Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

patersongroup

Phase II-Environmental Site Assessment

381 Churchill Avenue N
319, 325, and 327 Richmond Road
380 Winona Avenue
Ottawa, Ontario

Prepared For

Richmond Churchill Limited Partnership

April 8, 2021

Report: PE4909-2R

Paterson Group Inc.

Consulting Engineers
154 Colonnade Road South
Ottawa (Nepean), Ontario
Canada K2E 7J5

Tel: (613) 226-7381
Fax: (613) 226-6344
www.patersongroup.ca

TABLE OF CONTENTS

List of Figures

Appendix 1

Appendix 2

Appendix 3

EXECUTIVE SUMMARY

Assessment

A Phase II-ESA was conducted for 381 Churchill Avenue N, 319, 325, and 327 Richmond Road, and 380 Winona Avenue, Ottawa, Ontario. The purpose of the Phase II-ESA was to address the areas of potential environmental concern identified during the Phase I-ESA, in particular a former use 319 Richmond Road as a former retail fuel outlet and automotive service garage. The subsurface investigations at the subject site were carried out by several consultants and consisted of 15 boreholes and four excavations.

Soil samples obtained from the boreholes and excavations were analysed for potential impacts using a combination of visual, olfactory and vapour screening methods. A total of 27 soil samples from the boreholes and excavations were submitted for laboratory analysis of PHCs (F_1-F_4), BTEX, VOCs, metals, and/or PAHs. Several sampling locations exceeded the MECP Table 7 Standards for PHCs, BTEX, PAHs, and metals.

Groundwater samples were obtained from the onsite monitoring wells during several sampling events. Impacted groundwater was identified on 319 Richmond Road and 380 Winona Avenue as part of the original groundwater sampling programs. Any monitoring wells re-tested by Paterson as part of the May 2020 Phase II ESA were in compliance with the MECP Table 7 Standards, including the monitoring wells at 319 Richmond Road and 380 Winona Avenue.

Supplemental groundwater monitoring at 319 Richmond Road in August 2020 identified impacted groundwater at several monitoring wells.

Recommendations

Prior to the filing of an RSC for the Phase II ESA property, a remedial program is required to address impacted soil exceeding MECP Table 7 standards for residential land use. The current report is considered suitable for an assessment of the property.

Prior to redevelopment of the property groundwater monitoring should be completed to update the groundwater quality at the site.

It is our understanding that the Phase II-ESA Property is to be redeveloped primarily as residential with several dwellings and buildings. Upon acknowledgement of the RSC by

the MECP, any monitoring wells, which are encountered and are no longer in use, should be abandoned according to Ontario Regulation 903.

Following the completion of a soil and groundwater remediation an RSC will be submitted to the MECP. The RSC will indicate that the soil and groundwater contamination identified in the Phase II ESA has been remediated and the soil and groundwater on the RSC property site meets the applicable MECP Standards.

.

1.0 Introduction

At the request of Richmond Churchill Limited Partnership, Paterson Group (Paterson) conducted a Phase II-Environmental Site Assessment (ESA) for the properties located at 381 Churchill Avenue North, 319, 325, and 327 Richmond Road, and 380 Winona Avenue (Phase II ESA Property) in the City of Ottawa, Ontario. The purpose of this Phase II-ESA was to review current site conditions.

1.1 Site Description

Address:	381 Churchill Avenue N, 319, 325, and 327 Richmond Road, and 380 Winona Avenue, Ottawa, Ontario.
Legal Description:	325 Richmond Road: Part of Lot 2, Plan 37; 327 Richmond Road: Frontage of Lot 1, Richmond Road North and Churchill East; 381 Churchill Avenue: Part of Lot 28, Churchill East; 380 Winona Avenue: Part of Lot 28, Winona West, in the City of Ottawa.
Property Identification Number:	04020-0004, 04020-0003, 04020-0002, 04020-0001, and 04020-0035
Location:	The subject property is located between Churchill Avenue N and Winona Avenue, on the north side of Richmond Road, in Ottawa, Ontario. The boundaries of the Phase II ESA Property are shown on Figure 1 - Key Plan following the body of this report.
Latitude and Longitude:	45° 23' 33" N, 75° 45' 13" W
Configuration:	Irregular
Site Area:	2,246 m^2 (approximate).

