug/g	ND	84.3	50-140			
Surrogate: 2-Fluorobiphenyl	1.67		ug/g		116	50-140			
Volatiles									
Acetone	7.94	0.50	ug/g		79.4	50-140			
Benzene	4.25	0.02	ug/g		106	60-130			
Bromodichloromethane	3.82	0.05	ug/g		95.6	60-130			

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Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromoform	3.87	0.05	ug/g		96.8	60-130			
Bromomethane	3.90	0.05	ug/g		97.5	50-140			
Carbon Tetrachloride	3.74	0.05	ug/g		93.5	60-130			
Chlorobenzene	3.58	0.05	ug/g		89.5	60-130			
Chloroform	3.99	0.05	ug/g		99.7	60-130			
Dibromochloromethane	3.61	0.05	ug/g		90.3	60-130			
Dichlorodifluoromethane	2.63	0.05	ug/g		65.7	50-140			
1,2-Dichlorobenzene	3.72	0.05	ug/g		93.1	60-130			
1,3-Dichlorobenzene	3.83	0.05	ug/g		95.8	60-130			
1,4-Dichlorobenzene	3.50	0.05	ug/g		87.5	60-130			
1,1-Dichloroethane	4.09	0.05	ug/g		102	60-130			
1,2-Dichloroethane	3.41	0.05	ug/g		85.2	60-130			
1,1-Dichloroethylene	4.02	0.05	ug/g		100	60-130			
cis-1,2-Dichloroethylene	3.93	0.05	ug/g		98.3	60-130			
trans-1,2-Dichloroethylene	4.34	0.05	ug/g		108	60-130			
1,2-Dichloropropane	3.72	0.05	ug/g		93.1	60-130			
cis-1,3-Dichloropropylene	3.48	0.05	ug/g		87.0	60-130			
trans-1,3-Dichloropropylene	3.28	0.05	ug/g		81.9	60-130			
Ethylbenzene	3.33	0.05	ug/g		83.4	60-130			
Ethylene dibromide (dibromoethane)	3.70	0.05	ug/g		92.6	60-130			
Hexane	3.00	0.05	ug/g		75.1	60-130			
Methyl Ethyl Ketone (2-Butanone)	7.92	0.50	ug/g		79.2	50-140			
Methyl Isobutyl Ketone	8.23	0.50	ug/g		82.3	50-140			
Methyl tert-butyl ether	10.2	0.05	ug/g		102	50-140			
Methylene Chloride	3.89	0.05	ug/g		97.3	60-130			
Styrene	3.41	0.05	ug/g		85.2	60-130			
1,1,1,2-Tetrachloroethane	3.62	0.05	ug/g		90.5	60-130			
1,1,2,2-Tetrachloroethane	3.37	0.05	ug/g		84.2	60-130			
Tetrachloroethylene	3.89	0.05	ug/g		97.3	60-130			
Toluene	3.44	0.05	ug/g		86.0	60-130			
1,1,1-Trichloroethane	3.81	0.05	ug/g		95.3	60-130			
1,1,2-Trichloroethane	3.82	0.05	ug/g		95.6	60-130			
Trichloroethylene	3.25	0.05	ug/g		81.2	60-130			
Trichlorofluoromethane	3.65	0.05	ug/g		91.2	50-140			
Vinyl chloride	4.44	0.02	ug/g		111	50-140			
m,p-Xylenes	7.12	0.05	ug/g		88.9	60-130			
o-Xylene	3.19	0.05	ug/g		79.8	60-130			
Benzene	4.25	0.02	ug/g		106	60-130			
Ethylbenzene	3.33	0.05	ug/g		83.4	60-130			
Toluene	3.44	0.05	ug/g		86.0	60-130			
m,p-Xylenes	7.12	0.05	ug/g		88.9	60-130			
o-Xylene	3.19	0.05	ug/g		79.8	60-130			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20920

Report Date: 04-Nov-2016

Order Date: 31-Oct-2016

Project Description: PE3896

Qualifier Notes:

Sample Qualifiers :

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

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

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.

Client Name: Paterson Group
Contact Name: Karyn Munch
Address: 154 Colonnade Rd. S.
Telephone: 613-226-7381

Project Reference: PE38916
Quote #: _____
PO #: 20920
Email Address: kmunch@patersongroup.ca

Turnaround Time:
 1 Day 3 Day
 2 Day Regular
Date Required: _____

Criteria: O. Reg. 153/04 (As Amended) 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: <u>1645106</u>		Matrix	Air Volume	# of Containers	Sample Taken		BTEX/PHK	VOC/PHC	Metals + Cu + Ni + Hg	VOCs	PAHs				
Sample ID/Location Name					Date	Time									
1	BH4-SS5	S		2	Oct. 28/16	am	✓								- 120ml + 1 vial +
2	BH10-SS3	S		2	"	pm		✓							
3	BH10-SS2	S		1	"	pm			✓		✓				- 120ml -
4	BH2-SS5/SS6	S		2	Oct. 27/16	pm				✓					- 120ml + 1 vial -
*5	BH1-SS6 hold piece	S		2	Oct. 27/16	pm	✓								✓
6															
7															
8															
9															
10															

Comments: _____ Method of Delivery: Paracel

Relinquished By (Sign): <u>KMunch</u>	Received by Driver/Depot: <u>[Signature]</u>	Received at Lab: <u>SUNEPORN DONMAI</u>	Verified By: <u>[Signature]</u>
Relinquished By (Print): <u>KMunch</u>	Date/Time: <u>31/10/16 4:45</u>	Date/Time: <u>Oct 31, 2016 05:44</u>	Date/Time: <u>NOV 11/16</u>
Date/Time: <u>Oct. 31, 2016</u>	Temperature: _____ °C <u>PH</u>	Temperature: <u>16.2 °C</u>	pH Verified [] By: <u>N/A</u>

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 20920
Project: PE3896
Custody: 28919

Report Date: 8-Nov-2016
Order Date: 2-Nov-2016

Order #: 1645241

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

Parcel ID	Client ID
1645241-01	BH1 - SS6

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: **Paterson Group Consulting Engineers**
Client PO: **20920**

Report Date: 08-Nov-2016
Order Date: 2-Nov-2016
Project Description: **PE3896**

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	4-Nov-16	6-Nov-16
PHC F1	CWS Tier 1 - P&T GC-FID	4-Nov-16	6-Nov-16
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	3-Nov-16	4-Nov-16
Solids, %	Gravimetric, calculation	3-Nov-16	3-Nov-16

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20920

Report Date: 08-Nov-2016

Order Date: 2-Nov-2016

Project Description: PE3896

Client ID:	BH1 - SS6	-	-	-
Sample Date:	27-Oct-16	-	-	-
Sample ID:	1645241-01	-	-	-
MDL/Units	Soil	-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	66.5	-	-	-
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Volatiles

Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	102%	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	-	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	-	-
F3 PHCs (C16-C34)	8 ug/g dry	72	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	160	-	-	-

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20920

Report Date: 08-Nov-2016
 Order Date: 2-Nov-2016
 Project Description: PE3896

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	8.16		ug/g		102	50-140			

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20920

Report Date: 08-Nov-2016
 Order Date: 2-Nov-2016
 Project Description: PE3896

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	
Physical Characteristics									
% Solids	83.2	0.1	% by Wt.	82.4			0.9	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	5.68		ug/g dry		103	50-140			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20920

Report Date: 08-Nov-2016
 Order Date: 2-Nov-2016
Project Description: PE3896

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	190	7	ug/g		94.9	80-120			
F2 PHCs (C10-C16)	185	4	ug/g	ND	137	60-140			
F3 PHCs (C16-C34)	433	8	ug/g	72	129	60-140			
F4 PHCs (C34-C50)	361	6	ug/g	160	107	60-140			
Volatiles									
Benzene	3.73	0.02	ug/g		93.2	60-130			
Ethylbenzene	3.39	0.05	ug/g		84.6	60-130			
Toluene	3.49	0.05	ug/g		87.3	60-130			
m,p-Xylenes	7.30	0.05	ug/g		91.2	60-130			
o-Xylene	3.25	0.05	ug/g		81.3	60-130			
Surrogate: Toluene-d8	7.80		ug/g		97.5	50-140			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20920

Report Date: 08-Nov-2016

Order Date: 2-Nov-2016

Project Description: PE3896

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.

Client Name: Peterson Group	Project Reference: PF38910	Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required:
Contact Name: Karyn Munch	Quote #: _____	
Address: 154 Colonnade Rd. S.	PO#: 20920	
Telephone: 613-226-7381	Email Address: kmunch@petersongroup.ca	

Criteria: O. Reg. 153/04 (As Amended) Table 3 RSC Filing O. Reg. 558/00 PWQO CCME SUB (Storm) SUB (Sanitary) Municipality Other

Matrix Types: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other)				Required Analyses							
Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		BTEX/PHC	VOC/PHC	Metals + Cu, Ni + Hg	VOCs	PAHs	[Redacted]
				Date	Time						
1 BH4-SS5	S		2	Oct. 28/16	am	✓					-120ml + 2 vial
2 BH10-SS3	S		2	"	pm		✓				
3 BH10-SS2	S		1	"	pm			✓	✓		-120ml-
4 BH2-SS5/SS6	S		2	Oct. 27/16	pm				✓		-120ml + 1 vial-
*5 BH1-SS6 hold please	S		2	Oct. 27/16	pm	✓					✓
<p>6 Revised: NOV 2/16</p> <p>7 → RUN SAMPLE for PHC/STEX on regular TAT.</p> <p>8 DB/DM</p>											
9											
10											

Comments: _____ Method of Delivery: **Parcel**

Relinquished By (Sign): KMunch	Received by Driver/Depot: [Signature]	Received at Lab: [Signature]	Verified By: [Signature]
Relinquished By (Print): KMunch	Date/Time: 3/10/16 4:45	Date/Time: OCT 31 2016 05:44	Date/Time: NOV 1/16
Date/Time: OCT 31 2016	Temperature: 11 °C	Temperature: 6.3 °C	pH Verified By: N/A

9:59c
8/2/1/16 11:49

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 20921
Project: PE3896
Custody: 28921

Report Date: 9-Nov-2016
Order Date: 3-Nov-2016

Order #: 1645395

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

Parcel ID	Client ID
1645395-01	BH5 - SS2
1645395-02	BH11 - SS2
1645395-03	BH12 - SS3
1645395-04	BH13 - SS3

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20921

Report Date: 09-Nov-2016
 Order Date: 3-Nov-2016
Project Description: PE3896

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	4-Nov-16	9-Nov-16
PHC F1	CWS Tier 1 - P&T GC-FID	4-Nov-16	9-Nov-16
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	7-Nov-16	7-Nov-16
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	4-Nov-16	5-Nov-16
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	7-Nov-16	8-Nov-16
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	4-Nov-16	9-Nov-16
Solids, %	Gravimetric, calculation	7-Nov-16	7-Nov-16

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20921

Report Date: 09-Nov-2016

Order Date: 3-Nov-2016

Project Description: PE3896

Client ID:	BH5 - SS2	BH11 - SS2	BH12 - SS3	BH13 - SS3
Sample Date:	31-Oct-16	31-Oct-16	31-Oct-16	01-Nov-16
Sample ID:	1645395-01	1645395-02	1645395-03	1645395-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	85.3	83.2	89.6	91.0
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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	-	-
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)	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	-	-

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20921

Report Date: 09-Nov-2016

Order Date: 3-Nov-2016

Project Description: PE3896

	Client ID: Sample Date: Sample ID:	BH5 - SS2 31-Oct-16 1645395-01 Soil	BH11 - SS2 31-Oct-16 1645395-02 Soil	BH12 - SS3 31-Oct-16 1645395-03 Soil	BH13 - SS3 01-Nov-16 1645395-04 Soil
	MDL/Units				
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	93.7%	95.9%	-	-
Dibromofluoromethane	Surrogate	113%	118%	-	-
Toluene-d8	Surrogate	102%	101%	-	-
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	-	-	103%	103%

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	525	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	721 [1]	<6	<6	<6
F4G PHCs (gravimetric)	50 ug/g dry	575	-	-	-

Semi-Volatiles

Acenaphthene	0.02 ug/g dry	<0.02	-	-	-
Acenaphthylene	0.02 ug/g dry	0.15	-	-	-
Anthracene	0.02 ug/g dry	0.10	-	-	-
Benzo [a] anthracene	0.02 ug/g dry	0.16	-	-	-
Benzo [a] pyrene	0.02 ug/g dry	0.24	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	0.26	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.21	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	0.12	-	-	-
Chrysene	0.02 ug/g dry	0.19	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	0.05	-	-	-
Fluoranthene	0.02 ug/g dry	0.25	-	-	-

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20921

Report Date: 09-Nov-2016

Order Date: 3-Nov-2016

Project Description: PE3896

	Client ID:	BH5 - SS2	BH11 - SS2	BH12 - SS3	BH13 - SS3
	Sample Date:	31-Oct-16	31-Oct-16	31-Oct-16	01-Nov-16
	Sample ID:	1645395-01	1645395-02	1645395-03	1645395-04
	MDL/Units	Soil	Soil	Soil	Soil
Fluorene	0.02 ug/g dry	<0.02	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.17	-	-	-
1-Methylnaphthalene	0.02 ug/g dry	0.06	-	-	-
2-Methylnaphthalene	0.02 ug/g dry	0.06	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	0.12	-	-	-
Naphthalene	0.01 ug/g dry	0.05	-	-	-
Phenanthrene	0.02 ug/g dry	0.07	-	-	-
Pyrene	0.02 ug/g dry	0.26	-	-	-
2-Fluorobiphenyl	Surrogate	93.6%	-	-	-
Terphenyl-d14	Surrogate	80.8%	-	-	-

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20921

Report Date: 09-Nov-2016

Order Date: 3-Nov-2016

Project Description: PE3896

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
F4G PHCs (gravimetric)	ND	50	ug/g						
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	1.24		ug/g		93.0	50-140			
Surrogate: Terphenyl-d14	1.23		ug/g		92.1	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						
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)	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						

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20921

Report Date: 09-Nov-2016

Order Date: 3-Nov-2016

Project Description: PE3896

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	7.95		ug/g		99.3	50-140			
Surrogate: Dibromofluoromethane	9.17		ug/g		115	50-140			
Surrogate: Toluene-d8	8.16		ug/g		102	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	8.16		ug/g		102	50-140			

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20921

Report Date: 09-Nov-2016
 Order Date: 3-Nov-2016
 Project Description: PE3896

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	
F4G PHCs (gravimetric)	ND	50	ug/g dry	ND				30	
Physical Characteristics									
% Solids	90.7	0.1	% by Wt.	90.6			0.2	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND				40	
Anthracene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND				40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND				40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND				40	
Chrysene	ND	0.02	ug/g dry	ND				40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	ND	0.02	ug/g dry	ND				40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND				40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
Naphthalene	ND	0.01	ug/g dry	ND				40	
Phenanthrene	ND	0.02	ug/g dry	ND			0.0	40	
Pyrene	ND	0.02	ug/g dry	ND				40	
Surrogate: 2-Fluorobiphenyl	2.57		ug/g dry		86.1	50-140			
Surrogate: Terphenyl-d14	2.44		ug/g dry		81.9	50-140			
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	
Chloroform	ND	0.05	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-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	
Ethylene dibromide (dibromoethane)	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 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	

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20921

Report Date: 09-Nov-2016
 Order Date: 3-Nov-2016
Project Description: PE3896

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	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	
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	6.06		ug/g dry		96.4	50-140			
Surrogate: Dibromofluoromethane	7.19		ug/g dry		114	50-140			
Surrogate: Toluene-d8	6.49		ug/g dry		103	50-140			
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	6.49		ug/g dry		103	50-140			

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20921

Report Date: 09-Nov-2016

Order Date: 3-Nov-2016

Project Description: PE3896

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	190	7	ug/g		94.9	80-120			
F2 PHCs (C10-C16)	102	4	ug/g	ND	95.8	60-140			
F3 PHCs (C16-C34)	244	8	ug/g	ND	111	60-140			
F4 PHCs (C34-C50)	167	6	ug/g	ND	114	60-140			
F4G PHCs (gravimetric)	820	50	ug/g		82.0	80-120			
Semi-Volatiles									
Acenaphthene	0.158	0.02	ug/g	ND	84.5	50-140			
Acenaphthylene	0.147	0.02	ug/g	ND	78.7	50-140			
Anthracene	0.170	0.02	ug/g	ND	91.0	50-140			
Benzo [a] anthracene	0.134	0.02	ug/g	ND	71.7	50-140			
Benzo [a] pyrene	0.175	0.02	ug/g	ND	93.8	50-140			
Benzo [b] fluoranthene	0.209	0.02	ug/g	ND	112	50-140			
Benzo [g,h,i] perylene	0.181	0.02	ug/g	ND	97.2	50-140			
Benzo [k] fluoranthene	0.217	0.02	ug/g	ND	116	50-140			
Chrysene	0.173	0.02	ug/g	ND	92.8	50-140			
Dibenzo [a,h] anthracene	0.182	0.02	ug/g	ND	97.7	50-140			
Fluoranthene	0.168	0.02	ug/g	ND	89.9	50-140			
Fluorene	0.156	0.02	ug/g	ND	83.8	50-140			
Indeno [1,2,3-cd] pyrene	0.193	0.02	ug/g	ND	104	50-140			
1-Methylnaphthalene	0.211	0.02	ug/g	ND	113	50-140			
2-Methylnaphthalene	0.216	0.02	ug/g	ND	116	50-140			
Naphthalene	0.172	0.01	ug/g	ND	92.4	50-140			
Phenanthrene	0.161	0.02	ug/g	ND	86.3	50-140			
Pyrene	0.173	0.02	ug/g	ND	93.0	50-140			
Surrogate: 2-Fluorobiphenyl	1.01		ug/g		68.0	50-140			
Volatiles									
Acetone	6.71	0.50	ug/g		67.1	50-140			
Benzene	3.73	0.02	ug/g		93.2	60-130			
Bromodichloromethane	3.51	0.05	ug/g		87.7	60-130			
Bromoform	3.94	0.05	ug/g		98.5	60-130			
Bromomethane	3.15	0.05	ug/g		78.8	50-140			
Carbon Tetrachloride	3.18	0.05	ug/g		79.6	60-130			
Chlorobenzene	3.63	0.05	ug/g		90.7	60-130			
Chloroform	3.48	0.05	ug/g		87.1	60-130			
Dibromochloromethane	3.71	0.05	ug/g		92.7	60-130			
Dichlorodifluoromethane	2.21	0.05	ug/g		55.1	50-140			
1,2-Dichlorobenzene	3.99	0.05	ug/g		99.6	60-130			
1,3-Dichlorobenzene	4.09	0.05	ug/g		102	60-130			
1,4-Dichlorobenzene	3.90	0.05	ug/g		97.6	60-130			
1,1-Dichloroethane	3.12	0.05	ug/g		78.0	60-130			
1,2-Dichloroethane	3.25	0.05	ug/g		81.4	60-130			
1,1-Dichloroethylene	3.32	0.05	ug/g		82.9	60-130			
cis-1,2-Dichloroethylene	3.44	0.05	ug/g		85.9	60-130			
trans-1,2-Dichloroethylene	3.45	0.05	ug/g		86.3	60-130			
1,2-Dichloropropane	3.38	0.05	ug/g		84.6	60-130			
cis-1,3-Dichloropropylene	2.82	0.05	ug/g		70.4	60-130			
trans-1,3-Dichloropropylene	2.64	0.05	ug/g		66.1	60-130			
Ethylbenzene	3.39	0.05	ug/g		84.6	60-130			
Ethylene dibromide (dibromoethane)	3.74	0.05	ug/g		93.6	60-130			
Hexane	2.46	0.05	ug/g		61.4	60-130			
Methyl Ethyl Ketone (2-Butanone)	6.49	0.50	ug/g		64.9	50-140			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20921

Report Date: 09-Nov-2016

Order Date: 3-Nov-2016

Project Description: PE3896

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl Isobutyl Ketone	6.71	0.50	ug/g		67.1	50-140			
Methyl tert-butyl ether	8.37	0.05	ug/g		83.7	50-140			
Methylene Chloride	3.23	0.05	ug/g		80.7	60-130			
Styrene	3.43	0.05	ug/g		85.8	60-130			
1,1,1,2-Tetrachloroethane	3.69	0.05	ug/g		92.3	60-130			
1,1,2,2-Tetrachloroethane	3.65	0.05	ug/g		91.2	60-130			
Tetrachloroethylene	3.92	0.05	ug/g		97.9	60-130			
Toluene	3.49	0.05	ug/g		87.3	60-130			
1,1,1-Trichloroethane	3.25	0.05	ug/g		81.2	60-130			
1,1,2-Trichloroethane	3.21	0.05	ug/g		80.3	60-130			
Trichloroethylene	2.98	0.05	ug/g		74.5	60-130			
Trichlorofluoromethane	3.04	0.05	ug/g		76.0	50-140			
Vinyl chloride	3.82	0.02	ug/g		95.4	50-140			
m,p-Xylenes	7.30	0.05	ug/g		91.2	60-130			
o-Xylene	3.25	0.05	ug/g		81.3	60-130			
Benzene	3.73	0.02	ug/g		93.2	60-130			
Ethylbenzene	3.39	0.05	ug/g		84.6	60-130			
Toluene	3.49	0.05	ug/g		87.3	60-130			
m,p-Xylenes	7.30	0.05	ug/g		91.2	60-130			
o-Xylene	3.25	0.05	ug/g		81.3	60-130			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20921

Report Date: 09-Nov-2016

Order Date: 3-Nov-2016

Project Description: PE3896

Qualifier Notes:

Sample Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

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.

Client Name: Paterson Group	Project Reference: PF3896	Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____
Contact Name: Kayn Munch	Quote #	
Address: 154 Colonnade Rd S.	PO # 20921	
Telephone: 613-226-7381	Email Address: kmunch@patersongroup.ca	

Criteria: O. Reg. 153/04 (As Amended) 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)

Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		BTEX/PHCS	VOCs/PHCS	Metals*	Required Analyses												
				Date	Time																
1 BHS-SS2			2	Oct. 31/16	am		✓	✓													
2 BH11-SS2			2	Oct. 31/16	am		✓														
3 BH12-SS3			2	Oct. 31/16	pm	✓															
4 BH13-SS3			2	Nov. 1/16	am	✓															
5																					
6																					
7																					
8																					
9																					
10																					

Comments: *** please hold off on the metal analysis for now - will call Monday once I receive results fr. earlier submission.**

Relinquished By (Sign): KMunch	Received by Driver/Depot: A. DLOUVE	Received at Lab: SUNEPORN DEN MATI	Method of Delivery: Paracel
Relinquished By (Print): Kayn Munch	Date/Time: 03/11/16 3:00 PM	Date/Time: NOV 03 2016 04:55	Verified By: J
Date/Time: Nov. 3, 2016	Temperature: °C	Temperature: 15.6 °C	Date/Time: 3/4/16 17:13
			pH Verified [] By: -

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 21258
Project: PE3896
Custody: 109806

Report Date: 11-Nov-2016
Order Date: 8-Nov-2016

Order #: 1646161

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

Parcel ID	Client ID
1646161-01	BH1 - GW1
1646161-02	BH2 - GW1
1646161-03	BH4 - GW1
1646161-04	BH11 - GW1
1646161-05	BH12 - GW1

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 21258

Report Date: 11-Nov-2016
Order Date: 8-Nov-2016
Project Description: PE3896

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	10-Nov-16	10-Nov-16
PHC F1	CWS Tier 1 - P&T GC-FID	9-Nov-16	10-Nov-16
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	9-Nov-16	10-Nov-16
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	9-Nov-16	10-Nov-16
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	9-Nov-16	10-Nov-16

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 21258

Report Date: 11-Nov-2016

Order Date: 8-Nov-2016

Project Description: PE3896

Client ID:	BH1 - GW1	BH2 - GW1	BH4 - GW1	BH11 - GW1
Sample Date:	07-Nov-16	07-Nov-16	07-Nov-16	07-Nov-16
Sample ID:	1646161-01	1646161-02	1646161-03	1646161-04
MDL/Units	Water	Water	Water	Water

Volatiles

	MDL/Units	BH1 - GW1	BH2 - GW1	BH4 - GW1	BH11 - GW1
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide (dibromoethane)	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

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Project Description: PE3896

	Client ID: Sample Date: Sample ID:	BH1 - GW1 07-Nov-16 1646161-01 Water	BH2 - GW1 07-Nov-16 1646161-02 Water	BH4 - GW1 07-Nov-16 1646161-03 Water	BH11 - GW1 07-Nov-16 1646161-04 Water
	MDL/Units				
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	111%	100%	110%	110%
Dibromofluoromethane	Surrogate	83.7%	95.4%	89.1%	94.2%
Toluene-d8	Surrogate	115%	102%	109%	109%

Hydrocarbons

F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100
F1 + F2 PHCs	125 ug/L	<125	<125	<125	<125
F3 + F4 PHCs	200 ug/L	<200	<200	<200	<200

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	-
Chrysene	0.05 ug/L	-	-	<0.05	-
Dibenzo [a,h] anthracene	0.05 ug/L	-	-	<0.05	-
Fluoranthene	0.01 ug/L	-	-	<0.01	-
Fluorene	0.05 ug/L	-	-	<0.05	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	-	-	<0.05	-
1-Methylnaphthalene	0.05 ug/L	-	-	<0.05	-
2-Methylnaphthalene	0.05 ug/L	-	-	<0.05	-
Methylnaphthalene (1&2)	0.10 ug/L	-	-	<0.10	-
Naphthalene	0.05 ug/L	-	-	<0.05	-
Phenanthrene	0.05 ug/L	-	-	<0.05	-
Pyrene	0.01 ug/L	-	-	<0.01	-

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	Client ID:	BH1 - GW1	BH2 - GW1	BH4 - GW1	BH11 - GW1
	Sample Date:	07-Nov-16	07-Nov-16	07-Nov-16	07-Nov-16
	Sample ID:	1646161-01	1646161-02	1646161-03	1646161-04
	MDL/Units	Water	Water	Water	Water
2-Fluorobiphenyl	Surrogate	-	-	88.1%	-
Terphenyl-d14	Surrogate	-	-	88.2%	-
	Client ID:	BH12 - GW1	-	-	-
	Sample Date:	07-Nov-16	-	-	-
	Sample ID:	1646161-05	-	-	-
	MDL/Units	Water	-	-	-

Volatiles

Benzene	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
Toluene-d8	Surrogate	111%	-	-	-

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	-	-	-

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Project Description: PE3896

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						
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	16.6		ug/L		83.2	50-140			
Surrogate: Terphenyl-d14	17.0		ug/L		85.2	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						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane,	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
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						

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Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	82.9		ug/L		104	50-140			
Surrogate: Dibromofluoromethane	81.2		ug/L		101	50-140			
Surrogate: Toluene-d8	80.6		ug/L		101	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	80.6		ug/L		101	50-140			

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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	
Chloroform	ND	0.5	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Ethylene dibromide (dibromoethane)	ND	0.2	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				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	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	92.8		ug/L		116	50-140			
Surrogate: Dibromofluoromethane	77.2		ug/L		96.4	50-140			
Surrogate: Toluene-d8	82.3		ug/L		103	50-140			
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	82.3		ug/L		103	50-140			

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 Project Description: PE3896

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2040	25	ug/L		102	68-117			
F2 PHCs (C10-C16)	1640	100	ug/L		91.0	60-140			
F3 PHCs (C16-C34)	3500	100	ug/L		94.2	60-140			
F4 PHCs (C34-C50)	2210	100	ug/L		89.3	60-140			
Semi-Volatiles									
Acenaphthene	3.89	0.05	ug/L		77.7	50-140			
Acenaphthylene	3.71	0.05	ug/L		74.2	50-140			
Anthracene	4.41	0.01	ug/L		88.2	50-140			
Benzo [a] anthracene	3.59	0.01	ug/L		71.9	50-140			
Benzo [a] pyrene	4.69	0.01	ug/L		93.9	50-140			
Benzo [b] fluoranthene	4.89	0.05	ug/L		97.8	50-140			
Benzo [g,h,i] perylene	5.66	0.05	ug/L		113	50-140			
Benzo [k] fluoranthene	5.12	0.05	ug/L		102	50-140			
Chrysene	4.37	0.05	ug/L		87.4	50-140			
Dibenzo [a,h] anthracene	5.60	0.05	ug/L		112	50-140			
Fluoranthene	4.40	0.01	ug/L		88.1	50-140			
Fluorene	4.04	0.05	ug/L		80.9	50-140			
Indeno [1,2,3-cd] pyrene	5.91	0.05	ug/L		118	50-140			
1-Methylnaphthalene	5.45	0.05	ug/L		109	50-140			
2-Methylnaphthalene	5.18	0.05	ug/L		104	50-140			
Naphthalene	4.56	0.05	ug/L		91.2	50-140			
Phenanthrene	4.26	0.05	ug/L		85.2	50-140			
Pyrene	4.52	0.01	ug/L		90.4	50-140			
Surrogate: 2-Fluorobiphenyl	20.0		ug/L		100	50-140			
Volatiles									
Acetone	91.0	5.0	ug/L		91.0	50-140			
Benzene	44.0	0.5	ug/L		110	60-130			
Bromodichloromethane	48.4	0.5	ug/L		121	60-130			
Bromoform	46.9	0.5	ug/L		117	60-130			
Bromomethane	48.3	0.5	ug/L		121	50-140			
Carbon Tetrachloride	47.8	0.2	ug/L		120	60-130			
Chlorobenzene	39.5	0.5	ug/L		98.8	60-130			
Chloroform	44.4	0.5	ug/L		111	60-130			
Dibromochloromethane	45.4	0.5	ug/L		114	60-130			
Dichlorodifluoromethane	44.3	1.0	ug/L		111	50-140			
1,2-Dichlorobenzene	51.8	0.5	ug/L		130	60-130			
1,3-Dichlorobenzene	50.3	0.5	ug/L		126	60-130			
1,4-Dichlorobenzene	49.3	0.5	ug/L		123	60-130			
1,1-Dichloroethane	42.9	0.5	ug/L		107	60-130			
1,2-Dichloroethane	44.3	0.5	ug/L		111	60-130			
1,1-Dichloroethylene	43.0	0.5	ug/L		108	60-130			
cis-1,2-Dichloroethylene	44.6	0.5	ug/L		112	60-130			
trans-1,2-Dichloroethylene	44.2	0.5	ug/L		110	60-130			
1,2-Dichloropropane	43.7	0.5	ug/L		109	60-130			
cis-1,3-Dichloropropylene	46.9	0.5	ug/L		117	60-130			
trans-1,3-Dichloropropylene	46.7	0.5	ug/L		117	60-130			
Ethylbenzene	42.1	0.5	ug/L		105	60-130			
Ethylene dibromide (dibromoethane)	40.3	0.2	ug/L		101	60-130			
Hexane	38.7	1.0	ug/L		96.6	60-130			
Methyl Ethyl Ketone (2-Butanone)	103	5.0	ug/L		103	50-140			
Methyl Isobutyl Ketone	116	5.0	ug/L		116	50-140			

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Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl tert-butyl ether	109	2.0	ug/L		109	50-140			
Methylene Chloride	40.2	5.0	ug/L		101	60-130			
Styrene	36.8	0.5	ug/L		91.9	60-130			
1,1,1,2-Tetrachloroethane	43.8	0.5	ug/L		110	60-130			
1,1,2,2-Tetrachloroethane	38.6	0.5	ug/L		96.4	60-130			
Tetrachloroethylene	39.1	0.5	ug/L		97.6	60-130			
Toluene	40.3	0.5	ug/L		101	60-130			
1,1,1-Trichloroethane	45.9	0.5	ug/L		115	60-130			
1,1,2-Trichloroethane	45.0	0.5	ug/L		112	60-130			
Trichloroethylene	45.9	0.5	ug/L		115	60-130			
Trichlorofluoromethane	44.9	1.0	ug/L		112	60-130			
Vinyl chloride	44.4	0.5	ug/L		111	50-140			
m,p-Xylenes	82.4	0.5	ug/L		103	60-130			
o-Xylene	40.8	0.5	ug/L		102	60-130			
Benzene	44.0	0.5	ug/L		110	60-130			
Ethylbenzene	42.1	0.5	ug/L		105	60-130			
Toluene	40.3	0.5	ug/L		101	60-130			
m,p-Xylenes	82.4	0.5	ug/L		103	60-130			
o-Xylene	40.8	0.5	ug/L		102	60-130			

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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.

Client Name: Paterson Group	Project Reference: PE3896	Turnaround Time: <input type="checkbox"/> 1 Day <input checked="" type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Regular Date Required: Fri Nov. 11/16
Contact Name: Karyn Munch.	Quote #	
Address: 154 Colonnade Rd. 5 Ottawa, ON	PO # 21258	
Telephone: 613-226-7381	Email Address: kmunch@patersongroup	

Criteria: O. Reg. 153/04 (As Amended) Table 2 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**

Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP				PHCs	
				Date	Time				Hg	CrVI	B (HWS)			
1 BH1 - GW	GW		4	Nov 7/16	2:30	✓	✓					✓	3 containers submitted ✓	
2 BH2 - GW *			3		3:00		✓					✓		
3 BH4 - GW			5		3:30		✓	✓				✓	4 containers submitted ✓	
4 BH11 - GW			3		4:00		✓					✓		
5 BH12 - GW			3		4:30	✓								
6 DUPLICATE			3				✓					✓		
7														
8														
9														
10														

Comments: *** BH2 - limited glw available - can you please let me know if you can run analysis.** Method of Delivery: **Paracel**

Relinquished By (Sign): KMunch	Received by Driver/Depot: A. J. [Signature]	Received at Lab: STINEPORN DOKMAI	Verified By: [Signature]
Relinquished By (Print): KMunch	Date/Time: 08/11/16 1:30	Date/Time: Nov 04, 2016 04:48	Date/Time: 8/11/16 17:05
Date/Time: Nov. 9/16.	Temperature: 7.3°C	Temperature: 17.3°C	pH Verified [] By: _____

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 20922
Project: PE3896
Custody: 110207

Report Date: 16-Nov-2016
Order Date: 11-Nov-2016

Order #: 1646446

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

Parcel ID	Client ID
1646446-01	BH10-SS5
1646446-02	BH5-SS3

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20922

Report Date: 16-Nov-2016
Order Date: 11-Nov-2016
Project Description: PE3896

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	14-Nov-16	14-Nov-16
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	11-Nov-16	14-Nov-16
Solids, %	Gravimetric, calculation	15-Nov-16	15-Nov-16

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20922

Report Date: 16-Nov-2016

Order Date: 11-Nov-2016

Project Description: PE3896

Client ID:	BH10-SS5	BH5-SS3	-	-
Sample Date:	28-Oct-16	31-Oct-16	-	-
Sample ID:	1646446-01	1646446-02	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	59.5	64.6	-	-
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Hydrocarbons

F2 PHCs (C10-C16)	4 ug/g dry	<4 [1]	<4 [1]	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8 [1]	38 [1]	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6 [1]	42 [1]	-	-

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	64.8%	-	-	-
Terphenyl-d14	Surrogate	63.9%	-	-	-

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20922

Report Date: 16-Nov-2016
 Order Date: 11-Nov-2016
 Project Description: PE3896

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	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	1.08		ug/g		81.0	50-140			
Surrogate: Terphenyl-d14	0.983		ug/g		73.7	50-140			

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20922

Report Date: 16-Nov-2016
 Order Date: 11-Nov-2016
 Project Description: PE3896

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Physical Characteristics									
% Solids	91.9	0.1	% by Wt.	90.5			1.6	25	
Semi-Volatiles									
Acenaphthene	0.022	0.02	ug/g dry	ND			0.0	40	
Acenaphthylene	0.430	0.02	ug/g dry	0.366			16.2	40	
Anthracene	0.320	0.02	ug/g dry	0.278			14.3	40	
Benzo [a] anthracene	0.616	0.02	ug/g dry	0.546			12.0	40	
Benzo [a] pyrene	0.893	0.02	ug/g dry	0.777			13.9	40	
Benzo [b] fluoranthene	0.936	0.02	ug/g dry	0.848			9.9	40	
Benzo [g,h,i] perylene	0.704	0.02	ug/g dry	0.631			10.9	40	
Benzo [k] fluoranthene	0.498	0.02	ug/g dry	0.448			10.6	40	
Chrysene	0.620	0.02	ug/g dry	0.558			10.4	40	
Dibenzo [a,h] anthracene	0.186	0.02	ug/g dry	0.160			14.8	40	
Fluoranthene	1.04	0.02	ug/g dry	0.910			13.1	40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	0.646	0.02	ug/g dry	0.566			13.1	40	
1-Methylnaphthalene	0.152	0.02	ug/g dry	0.148			2.6	40	
2-Methylnaphthalene	0.211	0.02	ug/g dry	0.189			11.2	40	
Naphthalene	0.131	0.01	ug/g dry	0.119			10.0	40	
Phenanthrene	0.293	0.02	ug/g dry	0.267			9.4	40	
Pyrene	0.942	0.02	ug/g dry	0.822			13.6	40	
Surrogate: 2-Fluorobiphenyl	1.37		ug/g dry		80.1	50-140			
Surrogate: Terphenyl-d14	0.951		ug/g dry		55.5	50-140			

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20922

Report Date: 16-Nov-2016
 Order Date: 11-Nov-2016
 Project Description: PE3896

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F2 PHCs (C10-C16)	90	4	ug/g	24	66.5	60-140			
F3 PHCs (C16-C34)	269	8	ug/g	132	66.9	60-140			
F4 PHCs (C34-C50)	175	6	ug/g	55	88.0	60-140			
Semi-Volatiles									
Acenaphthene	0.172	0.02	ug/g	ND	80.4	50-140			
Acenaphthylene	0.626	0.02	ug/g	0.366	122	50-140			
Anthracene	0.512	0.02	ug/g	0.278	109	50-140			
Benzo [a] anthracene	0.798	0.02	ug/g	0.546	118	50-140			
Benzo [a] pyrene	1.05	0.02	ug/g	0.777	130	50-140			
Benzo [b] fluoranthene	1.21	0.02	ug/g	0.848	170	50-140			QM-06
Benzo [g,h,i] perylene	0.880	0.02	ug/g	0.631	116	50-140			
Benzo [k] fluoranthene	0.742	0.02	ug/g	0.448	137	50-140			
Chrysene	0.867	0.02	ug/g	0.558	144	50-140			QM-06
Dibenzo [a,h] anthracene	0.347	0.02	ug/g	0.160	87.5	50-140			
Fluoranthene	1.21	0.02	ug/g	0.910	138	50-140			
Fluorene	0.176	0.02	ug/g	ND	82.0	50-140			
Indeno [1,2,3-cd] pyrene	0.833	0.02	ug/g	0.566	125	50-140			
1-Methylnaphthalene	0.350	0.02	ug/g	0.148	94.5	50-140			
2-Methylnaphthalene	0.405	0.02	ug/g	0.189	101	50-140			
Naphthalene	0.322	0.01	ug/g	0.119	94.8	50-140			
Phenanthrene	0.460	0.02	ug/g	0.267	90.3	50-140			
Pyrene	1.12	0.02	ug/g	0.822	139	50-140			
Surrogate: 2-Fluorobiphenyl	1.38		ug/g		80.6	50-140			

Certificate of Analysis
Client: **Paterson Group Consulting Engineers**
Client PO: **20922**

Report Date: 16-Nov-2016
Order Date: 11-Nov-2016
Project Description: **PE3896**

Qualifier Notes:

Login Qualifiers :

Sample - One or more parameter received past hold time - Proceed with expired analysis of F2-F4
Applies to samples: BH10-SS5

Sample Qualifiers :

1 : This analysis was conducted after the accepted holding time had been exceeded.

QC Qualifiers :

QM-06 : Due to noted non-homogeneity of the QC sample matrix, the spike recoveries were out side the accepted range. Batch data accepted based on other QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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.

Client Name: <i>Waterloo Group</i>	Project Reference: <i>PE3896</i>	Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____
Contact Name: <i>Kayn Munch</i>	Quote #	
Address: <i>157 Colonnade Rd.</i>	PO# <i>20922</i>	
Telephone: <i>(613-226-7381)</i>	Email Address: <i>Kmunch---</i>	

Criteria: O. Reg. 153/04 (As Amended) 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: <i>1646446</i>		Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	<i>F2-F4</i>					
Sample ID/Location Name					Date	Time													
1	<i>BH10-SSS</i>	<i>S</i>		<i>1</i>	<i>Oct. 3/16</i>	<i>am</i>			<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>					
2	<i>BH5-SS3</i>	<i>S</i>		<i>1</i>	<i>Oct. 28/16</i>	<i>pm</i>								<input checked="" type="checkbox"/>					<i>120ml</i>
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments: *Proceed regardless of exceedance in hold time for sample #1.* Method of Delivery: *Paracel*

Relinquished By (Sign): <i>K Munch</i>	Received by Driver/Depot: <i>J. DEANE</i>	Received at Lab: <i>UNEPORN DOKMAN</i>	Verified By: <i>S</i>
Relinquished By (Print): <i>Kayn Munch</i>	Date/Time: <i>11/11/16 2:05</i>	Date/Time: <i>NOV 11, 2016 04:00</i>	Date/Time: <i>11/11/16 17:45</i>
Date/Time: <i>NOV. 11/16 2:05</i>	Temperature: _____ °C	Temperature: <i>18.1</i> °C	pH Verified [By: _____]

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 20927
Project: PE3896
Custody: 110220

Report Date: 5-Dec-2016
Order Date: 30-Nov-2016

Order #: 1649275

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

Parcel ID	Client ID
1649275-01	BH9-AU1
1649275-02	BH7-AU1

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20927

Report Date: 05-Dec-2016
Order Date: 30-Nov-2016
Project Description: PE3896

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Boron, available	MOE (HWE), EPA 200.7 - ICP-OES	2-Dec-16	2-Dec-16
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	30-Nov-16	2-Dec-16
Mercury by CVAA	EPA 7471B - CVAA, digestion	2-Dec-16	2-Dec-16
REG 153: Metals by ICP/OES, soil	based on MOE E3470, ICP-OES	2-Dec-16	2-Dec-16
Solids, %	Gravimetric, calculation	5-Dec-16	5-Dec-16

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 20927

Report Date: 05-Dec-2016

Order Date: 30-Nov-2016

Project Description: PE3896

Client ID:	BH9-AU1	BH7-AU1	-	-
Sample Date:	26-Oct-16	26-Oct-16	-	-
Sample ID:	1649275-01	1649275-02	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	95.6	97.6	-	-
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Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	<1.0	<1.0	-	-
Barium	1.0 ug/g dry	96.3	132	-	-
Beryllium	1.0 ug/g dry	<1.0	<1.0	-	-
Boron	1.0 ug/g dry	14.2	17.9	-	-
Boron, available	0.5 ug/g dry	<0.5	<0.5	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	1.0 ug/g dry	14.0	10.5	-	-
Chromium (VI)	0.2 ug/g dry	<0.2 [1]	<0.2 [1]	-	-
Cobalt	1.0 ug/g dry	5.4	5.1	-	-
Copper	1.0 ug/g dry	13.9	35.8	-	-
Lead	1.0 ug/g dry	10.6	18.6	-	-
Mercury	0.1 ug/g dry	<0.1 [1]	<0.1 [1]	-	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	-	-
Nickel	1.0 ug/g dry	12.0	10.9	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.5 ug/g dry	<0.5	<0.5	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	1.0 ug/g dry	19.8	12.0	-	-
Zinc	1.0 ug/g dry	16.7	10.7	-	-

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20927

Report Date: 05-Dec-2016
 Order Date: 30-Nov-2016
Project Description: PE3896

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	1.0	ug/g						
Boron, available	ND	0.5	ug/g						
Boron	ND	1.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	1.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	1.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	1.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.5	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20927

Report Date: 05-Dec-2016
 Order Date: 30-Nov-2016
Project Description: PE3896

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1.0	ug/g dry	ND				30	
Arsenic	7.21	1.0	ug/g dry	8.84			20.3	30	
Barium	61.4	1.0	ug/g dry	64.8			5.5	30	
Beryllium	ND	1.0	ug/g dry	ND			0.0	30	
Boron, available	ND	0.5	ug/g dry	ND			0.0	35	
Boron	13.1	1.0	ug/g dry	16.6			23.0	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium (VI)	ND	0.2	ug/g dry	ND				35	
Chromium	22.5	1.0	ug/g dry	24.0			6.3	30	
Cobalt	13.9	1.0	ug/g dry	13.8			0.6	30	
Copper	46.6	1.0	ug/g dry	47.3			1.5	30	
Lead	13.5	1.0	ug/g dry	12.2			9.8	30	
Mercury	ND	0.1	ug/g dry	ND			0.0	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	26.8	1.0	ug/g dry	27.7			3.3	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.5	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND				30	
Uranium	ND	1.0	ug/g dry	ND				30	
Vanadium	29.2	1.0	ug/g dry	32.0			9.1	30	
Zinc	64.3	1.0	ug/g dry	67.2			4.5	30	
Physical Characteristics									
% Solids	85.0	0.1	% by Wt.	84.5			0.5	25	

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20927

Report Date: 05-Dec-2016

Order Date: 30-Nov-2016

Project Description: PE3896

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	296		ug/L	ND	118	70-130			
Arsenic	415		ug/L	177	95.1	70-130			
Barium	1480		ug/L	1300	74.3	70-130			
Beryllium	255		ug/L	5.55	99.8	70-130			
Boron, available	4.42	0.5	ug/g	ND	88.5	70-122			
Boron	576		ug/L	331	98.0	70-130			
Cadmium	259		ug/L	2.26	103	70-130			
Chromium (VI)	4.6	0.2	ug/g		91.5	70-130			
Chromium	688		ug/L	480	82.9	70-130			
Cobalt	491		ug/L	276	85.8	70-130			
Copper	1180		ug/L	947	91.5	70-130			
Lead	451		ug/L	244	82.8	70-130			
Mercury	1.42	0.1	ug/g	ND	94.5	70-130			
Molybdenum	233		ug/L	8.35	89.7	70-130			
Nickel	730		ug/L	554	70.4	70-130			
Selenium	238		ug/L	2.47	94.2	70-130			
Silver	258		ug/L	8.09	99.9	70-130			
Thallium	253		ug/L	ND	101	70-130			
Uranium	271		ug/L	ND	109	70-130			
Vanadium	846		ug/L	640	82.5	70-130			
Zinc	1520		ug/L	1340	70.8	70-130			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 20927

Report Date: 05-Dec-2016
Order Date: 30-Nov-2016
Project Description: PE3896

Qualifier Notes:

Login Qualifiers :

Container(s) - Bottle and COC sample ID don't match -

Applies to samples: BH9-AU1, BH7-AU1

Sample - One or more parameter received past hold time -

Applies to samples: BH9-AU1, BH7-AU1

Sample Qualifiers :

1 : Holding time had been exceeded upon receipt of the sample at the laboratory.