1.2 Property Ownership

Paterson was retained to complete this Phase II-ESA by Ms. Josie Tavares of InterRent REIT on behalf of Richmond Churchill Limited Partnership. Richmond Churchill Limited Partnership's offices are located at 485 Bank Street, Suite 200, Ottawa, Ontario. Ms. Tavares can be reached by email at josie.tavares@interrentreit.com.

1.3 Current and Proposed Future Uses

The Phase II-ESA Property is currently used for residential and commercial purposes. It is our understanding that the Phase II-ESA Property will be redeveloped as a residential and commercial development consisting a residential tower with commercial development on the ground floor. A record of site condition is required for the more sensitive land use change from commercial to residential.

1.4 Applicable Site Condition Standard

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

- The proposed use of the Phase II-ESA Property is residential and commercial. Residential land use standards are selected as it is the most sensitive land use.
- Section 35 of the regulation applies to the Phase II-ESA Property. No drinking water wells or private septic systems are expected to be present in the area of the Phase II-ESA Property due to the availability of municipal water and sewer.
- Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) do not apply to the Phase II-ESA Property. A search for areas of natural significance and features was completed as part of the Phase I-ESA within the Phase I-ESA study area (250 m radius from site boundary) on the Ontario Ministry of Natural Resources (MNR) website and the search did not reveal any areas of natural significance, or

environmentally sensitive areas within the Phase I-ESA study. The soil on the Phase II-ESA Property has a pH between 5 and 9.

- ❑ No grain size analysis was completed for the subject site, therefore coarse-grained standards are used as a conservative approach.

- ❑ Section 43.1 of the Regulation does apply to the Phase II-ESA Property in that the Phase II-ESA Property is a Shallow Soil Property. The Phase II-ESA Property is not within 30 m of a water body or sensitive receptor.

2.0 Background Information

2.1 Physical Setting

Site Surface Conditions

The Phase II ESA property consists of an assembly of four parcels of land. One of the parcels was most recently used as a mixed use property, with residential units above commercial tenants. Two of the remaining properties are used for residential purposes, while the last property is used as an automotive service garage. The site is either paved, covered with crushed stone, or developed. Small landscaped areas are present along property boundaries.

The subject site topography varies between properties; however the topography is generally flat, with slight slopes to the nearest property boundaries. The regional topography slopes gradually down towards the north. Water drainage on the subject property consists primarily of overland flow to the adjacent roadways.

Water Bodies and Areas of Natural Significance

A search for water bodies and areas of natural significance and features within the Phase I study area was conducted on the Ontario Ministry of Natural Resources (MNR) website and the search did not reveal any water bodies or areas of natural significance within the Phase I-ESA study area.

2.2 Past Investigations

Paterson has completed a Phase I-ESA, dated June 6, 2020, for the Phase II-ESA Property provided under separate cover. A summary of the Phase I ESA report follows;

Phase I-ESA

Paterson Group was retained by Richmond Churchill Limited Partnership to conduct a Phase I-Environmental Site Assessment (ESA) for the subject site. The purpose of this Phase I-ESA was to research the past and current use of the site and study area and to identify any environmental concerns with the potential to have impacted the subject property.

The property is currently occupied by several residential and commercial buildings. The site was first developed for residential and/or commercial purposes some time prior to 1925. Several Areas of Potential Environmental Concern with respect to the Phase I-ESA Study area were identified:

- ❑ APEC 1 – Former USTs
- ❑ APEC 2 – Former Pump Islands
- ❑ APEC 3 – Former Automotive Repair Garage
- ❑ APEC 4 – Former Waste Oil UST
- ❑ APEC 5 – Former Furnace Oil UST
- ❑ APEC 6 – Fill Material of Unknown Quality
- ❑ APEC 7 – Former Furnace Oil AST
- ❑ APEC 8 – Former Furnace Oil AST
- ❑ APEC 9 – Former Dry Cleaners
- ❑ APEC 10 – Former Automotive Dealership

The results of the historical research, personal interviews, and the site inspection identified the historical presence of multiple Potentially Contaminating Activities (PCAs) and Areas of Potential Environmental Concern (APECs) relating to the former uses of the subject site and adjacent properties.

Additional Reports

- ❒ *"Phase I-II Environmental Assessment, 325 and 327-331 Richmond Road, Ottawa, Ontario,"* prepared by Paterson Group Inc. (Paterson), dated June 22, 2012.

Based on the Phase I ESA, the subject site was used for commercial and residential purposes. The building located at 327 Richmond Road was constructed prior to 1928 and the building at 325 Richmond Road was built circa 1956. At the time of the assessment, the 325 Richmond Road building was on furnace oil heating with an AST located on the northern interior wall of the

basement, while 327 Richmond Road had converted to natural gas fired equipment in 2013.

The historical and current use of the neighbouring lands consisted of residential with commercial along Richmond Road. The adjacent property to the east, 319 Richmond Road, was operating as an automotive repair garage, prior to which, it had been a retail fuel outlet (RFO) from the late 1930s to the 2011. The neighbouring land to the southeast, 312 Richmond Road, was identified as having formerly operated as a dry cleaners. A subsequent Phase II ESA was conducted to assess the potential impact on the subject site as a result of the RFO, garage and former dry cleaners.

Four (4) boreholes were drilled on-site to assess the soil and groundwater conditions. Soil samples were submitted and analyzed for metals, BTEX and PHCs. Based on the analytical results, no detectable BTEX was identified, and one PHC parameter was identified below the selected MECP Standards. All soil samples were in compliance with the selected site condition standards.

Groundwater samples were submitted and analyzed for PHCs and VOCs. All parameters, with the exception of methylene chloride, were not detected above the laboratory limits. Methylene chloride was identified although below the selected MECP Standards.

Based on the findings of the Phase I-II ESA, the site conditions at the subject site appeared to be unaffected by the former presence of the RFO and dry cleaners.

- ❒ *"Phase I Environmental Assessment, 381 Churchill Avenue, Ottawa, Ontario,"* prepared by Paterson Group Inc., dated June 5, 2016.

Based on the Phase I ESA, the subject site was historically used for mixed-use purposes (residential and commercial offices) and was later used for residential purposes only. No concerns were noted with the former and current use of the subject site.

Neighbouring land use consisted of residential and commercial purposes. The RFO and former dry cleaners located 319 Richmond Road and 312 Richmond Road, respectively, were considered to pose potential concerns to the subject site. A Phase II ESA was recommended.

- *"Phase II Environmental Assessment, 381 Churchill Avenue, Ottawa, Ontario,"* prepared by Paterson Group Inc., dated August 2, 2016.

Four (4) boreholes were drilled on-site to assess the soil and groundwater conditions. Soil samples were submitted and analyzed for BTEX and PHCs. Based on the analytical results, no detectable BTEX was identified. PHC, fraction F3 was identifed in two (2) boreholes along the eastern portion of the site in excess of the selected MECP Standards.

Groundwater samples were submitted and analyzed for PHCs and VOCs. Based on the analytical results, BTEX and several chlorinated solvents were detected in the groundwater samples, although below the selected MECP Standards. All groundwater beneath the subject site was in compliance of the selected standards.

Based on the findings of the Phase II ESA, it was recommended that the PHC impacted soil be removed and disposed off-site.

- *"Phase I Environmental Assessment, 319 Richmond Road, Ottawa, Ontario,"* prepared by Golder Associates Ltd. (Golder), dated October 2017.