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.

Client Name: <i>Paterson Group</i>	Project Reference: <i>PE3896</i>	Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____
Contact Name: <i>Kevyn Munch</i>	Quote #	
Address: <i>154 Colonnade Rd S.</i>	PO # <i>20927</i>	
Telephone: <i>613-226-7381 (601-4014 cell)</i>	Email Address: <i>kmunch@patersengroup.ca</i>	

Criteria: O. Reg. 153/04 (As Amended) 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: <i>1649275</i>		Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP			B (HWS)					
Sample ID/Location Name	Date				Time	Hg				Cr-VI								
1	<i>B9-AU1</i>	<i>S</i>			<i>Oct. 26/16</i>	<i>pm</i>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
2	<i>B6-AU1</i>	<i>S</i>			<i>"</i>	<i>am</i>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						<i>120 ml -</i>
3																		
4																		
5																		
6					<i>* Enter #1 as BH9-AU1</i>													
7					<i>* Enter #2 as BH7-AU1</i>													
8																		
9																		
10																		

Comments: *Sample read = BH9-AU1 -> Proceed regardless of exceedance in* Method of Delivery: *Paracel*
= Sample read = BH7-AU1. hold time for Hg+Cr6

Relinquished By (Sign): <i>KMunch</i>	Received by Driver/Depot: <i>A. Jean</i>	Received at Lab: <i>SUNBORN DOKMAI</i>	Verified By: <i>Rachel Subject</i>
Relinquished By (Print): <i>Kevyn Munch</i>	Date/Time: <i>30/11/16 4:10 PM</i>	Date/Time: <i>NOV 30, 2016 05:15</i>	Date/Time: <i>2016 Dec 1/16</i>
Date/Time: <i>NOV. 30, 2016 2:00 PM</i>	Temperature: _____ °C	Temperature: <i>11.2</i> °C	pH Verified <input checked="" type="checkbox"/> By: <i>N/A</i> <i>11:46</i>

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 22248
Project: PE3896
Custody: 37413

Report Date: 30-Aug-2017
Order Date: 24-Aug-2017

Order #: 1734423

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

Parcel ID	Client ID
1734423-01	BH5-17-GW1
1734423-02	DUP 1

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 22248

Report Date: 30-Aug-2017
Order Date: 24-Aug-2017
Project Description: PE3896

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	30-Aug-17	30-Aug-17
PHC F1	CWS Tier 1 - P&T GC-FID	29-Aug-17	30-Aug-17
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	28-Aug-17	29-Aug-17
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	28-Aug-17	28-Aug-17

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 22248

Report Date: 30-Aug-2017
 Order Date: 24-Aug-2017
 Project Description: PE3896

Client ID:	BH5-17-GW1	DUP 1	-	-
Sample Date:	24-Aug-17	24-Aug-17	-	-
Sample ID:	1734423-01	1734423-02	-	-
MDL/Units	Water	Water	-	-

Volatiles

Benzene	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
Toluene-d8	Surrogate	96.8%	-	-	-

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	-	-	-

Semi-Volatiles

Acenaphthene	0.05 ug/L	<0.05	<0.05	-	-
Acenaphthylene	0.05 ug/L	<0.05	<0.05	-	-
Anthracene	0.01 ug/L	<0.01	<0.01	-	-
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	-	-
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	-	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	-	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	-	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	-	-
Chrysene	0.05 ug/L	<0.05	<0.05	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	-	-
Fluoranthene	0.01 ug/L	<0.01	<0.01	-	-
Fluorene	0.05 ug/L	<0.05	<0.05	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	-	-
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	-	-
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	-	-
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	-	-
Naphthalene	0.05 ug/L	<0.05	<0.05	-	-
Phenanthrene	0.05 ug/L	<0.05	<0.05	-	-
Pyrene	0.01 ug/L	<0.01	<0.01	-	-
2-Fluorobiphenyl	Surrogate	96.7%	114%	-	-
Terphenyl-d14	Surrogate	113%	111%	-	-

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 22248

Report Date: 30-Aug-2017
 Order Date: 24-Aug-2017
 Project Description: PE3896

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						
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	17.7		ug/L		88.3	50-140			
Surrogate: Terphenyl-d14	18.9		ug/L		94.6	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	77.6		ug/L		97.0	50-140			

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 22248

Report Date: 30-Aug-2017
 Order Date: 24-Aug-2017
 Project Description: PE3896

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	76.1		ug/L		95.2	50-140			

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 22248

Report Date: 30-Aug-2017
 Order Date: 24-Aug-2017
 Project Description: PE3896

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1990	25	ug/L		99.6	68-117			
F2 PHCs (C10-C16)	2190	100	ug/L		121	60-140			
F3 PHCs (C16-C34)	3880	100	ug/L		104	60-140			
F4 PHCs (C34-C50)	2500	100	ug/L		101	60-140			
Semi-Volatiles									
Acenaphthene	5.02	0.05	ug/L		100	50-140			
Acenaphthylene	4.52	0.05	ug/L		90.3	50-140			
Anthracene	4.65	0.01	ug/L		93.0	50-140			
Benzo [a] anthracene	3.97	0.01	ug/L		79.5	50-140			
Benzo [a] pyrene	4.43	0.01	ug/L		88.6	50-140			
Benzo [b] fluoranthene	4.60	0.05	ug/L		92.0	50-140			
Benzo [g,h,i] perylene	4.81	0.05	ug/L		96.2	50-140			
Benzo [k] fluoranthene	4.35	0.05	ug/L		87.1	50-140			
Chrysene	4.60	0.05	ug/L		91.9	50-140			
Dibenzo [a,h] anthracene	5.27	0.05	ug/L		105	50-140			
Fluoranthene	3.73	0.01	ug/L		74.5	50-140			
Fluorene	4.73	0.05	ug/L		94.5	50-140			
Indeno [1,2,3-cd] pyrene	5.26	0.05	ug/L		105	50-140			
1-Methylnaphthalene	4.79	0.05	ug/L		95.8	50-140			
2-Methylnaphthalene	5.22	0.05	ug/L		104	50-140			
Naphthalene	4.92	0.05	ug/L		98.3	50-140			
Phenanthrene	4.27	0.05	ug/L		85.4	50-140			
Pyrene	4.17	0.01	ug/L		83.5	50-140			
Surrogate: 2-Fluorobiphenyl	20.1		ug/L		100	50-140			
Volatiles									
Benzene	33.2	0.5	ug/L		83.0	60-130			
Ethylbenzene	40.2	0.5	ug/L		100	60-130			
Toluene	34.6	0.5	ug/L		86.5	60-130			
m,p-Xylenes	79.0	0.5	ug/L		98.8	60-130			
o-Xylene	39.9	0.5	ug/L		99.8	60-130			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 22248

Report Date: 30-Aug-2017
Order Date: 24-Aug-2017
Project Description: PE3896

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.

Parcel ID: 1734423



TRUSTED
RESPONSIBLE
RELIABLE



Chain of Custody
(Lab Use Only)

No 37413

Page 1 of 1

Client Name: <u>Patersa Group</u>	Project Reference: <u>1734423 PE3896</u>	Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____
Contact Name: <u>Karen Munch</u>	Quote #	
Address: <u>154 Colomade Rd. S.</u>	PO # <u>22248</u>	
Telephone: <u>613-226-7381</u>	Email Address: <u>kmunch@Patersagroup.ca.</u>	

Criteria: Reg. 153/04 (As Amended) 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

Parcel Order Number: <u>1734423</u>	Matrix	Air Volume	# of Containers	Sample Taken		BTEX / PAHs (E-F4)	PAH	Required Analyses												
				Date	Time			1	2	3	4	5	6	7	8	9	10			
Sample ID/Location Name																				
1	GW	/	4	24.8.17	11am	X	X													
2	GW	/	1	'			X													
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments: _____ Method of Delivery: Paracel

Relinquished By (Sign): <u>[Signature]</u>	Received by Driver/Depot: <u>[Signature]</u>	Received at Lab: <u>SUMNER QKMAI</u>	Verified By: <u>[Signature]</u>
Relinquished By (Print): <u>Ryan Matheson</u>	Date/Time: <u>24/08/17 4:00</u>	Date/Time: <u>Aug 24 2017 05:24</u>	Date/Time: <u>08/25/17 0:12</u>
Date/Time: <u>Aug 24.17 / 2pm.</u>	Temperature: _____ °C	Temperature: _____ °C	pH Verified By: _____

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 22248
Project: PE3896
Custody: 37413

Report Date: 30-Aug-2017
Order Date: 24-Aug-2017

Order #: 1734423

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

Parcel ID	Client ID
1734423-01	BH5-17-GW1
1734423-02	DUP 1

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 22248

Report Date: 30-Aug-2017
Order Date: 24-Aug-2017
Project Description: PE3896

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	30-Aug-17	30-Aug-17
PHC F1	CWS Tier 1 - P&T GC-FID	29-Aug-17	30-Aug-17
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	28-Aug-17	29-Aug-17
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	28-Aug-17	28-Aug-17

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 22248

Report Date: 30-Aug-2017
 Order Date: 24-Aug-2017
Project Description: PE3896

Client ID:	BH5-17-GW1	DUP 1	-	-
Sample Date:	24-Aug-17	24-Aug-17	-	-
Sample ID:	1734423-01	1734423-02	-	-
MDL/Units	Water	Water	-	-

Volatiles

Benzene	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
Toluene-d8	Surrogate	96.8%	-	-	-

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	-	-	-

Semi-Volatiles

Acenaphthene	0.05 ug/L	<0.05	<0.05	-	-
Acenaphthylene	0.05 ug/L	<0.05	<0.05	-	-
Anthracene	0.01 ug/L	<0.01	<0.01	-	-
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	-	-
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	-	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	-	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	-	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	-	-
Chrysene	0.05 ug/L	<0.05	<0.05	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	-	-
Fluoranthene	0.01 ug/L	<0.01	<0.01	-	-
Fluorene	0.05 ug/L	<0.05	<0.05	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	-	-
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	-	-
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	-	-
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	-	-
Naphthalene	0.05 ug/L	<0.05	<0.05	-	-
Phenanthrene	0.05 ug/L	<0.05	<0.05	-	-
Pyrene	0.01 ug/L	<0.01	<0.01	-	-
2-Fluorobiphenyl	Surrogate	96.7%	114%	-	-
Terphenyl-d14	Surrogate	113%	111%	-	-

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 22248

Report Date: 30-Aug-2017
 Order Date: 24-Aug-2017
Project Description: PE3896

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						
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	17.7		ug/L		88.3	50-140			
Surrogate: Terphenyl-d14	18.9		ug/L		94.6	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	77.6		ug/L		97.0	50-140			

Certificate of Analysis
 Client: Paterson Group Consulting Engineers
 Client PO: 22248

Report Date: 30-Aug-2017
 Order Date: 24-Aug-2017
 Project Description: PE3896

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	76.1		ug/L		95.2	50-140			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 22248

Report Date: 30-Aug-2017
 Order Date: 24-Aug-2017
Project Description: PE3896

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1990	25	ug/L		99.6	68-117			
F2 PHCs (C10-C16)	2190	100	ug/L		121	60-140			
F3 PHCs (C16-C34)	3880	100	ug/L		104	60-140			
F4 PHCs (C34-C50)	2500	100	ug/L		101	60-140			
Semi-Volatiles									
Acenaphthene	5.02	0.05	ug/L		100	50-140			
Acenaphthylene	4.52	0.05	ug/L		90.3	50-140			
Anthracene	4.65	0.01	ug/L		93.0	50-140			
Benzo [a] anthracene	3.97	0.01	ug/L		79.5	50-140			
Benzo [a] pyrene	4.43	0.01	ug/L		88.6	50-140			
Benzo [b] fluoranthene	4.60	0.05	ug/L		92.0	50-140			
Benzo [g,h,i] perylene	4.81	0.05	ug/L		96.2	50-140			
Benzo [k] fluoranthene	4.35	0.05	ug/L		87.1	50-140			
Chrysene	4.60	0.05	ug/L		91.9	50-140			
Dibenzo [a,h] anthracene	5.27	0.05	ug/L		105	50-140			
Fluoranthene	3.73	0.01	ug/L		74.5	50-140			
Fluorene	4.73	0.05	ug/L		94.5	50-140			
Indeno [1,2,3-cd] pyrene	5.26	0.05	ug/L		105	50-140			
1-Methylnaphthalene	4.79	0.05	ug/L		95.8	50-140			
2-Methylnaphthalene	5.22	0.05	ug/L		104	50-140			
Naphthalene	4.92	0.05	ug/L		98.3	50-140			
Phenanthrene	4.27	0.05	ug/L		85.4	50-140			
Pyrene	4.17	0.01	ug/L		83.5	50-140			
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>20.1</i>		<i>ug/L</i>		<i>100</i>	<i>50-140</i>			
Volatiles									
Benzene	33.2	0.5	ug/L		83.0	60-130			
Ethylbenzene	40.2	0.5	ug/L		100	60-130			
Toluene	34.6	0.5	ug/L		86.5	60-130			
m,p-Xylenes	79.0	0.5	ug/L		98.8	60-130			
o-Xylene	39.9	0.5	ug/L		99.8	60-130			

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 22248

Report Date: 30-Aug-2017
Order Date: 24-Aug-2017
Project Description: PE3896

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.

Parcel ID: 1734423



TRUSTED
RESPONSIBLE
RELIABLE



Chain of Custody
(Lab Use Only)

No 37413

Page 1 of 1

Client Name: <u>Patersa Group</u>	Project Reference: <u>1734423 PE3896</u>	Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____
Contact Name: <u>Karen Munch</u>	Quote #	
Address: <u>154 Colomade Rd. S.</u>	PO # <u>22248</u>	
Telephone: <u>613-226-7381</u>	Email Address: <u>kmunch@Patersagroup.ca.</u>	

Criteria: Reg. 153/04 (As Amended) 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

Parcel Order Number: <u>1734423</u>	Matrix	Air Volume	# of Containers	Sample Taken		BTEX / PAHs (E-F4)	PAH	Required Analyses												
				Date	Time			1	2	3	4	5	6	7	8	9	10			
Sample ID/Location Name																				
1	GW	/	4	24.8.17	11am	X	X													
2	GW	/	1	'			X													
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments: _____ Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: <u>J. J. J. J.</u>	Received at Lab: <u>SUMMIT</u>	Verified By:
Relinquished By (Print): <u>Ryan Matheson</u>	Date/Time: <u>24/08/17 4:00</u>	Date/Time: <u>Aug 24 2017 05:34</u>	Date/Time: <u>08/25/17 0:16</u>
Date/Time: <u>Aug 24.17 / 2pm.</u>	Temperature: _____ °C	Temperature: _____ °C	pH Verified By: _____

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 30490
Project: PE3929
Custody: 55631

Report Date: 8-Apr-2021
Order Date: 30-Mar-2021

Revised Report

Order #: 2114245

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

Parcel ID	Client ID
2114245-01	TP1-21-G6
2114245-02	TP2-21-G2
2114245-03	TP2-21-G3
2114245-04	TP3-21-G1
2114245-05	TP3-21-G2
2114245-06	TP6-21-G4

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 08-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 30-Mar-2021

Client PO: 30490

Project Description: PE3929

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	31-Mar-21	1-Apr-21
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	6-Apr-21	8-Apr-21
Mercury by CVAA	EPA 7471B - CVAA, digestion	7-Apr-21	8-Apr-21
PHC F1	CWS Tier 1 - P&T GC-FID	31-Mar-21	31-Mar-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	31-Mar-21	31-Mar-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	7-Apr-21	7-Apr-21
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	1-Apr-21	1-Apr-21
Solids, %	Gravimetric, calculation	31-Mar-21	31-Mar-21

Certificate of Analysis

Report Date: 08-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 30-Mar-2021

Client PO: 30490

Project Description: PE3929

Client ID:	TP1-21-G6	TP2-21-G2	TP2-21-G3	TP3-21-G1
Sample Date:	29-Mar-21 09:00	29-Mar-21 09:00	29-Mar-21 09:00	29-Mar-21 09:00
Sample ID:	2114245-01	2114245-02	2114245-03	2114245-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	70.2	58.8	71.3	95.3
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Metals

Element	MDL/Units	TP1-21-G6	TP2-21-G2	TP2-21-G3	TP3-21-G1
Antimony	1.0 ug/g dry	-	<1.0	-	<1.0
Arsenic	1.0 ug/g dry	-	3.3	-	2.6
Barium	1.0 ug/g dry	-	421	-	193
Beryllium	0.5 ug/g dry	-	0.8	-	<0.5
Boron	5.0 ug/g dry	-	6.4	-	16.9
Cadmium	0.5 ug/g dry	-	<0.5	-	<0.5
Chromium	5.0 ug/g dry	-	118	-	23.1
Chromium (VI)	0.2 ug/g dry	-	1.0	-	<0.2
Cobalt	1.0 ug/g dry	-	23.7	-	8.5
Copper	5.0 ug/g dry	-	51.0	-	15.8
Lead	1.0 ug/g dry	-	7.5	-	15.1
Mercury	0.1 ug/g dry	-	<0.1	-	<0.1
Molybdenum	1.0 ug/g dry	-	1.4	-	<1.0
Nickel	5.0 ug/g dry	-	64.1	-	18.4
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	-	112	-	23.7
Zinc	20.0 ug/g dry	-	126	-	31.4

Volatiles

Compound	MDL/Units	TP1-21-G6	TP2-21-G2	TP2-21-G3	TP3-21-G1
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%	-	104%	-

Hydrocarbons

PHC Group	MDL/Units	TP1-21-G6	TP2-21-G2	TP2-21-G3	TP3-21-G1
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	-	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	<6	-

Certificate of Analysis

Report Date: 08-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 30-Mar-2021

Client PO: 30490

Project Description: PE3929

	Client ID:	TP1-21-G6	TP2-21-G2	TP2-21-G3	TP3-21-G1
	Sample Date:	29-Mar-21 09:00	29-Mar-21 09:00	29-Mar-21 09:00	29-Mar-21 09:00
	Sample ID:	2114245-01	2114245-02	2114245-03	2114245-04
	MDL/Units	Soil	Soil	Soil	Soil

Semi-Volatiles

	MDL/Units	TP1-21-G6	TP2-21-G2	TP2-21-G3	TP3-21-G1
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	-	85.4%	-	94.7%
Terphenyl-d14	Surrogate	-	107%	-	118%

Certificate of Analysis

Report Date: 08-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 30-Mar-2021

Client PO: 30490

Project Description: PE3929

Client ID:	TP3-21-G2	TP6-21-G4	-	-
Sample Date:	29-Mar-21 09:00	29-Mar-21 09:00	-	-
Sample ID:	2114245-05	2114245-06	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	73.4	74.1	-	-
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Volatiles

Benzene	0.02 ug/g dry	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene	0.05 ug/g dry	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene-d8	Surrogate	104%	118%	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	20	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	11	-	-

Certificate of Analysis

Report Date: 08-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 30-Mar-2021

Client PO: 30490

Project Description: PE3929

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	0.994		ug/g		74.5	50-140			
Surrogate: Terphenyl-d14	1.12		ug/g		84.4	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	4.03		ug/g		126	50-140			

Certificate of Analysis

Report Date: 08-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 30-Mar-2021

Client PO: 30490

Project Description: PE3929

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			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	1.2	1.0	ug/g dry	ND			NC	30	
Arsenic	1.3	1.0	ug/g dry	1.4			3.7	30	
Barium	11.8	1.0	ug/g dry	12.3			4.2	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	ND	5.0	ug/g dry	ND			NC	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	0.9	0.2	ug/g dry	1.0			8.7	35	
Chromium	7.5	5.0	ug/g dry	8.1			7.4	30	
Cobalt	1.9	1.0	ug/g dry	1.9			0.2	30	
Copper	ND	5.0	ug/g dry	ND			NC	30	
Lead	2.4	1.0	ug/g dry	2.3			1.9	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	ND	5.0	ug/g dry	ND			NC	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	17.7	10.0	ug/g dry	18.8			5.8	30	
Zinc	ND	20.0	ug/g dry	ND			NC	30	
Physical Characteristics									
% Solids	90.6	0.1	% by Wt.	89.0			1.7	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g dry	ND			NC	40	
Anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Chrysene	ND	0.02	ug/g dry	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Fluoranthene	ND	0.02	ug/g dry	0.037			NC	40	
Fluorene	ND	0.02	ug/g dry	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
Naphthalene	ND	0.01	ug/g dry	ND			NC	40	
Phenanthrene	ND	0.02	ug/g dry	0.028			NC	40	
Pyrene	ND	0.02	ug/g dry	0.031			NC	40	
Surrogate: 2-Fluorobiphenyl	1.07		ug/g dry		62.4	50-140			
Surrogate: Terphenyl-d14	1.02		ug/g dry		59.5	50-140			
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	3.83		ug/g dry		106	50-140			