Based on the findings of the Phase I ESA, the subject site had operated as an RFO from 1939 to 2011 under various identities. In 2013, five (5) USTs were removed. It was noted at that time that visible contamination was removed, however, impacted soil around the pump islands remained on-site. The site was occupied by an automotive repair garage with evidence of former in-ground hydraulic hoists in the garage bay.

The historical use of neighbouring lands included a former dry cleaner and automotive dealership with 2 USTs at 312 and 300 Richmond Road, respectively, located across Richmond Road to the south and southeast. A Phase II ESA was conducted to address the potential impacts as a result of the use of the subject site as well as the former use of the adjacent lands.

- *"Phase II Environmental Assessment, 319 Richmond Road, Ottawa, Ontario,"* prepared by Golder Associates Ltd. (Golder), dated October 2017.

Five (5) boreholes were drilled on-site to assess the soil and groundwater conditions. Fill material containing demolition debris was identifed on-site. Soil samples were submitted and analyzed for BTEX, PHCs, PAHs and metals.

Based on the analytical results, fill material was impacted with PAHs and metals. Soil, specifically in the vicinity of the former pump island and UST nest were impacted with petroleum hydrocarbons.

Groundwater samples were submitted and analyzed for PAHs, PHCs and VOCs. Based on the analytical results, benzene, anthracene and PHCs (F1-F3) were in excess of the selected MECP Standards.

Based on the findings of the Phase II ESA, the former and current use of the site has impacted the site conditions. Off-site potential environmental concerns were considered to have not impacted the subject site.

- ❒ *"Phase I Environmental Assessment, 319, 325 and 327-331 Richmond Road, and 381 Churchill Avenue North, Ottawa, Ontario,"* prepared by Pinchin Ltd. (Pinchin), dated January 16, 2018.

The findings of this Phase I ESA report were in agreement with the earlier Phase I ESA conducted for the subject properties prepared by Paterson (2012 and 2016) and Golder (2017), with the exception of the AST noted in the interior of 325 Richmond Road. Although it was expected that the subject buildings were heated using furnace oil, there were no signs or indications of a former AST located at 325 Richmond Road at the time of their assessment.

A Phase II ESA was not recommended as it was Pinchin's understanding that the subject site was to be remediated in the future.

- ❒ *"Phase I Environmental Assessment, 380 Winona Avenue, Ottawa, Ontario,"* prepared by Pinchin Ltd. (Pinchin), dated November 27, 2019.

Based on the Phase I ESA, the subject site has always been used for residential purposes. The subject building was constructed in the 1920s with an addition built on the west wing of the building in the 1960s. No concerns were noted with the former and current use of the subject site.

Neighbouring land use consisted of residential and commercial purposes. The RFO and former dry cleaners located 319 Richmond Road and 312 Richmond Road, respectively, were considered to be potential concerns to the subject site. A Phase II ESA was recommended.

- Draft *"Phase II Environmental Assessment, 380 Winona Avenue, Ottawa, Ontario,"* prepared by Pinchin Ltd. (Pinchin), dated February 4, 2020.

Two (2) boreholes were drilled on-site to assess the soil and groundwater conditions. Soil samples were submitted and analyzed for PHCs, PAHs and VOCs. Based on the analytical results, all soil results were in compliance with the selected MECP Standards.

Groundwater samples were submitted and analyzed for PAHs, PHCs and VOCs. Based on the analytical results, benzene and cis-1,2-Dichloroethylene were in excess of the selected groundwater standards.

3.0 Scope of Investigation

3.1 Overview of Site Investigation

The subsurface investigations for the various properties were conducted by Paterson and other consultants. This site investigation consisted of compiling data from the previous work and resampling the monitoring wells on site.

3.2 Media Investigated

During the subsurface investigations, soil and groundwater samples were recovered and submitted for laboratory analytical testing. There are no water bodies on the Phase II-ESA Property and as such, sediment sampling was not part of the Phase II-ESA. The rationale for sampling and analyzing these media is based on the Contaminants of Potential Concern identified in the Phase I-ESA Conceptual Site Model, discussed in Subsection 3.3.

Soil

Soil samples were collected from 15 boreholes throughout the subject property. Soil samples were also collected from four excavations completed during the decommissioning of the former retail fuel outlet at 319 Richmond Road. Soil samples were collected from the boreholes by means of split spoon or grab sampling. Soil samples from the excavations were collected using grab samples. All boreholes extended from the existing ground surface to bedrock refusal.

Groundwater

Groundwater monitoring wells were developed upon completion using a dedicated inertial lift pump. A minimum of three well volumes were removed from the monitoring wells during development. Groundwater samples were obtained from each monitoring well, using dedicated sampling equipment. Standing water was purged from each monitoring 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 3.

Sediment

There is no water body present on the Phase II-ESA property. As such, there is no sediment on, in or under the Phase II-ESA property. No sediment sampling was completed.

3.3 Phase I-ESA Conceptual Site Model

Geological and Hydrogeological Setting

The Geological Survey of Canada website on the Urban Geology of the National Capital Area was consulted as part of this assessment. Based on the information from NRCAN, bedrock in the area of the site consists of interbedded limestone and dolomite of the Gull River Formation. Based on the maps, the surficial geology consists of plain till with an overburden thickness ranging from 1 to 2 m. The geological setting reported by NRCAN is supported by the findings of previous subsurface investigations.

Based on regional topography, the location of the Ottawa River approximately 730 m to the west of the Phase I Property at its closest point, and our knowledge of the Ottawa area, the groundwater flow in the vicinity of the Phase I Property is expected to be to the northwest.

Fill Placement

Fill material of unknown quality associated with the demolition and/or backfilling of the former buildings at 323 Richmond Road (eastern half of 327 Richmond Road) and 319 Richmond Road (including the former UST nest and pump islands) is expected to be present on the Phase I Property.

Water Bodies and Areas of Natural Significance

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

Drinking Water Wells

There are no potable water wells on the Phase I Property or within the Phase I Study Area.

Monitoring Wells

Records of four (4) monitoring wells were identified on the Phase I Property at 319 Richmond Road in 2017 associated with the previous Phase II ESA investigation conducted by Golder Associates. No other well records were identified for the Phase I Property.

Based on the monitoring well records, the general stratigraphy on the Phase I Property consists of sand followed by limestone bedrock. Bedrock was reportedly encountered at depths ranging from approximately 0.61 to 2.0 m below grade. A copy of the well records has been included in Appendix 2.

Existing Buildings and Structures

The parcel of land addressed 381 Churchill is occupied by a 3-storey residential apartment building. The building, considered to have been constructed circa 1928, is of a poured concrete foundation construction with an exterior finished in red brick with a flat, tar-and-gravel style roof.

The parcel of land addressed 381 Winona Avenue is occupied by a 2-storey residential apartment building constructed circa 1928 with an addition constructed circa 1970. The building foundation is of a poured concrete construction with an exterior finished in red brick with a sloped shingle style roof.

The parcel of land addressed 319 Richmond Road is occupied by a single-storey automotive garage with a partial basement level. The building constructed circa 1976 is of a slab-on-grade construction with a partial basement on the eastern side of the building with a concrete block foundation. The building exterior is finished with red brick with a flat, tar-and-gravel style roof. The garage is presently unoccupied by any active business and used solely for storing landscaping equipment.

The parcel of land addressed 325 Richmond Road is occupied by a 2-storey commercial building with a full basement. The building was constructed circa 1956 with a poured concrete foundation and is finished on the exterior with brick and has a flat, tar-and-gravel style roof. The building is presently vacant/abandoned.

The property addressed 327 Richmond Road is occupied by a 2-storey mixed-use building, containing store fronts on the ground level and residential apartments on the upper level. The building was constructed circa 1928 with a limestone block foundation, finished in red brick and a flat, tar-and-gravel style roof. The building is presently vacant/abandoned.