Certificate of Analysis

Report Date: 08-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 30-Mar-2021

Client PO: 30490

Project Description: PE3929

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	88.0	80-120			
F2 PHCs (C10-C16)	92	4	ug/g	ND	95.0	60-140			
F3 PHCs (C16-C34)	252	8	ug/g	ND	106	60-140			
F4 PHCs (C34-C50)	157	6	ug/g	ND	104	60-140			
Metals									
Antimony	43.5	1.0	ug/g	ND	86.9	70-130			
Arsenic	51.5	1.0	ug/g	ND	102	70-130			
Barium	51.1	1.0	ug/g	4.9	92.4	70-130			
Beryllium	50.0	0.5	ug/g	ND	99.8	70-130			
Boron	45.7	5.0	ug/g	ND	89.8	70-130			
Cadmium	47.5	0.5	ug/g	ND	95.0	70-130			
Chromium (VI)	7.1	0.2	ug/g	1.0	72.0	70-130			
Chromium	52.7	5.0	ug/g	ND	99.0	70-130			
Cobalt	50.9	1.0	ug/g	ND	100	70-130			
Copper	48.8	5.0	ug/g	ND	95.2	70-130			
Lead	47.1	1.0	ug/g	ND	92.3	70-130			
Mercury	1.45	0.1	ug/g	ND	96.4	70-130			
Molybdenum	49.4	1.0	ug/g	ND	98.7	70-130			
Nickel	49.5	5.0	ug/g	ND	95.7	70-130			
Selenium	47.4	1.0	ug/g	ND	94.7	70-130			
Silver	42.8	0.3	ug/g	ND	85.7	70-130			
Thallium	45.9	1.0	ug/g	ND	91.8	70-130			
Uranium	48.7	1.0	ug/g	ND	97.1	70-130			
Vanadium	57.1	10.0	ug/g	ND	99.1	70-130			
Zinc	51.9	20.0	ug/g	ND	94.2	70-130			
Semi-Volatiles									
Acenaphthene	0.117	0.02	ug/g	ND	54.9	50-140			
Acenaphthylene	0.111	0.02	ug/g	ND	52.0	50-140			
Anthracene	0.109	0.02	ug/g	ND	50.8	50-140			
Benzo [a] anthracene	0.113	0.02	ug/g	ND	52.9	50-140			
Benzo [a] pyrene	0.112	0.02	ug/g	ND	52.3	50-140			
Benzo [b] fluoranthene	0.124	0.02	ug/g	ND	57.9	50-140			
Benzo [g,h,i] perylene	0.117	0.02	ug/g	ND	54.5	50-140			
Benzo [k] fluoranthene	0.108	0.02	ug/g	ND	50.5	50-140			
Chrysene	0.123	0.02	ug/g	ND	57.3	50-140			
Dibenzo [a,h] anthracene	0.115	0.02	ug/g	ND	53.7	50-140			
Fluoranthene	0.110	0.02	ug/g	ND	65.9	50-140			
Fluorene	0.137	0.02	ug/g	ND	64.0	50-140			
Indeno [1,2,3-cd] pyrene	0.120	0.02	ug/g	ND	56.1	50-140			
1-Methylnaphthalene	0.114	0.02	ug/g	ND	53.1	50-140			
2-Methylnaphthalene	0.129	0.02	ug/g	ND	60.3	50-140			
Naphthalene	0.124	0.01	ug/g	ND	58.2	50-140			
Phenanthrene	0.119	0.02	ug/g	ND	71.6	50-140			
Pyrene	0.110	0.02	ug/g	ND	66.2	50-140			
Surrogate: 2-Fluorobiphenyl	0.907		ug/g		53.0	50-140			
Surrogate: Terphenyl-d14	1.05		ug/g		61.1	50-140			
Volatiles									
Benzene	3.62	0.02	ug/g	ND	90.5	60-130			

Certificate of Analysis

Report Date: 08-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 30-Mar-2021

Client PO: 30490

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	3.57	0.05	ug/g	ND	89.3	60-130			
Toluene	3.81	0.05	ug/g	ND	95.2	60-130			
m,p-Xylenes	7.26	0.05	ug/g	ND	90.7	60-130			
o-Xylene	3.78	0.05	ug/g	ND	94.5	60-130			
Surrogate: Toluene-d8	3.28		ug/g		102	50-140			

Certificate of Analysis

Report Date: 08-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 30-Mar-2021

Client PO: 30490

Project Description: PE3929

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision-1 This report includes an updated parameter list as per the client.

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.



Parcel Order Number
(Lab Use Only)

2114245

Chain Of Custody
(Lab Use Only)

Nº 55631

Client Name: <u>Paterson Group, Inc</u>	Project Ref: <u>PE3929</u>	Page <u>1</u> of <u>1</u>
Contact Name: <u>Karyn Munch / Jesse Andrechek</u>	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: <u>154 Colonnade Rd, S</u>	PO #: <u>30490</u>	
Telephone: <u>613-226-7381</u>	E-mail: <u>jandrechek@patersongroup.ca</u> <u>kmunch@ " " "</u>	
Date Required: _____		

Regulation 153/04		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																			
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Med/Fine	<input type="checkbox"/> REG 558	<input type="checkbox"/> PWQO	Matrix	Air Volume	# of Containers	Sample Taken		BTEX/PHCS	PAHs															
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> CCME	<input type="checkbox"/> MISA				Date	Time																	
<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other		<input type="checkbox"/> SU - Sani	<input type="checkbox"/> SU - Storm																						
<input type="checkbox"/> Table _____			Mun: _____																							
For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Other: _____																							
Sample ID/Location Name																										
1	TP1-21 - G6	S	2	29-MAR-21		X																				
2	TP2-21 - G2	S	1	29-MAR-21		X																				
3	TP2-21 - G3	S	2	29-MAR-21		X																				
4	TP3-21 - G1	S	1	"		X																				
5	TP3-21 - G2	S	2	"		X																				
6	TP6-21 - G4	S	2	"		X																				
7																										
8																										
9																										
10																										

Comments:			Method of Delivery: <u>PARACEL COURIER</u>		
Relinquished By (Sign): <u>[Signature]</u>	Received By Driver/Depot: <u>M. JEANE</u>	Received at Lab: <u>[Signature]</u>	Verified By: <u>[Signature]</u>		
Relinquished By (Print): <u>Jesse Andrechek</u>	Date/Time: <u>30/03/21 3:45</u>	Date/Time: <u>March 30, 2021 17:20</u>	Date/Time: <u>3-30-21/7/32</u>		
Date/Time: <u>30-MAR-21 1PM</u>	Temperature: <u>°C PA</u>	Temperature: <u>6.0 °C</u>	pH Verified: <input type="checkbox"/>	By: _____	

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 31349
Project: PE3929
Custody: 131503

Report Date: 12-Apr-2021
Order Date: 8-Apr-2021

Revised Report

Order #: 2115500

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

Parcel ID	Client ID
2115500-01	TP7-21-G1
2115500-02	TP9-21-G1
2115500-03	TP9-21-G3

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 12-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Apr-2021

Client PO: 31349

Project Description: PE3929

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	8-Apr-21	9-Apr-21
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	9-Apr-21	9-Apr-21
Conductivity	MOE E3138 - probe @25 °C, water ext	9-Apr-21	9-Apr-21
Mercury by CVAA	EPA 7471B - CVAA, digestion	9-Apr-21	9-Apr-21
PHC F1	CWS Tier 1 - P&T GC-FID	8-Apr-21	9-Apr-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	9-Apr-21	9-Apr-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	9-Apr-21	9-Apr-21
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	9-Apr-21	9-Apr-21
SAR	Calculated	9-Apr-21	9-Apr-21
Solids, %	Gravimetric, calculation	9-Apr-21	9-Apr-21

Certificate of Analysis

Report Date: 12-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Apr-2021

Client PO: 31349

Project Description: PE3929

Client ID:	TP7-21-G1	TP9-21-G1	TP9-21-G3	-
Sample Date:	07-Apr-21 09:00	07-Apr-21 09:00	07-Apr-21 09:00	-
Sample ID:	2115500-01	2115500-02	2115500-03	-
MDL/Units	Soil	Soil	Soil	-

Physical Characteristics

% Solids	0.1 % by Wt.	65.0	79.2	62.7	-
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General Inorganics

SAR	0.01 N/A	2.34	6.22	10.5	-
Conductivity	5 uS/cm	1670	1130	3790	-

Metals

Antimony	1.0 ug/g dry	<1.0	1.4	<1.0	-
Arsenic	1.0 ug/g dry	3.6	8.2	4.6	-
Barium	1.0 ug/g dry	357	167	438	-
Beryllium	0.5 ug/g dry	0.8	0.5	1.2	-
Boron	5.0 ug/g dry	<5.0	6.0	6.2	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Chromium	5.0 ug/g dry	102	54.5	119	-
Chromium (VI)	0.2 ug/g dry	0.7	<0.2	0.6	-
Cobalt	1.0 ug/g dry	20.4	10.4	34.2	-
Copper	5.0 ug/g dry	41.2	21.5	38.6	-
Lead	1.0 ug/g dry	9.9	113	10.5	-
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	1.5	-
Nickel	5.0 ug/g dry	54.2	25.9	65.2	-
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	3.0	1.6	-
Vanadium	10.0 ug/g dry	107	51.6	136	-
Zinc	20.0 ug/g dry	108	137	135	-

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	106%	106%	105%	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
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Certificate of Analysis

Report Date: 12-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Apr-2021

Client PO: 31349

Project Description: PE3929

	Client ID:	TP7-21-G1	TP9-21-G1	TP9-21-G3	-
	Sample Date:	07-Apr-21 09:00	07-Apr-21 09:00	07-Apr-21 09:00	-
	Sample ID:	2115500-01	2115500-02	2115500-03	-
	MDL/Units	Soil	Soil	Soil	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	12	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	-

Semi-Volatiles

Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	0.03	<0.02	-
Benzo [a] pyrene	0.02 ug/g dry	<0.02	0.03	<0.02	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	0.02	<0.02	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Chrysene	0.02 ug/g dry	<0.02	0.04	<0.02	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Fluoranthene	0.02 ug/g dry	<0.02	0.05	<0.02	-
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	-
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	-
Phenanthrene	0.02 ug/g dry	<0.02	0.02	<0.02	-
Pyrene	0.02 ug/g dry	<0.02	0.05	<0.02	-
2-Fluorobiphenyl	Surrogate	69.9%	88.0%	82.8%	-
Terphenyl-d14	Surrogate	74.0%	93.5%	88.2%	-

Certificate of Analysis

Report Date: 12-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Apr-2021

Client PO: 31349

Project Description: PE3929

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	1.31		ug/g		98.1	50-140			
Surrogate: Terphenyl-d14	1.69		ug/g		127	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	3.61		ug/g		113	50-140			

Certificate of Analysis

Report Date: 12-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Apr-2021

Client PO: 31349

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.60	0.01	N/A	0.64			6.5	30	
Conductivity	910	5	uS/cm	901			1.0	5	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			NC	30	
Arsenic	1.9	1.0	ug/g dry	1.8			5.3	30	
Barium	21.8	1.0	ug/g dry	21.1			3.4	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	ND	5.0	ug/g dry	ND			NC	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	8.6	5.0	ug/g dry	8.5			1.1	30	
Cobalt	4.3	1.0	ug/g dry	3.8			12.2	30	
Copper	9.0	5.0	ug/g dry	8.2			9.5	30	
Lead	4.1	1.0	ug/g dry	3.8			7.6	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	6.4	5.0	ug/g dry	6.1			5.0	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	20.0	10.0	ug/g dry	20.9			4.3	30	
Zinc	ND	20.0	ug/g dry	ND			NC	30	
Physical Characteristics									
% Solids	93.6	0.1	% by Wt.	92.2			1.5	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g dry	ND			NC	40	
Anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Chrysene	ND	0.02	ug/g dry	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Fluorene	ND	0.02	ug/g dry	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
Naphthalene	ND	0.01	ug/g dry	ND			NC	40	
Phenanthrene	ND	0.02	ug/g dry	ND			NC	40	
Pyrene	ND	0.02	ug/g dry	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	1.17		ug/g dry		81.3	50-140			
Surrogate: Terphenyl-d14	1.81		ug/g dry		126	50-140			
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	

Certificate of Analysis

Report Date: 12-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Apr-2021

Client PO: 31349

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	3.95		ug/g dry		103	50-140			

Certificate of Analysis

Report Date: 12-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Apr-2021

Client PO: 31349

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	166	7	ug/g	ND	83.1	80-120			
F2 PHCs (C10-C16)	101	4	ug/g	ND	89.1	60-140			
F3 PHCs (C16-C34)	324	8	ug/g	ND	117	60-140			
F4 PHCs (C34-C50)	211	6	ug/g	ND	120	60-140			
Metals									
Antimony	42.8	1.0	ug/g	ND	85.0	70-130			
Arsenic	49.9	1.0	ug/g	ND	98.3	70-130			
Barium	56.8	1.0	ug/g	8.4	96.7	70-130			
Beryllium	49.6	0.5	ug/g	ND	99.1	70-130			
Boron	46.0	5.0	ug/g	ND	89.9	70-130			
Cadmium	46.1	0.5	ug/g	ND	92.1	70-130			
Chromium (VI)	4.1	0.2	ug/g	ND	75.5	70-130			
Chromium	52.0	5.0	ug/g	ND	97.2	70-130			
Cobalt	50.1	1.0	ug/g	1.5	97.2	70-130			
Copper	51.0	5.0	ug/g	ND	95.4	70-130			
Lead	50.4	1.0	ug/g	1.5	97.9	70-130			
Mercury	1.51	0.1	ug/g	ND	101	70-130			
Molybdenum	48.7	1.0	ug/g	ND	96.8	70-130			
Nickel	49.5	5.0	ug/g	ND	94.2	70-130			
Selenium	48.2	1.0	ug/g	ND	96.1	70-130			
Silver	44.1	0.3	ug/g	ND	88.2	70-130			
Thallium	46.3	1.0	ug/g	ND	92.6	70-130			
Uranium	51.0	1.0	ug/g	ND	102	70-130			
Vanadium	56.5	10.0	ug/g	ND	96.4	70-130			
Zinc	50.4	20.0	ug/g	ND	92.5	70-130			
Semi-Volatiles									
Acenaphthene	0.147	0.02	ug/g	ND	81.6	50-140			
Acenaphthylene	0.148	0.02	ug/g	ND	82.4	50-140			
Anthracene	0.181	0.02	ug/g	ND	101	50-140			
Benzo [a] anthracene	0.206	0.02	ug/g	ND	115	50-140			
Benzo [a] pyrene	0.228	0.02	ug/g	ND	127	50-140			
Benzo [b] fluoranthene	0.245	0.02	ug/g	ND	136	50-140			
Benzo [g,h,i] perylene	0.186	0.02	ug/g	ND	103	50-140			
Benzo [k] fluoranthene	0.221	0.02	ug/g	ND	123	50-140			
Chrysene	0.233	0.02	ug/g	ND	130	50-140			
Dibenzo [a,h] anthracene	0.159	0.02	ug/g	ND	88.4	50-140			
Fluoranthene	0.164	0.02	ug/g	ND	91.4	50-140			
Fluorene	0.146	0.02	ug/g	ND	81.0	50-140			
Indeno [1,2,3-cd] pyrene	0.182	0.02	ug/g	ND	101	50-140			
1-Methylnaphthalene	0.177	0.02	ug/g	ND	98.8	50-140			
2-Methylnaphthalene	0.201	0.02	ug/g	ND	112	50-140			
Naphthalene	0.189	0.01	ug/g	ND	105	50-140			
Phenanthrene	0.163	0.02	ug/g	ND	90.8	50-140			
Pyrene	0.182	0.02	ug/g	ND	101	50-140			
Surrogate: 2-Fluorobiphenyl	1.30		ug/g		90.2	50-140			
Surrogate: Terphenyl-d14	1.19		ug/g		82.8	50-140			
Volatiles									
Benzene	4.08	0.02	ug/g	ND	102	60-130			

Certificate of Analysis

Report Date: 12-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Apr-2021

Client PO: 31349

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	3.64	0.05	ug/g	ND	91.1	60-130			
Toluene	3.92	0.05	ug/g	ND	98.0	60-130			
m,p-Xylenes	7.27	0.05	ug/g	ND	90.9	60-130			
o-Xylene	3.76	0.05	ug/g	ND	94.0	60-130			
Surrogate: Toluene-d8	3.20		ug/g		99.9	50-140			

Certificate of Analysis

Report Date: 12-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Apr-2021

Client PO: 31349

Project Description: PE3929

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision-1 This report includes an updated parameter list as per the client.

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 Order Number (Lab Use Only) <i>2115500</i>	Chain Of Custody (Lab Use Only) No 131503
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Client Name: <i>Paterson Group Inc.</i>	Project Ref: <i>PE3929</i>	Page <u>1</u> of <u>1</u>
Contact Name: <i>Karyn Munch / Jesse Andrechek</i>	Quote #:	Turnaround Time <input checked="" type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input type="checkbox"/> Regular
Address: <i>154 Colonnade Rd, S</i>	PO #: <i>31349</i>	Date Required: _____
Telephone: <i>613-226-7381</i>	E-mail: <i>jandrechek@patersongroup.ca</i> <i>Kmunch@ " " "</i>	

Regulation 153/04		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											
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Med/Fine	<input type="checkbox"/> REG 558	<input type="checkbox"/> PWQO	Matrix	Air Volume	# of Containers	Sample Taken Date Time		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP			B (HWS)	EC / SAR
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> CCME	<input type="checkbox"/> MISA									Hg	CrVI			
<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other		<input type="checkbox"/> SU - Sani	<input type="checkbox"/> SU - Storm													
For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No		Mun: _____		Other: _____													
Sample ID/Location Name																	
1	<i>TP7-21-G1</i>			<i>S</i>	<i>23</i>	<i>7-APR-21</i>	<i>/</i>	<i>X</i>		<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>		
2	<i>TP8-21-G1</i>			<i>↓</i>	<i>2</i>	<i>↓</i>	<i>↓</i>	<i>X</i>		<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>		
3	<i>TP9-21-G1</i>			<i>↓</i>	<i>3</i>	<i>↓</i>	<i>↓</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>		
4	<i>TP9-21-G3</i>			<i>↓</i>	<i>3</i>	<i>↓</i>	<i>↓</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>X</i>		
5																	
6																	
7																	
8																	
9																	
10																	

Comments:		Method of Delivery: <i>Drop Box</i>	
Relinquished By (Sign): <i>J. Andrechek</i>	Received By Driver/Depot:	Received at Lab: <i>SLM</i>	Verified By: <i>SLM</i>
Relinquished By (Print): <i>Jesse Andrechek</i>	Date/Time:	Date/Time: <i>April 8, 2021 16:55</i>	Date/Time: <i>April 8, 2021 17:24</i>
Date/Time: <i>8-APR-21 1PM</i>	Temperature: _____ °C	Temperature: <i>21.9</i> °C	pH Verified: <input type="checkbox"/> By: _____

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 33020
Project: PE3929
Custody: 131555

Report Date: 26-Apr-2021
Order Date: 21-Apr-2021

Order #: 2117384

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

Parcel ID	Client ID
2117384-01	TP2(2)-1
2117384-02	TP7(2)-1

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: **Paterson Group Consulting Engineers**
Client PO: **33020**

Report Date: 26-Apr-2021
Order Date: 21-Apr-2021
Project Description: **PE3929**

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	26-Apr-21	26-Apr-21
Solids, %	Gravimetric, calculation	23-Apr-21	24-Apr-21

Certificate of Analysis

Report Date: 26-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 21-Apr-2021

Client PO: 33020

Project Description: PE3929

Client ID:	TP2(2)-1	TP7(2)-1	-	-
Sample Date:	14-Apr-21 09:00	14-Apr-21 09:00	-	-
Sample ID:	2117384-01	2117384-02	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	93.6	81.1	-	-
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Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	1.4	1.8	-	-
Barium	1.0 ug/g dry	19.3	78.2	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	<5.0	<5.0	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	7.0	23.7	-	-
Cobalt	1.0 ug/g dry	3.4	5.5	-	-
Copper	5.0 ug/g dry	7.5	13.6	-	-
Lead	1.0 ug/g dry	2.2	6.0	-	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	-	-
Nickel	5.0 ug/g dry	5.6	12.9	-	-
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	17.5	38.2	-	-
Zinc	20.0 ug/g dry	<20.0	28.4	-	-

Certificate of Analysis

Report Date: 26-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 21-Apr-2021

Client PO: 33020

Project Description: PE3929

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						

Certificate of Analysis

Report Date: 26-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 21-Apr-2021

Client PO: 33020

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1.0	ug/g dry	ND			NC	30	
Arsenic	2.1	1.0	ug/g dry	2.2			5.5	30	
Barium	99.0	1.0	ug/g dry	109			9.7	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	14.8	5.0	ug/g dry	14.8			0.2	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium	17.5	5.0	ug/g dry	18.1			3.3	30	
Cobalt	5.7	1.0	ug/g dry	5.9			3.6	30	
Copper	11.5	5.0	ug/g dry	12.1			4.6	30	
Lead	7.0	1.0	ug/g dry	7.2			2.5	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	11.5	5.0	ug/g dry	12.7			9.8	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	23.6	10.0	ug/g dry	24.7			4.6	30	
Zinc	26.5	20.0	ug/g dry	28.0			5.6	30	
Physical Characteristics									
% Solids	83.8	0.1	% by Wt.	83.1			0.8	25	

Certificate of Analysis

Report Date: 26-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 21-Apr-2021

Client PO: 33020

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	45.4	1.0	ug/g	ND	90.8	70-130			
Arsenic	48.3	1.0	ug/g	ND	94.8	70-130			
Barium	84.6	1.0	ug/g	43.6	81.9	70-130			
Beryllium	46.4	0.5	ug/g	ND	92.4	70-130			
Boron	48.6	5.0	ug/g	5.9	85.3	70-130			
Cadmium	44.6	0.5	ug/g	ND	89.1	70-130			
Chromium	54.8	5.0	ug/g	7.2	95.2	70-130			
Cobalt	49.4	1.0	ug/g	2.4	94.0	70-130			
Copper	49.1	5.0	ug/g	ND	88.5	70-130			
Lead	45.6	1.0	ug/g	2.9	85.4	70-130			
Molybdenum	46.0	1.0	ug/g	ND	91.7	70-130			
Nickel	49.4	5.0	ug/g	5.1	88.6	70-130			
Selenium	45.1	1.0	ug/g	ND	89.9	70-130			
Silver	37.0	0.3	ug/g	ND	74.0	70-130			
Thallium	43.5	1.0	ug/g	ND	86.9	70-130			
Uranium	45.0	1.0	ug/g	ND	89.6	70-130			
Vanadium	58.0	10.0	ug/g	ND	96.2	70-130			
Zinc	54.4	20.0	ug/g	ND	86.4	70-130			

Certificate of Analysis

Report Date: 26-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 21-Apr-2021

Client PO: 33020

Project Description: PE3929

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.



Parcel Order Number (Lab Use Only) 2117384	Chain Of Custody (Lab Use Only) No 131555
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Client Name: Paterson	Project Ref: PE3929	Page 1 of 1
Contact Name: Maryn Munch	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 154 Colonnade Rd	PO #: 33020	
Telephone: 613-226-7381	E-mail: kmunch@patersoncorp.ca	

Regulation 153/04		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									
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Med/Fine	<input type="checkbox"/> REG 558	<input type="checkbox"/> PWQO	Sample Taken	PHCS F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)			
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> CCME	<input type="checkbox"/> MISA									Date	Time	
<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other		<input type="checkbox"/> SU - Sani	<input type="checkbox"/> SU - Storm											
For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No		Mun: _____	Other: _____												
Sample ID/Location Name				Matrix	Air Volume	# of Containers	Sample Taken								
1	TP2(2)-1			S		1	4/14/2021								
2	TP7(2)-1			↓		↓	↓								
3															
4															
5															
6															
7															
8															
9															
10															

Comments:		Method of Delivery: PARACEL COURIER	
Relinquished By (Sign): <i>[Signature]</i>	Received By Driver/Depot: A. Koush	Received at Lab: Jurgenorm Bohmai	Verified By: <i>[Signature]</i>
Relinquished By (Print): Jeremy Compostore	Date/Time: 21/04/21 2:16	Date/Time: APR 21, 2021 09:52	Date/Time: April 21, 2021 15:31
Date/Time: 4/21/2021	Temperature: 7.7 °C	Temperature: 14.9 °C	pH Verified: <input type="checkbox"/> By: _____

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 33019
Project: PE3929
Custody: 131554

Report Date: 26-Apr-2021
Order Date: 21-Apr-2021

Order #: 2117383

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

Paracel ID	Client ID
2117383-01	TP10-2
2117383-02	TP11-4

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 26-Apr-2021

Client: **Paterson Group Consulting Engineers**

Order Date: 21-Apr-2021

Client PO: 33019

Project Description: **PE3929**

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	26-Apr-21	26-Apr-21
Solids, %	Gravimetric, calculation	23-Apr-21	24-Apr-21

Certificate of Analysis

Report Date: 26-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 21-Apr-2021

Client PO: 33019

Project Description: PE3929

Client ID:	TP10-2	TP11-4	-	-
Sample Date:	14-Apr-21 09:00	14-Apr-21 09:00	-	-
Sample ID:	2117383-01	2117383-02	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	91.2	92.6	-	-
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Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	1.6	1.5	-	-
Barium	1.0 ug/g dry	93.3	82.0	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	7.7	8.8	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	13.7	12.0	-	-
Cobalt	1.0 ug/g dry	5.3	4.7	-	-
Copper	5.0 ug/g dry	9.6	8.2	-	-
Lead	1.0 ug/g dry	4.6	3.9	-	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	-	-
Nickel	5.0 ug/g dry	9.1	8.3	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	20.8	18.4	-	-
Zinc	20.0 ug/g dry	<20.0	<20.0	-	-

Certificate of Analysis

Report Date: 26-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 21-Apr-2021

Client PO: 33019

Project Description: PE3929

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						

Certificate of Analysis

Report Date: 26-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 21-Apr-2021

Client PO: 33019

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1.0	ug/g dry	ND			NC	30	
Arsenic	2.1	1.0	ug/g dry	2.2			5.5	30	
Barium	99.0	1.0	ug/g dry	109			9.7	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	14.8	5.0	ug/g dry	14.8			0.2	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium	17.5	5.0	ug/g dry	18.1			3.3	30	
Cobalt	5.7	1.0	ug/g dry	5.9			3.6	30	
Copper	11.5	5.0	ug/g dry	12.1			4.6	30	
Lead	7.0	1.0	ug/g dry	7.2			2.5	30	
Molybdenum	ND	1.0	ug/g dry	ND			NC	30	
Nickel	11.5	5.0	ug/g dry	12.7			9.8	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	23.6	10.0	ug/g dry	24.7			4.6	30	
Zinc	26.5	20.0	ug/g dry	28.0			5.6	30	
Physical Characteristics									
% Solids	83.8	0.1	% by Wt.	83.1			0.8	25	

Certificate of Analysis

Report Date: 26-Apr-2021

Client: Paterson Group Consulting Engineers

Order Date: 21-Apr-2021

Client PO: 33019

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	45.4	1.0	ug/g	ND	90.8	70-130			
Arsenic	48.3	1.0	ug/g	ND	94.8	70-130			
Barium	84.6	1.0	ug/g	43.6	81.9	70-130			
Beryllium	46.4	0.5	ug/g	ND	92.4	70-130			
Boron	48.6	5.0	ug/g	5.9	85.3	70-130			
Cadmium	44.6	0.5	ug/g	ND	89.1	70-130			
Chromium	54.8	5.0	ug/g	7.2	95.2	70-130			
Cobalt	49.4	1.0	ug/g	2.4	94.0	70-130			
Copper	49.1	5.0	ug/g	ND	88.5	70-130			
Lead	45.6	1.0	ug/g	2.9	85.4	70-130			
Molybdenum	46.0	1.0	ug/g	ND	91.7	70-130			
Nickel	49.4	5.0	ug/g	5.1	88.6	70-130			
Selenium	45.1	1.0	ug/g	ND	89.9	70-130			
Silver	37.0	0.3	ug/g	ND	74.0	70-130			
Thallium	43.5	1.0	ug/g	ND	86.9	70-130			
Uranium	45.0	1.0	ug/g	ND	89.6	70-130			
Vanadium	58.0	10.0	ug/g	ND	96.2	70-130			
Zinc	54.4	20.0	ug/g	ND	86.4	70-130			

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 33019

Report Date: 26-Apr-2021

Order Date: 21-Apr-2021

Project Description: PE3929

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.



Parcel Order Number (Lab Use Only) 2117383	Chain Of Custody (Lab Use Only) No 131554
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Client Name: Paterson	Project Ref: PE3929	Page 1 of 1
Contact Name: Karyn Munch	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 154 Colonnade Rd	PO #: 33019	
Telephone: 613-226-7381	E-mail: kmunch@patersongroup.ca	
Date Required: _____		

Regulation 153/04		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								
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Med/Fine	<input type="checkbox"/> REG 558	<input type="checkbox"/> PWQO	Sample Taken	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)		
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> CCME	<input type="checkbox"/> MISA										
<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other		<input type="checkbox"/> SU - Sani	<input type="checkbox"/> SU - Storm										
For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No		Mun: _____	Other: _____											
Sample ID/Location Name					Matrix	Air Volume	# of Containers	Date	Time					
1	TP10-2				S		1	4/14/2021						
2	TP11-4				↓		↓							
3														
4														
5														
6														
7														
8														
9														
10														

Comments:		Method of Delivery: PARACEI CURIER	
Relinquished By (Sign): <i>[Signature]</i>	Received By Driver/Depot: <i>M. DENISE</i>	Received at Lab: <i>Simone Poon</i>	Verified By: <i>[Signature]</i>
Relinquished By (Print): <i>Jeremy Compositore</i>	Date/Time: <i>21/04/21 2:16</i>	Date/Time: <i>APR 21, 2021 02:52</i>	Date/Time: <i>April 21, 2021 15:29</i>
Date/Time: <i>4/21/2021</i>	Temperature: <i>14.9 °C</i>	Temperature: <i>14.9 °C</i>	pH Verified: <input type="checkbox"/> By: _____

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 33030
Project: PE3929
Custody: 131539

Report Date: 26-May-2021
Order Date: 19-May-2021

Order #: 2121463

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

Parcel ID	Client ID
2121463-01	TPT-GSI
2121463-02	GSI
2121463-03	BIII
2121463-04	SWI

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: **Paterson Group Consulting Engineers**

Client PO: 33030

Report Date: 26-May-2021

Order Date: 19-May-2021

Project Description: **PE3929**

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	21-May-21	21-May-21
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	21-May-21	21-May-21
PHC F1	CWS Tier 1 - P&T GC-FID	21-May-21	21-May-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	20-May-21	25-May-21
Solids, %	Gravimetric, calculation	21-May-21	25-May-21

Certificate of Analysis

Report Date: 26-May-2021

Client: Paterson Group Consulting Engineers

Order Date: 19-May-2021

Client PO: 33030

Project Description: PE3929

Client ID:	TPT-GSI	GSI	BIII	SWI
Sample Date:	19-May-21 09:00	18-May-21 09:00	17-May-21 09:00	18-May-21 09:00
Sample ID:	2121463-01	2121463-02	2121463-03	2121463-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	74.8	80.6	68.0	-
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General Inorganics

pH	0.05 pH Units	-	-	-	7.61
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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	124%	107%	99.9%	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	61	165	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	108	221	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	-

Certificate of Analysis

Report Date: 26-May-2021

Client: Paterson Group Consulting Engineers

Order Date: 19-May-2021

Client PO: 33030

Project Description: PE3929

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	3.80		ug/g		119	50-140			

Certificate of Analysis

Report Date: 26-May-2021

Client: Paterson Group Consulting Engineers

Order Date: 19-May-2021

Client PO: 33030

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	9.25	0.05	pH Units	9.25			0.0	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	54	4	ug/g dry	52			3.7	30	
F3 PHCs (C16-C34)	1910	8	ug/g dry	1840			3.9	30	
F4 PHCs (C34-C50)	740	6	ug/g dry	772			4.2	30	
Physical Characteristics									
% Solids	90.8	0.1	% by Wt.	87.4			3.7	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	3.56		ug/g dry		110	50-140			

Certificate of Analysis

Report Date: 26-May-2021

Client: Paterson Group Consulting Engineers

Order Date: 19-May-2021

Client PO: 33030

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	201	7	ug/g	ND	100	80-120			
F2 PHCs (C10-C16)	81	4	ug/g	ND	101	80-120			
F3 PHCs (C16-C34)	227	8	ug/g	ND	116	80-120			
F4 PHCs (C34-C50)	148	6	ug/g	ND	119	80-120			
Volatiles									
Benzene	4.26	0.02	ug/g	ND	107	60-130			
Ethylbenzene	3.79	0.05	ug/g	ND	94.9	60-130			
Toluene	4.20	0.05	ug/g	ND	105	60-130			
m,p-Xylenes	7.76	0.05	ug/g	ND	97.0	60-130			
o-Xylene	4.17	0.05	ug/g	ND	104	60-130			
Surrogate: Toluene-d8	2.67		ug/g		83.5	50-140			

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 33030

Report Date: 26-May-2021

Order Date: 19-May-2021

Project Description: PE3929

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

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



2121463

No 131539

Client Name: Paterson	Project Ref: PE3929	Page <u>1</u> of <u>1</u>
Contact Name: Karyn Munch	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 154 Colonnade Rd	PO #: 33030	
Telephone: 613-226-7381	E-mail: k.munch@patersongroup.ca j.composarccone@patersongroup.ca	Date Required: _____

Regulation 153/04		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											
<input type="checkbox"/> Table 1	<input checked="" type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine	<input type="checkbox"/> REG 558	<input type="checkbox"/> PWQO	Matrix	Air Volume	# of Containers	Sample Taken	Date	Time	PHCs F1-F4+BTEX	VOCS	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	PH
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm <input checked="" type="checkbox"/> Coarse	<input type="checkbox"/> CCME	<input type="checkbox"/> MISA														
<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> SU - Sani	<input type="checkbox"/> SU - Storm	Mun: _____		Other: _____											
For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No																	
Sample ID/Location Name																	
1	BHC	S	2	S	2	5/17/2021											
2	BII	S	2	S	2	5/18/2021											
3	GSI	S	2	S	2	5/18/2021											
4	GSI	S	2	S	2	5/18/2021											
5	1 TPT-GSI	S	2	S	2	19-MAY-21				X							
6	2 GSI	S	2	S	2	18-MAY-21				X							
7	3 BII	S	2	S	2	17-MAY-21				X							
8	4 SWI	S	1	S	1	18-MAY-21										X	
9	5																
10																	

Comments:		Method of Delivery: PARCEL COURIER	
Relinquished By (Sign):	Received By Driver/Depot: A. FLOUSE	Received At Lab:	Verified By:
Relinquished By (Print): Jeremy Camposarccone	Date/Time: 19/05/21 3:40	Date/Time: May 19/21 5:10pm	Date/Time: May 20/21 10:24a
Date/Time: 5/18/2021	Temperature: _____ °C PH	Temperature: 13.6 °C	pH Verified: <input type="checkbox"/> By: N/A

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 32200
Project: PE3929
Custody: 131138

Report Date: 17-Jun-2021
Order Date: 11-Jun-2021

Order #: 2124683

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

Paracel ID	Client ID
2124683-01	MW1-21-GW1
2124683-02	MW2-21-GW1

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 17-Jun-2021

Client: **Paterson Group Consulting Engineers**

Order Date: 11-Jun-2021

Client PO: 32200

Project Description: **PE3929**

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	15-Jun-21	15-Jun-21
PHC F1	CWS Tier 1 - P&T GC-FID	14-Jun-21	15-Jun-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	15-Jun-21	17-Jun-21

Certificate of Analysis

Report Date: 17-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 11-Jun-2021

Client PO: 32200

Project Description: PE3929

Client ID:	MW1-21-GW1	MW2-21-GW1	-	-
Sample Date:	01-Jun-21 09:00	10-Jun-21 09:00	-	-
Sample ID:	2124683-01	2124683-02	-	-
MDL/Units	Water	Water	-	-

Volatiles

Benzene	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	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	-	-
Toluene-d8	Surrogate	94.6%	93.3%	-	-

Hydrocarbons

F1 PHCs (C6-C10)	25 ug/L	<25	<25	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	-	-

Certificate of Analysis

Report Date: 17-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 11-Jun-2021

Client PO: 32200

Project Description: PE3929

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	74.2		ug/L		92.7	50-140			

Certificate of Analysis

Report Date: 17-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 11-Jun-2021

Client PO: 32200

Project Description: PE3929

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	74.0		ug/L		92.5	50-140			

Certificate of Analysis

Report Date: 17-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 11-Jun-2021

Client PO: 32200

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1890	25	ug/L	ND	94.4	68-117			
F2 PHCs (C10-C16)	1280	100	ug/L	ND	79.7	60-140			
F3 PHCs (C16-C34)	3270	100	ug/L	ND	83.5	60-140			
F4 PHCs (C34-C50)	2270	100	ug/L	ND	91.7	60-140			
Volatiles									
Benzene	40.4	0.5	ug/L	ND	101	60-130			
Ethylbenzene	38.5	0.5	ug/L	ND	96.2	60-130			
Toluene	39.8	0.5	ug/L	ND	99.4	60-130			
m,p-Xylenes	79.6	0.5	ug/L	ND	99.5	60-130			
o-Xylene	41.4	0.5	ug/L	ND	104	60-130			
Surrogate: Toluene-d8	62.8		ug/L		78.4	50-140			

Certificate of Analysis

Report Date: 17-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 11-Jun-2021

Client PO: 32200

Project Description: PE3929

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

CCME PHC additional information:

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



2124683

No 131138

Client Name: Paterson Project Ref: PE3929 Page 1 of 1

Contact Name: Karyn Munch Quote #:

Address: 154 Colonnade Road PO #: 32200 Turnaround Time

Telephone: 613-226-7381 E-mail: jcamposar@patersongroup.ca 1 day 3 day

krmunch@patersongroup.ca 2 day Regular

Date Required: _____

Regulation 153/04		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											
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Med/Fine	<input type="checkbox"/> REG 558	<input type="checkbox"/> PWQO	Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP					
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> CCME	<input type="checkbox"/> MISA									Hg	Cd	Cu	Pb		
<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other		<input type="checkbox"/> SU - Sani	<input type="checkbox"/> SU - Storm														
For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No		Mun: _____		Other: _____														
Sample ID/Location Name																		
1	MW1-21-GW1				GW		3	6/1/2021										
2	MW2-21-GW1				GW		3	6/10/2021										
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments: _____

Method of Delivery: PARACEL COURIER

Relinquished By (Sign): [Signature] Received By Driver/Depot: A. ROUSE Received at Lab: Jerome Park mai Verified By: [Signature]

Relinquished By (Print): Jeremy Campos Date/Time: 11/06/21 2:41 Date/Time: JUN 11, 2021 03:15 Date/Time: JUN 11, 2021 16:03

Date/Time: 6/11/2021 Temperature: 7.1 °C Temperature: 18.0 °C pH Verified: By: _____

Chain of Custody (Env.) xlsx

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 32204
Project: PE3929
Custody: 131143

Report Date: 29-Jun-2021
Order Date: 23-Jun-2021

Revised Report

Order #: 2126441

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

Parcel ID	Client ID
2126441-01	TPTi-1-GS1
2126441-02	TPTi-2-GS1
2126441-03	TPTi-3-GS1
2126441-04	TPTi-4-GS1
2126441-05	TPTi-5-GS1
2126441-06	TPTi-6-GS1

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	24-Jun-21	25-Jun-21
Conductivity	MOE E3138 - probe @25 °C, water ext	28-Jun-21	28-Jun-21
Mercury by CVAA	EPA 7471B - CVAA, digestion	25-Jun-21	25-Jun-21
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	23-Jun-21	24-Jun-21
PHC F1	CWS Tier 1 - P&T GC-FID	24-Jun-21	25-Jun-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	24-Jun-21	25-Jun-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	25-Jun-21	25-Jun-21
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	24-Jun-21	25-Jun-21
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	24-Jun-21	25-Jun-21
SAR	Calculated	28-Jun-21	28-Jun-21
Solids, %	Gravimetric, calculation	24-Jun-21	25-Jun-21

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

Client ID:	TPTi-1-GS1	TPTi-2-GS1	TPTi-3-GS1	TPTi-4-GS1
Sample Date:	23-Jun-21 09:00	23-Jun-21 09:00	23-Jun-21 09:00	23-Jun-21 09:00
Sample ID:	2126441-01	2126441-02	2126441-03	2126441-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	75.0	78.7	77.9	88.4
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General Inorganics

SAR	0.01 N/A	0.59	0.54	3.28	0.30
Conductivity	5 uS/cm	568	524	1830	365
pH	0.05 pH Units	8.41	8.25	8.05	8.16

Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	2.1	2.1	1.8	1.9
Barium	1.0 ug/g dry	245	197	246	118
Beryllium	0.5 ug/g dry	0.6	0.5	0.5	<0.5
Boron	5.0 ug/g dry	5.8	5.7	6.5	6.2
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	45.1	34.1	36.2	24.7
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	12.9	9.8	10.0	7.5
Copper	5.0 ug/g dry	25.8	20.9	20.5	16.5
Lead	1.0 ug/g dry	6.1	5.0	5.2	4.6
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	26.4	19.6	20.7	15.0
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	1.1
Vanadium	10.0 ug/g dry	62.9	53.3	53.3	40.6
Zinc	20.0 ug/g dry	67.5	49.8	51.9	34.1

Volatiles

Acetone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromoform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromomethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chloroform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

	Client ID:	TPTi-1-GS1	TPTi-2-GS1	TPTi-3-GS1	TPTi-4-GS1
	Sample Date:	23-Jun-21 09:00	23-Jun-21 09:00	23-Jun-21 09:00	23-Jun-21 09:00
	Sample ID:	2126441-01	2126441-02	2126441-03	2126441-04
	MDL/Units	Soil	Soil	Soil	Soil
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Hexane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Styrene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	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
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
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
4-Bromofluorobenzene	Surrogate	117%	106%	90.1%	106%
Dibromofluoromethane	Surrogate	101%	98.8%	98.4%	101%

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

	Client ID:	TPTi-1-GS1	TPTi-2-GS1	TPTi-3-GS1	TPTi-4-GS1
	Sample Date:	23-Jun-21 09:00	23-Jun-21 09:00	23-Jun-21 09:00	23-Jun-21 09:00
	Sample ID:	2126441-01	2126441-02	2126441-03	2126441-04
	MDL/Units	Soil	Soil	Soil	Soil
Toluene-d8	Surrogate	99.8%	97.9%	96.0%	130%

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

Semi-Volatiles

Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	86.4%	98.3%	81.1%	74.5%
Terphenyl-d14	Surrogate	97.8%	109%	95.8%	96.1%

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

Client ID:	TPTI-5-GS1	TPTI-6-GS1	-	-
Sample Date:	23-Jun-21 09:00	23-Jun-21 09:00	-	-
Sample ID:	2126441-05	2126441-06	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	91.4	90.4	-	-
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General Inorganics

SAR	0.01 N/A	0.14	0.17	-	-
Conductivity	5 uS/cm	166	143	-	-
pH	0.05 pH Units	8.23	8.23	-	-

Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	1.6	1.4	-	-
Barium	1.0 ug/g dry	96.7	85.8	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	10.5	8.1	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	15.9	14.5	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	-	-
Cobalt	1.0 ug/g dry	5.5	5.6	-	-
Copper	5.0 ug/g dry	9.6	11.1	-	-
Lead	1.0 ug/g dry	4.7	4.3	-	-
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	10.6	10.0	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	23.3	23.7	-	-
Zinc	20.0 ug/g dry	<20.0	22.0	-	-

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: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

	MDL/Units	TPTI-5-GS1 23-Jun-21 09:00 2126441-05 Soil	TPTI-6-GS1 23-Jun-21 09:00 2126441-06 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	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	-	-
1,1,1,2,2-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	100%	92.8%	-	-