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

Subsurface Structures and Utilities

The Phase I Property is situated in a municipally serviced area. Underground utility services on the subject land include natural gas, electricity, cable, water and sewer services. Services enter the Phase I Property from Churchill Avenue, Winona Avenue and Richmond Road.

No potable wells or private sewage systems were observed on the properties at the time of the site visit. An oil-water separator was observed on the interior of 319 Richmond Road. No other subsurface structures were identified at the time of the site visit.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area consists of a combination of residential, commercial (offices and retail) and institutional (churches and schools).

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Eight on-site and two off-site PCAs are considered to result in ten APECs on the Phase I Property. The PCAs, APECs and associated contaminants of potential concern (CPCs) are summarized in the Table 3.

Table 1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1: Former USTs	Southeastern portion of the Phase I Property (319 Richmond Road)	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 2: Former Pump Islands	Southeastern portion of the Phase I Property (319 Richmond Road)	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 3: Former Automotive Repair Garage	Southeastern portion of the Phase I Property (319 Richmond Road)	PCA: 52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 4: Former Waste Oil UST	Southwest corner of the garage (319 Richmond Road)	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 5: Former Furnace Oil UST	North side of the garage (319 Richmond Road)	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 6: Fill Material of Unknown Quality	Southern portion of the Phase I Property (specifically the eastern half of 327 Richmond Road and 319 Richmond Road	PCA: 30 - Importation of Fill Material of Unknown Quality	On-site	PAHs Metals including Hg, CrVI	Soil, Groundwater

APEC 7: Former Furnace Oil AST	Within the building at 325 Richmond Road	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 8: Former Furnace Oil AST	Within the building at 327 Richmond Road	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 9: Former Dry Cleaners	Southeastern corner of the Phase I Property	PCA: 37 - Operation of Dry Cleaning Equipment (where chemicals are used)	Off-site	VOC	Groundwater
APEC 10: Former Automotive Dealership	Southeast corner of the Phase I Property	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHC (F1-F4)	Groundwater

Contaminants of Potential Concern

As Table 1, contaminants of potential concern (CPCs) in the soil and/or groundwater beneath the Phase I Property include the following:

- ❒ Benzene, Ethylbenzene, Toluene and Xylenes (BTEX);
- ❒ Petroleum Hydrocarbons (PHCs, Fractions F1-F4);
- ❒ Volatile Organic Compounds (VOCs);
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs); and
- ❒ Metals including mercury (Hg) and hexavalent chromium (CrVI)

Assessment of Uncertainty and/or Absence of Information

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

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

3.5 Impediments

Due to stored materials at the rear of 319 Richmond Road, Paterson was unable to resample monitoring well 17-03 as part of the Phase II Environmental Site Assessment. Several other monitoring wells 17-01, 17-04, and 17-05 at 319 Richmond Road and BH2 at 325 Richmond Road were unable to be located during the sampling program. These monitoring wells were suspected to have been buried within the gravel areas of the parking lots.

A supplemental groundwater sampling program was completed to find and sample the missing groundwater wells. All groundwater wells were able to be sampled during the supplemental program. No denial of access was encountered during the Phase II-Environmental Site Assessment.

4.0 Investigation Method

4.1 Drilling and Excavating

Soil samples and excavations were completed prior to the start of this Phase II ESA. No additional soil sampling was completed as part of this Phase II ESA.

4.2 Soil Sampling

A total of 33 soil samples were obtained from the boreholes by means of split spoon or grab sampling. A total of 53 soil samples were obtained from the excavations by means of grab sampling. Grab samples were collected following the decommissioning of the USTs and pump island at 319 Richmond Road. The depths at which grab samples were obtained from the excavations are shown on Drawing PE4909-6 – Analytical Testing Plan - Remediation.