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

	Client ID:	TPTI-5-GS1	TPTI-6-GS1	-	-
	Sample Date:	23-Jun-21 09:00	23-Jun-21 09:00	-	-
	Sample ID:	2126441-05	2126441-06	-	-
	MDL/Units	Soil	Soil	-	-
Dibromofluoromethane	Surrogate	106%	85.7%	-	-
Toluene-d8	Surrogate	127%	97.6%	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	-	-

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	97.1%	95.5%	-	-
Terphenyl-d14	Surrogate	109%	108%	-	-

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

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	1.11		ug/g		83.4	50-140			
Surrogate: Terphenyl-d14	1.25		ug/g		93.5	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						

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

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-Hexane	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	3.92		ug/g		122	50-140			
Surrogate: Dibromofluoromethane	2.97		ug/g		92.8	50-140			
Surrogate: Toluene-d8	4.16		ug/g		130	50-140			

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.56	0.01	N/A	0.59			5.2	30	
Conductivity	577	5	uS/cm	568			1.6	5	
pH	7.88	0.05	pH Units	7.86			0.3	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	1.1	1.0	ug/g dry	1.2			2.2	30	
Arsenic	1.8	1.0	ug/g dry	2.1			13.1	30	
Barium	50.9	1.0	ug/g dry	47.2			7.4	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	6.7	5.0	ug/g dry	7.0			3.5	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	15.4	5.0	ug/g dry	16.0			3.6	30	
Cobalt	4.9	1.0	ug/g dry	4.9			0.6	30	
Copper	14.9	5.0	ug/g dry	15.8			5.6	30	
Lead	15.1	1.0	ug/g dry	14.9			1.3	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	1.5	1.0	ug/g dry	1.6			6.8	30	
Nickel	11.5	5.0	ug/g dry	12.0			4.0	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	18.6	10.0	ug/g dry	19.2			2.9	30	
Zinc	32.6	20.0	ug/g dry	31.2			4.3	30	
Physical Characteristics									
% Solids	95.6	0.1	% by Wt.	95.0			0.6	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g dry	ND			NC	40	
Anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] anthracene	0.024	0.02	ug/g dry	0.026			8.3	40	
Benzo [a] pyrene	0.031	0.02	ug/g dry	0.027			16.3	40	
Benzo [b] fluoranthene	0.037	0.02	ug/g dry	0.037			1.0	40	
Benzo [g,h,i] perylene	0.024	0.02	ug/g dry	0.022			10.4	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	0.021			NC	40	
Chrysene	0.029	0.02	ug/g dry	0.033			10.1	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Fluoranthene	0.048	0.02	ug/g dry	0.049			2.4	40	
Fluorene	ND	0.02	ug/g dry	ND			NC	40	
Indeno [1,2,3-cd] pyrene	0.022	0.02	ug/g dry	0.022			1.1	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
Naphthalene	ND	0.01	ug/g dry	ND			NC	40	
Phenanthrene	0.028	0.02	ug/g dry	0.028			1.4	40	
Pyrene	0.043	0.02	ug/g dry	0.046			6.9	40	
Surrogate: 2-Fluorobiphenyl	1.55		ug/g dry		88.0	50-140			
Surrogate: Terphenyl-d14	1.75		ug/g dry		99.0	50-140			
Volatiles									
Acetone	ND	0.50	ug/g dry	ND			NC	50	
Benzene	ND	0.02	ug/g dry	ND			NC	50	

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromodichloromethane	ND	0.05	ug/g dry	ND			NC	50	
Bromoform	ND	0.05	ug/g dry	ND			NC	50	
Bromomethane	ND	0.05	ug/g dry	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
Chloroform	ND	0.05	ug/g dry	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g dry	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.05	ug/g dry	ND			NC	50	
Hexane	ND	0.05	ug/g dry	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g dry	ND			NC	50	
Styrene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	4.09		ug/g dry		119	50-140			
Surrogate: Dibromofluoromethane	3.22		ug/g dry		93.7	50-140			
Surrogate: Toluene-d8	3.99		ug/g dry		116	50-140			

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	177	7	ug/g	ND	88.4	80-120			
F2 PHCs (C10-C16)	89	4	ug/g	ND	98.0	60-140			
F3 PHCs (C16-C34)	233	8	ug/g	ND	105	60-140			
F4 PHCs (C34-C50)	150	6	ug/g	ND	107	60-140			
Metals									
Antimony	46.7	1.0	ug/g	ND	92.5	70-130			
Arsenic	51.9	1.0	ug/g	ND	102	70-130			
Barium	68.3	1.0	ug/g	18.9	98.9	70-130			
Beryllium	50.3	0.5	ug/g	ND	100	70-130			
Boron	48.8	5.0	ug/g	ND	92.0	70-130			
Cadmium	46.6	0.5	ug/g	ND	93.1	70-130			
Chromium (VI)	0.1	0.2	ug/g	ND	59.0	70-130			QM-05
Chromium	57.2	5.0	ug/g	6.4	102	70-130			
Cobalt	51.7	1.0	ug/g	2.0	99.4	70-130			
Copper	55.0	5.0	ug/g	6.3	97.4	70-130			
Lead	61.7	1.0	ug/g	6.0	112	70-130			
Mercury	1.58	0.1	ug/g	ND	106	70-130			
Molybdenum	49.8	1.0	ug/g	ND	98.3	70-130			
Nickel	54.0	5.0	ug/g	ND	98.4	70-130			
Selenium	48.5	1.0	ug/g	ND	96.7	70-130			
Silver	44.5	0.3	ug/g	ND	89.0	70-130			
Thallium	47.8	1.0	ug/g	ND	95.6	70-130			
Uranium	62.3	1.0	ug/g	ND	124	70-130			
Vanadium	58.6	10.0	ug/g	ND	102	70-130			
Zinc	60.7	20.0	ug/g	ND	96.4	70-130			
Semi-Volatiles									
Acenaphthene	0.177	0.02	ug/g	ND	80.1	50-140			
Acenaphthylene	0.147	0.02	ug/g	ND	66.6	50-140			
Anthracene	0.176	0.02	ug/g	ND	79.7	50-140			
Benzo [a] anthracene	0.192	0.02	ug/g	0.026	75.4	50-140			
Benzo [a] pyrene	0.210	0.02	ug/g	0.027	83.1	50-140			
Benzo [b] fluoranthene	0.248	0.02	ug/g	0.037	95.6	50-140			
Benzo [g,h,i] perylene	0.181	0.02	ug/g	0.022	72.1	50-140			
Benzo [k] fluoranthene	0.228	0.02	ug/g	0.021	94.2	50-140			
Chrysene	0.229	0.02	ug/g	0.033	89.2	50-140			
Dibenzo [a,h] anthracene	0.167	0.02	ug/g	ND	75.7	50-140			
Fluoranthene	0.205	0.02	ug/g	0.049	70.8	50-140			
Fluorene	0.152	0.02	ug/g	ND	69.0	50-140			
Indeno [1,2,3-cd] pyrene	0.176	0.02	ug/g	0.022	69.8	50-140			
1-Methylnaphthalene	0.166	0.02	ug/g	ND	75.2	50-140			
2-Methylnaphthalene	0.173	0.02	ug/g	ND	78.2	50-140			
Naphthalene	0.175	0.01	ug/g	ND	79.2	50-140			
Phenanthrene	0.207	0.02	ug/g	0.028	81.3	50-140			
Pyrene	0.200	0.02	ug/g	0.046	69.9	50-140			
Surrogate: 2-Fluorobiphenyl	1.29		ug/g		73.1	50-140			
Surrogate: Terphenyl-d14	1.38		ug/g		78.2	50-140			
Volatiles									
Acetone	13.0	0.50	ug/g	ND	130	50-140			

Certificate of Analysis

Report Date: 29-Jun-2021

Client: Paterson Group Consulting Engineers

Order Date: 23-Jun-2021

Client PO: 32204

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	3.47	0.02	ug/g	ND	86.8	60-130			
Bromodichloromethane	3.48	0.05	ug/g	ND	87.1	60-130			
Bromoform	3.91	0.05	ug/g	ND	97.8	60-130			
Bromomethane	4.15	0.05	ug/g	ND	104	50-140			
Carbon Tetrachloride	3.47	0.05	ug/g	ND	86.8	60-130			
Chlorobenzene	3.58	0.05	ug/g	ND	89.5	60-130			
Chloroform	3.70	0.05	ug/g	ND	92.4	60-130			
Dibromochloromethane	3.87	0.05	ug/g	ND	96.6	60-130			
Dichlorodifluoromethane	4.69	0.05	ug/g	ND	117	50-140			
1,2-Dichlorobenzene	3.85	0.05	ug/g	ND	96.2	60-130			
1,3-Dichlorobenzene	3.78	0.05	ug/g	ND	94.5	60-130			
1,4-Dichlorobenzene	3.60	0.05	ug/g	ND	90.0	60-130			
1,1-Dichloroethane	3.71	0.05	ug/g	ND	92.9	60-130			
1,2-Dichloroethane	3.73	0.05	ug/g	ND	93.3	60-130			
1,1-Dichloroethylene	3.78	0.05	ug/g	ND	94.4	60-130			
cis-1,2-Dichloroethylene	3.62	0.05	ug/g	ND	90.6	60-130			
trans-1,2-Dichloroethylene	3.69	0.05	ug/g	ND	92.3	60-130			
1,2-Dichloropropane	3.72	0.05	ug/g	ND	93.0	60-130			
cis-1,3-Dichloropropylene	3.27	0.05	ug/g	ND	81.8	60-130			
trans-1,3-Dichloropropylene	3.28	0.05	ug/g	ND	81.9	60-130			
Ethylbenzene	3.54	0.05	ug/g	ND	88.6	60-130			
Ethylene dibromide (dibromoethane, 1,2)	3.95	0.05	ug/g	ND	98.8	60-130			
Hexane	4.73	0.05	ug/g	ND	118	60-130			
Methyl Ethyl Ketone (2-Butanone)	11.7	0.50	ug/g	ND	117	50-140			
Methyl Isobutyl Ketone	9.81	0.50	ug/g	ND	98.1	50-140			
Methyl tert-butyl ether	10.6	0.05	ug/g	ND	106	50-140			
Methylene Chloride	3.54	0.05	ug/g	ND	88.4	60-130			
Styrene	3.26	0.05	ug/g	ND	81.6	60-130			
1,1,1,2-Tetrachloroethane	3.98	0.05	ug/g	ND	99.4	60-130			
1,1,2,2-Tetrachloroethane	4.25	0.05	ug/g	ND	106	60-130			
Tetrachloroethylene	3.80	0.05	ug/g	ND	94.9	60-130			
Toluene	3.82	0.05	ug/g	ND	95.5	60-130			
1,1,1-Trichloroethane	3.73	0.05	ug/g	ND	93.3	60-130			
1,1,2-Trichloroethane	3.90	0.05	ug/g	ND	97.4	60-130			
Trichloroethylene	3.57	0.05	ug/g	ND	89.2	60-130			
Trichlorofluoromethane	4.04	0.05	ug/g	ND	101	50-140			
Vinyl chloride	4.52	0.02	ug/g	ND	113	50-140			
m,p-Xylenes	7.30	0.05	ug/g	ND	91.2	60-130			
o-Xylene	3.84	0.05	ug/g	ND	96.1	60-130			
Surrogate: 4-Bromofluorobenzene	3.04		ug/g		94.9	50-140			
Surrogate: Dibromofluoromethane	3.17		ug/g		98.9	50-140			
Surrogate: Toluene-d8	3.05		ug/g		95.2	50-140			

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 32204

Report Date: 29-Jun-2021

Order Date: 23-Jun-2021

Project Description: PE3929

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:

Revision-1 This report includes an updated parameters list as per the client.

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.



Parcel Order Number
(Lab Use Only)

2126441

Chain Of Custody

(Lab Use Only)

No 131143

Client Name: Patoson Group	Project Ref: PE3029	Page <u>1</u> of <u>1</u>
Contact Name: Maryn Munch	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input type="checkbox"/> Regular
Address: 154 Colonnade Rd	PO #: 32204	
Telephone: 613-226-7381	E-mail: mmunch jcampasarcane @ patosongroup.ca	
		Date Required: _____

Regulation 153/04		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															
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Med/Fine	<input type="checkbox"/> REG 558	<input type="checkbox"/> PWQO	Matrix	Air Volume	# of Containers	Sample Taken	Date	Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH	PAC+VOCs			
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> CCME	<input type="checkbox"/> MISA																		<input type="checkbox"/> SU - Sani
<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other																					
Sample ID/Location Name																						
1	TPTi-1-GS1							S	2	6/23/2021				✓	✓	✓	✓	✓	✓	✓		
2	TPTi-2-GS1													✓	✓	✓	✓	✓	✓	✓		
3	TPTi-3-GS1													✓	✓	✓	✓	✓	✓	✓		
4	TPTi-4-GS1													✓	✓	✓	✓	✓	✓	✓		
5	TPTi-5-GS1													✓	✓	✓	✓	✓	✓	✓		
6	TPTi-6-GS1													✓	✓	✓	✓	✓	✓	✓		
7														✓	✓	✓	✓	✓	✓			
8																						
9																						
10																						

Comments: **All ON HOLD**

Method of Delivery: **Drop Box**

Relinquished By (Sign): <i>[Signature]</i>	Received By Driver/Depot:	Received at Lab: <i>[Signature]</i>	Verified By: <i>[Signature]</i>
Relinquished By (Print): Jeremy Campasarcane	Date/Time:	Date/Time: June 23, 2021 17:55	Date/Time: June 24, 2021 11:45
Date/Time: 6/23/2021	Temperature: _____ °C	Temperature: 19.8 °C	pH Verified: <input type="checkbox"/> By: _____

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 32445
Project: PE3929
Custody:

Report Date: 13-Jul-2021
Order Date: 8-Jul-2021

Revised Report

Order #: 2128527

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

Parcel ID	Client ID
2128527-01	TP14-G2
2128527-02	TP14-G4
2128527-03	TP14-G6
2128527-04	TP15-G4
2128527-05	TP17-G3

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	9-Jul-21	9-Jul-21
Conductivity	MOE E3138 - probe @25 °C, water ext	9-Jul-21	9-Jul-21
Mercury by CVAA	EPA 7471B - CVAA, digestion	9-Jul-21	9-Jul-21
PHC F1	CWS Tier 1 - P&T GC-FID	8-Jul-21	9-Jul-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	8-Jul-21	9-Jul-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	9-Jul-21	9-Jul-21
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	7-Jul-21	9-Jul-21
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	8-Jul-21	9-Jul-21
SAR	Calculated	9-Jul-21	9-Jul-21
Solids, %	Gravimetric, calculation	9-Jul-21	9-Jul-21

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

Client ID:	TP14-G2	TP14-G4	TP14-G6	TP15-G4
Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00
Sample ID:	2128527-01	2128527-02	2128527-03	2128527-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	64.2	73.0	89.3	65.3
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General Inorganics

SAR	0.01 N/A	7.67	0.56	0.17	1.01
Conductivity	5 uS/cm	1480	744	207	802

Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	3.6	2.7	1.8	2.6
Barium	1.0 ug/g dry	423	332	123	343
Beryllium	0.5 ug/g dry	0.8	0.8	<0.5	0.6
Boron	5.0 ug/g dry	5.5	8.6	11.6	7.7
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	120	66.0	15.2	46.9
Chromium (VI)	0.2 ug/g dry	0.3	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	25.8	17.3	5.3	13.4
Copper	5.0 ug/g dry	54.4	34.3	9.3	28.0
Lead	1.0 ug/g dry	6.1	6.1	4.1	5.6
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Molybdenum	1.0 ug/g dry	1.1	1.1	<1.0	<1.0
Nickel	5.0 ug/g dry	66.9	37.4	10.3	27.0
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	121	86.3	22.4	68.6
Zinc	20.0 ug/g dry	139	102	<20.0	75.3

Volatiles

Acetone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromoform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromomethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chloroform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

	Client ID:	TP14-G2	TP14-G4	TP14-G6	TP15-G4
	Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00
	Sample ID:	2128527-01	2128527-02	2128527-03	2128527-04
	MDL/Units	Soil	Soil	Soil	Soil
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Hexane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Styrene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	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
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
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
4-Bromofluorobenzene	Surrogate	97.1%	106%	104%	106%
Dibromofluoromethane	Surrogate	89.5%	99.5%	101%	99.2%
Toluene-d8	Surrogate	118%	105%	105%	103%

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

Client ID:	TP14-G2	TP14-G4	TP14-G6	TP15-G4
Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00
Sample ID:	2128527-01	2128527-02	2128527-03	2128527-04
MDL/Units	Soil	Soil	Soil	Soil

Hydrocarbons

	MDL/Units	TP14-G2	TP14-G4	TP14-G6	TP15-G4
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

Semi-Volatiles

	MDL/Units	TP14-G2	TP14-G4	TP14-G6	TP15-G4
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	112%	115%	106%	107%
Terphenyl-d14	Surrogate	119%	136%	111%	136%

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

Client ID:	TP17-G3	-	-	-
Sample Date:	07-Jul-21 09:00	-	-	-
Sample ID:	2128527-05	-	-	-
MDL/Units	Soil	-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	61.2	-	-	-
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General Inorganics

SAR	0.01 N/A	0.79	-	-	-
Conductivity	5 uS/cm	1430	-	-	-

Metals

Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	2.6	-	-	-
Barium	1.0 ug/g dry	285	-	-	-
Beryllium	0.5 ug/g dry	0.7	-	-	-
Boron	5.0 ug/g dry	7.5	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	60.7	-	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	-	-	-
Cobalt	1.0 ug/g dry	15.5	-	-	-
Copper	5.0 ug/g dry	30.8	-	-	-
Lead	1.0 ug/g dry	5.7	-	-	-
Mercury	0.1 ug/g dry	<0.1	-	-	-
Molybdenum	1.0 ug/g dry	1.0	-	-	-
Nickel	5.0 ug/g dry	35.5	-	-	-
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	1.3	-	-	-
Vanadium	10.0 ug/g dry	79.0	-	-	-
Zinc	20.0 ug/g dry	92.8	-	-	-

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	-	-	-

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

	MDL/Units	Client ID: Sample Date: Sample ID:			
		TP17-G3 07-Jul-21 09:00 2128527-05	-	-	-
		Soil	-	-	-
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	-	-	-
1,1,1,2,2-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	106%	-	-	-
Dibromofluoromethane	Surrogate	100%	-	-	-

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

	Client ID:	TP17-G3	-	-	-
	Sample Date:	07-Jul-21 09:00	-	-	-
	Sample ID:	2128527-05	-	-	-
	MDL/Units	Soil	-	-	-
Toluene-d8	Surrogate	107%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	-	-
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	102%	-	-	-
Terphenyl-d14	Surrogate	102%	-	-	-

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

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	1.27		ug/g		95.3	50-140			
Surrogate: Terphenyl-d14	1.41		ug/g		106	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						

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

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	8.64		ug/g		108	50-140			
Surrogate: Dibromofluoromethane	8.54		ug/g		107	50-140			
Surrogate: Toluene-d8	8.48		ug/g		106	50-140			

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	7.73	0.01	N/A	7.67			0.8	30	
Conductivity	1460	5	uS/cm	1480			1.7	5	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	161	8	ug/g dry	186			14.6	30	
F4 PHCs (C34-C50)	139	6	ug/g dry	174			22.6	30	ORG01
Metals									
Antimony	4.0	1.0	ug/g dry	4.0			1.0	30	
Arsenic	7.5	1.0	ug/g dry	8.7			14.7	30	
Barium	108	1.0	ug/g dry	132			20.6	30	
Beryllium	0.6	0.5	ug/g dry	0.7			15.3	30	
Boron	7.2	5.0	ug/g dry	8.3			14.9	30	
Cadmium	ND	0.5	ug/g dry	0.6			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	24.6	5.0	ug/g dry	28.3			13.9	30	
Cobalt	12.6	1.0	ug/g dry	14.7			15.5	30	
Copper	23.9	5.0	ug/g dry	29.2			19.8	30	
Lead	68.8	1.0	ug/g dry	81.0			16.3	30	
Mercury	0.152	0.1	ug/g dry	0.151			0.7	30	
Molybdenum	7.3	1.0	ug/g dry	8.2			11.9	30	
Nickel	26.1	5.0	ug/g dry	30.0			13.8	30	
Selenium	1.4	1.0	ug/g dry	1.5			9.5	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	1.8	1.0	ug/g dry	2.1			14.4	30	
Vanadium	42.2	10.0	ug/g dry	48.7			14.2	30	
Zinc	123	20.0	ug/g dry	140			13.6	30	
Physical Characteristics									
% Solids	74.5	0.1	% by Wt.	73.6			1.2	25	
Semi-Volatiles									
Acenaphthene	0.048	0.02	ug/g dry	0.045			6.6	40	
Acenaphthylene	0.147	0.02	ug/g dry	0.126			15.0	40	
Anthracene	0.178	0.02	ug/g dry	0.159			11.5	40	
Benzo [a] anthracene	0.761	0.02	ug/g dry	0.646			16.4	40	
Benzo [a] pyrene	0.991	0.02	ug/g dry	0.808			20.4	40	
Benzo [b] fluoranthene	1.15	0.02	ug/g dry	0.967			17.4	40	
Benzo [g,h,i] perylene	0.596	0.02	ug/g dry	0.478			22.0	40	
Benzo [k] fluoranthene	0.573	0.02	ug/g dry	0.486			16.4	40	
Chrysene	0.874	0.02	ug/g dry	0.741			16.5	40	
Dibenzo [a,h] anthracene	0.155	0.02	ug/g dry	0.128			18.8	40	
Fluoranthene	1.97	0.02	ug/g dry	1.73			13.2	40	
Fluorene	0.053	0.02	ug/g dry	0.051			3.3	40	
Indeno [1,2,3-cd] pyrene	0.592	0.02	ug/g dry	0.492			18.5	40	
1-Methylnaphthalene	0.050	0.02	ug/g dry	0.065			27.2	40	
2-Methylnaphthalene	0.050	0.02	ug/g dry	0.054			9.3	40	
Naphthalene	0.031	0.01	ug/g dry	0.033			7.0	40	
Phenanthrene	0.767	0.02	ug/g dry	0.687			11.1	40	
Pyrene	1.64	0.02	ug/g dry	1.42			13.9	40	
Surrogate: 2-Fluorobiphenyl	1.77		ug/g dry		116	50-140			
Surrogate: Terphenyl-d14	1.92		ug/g dry		126	50-140			
Volatiles									
Acetone	ND	0.50	ug/g dry	ND			NC	50	
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g dry	ND			NC	50	

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromoform	ND	0.05	ug/g dry	ND			NC	50	
Bromomethane	ND	0.05	ug/g dry	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
Chloroform	ND	0.05	ug/g dry	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g dry	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.05	ug/g dry	ND			NC	50	
Hexane	ND	0.05	ug/g dry	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g dry	ND			NC	50	
Styrene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	8.35		ug/g dry		104	50-140			
Surrogate: Dibromofluoromethane	8.17		ug/g dry		102	50-140			
Surrogate: Toluene-d8	8.57		ug/g dry		107	50-140			

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	207	7	ug/g	ND	104	80-120			
F2 PHCs (C10-C16)	83	4	ug/g	ND	89.0	60-140			
F3 PHCs (C16-C34)	378	8	ug/g	186	83.8	60-140			
F4 PHCs (C34-C50)	305	6	ug/g	174	89.8	60-140			ORG0 1
Metals									
Antimony	51.8	1.0	ug/g	1.6	100	70-130			
Arsenic	53.5	1.0	ug/g	3.5	100	70-130			
Barium	99.0	1.0	ug/g	52.9	92.1	70-130			
Beryllium	49.4	0.5	ug/g	ND	98.1	70-130			
Boron	49.7	5.0	ug/g	ND	92.8	70-130			
Cadmium	50.6	0.5	ug/g	ND	101	70-130			
Chromium (VI)	0.1	0.2	ug/g	ND	69.5	70-130			QM-05
Chromium	61.6	5.0	ug/g	11.3	101	70-130			
Cobalt	55.6	1.0	ug/g	5.9	99.3	70-130			
Copper	59.3	5.0	ug/g	11.7	95.3	70-130			
Lead	77.9	1.0	ug/g	32.4	91.0	70-130			
Mercury	1.77	0.1	ug/g	0.151	108	70-130			
Molybdenum	49.6	1.0	ug/g	3.3	92.6	70-130			
Nickel	60.7	5.0	ug/g	12.0	97.4	70-130			
Selenium	47.1	1.0	ug/g	ND	93.0	70-130			
Silver	47.0	0.3	ug/g	ND	93.9	70-130			
Thallium	51.0	1.0	ug/g	ND	101	70-130			
Uranium	52.0	1.0	ug/g	ND	102	70-130			
Vanadium	69.2	10.0	ug/g	19.5	99.4	70-130			
Zinc	98.6	20.0	ug/g	56.1	84.9	70-130			
Semi-Volatiles									
Acenaphthene	0.269	0.02	ug/g	0.045	118	50-140			
Acenaphthylene	0.339	0.02	ug/g	0.126	112	50-140			
Anthracene	0.404	0.02	ug/g	0.159	129	50-140			
Benzo [a] anthracene	0.135	0.02	ug/g	ND	81.2	50-140			
Benzo [a] pyrene	0.160	0.02	ug/g	ND	96.2	50-140			
Benzo [b] fluoranthene	0.179	0.02	ug/g	ND	108	50-140			
Benzo [g,h,i] perylene	0.777	0.02	ug/g	0.478	157	50-140			QM-06
Benzo [k] fluoranthene	0.157	0.02	ug/g	ND	94.4	50-140			
Chrysene	0.163	0.02	ug/g	ND	97.5	50-140			
Dibenzo [a,h] anthracene	0.338	0.02	ug/g	0.128	110	50-140			
Fluoranthene	0.156	0.02	ug/g	ND	93.3	50-140			
Fluorene	0.251	0.02	ug/g	0.051	105	50-140			
Indeno [1,2,3-cd] pyrene	0.797	0.02	ug/g	0.492	161	50-140			QM-06
1-Methylnaphthalene	0.249	0.02	ug/g	0.065	96.6	50-140			
2-Methylnaphthalene	0.261	0.02	ug/g	0.054	109	50-140			
Naphthalene	0.235	0.01	ug/g	0.033	106	50-140			
Phenanthrene	0.168	0.02	ug/g	ND	101	50-140			
Pyrene	0.157	0.02	ug/g	ND	94.0	50-140			
Surrogate: 2-Fluorobiphenyl	1.56		ug/g		102	50-140			
Surrogate: Terphenyl-d14	1.65		ug/g		109	50-140			

Volatiles

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Acetone	10.9	0.50	ug/g	ND	109	50-140			
Benzene	4.09	0.02	ug/g	ND	102	60-130			
Bromodichloromethane	3.52	0.05	ug/g	ND	88.0	60-130			
Bromoform	3.77	0.05	ug/g	ND	94.2	60-130			
Bromomethane	4.21	0.05	ug/g	ND	105	50-140			
Carbon Tetrachloride	3.11	0.05	ug/g	ND	77.6	60-130			
Chlorobenzene	3.98	0.05	ug/g	ND	99.5	60-130			
Chloroform	4.00	0.05	ug/g	ND	100	60-130			
Dibromochloromethane	3.44	0.05	ug/g	ND	86.0	60-130			
Dichlorodifluoromethane	4.83	0.05	ug/g	ND	121	50-140			
1,2-Dichlorobenzene	3.41	0.05	ug/g	ND	85.3	60-130			
1,3-Dichlorobenzene	3.59	0.05	ug/g	ND	89.7	60-130			
1,4-Dichlorobenzene	3.49	0.05	ug/g	ND	87.2	60-130			
1,1-Dichloroethane	4.21	0.05	ug/g	ND	105	60-130			
1,2-Dichloroethane	3.99	0.05	ug/g	ND	99.8	60-130			
1,1-Dichloroethylene	4.83	0.05	ug/g	ND	121	60-130			
cis-1,2-Dichloroethylene	3.97	0.05	ug/g	ND	99.3	60-130			
trans-1,2-Dichloroethylene	4.13	0.05	ug/g	ND	103	60-130			
1,2-Dichloropropane	3.96	0.05	ug/g	ND	99.0	60-130			
cis-1,3-Dichloropropylene	2.91	0.05	ug/g	ND	72.9	60-130			
trans-1,3-Dichloropropylene	3.10	0.05	ug/g	ND	77.5	60-130			
Ethylbenzene	3.68	0.05	ug/g	ND	92.0	60-130			
Ethylene dibromide (dibromoethane, 1,2-	3.40	0.05	ug/g	ND	85.1	60-130			
Hexane	2.99	0.05	ug/g	ND	74.8	60-130			
Methyl Ethyl Ketone (2-Butanone)	8.36	0.50	ug/g	ND	83.6	50-140			
Methyl Isobutyl Ketone	8.49	0.50	ug/g	ND	84.9	50-140			
Methyl tert-butyl ether	9.87	0.05	ug/g	ND	98.7	50-140			
Methylene Chloride	4.42	0.05	ug/g	ND	111	60-130			
Styrene	4.02	0.05	ug/g	ND	100	60-130			
1,1,1,2-Tetrachloroethane	3.57	0.05	ug/g	ND	89.2	60-130			
1,1,2,2-Tetrachloroethane	3.09	0.05	ug/g	ND	77.2	60-130			
Tetrachloroethylene	3.50	0.05	ug/g	ND	87.5	60-130			
Toluene	4.11	0.05	ug/g	ND	103	60-130			
1,1,1-Trichloroethane	3.85	0.05	ug/g	ND	96.3	60-130			
1,1,2-Trichloroethane	3.81	0.05	ug/g	ND	95.2	60-130			
Trichloroethylene	4.36	0.05	ug/g	ND	109	60-130			
Trichlorofluoromethane	3.44	0.05	ug/g	ND	85.9	50-140			
Vinyl chloride	4.66	0.02	ug/g	ND	116	50-140			
m,p-Xylenes	7.40	0.05	ug/g	ND	92.5	60-130			
o-Xylene	3.86	0.05	ug/g	ND	96.4	60-130			
Surrogate: 4-Bromofluorobenzene	9.15		ug/g		114	50-140			
Surrogate: Dibromofluoromethane	9.02		ug/g		113	50-140			
Surrogate: Toluene-d8	8.37		ug/g		105	50-140			

Certificate of Analysis

Report Date: 13-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32445

Project Description: PE3929

Qualifier Notes:

Login Qualifiers :

Container and COC sample IDs don't match - COC ID missng "21" in the middle a shown on the containers

Applies to samples: TP14-G2, TP14-G4, TP14-G6, TP15-G4, TP17-G3

QC Qualifiers :

ORG01 : GC-FID signal did not return to baseline by C50

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

QM-06 : Due to noted non-homogeneity of the QC sample matrix, the spike recoveries were out side the accepted range. Batch data accepted based on other QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision 1 - this report includes updated VOC data based on re-analysis of the samples.

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.



Parcel Order Number (Lab Use Only) 2128527	Chain Of Custody (Lab Use Only)
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Client Name: Paterson Group	Project Ref: PE3929	Page 1 of 1
Contact Name: Kaylyn Munch	Quote #:	Turnaround Time <input checked="" type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input type="checkbox"/> Regular Date Required: _____
Address: 181 Colonnado Rd S.	PO #: 32445	
Telephone: 613-226-7381	E-mail: kmunch@patersongroup.ca	

<input type="checkbox"/> REG 153/04 <input checked="" type="checkbox"/> 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									
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> Table 2 <input checked="" type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm <input type="checkbox"/> Table 3.1 For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Other: _____		Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR
Sample ID/Location Name	Date				Time									
1	TP14-G2	S		2	July 7/21	am	✓	✓	✓	✓	✓	✓	✓	✓
2	TP14-G4	S		2	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓
3	TP14-G6	S		2	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓
4	TP15-G4	S		2	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓
5	TP17-G3	S		2	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓
6														
7														
8														
9														
10														

Comments:			Method of Delivery: Drop Box		
Relinquished By (Sign): KMunch	Received By Driver/Depot:	Received at Lab: Blm	Verified By: Blm		
Relinquished By (Print): KMunch	Date/Time:	Date/Time: July 8, 2021 16:45	Date/Time: July 8, 2021 17:32		
Date/Time: July 8/21	Temperature: _____ °C	Temperature: 8.4 °C	pH Verified: <input type="checkbox"/> By:		

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 32446
Project: PE3929
Custody:

Report Date: 14-Jul-2021
Order Date: 8-Jul-2021

Order #: 2128526

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

Parcel ID	Client ID
2128526-01	TP10-G1
2128526-02	TP10-G3
2128526-04	TP11-G5
2128526-08	TP18-G2
2128526-10	TP18-G6
2128526-11	TPJ-G3

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	9-Jul-21	9-Jul-21
Conductivity	MOE E3138 - probe @25 °C, water ext	14-Jul-21	14-Jul-21
Mercury by CVAA	EPA 7471B - CVAA, digestion	13-Jul-21	13-Jul-21
PHC F1	CWS Tier 1 - P&T GC-FID	12-Jul-21	13-Jul-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	13-Jul-21	13-Jul-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	13-Jul-21	13-Jul-21
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	13-Jul-21	13-Jul-21
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	12-Jul-21	13-Jul-21
SAR	Calculated	13-Jul-21	13-Jul-21
Solids, %	Gravimetric, calculation	9-Jul-21	9-Jul-21

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

Client ID:	TP10-G1	TP10-G3	TP11-G5	TP18-G2
Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00
Sample ID:	2128526-01	2128526-02	2128526-04	2128526-08
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	89.8	88.8	91.9	64.1
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General Inorganics

SAR	0.01 N/A	0.61	0.45	0.20	4.09
Conductivity	5 uS/cm	1320	1380	211	915

Metals

Antimony	1.0 ug/g dry	3.2	1.5	<1.0	<1.0
Arsenic	1.0 ug/g dry	1.3	1.3	1.2	2.8
Barium	1.0 ug/g dry	53.1	48.2	64.4	367
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	0.8
Boron	5.0 ug/g dry	6.8	5.8	6.4	5.4
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	11.1	11.5	9.5	111
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	4.7	5.0	3.8	23.5
Copper	5.0 ug/g dry	9.4	8.7	7.4	51.3
Lead	1.0 ug/g dry	3.3	3.3	2.1	6.5
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Molybdenum	1.0 ug/g dry	1.6	<1.0	<1.0	1.0
Nickel	5.0 ug/g dry	8.3	8.4	6.1	63.1
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	23.3	24.6	18.9	110
Zinc	20.0 ug/g dry	24.8	23.9	<20.0	128

Volatiles

Acetone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromoform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromomethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chloroform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

	Client ID:	TP10-G1	TP10-G3	TP11-G5	TP18-G2
	Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00
	Sample ID:	2128526-01	2128526-02	2128526-04	2128526-08
	MDL/Units	Soil	Soil	Soil	Soil
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Hexane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Styrene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	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
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
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
4-Bromofluorobenzene	Surrogate	95.0%	94.5%	96.0%	95.3%
Dibromofluoromethane	Surrogate	72.7%	75.2%	84.5%	76.8%
Toluene-d8	Surrogate	106%	105%	106%	105%

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

Client ID:	TP10-G1	TP10-G3	TP11-G5	TP18-G2
Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00
Sample ID:	2128526-01	2128526-02	2128526-04	2128526-08
MDL/Units	Soil	Soil	Soil	Soil

Hydrocarbons

	MDL/Units	TP10-G1	TP10-G3	TP11-G5	TP18-G2
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

Semi-Volatiles

	MDL/Units	TP10-G1	TP10-G3	TP11-G5	TP18-G2
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	99.1%	111%	115%	99.6%
Terphenyl-d14	Surrogate	111%	123%	124%	115%

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

Client ID:	TP18-G6	TPJ-G3	-	-
Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	-	-
Sample ID:	2128526-10	2128526-11	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	78.6	87.1	-	-
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General Inorganics

SAR	0.01 N/A	0.35	0.53	-	-
Conductivity	5 uS/cm	290	1200	-	-

Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	1.9	1.4	-	-
Barium	1.0 ug/g dry	129	47.1	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	7.0	6.7	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	29.9	12.0	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	-	-
Cobalt	1.0 ug/g dry	8.9	4.5	-	-
Copper	5.0 ug/g dry	18.2	8.8	-	-
Lead	1.0 ug/g dry	3.9	3.7	-	-
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	17.7	8.2	-	-
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	47.1	25.5	-	-
Zinc	20.0 ug/g dry	42.7	24.0	-	-

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: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

	MDL/Units	TP18-G6 07-Jul-21 09:00 2128526-10 Soil	TPJ-G3 07-Jul-21 09:00 2128526-11 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	<0.05	<0.05	-	-
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	-	-
1,1,1,2,2-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	91.8%	92.8%	-	-
Dibromofluoromethane	Surrogate	79.2%	73.4%	-	-

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

	Client ID:	TP18-G6	TPJ-G3	-	-
	Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	-	-
	Sample ID:	2128526-10	2128526-11	-	-
	MDL/Units	Soil	Soil	-	-
Toluene-d8	Surrogate	106%	105%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	-	-
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	79.0%	98.1%	-	-
Terphenyl-d14	Surrogate	94.5%	107%	-	-

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

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		89.8	50-140			
Surrogate: Terphenyl-d14	1.25		ug/g		94.0	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						

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

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-Hexane	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	3.68		ug/g		115	50-140			
Surrogate: Dibromofluoromethane	3.10		ug/g		96.9	50-140			
Surrogate: Toluene-d8	4.03		ug/g		126	50-140			

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.56	0.01	N/A	0.61			8.6	30	
Conductivity	1280	5	uS/cm	1320			2.7	5	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	3.1	1.0	ug/g dry	3.2			3.3	30	
Arsenic	1.4	1.0	ug/g dry	1.3			4.1	30	
Barium	41.9	1.0	ug/g dry	53.1			23.6	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	6.1	5.0	ug/g dry	6.8			11.2	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	9.5	5.0	ug/g dry	11.1			15.9	30	
Cobalt	4.5	1.0	ug/g dry	4.7			5.6	30	
Copper	7.6	5.0	ug/g dry	9.4			20.4	30	
Lead	3.2	1.0	ug/g dry	3.3			4.4	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	1.7	1.0	ug/g dry	1.6			5.9	30	
Nickel	7.2	5.0	ug/g dry	8.3			13.4	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	19.9	10.0	ug/g dry	23.3			15.7	30	
Zinc	23.9	20.0	ug/g dry	24.8			3.8	30	
Physical Characteristics									
% Solids	74.5	0.1	% by Wt.	73.6			1.2	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g dry	ND			NC	40	
Anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Chrysene	ND	0.02	ug/g dry	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Fluorene	ND	0.02	ug/g dry	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
Naphthalene	ND	0.01	ug/g dry	ND			NC	40	
Phenanthrene	ND	0.02	ug/g dry	ND			NC	40	
Pyrene	ND	0.02	ug/g dry	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	1.33		ug/g dry		93.6	50-140			
Surrogate: Terphenyl-d14	1.46		ug/g dry		103	50-140			
Volatiles									
Acetone	ND	0.50	ug/g dry	ND			NC	50	
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g dry	ND			NC	50	

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromoform	ND	0.05	ug/g dry	ND			NC	50	
Bromomethane	ND	0.05	ug/g dry	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
Chloroform	ND	0.05	ug/g dry	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g dry	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.05	ug/g dry	ND			NC	50	
Hexane	ND	0.05	ug/g dry	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g dry	ND			NC	50	
Styrene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	4.21		ug/g dry		107	50-140			
Surrogate: Dibromofluoromethane	3.65		ug/g dry		92.7	50-140			
Surrogate: Toluene-d8	5.38		ug/g dry		137	50-140			

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	184	7	ug/g	ND	91.9	80-120			
F2 PHCs (C10-C16)	75	4	ug/g	ND	80.0	60-140			
F3 PHCs (C16-C34)	190	8	ug/g	ND	83.2	60-140			
F4 PHCs (C34-C50)	130	6	ug/g	ND	90.0	60-140			
Metals									
Antimony	50.4	1.0	ug/g	1.3	98.2	70-130			
Arsenic	52.1	1.0	ug/g	ND	103	70-130			
Barium	73.5	1.0	ug/g	21.2	104	70-130			
Beryllium	51.6	0.5	ug/g	ND	103	70-130			
Boron	49.8	5.0	ug/g	ND	94.1	70-130			
Cadmium	50.3	0.5	ug/g	ND	100	70-130			
Chromium (VI)	0.1	0.2	ug/g	ND	69.5	70-130			QM-05
Chromium	56.6	5.0	ug/g	ND	104	70-130			
Cobalt	54.4	1.0	ug/g	1.9	105	70-130			
Copper	53.3	5.0	ug/g	ND	99.1	70-130			
Lead	46.4	1.0	ug/g	1.3	90.1	70-130			
Mercury	1.33	0.1	ug/g	ND	88.9	70-130			
Molybdenum	48.8	1.0	ug/g	ND	96.3	70-130			
Nickel	53.6	5.0	ug/g	ND	101	70-130			
Selenium	46.7	1.0	ug/g	ND	93.0	70-130			
Silver	48.2	0.3	ug/g	ND	96.4	70-130			
Thallium	49.7	1.0	ug/g	ND	99.2	70-130			
Uranium	46.5	1.0	ug/g	ND	92.5	70-130			
Vanadium	62.4	10.0	ug/g	ND	106	70-130			
Zinc	57.7	20.0	ug/g	ND	95.6	70-130			
Semi-Volatiles									
Acenaphthene	0.198	0.02	ug/g	ND	112	50-140			
Acenaphthylene	0.178	0.02	ug/g	ND	100	50-140			
Anthracene	0.184	0.02	ug/g	ND	104	50-140			
Benzo [a] anthracene	0.153	0.02	ug/g	ND	86.4	50-140			
Benzo [a] pyrene	0.186	0.02	ug/g	ND	105	50-140			
Benzo [b] fluoranthene	0.222	0.02	ug/g	ND	125	50-140			
Benzo [g,h,i] perylene	0.186	0.02	ug/g	ND	105	50-140			
Benzo [k] fluoranthene	0.192	0.02	ug/g	ND	108	50-140			
Chrysene	0.192	0.02	ug/g	ND	108	50-140			
Dibenzo [a,h] anthracene	0.180	0.02	ug/g	ND	101	50-140			
Fluoranthene	0.181	0.02	ug/g	ND	102	50-140			
Fluorene	0.181	0.02	ug/g	ND	102	50-140			
Indeno [1,2,3-cd] pyrene	0.184	0.02	ug/g	ND	104	50-140			
1-Methylnaphthalene	0.207	0.02	ug/g	ND	116	50-140			
2-Methylnaphthalene	0.223	0.02	ug/g	ND	126	50-140			
Naphthalene	0.216	0.01	ug/g	ND	121	50-140			
Phenanthrene	0.188	0.02	ug/g	ND	106	50-140			
Pyrene	0.182	0.02	ug/g	ND	103	50-140			
Surrogate: 2-Fluorobiphenyl	1.52		ug/g		107	50-140			
Surrogate: Terphenyl-d14	1.45		ug/g		102	50-140			
Volatiles									
Acetone	11.9	0.50	ug/g	ND	119	50-140			

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	3.45	0.02	ug/g	ND	86.2	60-130			
Bromodichloromethane	3.21	0.05	ug/g	ND	80.2	60-130			
Bromoform	3.27	0.05	ug/g	ND	81.8	60-130			
Bromomethane	3.16	0.05	ug/g	ND	79.0	50-140			
Carbon Tetrachloride	2.77	0.05	ug/g	ND	69.2	60-130			
Chlorobenzene	3.42	0.05	ug/g	ND	85.4	60-130			
Chloroform	3.19	0.05	ug/g	ND	79.8	60-130			
Dibromochloromethane	3.34	0.05	ug/g	ND	83.4	60-130			
Dichlorodifluoromethane	4.82	0.05	ug/g	ND	121	50-140			
1,2-Dichlorobenzene	3.51	0.05	ug/g	ND	87.8	60-130			
1,3-Dichlorobenzene	3.42	0.05	ug/g	ND	85.6	60-130			
1,4-Dichlorobenzene	3.47	0.05	ug/g	ND	86.7	60-130			
1,1-Dichloroethane	3.22	0.05	ug/g	ND	80.4	60-130			
1,2-Dichloroethane	3.29	0.05	ug/g	ND	82.2	60-130			
1,1-Dichloroethylene	2.95	0.05	ug/g	ND	73.8	60-130			
cis-1,2-Dichloroethylene	3.15	0.05	ug/g	ND	78.8	60-130			
trans-1,2-Dichloroethylene	3.19	0.05	ug/g	ND	79.7	60-130			
1,2-Dichloropropane	3.32	0.05	ug/g	ND	82.9	60-130			
cis-1,3-Dichloropropylene	4.13	0.05	ug/g	ND	103	60-130			
trans-1,3-Dichloropropylene	2.68	0.05	ug/g	ND	67.1	60-130			
Ethylbenzene	3.75	0.05	ug/g	ND	93.7	60-130			
Ethylene dibromide (dibromoethane, 1,2)	3.78	0.05	ug/g	ND	94.5	60-130			
Hexane	3.12	0.05	ug/g	ND	78.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	10.2	0.50	ug/g	ND	102	50-140			
Methyl Isobutyl Ketone	9.46	0.50	ug/g	ND	94.6	50-140			
Methyl tert-butyl ether	10.3	0.05	ug/g	ND	103	50-140			
Methylene Chloride	2.72	0.05	ug/g	ND	68.1	60-130			
Styrene	3.24	0.05	ug/g	ND	81.0	60-130			
1,1,1,2-Tetrachloroethane	3.66	0.05	ug/g	ND	91.6	60-130			
1,1,1,2-Tetrachloroethane	3.81	0.05	ug/g	ND	95.2	60-130			
Tetrachloroethylene	3.41	0.05	ug/g	ND	85.2	60-130			
Toluene	3.67	0.05	ug/g	ND	91.7	60-130			
1,1,1-Trichloroethane	3.05	0.05	ug/g	ND	76.3	60-130			
1,1,2-Trichloroethane	3.40	0.05	ug/g	ND	85.1	60-130			
Trichloroethylene	3.19	0.05	ug/g	ND	79.8	60-130			
Trichlorofluoromethane	2.07	0.05	ug/g	ND	51.7	50-140			
Vinyl chloride	4.65	0.02	ug/g	ND	116	50-140			
m,p-Xylenes	6.55	0.05	ug/g	ND	81.9	60-130			
o-Xylene	3.65	0.05	ug/g	ND	91.2	60-130			

Certificate of Analysis

Report Date: 14-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 8-Jul-2021

Client PO: 32446

Project Description: PE3929

Qualifier Notes:

Login Qualifiers :

Container and COC sample IDs don't match - COC ID missing "21" in the middle as shown on the jar + vial

Applies to samples: TP10-G1, TP10-G3, TP11-G5, TP18-G2, TP18-G6

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.