Site subsoil conditions generally consist of fill material, with the exception of 380 Winona Avenue where native silty sand with trace gravel was identified. The fill material generally consists silty sand. Trace building debris was also identified in the fill at 319 Richmond Road.

4.3 Field Screening Measurements

Soil vapour readings were collected by the various consultants at the time of the field programs. These vapour readings were recorded on the borehole logs and are generally not considered to be indicative of impacted soil. However, on 319 Richmond Road several vapour concentrations are considered to be indicative of impacted soil.

4.4 Groundwater Monitoring Well Installation

A total of 11 groundwater monitoring wells were installed during the drilling programs. The monitoring wells consisted of 51 or 32 mm diameter Schedule 40 threaded PVC risers and screens (with a slot width of 0.25 mm). 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.

Groundwater monitoring wells were developed upon completion using a dedicated inertial lift pump. A minimum of three well volumes were removed from the monitoring wells.

4.5 Groundwater: Field Measurement of Water Quality Parameters

Prior to groundwater sampling, water quality parameters were measured in the field using a multi-parameter analyzer. Parameters measured in the field include temperature, electrical conductivity, pH, and total dissolved solids. Wells were purged prior to sampling until at least three well volumes had been removed or until the well was purged dry. Field parameter values were measured after three well volumes were removed from the monitoring well by inserting the analyzer into the purge bucket. Parameter values subsequently are measured after every well volume purged, until field chemistry stabilizes.

4.6 Groundwater Sampling

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

4.7 Analytical Testing

Paracel Laboratories (Paracel) of Ottawa, performed the laboratory analysis on the samples submitted for analytical testing completed by Paterson Group during the most recent round of 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. Paracel Laboratories (Paracel) performed the laboratory analysis on the samples submitted for analytical testing.

4.8 Residue Management

Purge water and fluids from equipment cleaning were retained on the Phase II ESA property.

4.9 Elevation Surveying

All borehole locations are referenced to the geodetic datum.

4.10 Quality Assurance and Quality Control Measures

All sampling containers are provided to Paterson by Paracel with pre-attached blank labels. All samples are marked with the job number, sample ID, and date collected on the pre-attached label from Paracel. Samples are submitted under chain of custody protocol to Paracel or their agents. No deviations from the sampling and analysis plan were encountered during the Phase II ESA.

Table 2 – Sampling Containers		
Parameter	**Soil Sampling Container**	**Groundwater Sampling Container**
VOCs	40 ml vial preserved with 10 ml methanol	2x40 ml Amber Glass vial with 200 mg Sodium Bisulphate preservative
BTEX	40 ml vial preserved with 10 ml methanol	2x40 ml Amber Glass vial with 200 mg Sodium Bisulphate preservative
PHC (F_1-F_4)	40 mL vial preserved with 10 mL methanol, 60 ml glass jar	2x40 ml Amber Glass vial with 200 mg Sodium Bisulphate preservative, 500 ml Amber Glass with 2 g Sodium Bisulphate preservative
PAHs	60 ml Glass Jar	1 L Amber Glass
Metals (excluding Cr^{vi} and Hg)	60 ml Glass Jar	125 ml HDPE bottle field filtered with 0.5 ml Nitric Acid
Cr^{vi}	60 ml Glass Jar	40 ml Amber Glass Vial field filtered preserved with 1 ml Ammonium Sulphate Ammonium Hydroxide Buffer Solution
Hg	60 ml Glass Jar	100mL Amber Glass bottle preserved with 0.3 ml of hydrochloric acid

Equipment Cleaning Procedures

A groundwater level probe was washed using methanol and rinsed with water after every use. Disposable plastic gloves (changed after each sample) were used during the water level procedure.

Field Quality Control Measures

The field duplicates are considered to provide sufficient QA/QC for the Phase II ESA. If additional work is completed further field duplicate samples will be collected.