18 Blvd
G 4, B8
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Parcel Order Number (Lab Use Only) 2128526	Chain Of Custody (Lab Use Only)
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Client Name: Paterson Group Inc.	Project Ref: PE3929	Page 1 of 2
Contact Name: Karyn Munch	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input checked="" type="checkbox"/> 2 day <input type="checkbox"/> Regular Date Required: _____
Address: 154 Colborne Rd S.	PO #: 32446	
Telephone: (613-226-7381)	E-mail: kmunch@patersongroup.ca	

<input type="checkbox"/> REG 153/04 <input checked="" type="checkbox"/> REG 406/19 Other Regulation <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> Table 2 <input checked="" type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm <input checked="" type="checkbox"/> Table 3.1 For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Other: _____ Mun: _____		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		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR
				Date	Time								
1 TP10-G1	S		2	July 7/21	am	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
2 TP10-G3													
3 TP11-G3													
4 TP11-G5													
5 TP12-G1													
6 TP12-G3													
7 TP12-G5													
8 TP18-G2													
9 TP18-G4													
10 TP18-G6													

Comments:			Method of Delivery: Drop Box		
Relinquished By (Sign): KMunch	Received By Driver/Depot:	Received at Lab: BFM	Verified By: BFM		
Relinquished By (Print): KMunch	Date/Time:	Date/Time: July 8, 2021 16:45	Date/Time: July 8, 2021 17:22		
Date/Time: July 8/21	Temperature: _____ °C	Temperature: 8.4 °C	pH Verified: <input type="checkbox"/> By:		



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Parcel Order Number (Lab Use Only) 2128526	Chain Of Custody (Lab Use Only)
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Client Name: <u>Paterson Group Inc.</u>	Project Ref: <u>PE3929</u>	Page <u>2</u> of <u>2</u>
Contact Name: <u>Kaelyn Munch</u>	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input checked="" type="checkbox"/> 2 day <input type="checkbox"/> Regular Date Required: _____
Address: <u>124 Colonnade Rd S.</u>	PO #: <u>32446</u>	
Telephone: <u>613-226-7381</u>	E-mail: <u>kmunch@patersongroup.ca</u>	

<input type="checkbox"/> REG 153/04	<input checked="" type="checkbox"/> 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										
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Med/Fine	<input type="checkbox"/> REG 558	<input type="checkbox"/> PWQO	Matrix	Air Volume	# of Containers	Sample Taken Date Time		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	<u>EC/SAR</u>
<input type="checkbox"/> Table 2	<input checked="" type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> CCME	<input type="checkbox"/> MISA													
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other																
<input type="checkbox"/> Table <u>3.1</u>																	
For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No																	
Sample ID/Location Name																	
1	<u>TPJ-63</u>	<u>S</u>	<u>2</u>	<u>July 7/21</u>	<u>am</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
2	<u>TPJ-65</u>	<u>S</u>	<u>2</u>	<u>"</u>	<u>am</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments:			Method of Delivery: <u>DB</u>		
Relinquished By (Sign): <u>KMunch</u>	Received By Driver/Depot:	Received at Lab: <u>BSM</u>	Verified By: <u>BSM</u>		
Relinquished By (Print): <u>KMunch</u>	Date/Time:	Date/Time: <u>JUL 8, 2021 16:45</u>	Date/Time: <u>JUL 8, 2021 17:22</u>		
Date/Time: <u>July 8/21</u>	Temperature: _____ °C	Temperature: <u>8.4°C</u>	pH Verified: <input type="checkbox"/> By: _____		

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Karyn Munch

Client PO: 32465
Project: PE3929
Custody: 132957

Report Date: 16-Jul-2021
Order Date: 13-Jul-2021

Order #: 2129267

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

Paracel ID	Client ID
2129267-01	TP12-G2
2129267-02	TP12-G5
2129267-03	TPL-G5
2129267-04	TP13-G4
2129267-05	TP16-G2
2129267-06	TP16-G5

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	12-Jul-21	16-Jul-21
Conductivity	MOE E3138 - probe @25 °C, water ext	15-Jul-21	15-Jul-21
Mercury by CVAA	EPA 7471B - CVAA, digestion	15-Jul-21	15-Jul-21
PHC F1	CWS Tier 1 - P&T GC-FID	14-Jul-21	15-Jul-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	14-Jul-21	15-Jul-21
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	15-Jul-21	15-Jul-21
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	14-Jul-21	15-Jul-21
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	13-Jul-21	15-Jul-21
SAR	Calculated	15-Jul-21	15-Jul-21
Solids, %	Gravimetric, calculation	14-Jul-21	14-Jul-21

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

Client ID:	TP12-G2	TP12-G5	TPL-G5	TP13-G4
Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00
Sample ID:	2129267-01	2129267-02	2129267-03	2129267-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	89.3	91.9	92.3	85.3
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General Inorganics

SAR	0.01 N/A	0.42	0.52	0.49	1.17
Conductivity	5 uS/cm	200	151	151	329

Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	1.7	1.5	1.4	1.6
Barium	1.0 ug/g dry	84.9	52.4	43.5	117
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Boron	5.0 ug/g dry	8.9	<5.0	<5.0	7.4
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	12.6	8.9	8.8	19.1
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	5.3	4.2	4.0	6.4
Copper	5.0 ug/g dry	10.6	8.2	8.5	12.3
Lead	1.0 ug/g dry	3.8	2.5	2.3	3.6
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Nickel	5.0 ug/g dry	9.3	5.5	5.8	11.7
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	19.7	21.0	20.7	29.4
Zinc	20.0 ug/g dry	<20.0	20.0	<20.0	25.1

Volatiles

Acetone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromoform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromomethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chloroform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

	Client ID:	TP12-G2	TP12-G5	TPL-G5	TP13-G4
	Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00
	Sample ID:	2129267-01	2129267-02	2129267-03	2129267-04
	MDL/Units	Soil	Soil	Soil	Soil
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Hexane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Styrene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	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
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
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
4-Bromofluorobenzene	Surrogate	116%	95.0%	101%	123%
Dibromofluoromethane	Surrogate	79.6%	82.6%	91.6%	104%
Toluene-d8	Surrogate	70.9%	105%	103%	119%

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

Client ID:	TP12-G2	TP12-G5	TPL-G5	TP13-G4
Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00	07-Jul-21 09:00
Sample ID:	2129267-01	2129267-02	2129267-03	2129267-04
MDL/Units	Soil	Soil	Soil	Soil

Hydrocarbons

	MDL/Units	TP12-G2	TP12-G5	TPL-G5	TP13-G4
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

Semi-Volatiles

	MDL/Units	TP12-G2	TP12-G5	TPL-G5	TP13-G4
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Fluorobiphenyl	Surrogate	104%	80.7%	76.1%	89.6%
Terphenyl-d14	Surrogate	118%	92.6%	95.3%	101%

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

Client ID:	TP16-G2	TP16-G5	-	-
Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	-	-
Sample ID:	2129267-05	2129267-06	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	61.4	77.5	-	-
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General Inorganics

SAR	0.01 N/A	1.42	0.44	-	-
Conductivity	5 uS/cm	488	178	-	-

Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	2.6	2.0	-	-
Barium	1.0 ug/g dry	297	198	-	-
Beryllium	0.5 ug/g dry	0.9	<0.5	-	-
Boron	5.0 ug/g dry	8.7	<5.0	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	64.0	32.3	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	-	-
Cobalt	1.0 ug/g dry	16.9	9.5	-	-
Copper	5.0 ug/g dry	33.9	19.7	-	-
Lead	1.0 ug/g dry	6.3	4.1	-	-
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	37.1	19.3	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	83.7	49.8	-	-
Zinc	20.0 ug/g dry	102	48.3	-	-

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: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

	MDL/Units	TP16-G2 07-Jul-21 09:00 2129267-05 Soil	TP16-G5 07-Jul-21 09:00 2129267-06 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	<0.05	<0.05	-	-
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	-	-
1,1,1,2,2-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	113%	117%	-	-
Dibromofluoromethane	Surrogate	106%	77.8%	-	-

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

	Client ID:	TP16-G2	TP16-G5	-	-
	Sample Date:	07-Jul-21 09:00	07-Jul-21 09:00	-	-
	Sample ID:	2129267-05	2129267-06	-	-
	MDL/Units	Soil	Soil	-	-
Toluene-d8	Surrogate	111%	73.2%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	-	-
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	87.3%	62.6%	-	-
Terphenyl-d14	Surrogate	104%	79.3%	-	-

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

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		90.1	50-140			
Surrogate: Terphenyl-d14	1.43		ug/g		107	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						

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

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	3.67		ug/g		115	50-140			
Surrogate: Dibromofluoromethane	3.58		ug/g		112	50-140			
Surrogate: Toluene-d8	3.90		ug/g		122	50-140			

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	2.40	0.01	N/A	2.08			14.3	30	
Conductivity	295	5	uS/cm	293			0.7	5	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	2.6	1.0	ug/g dry	ND			NC	30	
Arsenic	1.7	1.0	ug/g dry	1.7			0.4	30	
Barium	86.3	1.0	ug/g dry	84.9			1.6	30	
Beryllium	ND	0.5	ug/g dry	ND			NC	30	
Boron	10.5	5.0	ug/g dry	8.9			16.8	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	13.0	5.0	ug/g dry	12.6			3.2	30	
Cobalt	4.9	1.0	ug/g dry	5.3			6.1	30	
Copper	10.5	5.0	ug/g dry	10.6			1.0	30	
Lead	3.7	1.0	ug/g dry	3.8			3.2	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	1.6	1.0	ug/g dry	ND			NC	30	
Nickel	8.9	5.0	ug/g dry	9.3			4.2	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	19.9	10.0	ug/g dry	19.7			1.1	30	
Zinc	ND	20.0	ug/g dry	ND			NC	30	
Physical Characteristics									
% Solids	85.5	0.1	% by Wt.	82.3			3.8	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g dry	ND			NC	40	
Anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Chrysene	ND	0.02	ug/g dry	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Fluorene	ND	0.02	ug/g dry	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
Naphthalene	ND	0.01	ug/g dry	ND			NC	40	
Phenanthrene	ND	0.02	ug/g dry	ND			NC	40	
Pyrene	ND	0.02	ug/g dry	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	1.22		ug/g dry		81.9	50-140			
Surrogate: Terphenyl-d14	1.42		ug/g dry		94.9	50-140			
Volatiles									
Acetone	ND	0.50	ug/g dry	ND			NC	50	
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g dry	ND			NC	50	

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromoform	ND	0.05	ug/g dry	ND			NC	50	
Bromomethane	ND	0.05	ug/g dry	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
Chloroform	ND	0.05	ug/g dry	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g dry	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.05	ug/g dry	ND			NC	50	
Hexane	ND	0.05	ug/g dry	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g dry	ND			NC	50	
Styrene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g dry	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	3.62		ug/g dry		106	50-140			
Surrogate: Dibromofluoromethane	3.77		ug/g dry		110	50-140			
Surrogate: Toluene-d8	3.97		ug/g dry		116	50-140			

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Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	207	7	ug/g	ND	103	80-120			
F2 PHCs (C10-C16)	87	4	ug/g	ND	97.5	60-140			
F3 PHCs (C16-C34)	227	8	ug/g	ND	104	60-140			
F4 PHCs (C34-C50)	148	6	ug/g	ND	106	60-140			
Metals									
Antimony	48.3	1.0	ug/g	ND	96.4	70-130			
Arsenic	49.8	1.0	ug/g	ND	98.2	70-130			
Barium	82.8	1.0	ug/g	34.0	97.7	70-130			
Beryllium	49.0	0.5	ug/g	ND	97.8	70-130			
Boron	48.7	5.0	ug/g	ND	90.3	70-130			
Cadmium	48.2	0.5	ug/g	ND	96.3	70-130			
Chromium (VI)	3.8	0.2	ug/g	ND	60.0	70-130			QM-05
Chromium	56.5	5.0	ug/g	5.0	103	70-130			
Cobalt	52.3	1.0	ug/g	2.1	100	70-130			
Copper	52.4	5.0	ug/g	ND	96.4	70-130			
Lead	47.9	1.0	ug/g	1.5	92.7	70-130			
Mercury	1.40	0.1	ug/g	ND	93.2	70-130			
Molybdenum	48.2	1.0	ug/g	ND	96.0	70-130			
Nickel	52.9	5.0	ug/g	ND	98.4	70-130			
Selenium	46.0	1.0	ug/g	ND	91.9	70-130			
Silver	46.8	0.3	ug/g	ND	93.5	70-130			
Thallium	46.6	1.0	ug/g	ND	93.1	70-130			
Uranium	48.6	1.0	ug/g	ND	96.6	70-130			
Vanadium	59.7	10.0	ug/g	ND	104	70-130			
Zinc	53.6	20.0	ug/g	ND	94.4	70-130			
Semi-Volatiles									
Acenaphthene	0.204	0.02	ug/g	ND	109	50-140			
Acenaphthylene	0.177	0.02	ug/g	ND	94.7	50-140			
Anthracene	0.195	0.02	ug/g	ND	104	50-140			
Benzo [a] anthracene	0.162	0.02	ug/g	ND	87.1	50-140			
Benzo [a] pyrene	0.187	0.02	ug/g	ND	100	50-140			
Benzo [b] fluoranthene	0.203	0.02	ug/g	ND	109	50-140			
Benzo [g,h,i] perylene	0.163	0.02	ug/g	ND	87.4	50-140			
Benzo [k] fluoranthene	0.175	0.02	ug/g	ND	93.8	50-140			
Chrysene	0.201	0.02	ug/g	ND	108	50-140			
Dibenzo [a,h] anthracene	0.153	0.02	ug/g	ND	81.9	50-140			
Fluoranthene	0.177	0.02	ug/g	ND	94.8	50-140			
Fluorene	0.189	0.02	ug/g	ND	101	50-140			
Indeno [1,2,3-cd] pyrene	0.153	0.02	ug/g	ND	81.8	50-140			
1-Methylnaphthalene	0.204	0.02	ug/g	ND	109	50-140			
2-Methylnaphthalene	0.223	0.02	ug/g	ND	120	50-140			
Naphthalene	0.215	0.01	ug/g	ND	115	50-140			
Phenanthrene	0.190	0.02	ug/g	ND	102	50-140			
Pyrene	0.178	0.02	ug/g	ND	95.3	50-140			
Surrogate: 2-Fluorobiphenyl	1.60		ug/g		107	50-140			
Surrogate: Terphenyl-d14	1.77		ug/g		118	50-140			
Volatiles									
Acetone	10.0	0.50	ug/g	ND	100	50-140			

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	3.60	0.02	ug/g	ND	89.9	60-130			
Bromodichloromethane	3.38	0.05	ug/g	ND	84.5	60-130			
Bromoform	3.92	0.05	ug/g	ND	98.1	60-130			
Bromomethane	4.41	0.05	ug/g	ND	110	50-140			
Carbon Tetrachloride	3.49	0.05	ug/g	ND	87.3	60-130			
Chlorobenzene	3.32	0.05	ug/g	ND	83.0	60-130			
Chloroform	3.36	0.05	ug/g	ND	83.9	60-130			
Dibromochloromethane	3.59	0.05	ug/g	ND	89.8	60-130			
Dichlorodifluoromethane	4.57	0.05	ug/g	ND	114	50-140			
1,2-Dichlorobenzene	3.33	0.05	ug/g	ND	83.3	60-130			
1,3-Dichlorobenzene	3.32	0.05	ug/g	ND	83.0	60-130			
1,4-Dichlorobenzene	3.38	0.05	ug/g	ND	84.5	60-130			
1,1-Dichloroethane	3.37	0.05	ug/g	ND	84.3	60-130			
1,2-Dichloroethane	3.30	0.05	ug/g	ND	82.4	60-130			
1,1-Dichloroethylene	3.06	0.05	ug/g	ND	76.6	60-130			
cis-1,2-Dichloroethylene	3.30	0.05	ug/g	ND	82.4	60-130			
trans-1,2-Dichloroethylene	3.41	0.05	ug/g	ND	85.3	60-130			
1,2-Dichloropropane	3.49	0.05	ug/g	ND	87.2	60-130			
cis-1,3-Dichloropropylene	3.18	0.05	ug/g	ND	79.4	60-130			
trans-1,3-Dichloropropylene	3.65	0.05	ug/g	ND	91.3	60-130			
Ethylbenzene	3.63	0.05	ug/g	ND	90.8	60-130			
Ethylene dibromide (dibromoethane, 1,2)	2.98	0.05	ug/g	ND	74.6	60-130			
Hexane	4.35	0.05	ug/g	ND	109	60-130			
Methyl Ethyl Ketone (2-Butanone)	9.67	0.50	ug/g	ND	96.7	50-140			
Methyl Isobutyl Ketone	9.31	0.50	ug/g	ND	93.1	50-140			
Methyl tert-butyl ether	10.4	0.05	ug/g	ND	104	50-140			
Methylene Chloride	2.85	0.05	ug/g	ND	71.1	60-130			
Styrene	3.26	0.05	ug/g	ND	81.6	60-130			
1,1,1,2-Tetrachloroethane	3.67	0.05	ug/g	ND	91.8	60-130			
1,1,2,2-Tetrachloroethane	3.78	0.05	ug/g	ND	94.5	60-130			
Tetrachloroethylene	3.46	0.05	ug/g	ND	86.5	60-130			
Toluene	3.46	0.05	ug/g	ND	86.4	60-130			
1,1,1-Trichloroethane	3.47	0.05	ug/g	ND	86.7	60-130			
1,1,2-Trichloroethane	3.42	0.05	ug/g	ND	85.4	60-130			
Trichloroethylene	3.27	0.05	ug/g	ND	81.7	60-130			
Trichlorofluoromethane	3.62	0.05	ug/g	ND	90.6	50-140			
Vinyl chloride	4.87	0.02	ug/g	ND	122	50-140			
m,p-Xylenes	6.35	0.05	ug/g	ND	79.3	60-130			
o-Xylene	3.42	0.05	ug/g	ND	85.5	60-130			
Surrogate: 4-Bromofluorobenzene	3.26		ug/g		102	50-140			
Surrogate: Dibromofluoromethane	2.70		ug/g		84.4	50-140			
Surrogate: Toluene-d8	2.77		ug/g		86.5	50-140			

Certificate of Analysis

Report Date: 16-Jul-2021

Client: Paterson Group Consulting Engineers

Order Date: 13-Jul-2021

Client PO: 32465

Project Description: PE3929

Qualifier Notes:

Login Qualifiers :

Container and COC sample IDs don't match - Sample labelled as TPL-G5, chain of custody reads TP12-L5

Applies to samples: TPL-G5

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.



Client Name: Katesash Group	Project Ref: PE3929	Page <u> </u> of <u> </u>
Contact Name: Karla Munch	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 154 Colonnade Rd	PO #: 32465	
Telephone:	E-mail: kmunch@katesashgroup.ca	
Date Required: _____		

<input type="checkbox"/> REG 153/04	<input checked="" type="checkbox"/> 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									
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fire	<input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO	<input type="checkbox"/> CCME <input type="checkbox"/> MISA	Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	GC/MS
<input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse	<input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm	Mun: _____				Date	Time								
<input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other	<input type="checkbox"/> Other: _____	For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No													
Sample ID/Location Name															
1	TP12-G2 TP12-G2	S	2	July 7/2021		X	X	X	X	X	X	X	X	X	
2	TP13-G4 TP12-G5	S	2	↓		X	X	X	X	X	X	X	X	X	
3	TP16-G2 TP12-L5	S	2	↓		X	X	X	X	X	X	X	X	X	
4	TP16-G5 TP13-G4	S	2	↓		X	X	X	X	X	X	X	X	X	
5	TP12-G5 TP16-G2	S	2	↓		X	X	X	X	X	X	X	X	X	
6	TP12-L6 TP16-G5	S	2	↓		X	X	X	X	X	X	X	X	X	
7															
8															
9															
10															

Comments: TP12-G5, TP12-L5 are currently on hold at the lab, please run.

Method of Delivery: **PARACEL COURIER**

Relinquished By (Sign): <i>Kat Linscott</i>	Received By Driver/Depot: <i>A. J. ROUSE</i>	Received at Lab: <i>R</i>	Verified By: <i>R</i>
Relinquished By (Print): Kat Linscott	Date/Time: 13/07/21 3:25	Date/Time: 4:35 July 13th 2021	Date/Time: 5:19 July 13 2021
Date/Time: July 13/2021	Temperature: °C 11.1	Temperature: 7.4 °C	pH Verified: <input type="checkbox"/> By: _____