5.0 Review and Evaluation

5.1 Geology

The overburden consists of a fill layer overlying an intermittent glacial till layer which overlies limestone bedrock. The fill material generally consists of sand and gravel in varying thicknesses between 0.46m and 2.90m, with the deeper soil relating to former tank nests and servicing trenches. The glacial till material

consists of silty sand matrix with gravel which varies in thickness and is only present in occasional boreholes, overlying to the bedrock surface.

Groundwater monitoring wells were installed in all boreholes on the Phase II-ESA Property. Site stratigraphy is shown on Drawing PE4909-4A - Section A-A', Drawing PE4909-4B - Section B-B', and Drawing PE4909-4C - Section C-C'.

5.2 Groundwater: Elevations and Flow Direction

Groundwater levels were measured during the groundwater sampling event on May 12 and 13, 2020, using an electronic water level meter. Groundwater levels are summarized below in Table 3. All measurements are referenced to Geodetic datum.

A complete set of groundwater levels were not collected during the August 2020 groundwater sampling program. The groundwater flow data from May 2020 is considered to remain valid.

Table 3 – Groundwater Level Measurements

Borehole ID	Screened Interval	Ground Surface Elevation (m ASL)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
381 Churchill Avenue N					
BH1	4.57-7.57	67.45	5.08	62.37	May 12, 2020
BH2	4.44-7.44	67.31	4.93	62.38	May 12, 2020
319 Richmond Road					
BH2	2.50-5.50	68.27	2.73	65.54	May 12, 2020
325 and 327 Richmond Road					
BH1	3.83-6.83	65.85	3.61	62.24	May 13, 2020
380 Winona Avenue					
MW1	3.10-6.10	67.80	5.27	62.53	May 13, 2020
MW2	4.62-7.62	67.75	2.41	65.34	May 13, 2020

No signs of free product or groundwater contamination were identified during the May 2020 groundwater sampling program.

During a supplemental groundwater sampling program in August 2020 both PHC and odour were identified in MW17-03. This monitoring well is located behind the former garage near a former heating oil UST.

It is not expected that buried utilities will have a significant impact on the groundwater table on the Phase II-ESA Property. The utility trenches on the site are expected to be above the long term groundwater table.

Groundwater: Hydraulic Gradients

Based on the groundwater elevations from the May 2020 monitoring event the groundwater flow direction was estimated. Based on the groundwater levels it is suspected that the groundwater flows in the northwest direction. Both seasonal and localized variation may be present in both the groundwater flow direction and hydraulic gradient, depending on the subsurface geology and weather conditions. The general direction of the hydraulic gradient is expected to remain towards the northwest, towards the Ottawa River.

5.3 Fine-Medium Soil Texture

Based on field soil observations the soil at the subject site is considered to be coarse grained.

5.4 Soil Field Screening

Field screening of the soil samples was completed as part of the historical field programs at the subject site. 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 27 soil samples were submitted for analysis of PHCs (F1-F4), BTEX, VOCs, metals, and/or PAHs. The results of the analytical testing are presented in the following tables enclosed in Appendix 2:

- Table 1A-Soil Analytical Test Results Metals (including Hg and Cr VI)
- Table 2A-Soil Analytical Test Results VOCs (including BTEX)
- Table 3A-Soil Analytical Test Results PAHs
- Table 4A-Soil Analytical Test Results PHCs

Based on the results of the soil testing, the Phase II-ESA property has fill material impacted with metals, PAHs, BTEX, and PHCs.

Based on the analytical results, no contaminants were identified as being by-products of chemical or biological transformations which have or may have occurred.

5.6 Groundwater Quality

Groundwater samples were submitted based on the concerns identified during the Phase I ESA. These samples were collected on May 12 and 13, 2020, and August 5, 2020. The groundwater samples were obtained from the screened intervals noted on the analytical results tables. The results of the analytical testing are enclosed in Appendix 2 and presented in the following tables:

- Table 2B- Groundwater Analytical Test Results VOCs (including BTEX)
- Table 3A- Groundwater Analytical Test Results PAHs
- Table 4A- Groundwater Analytical Test Results PHCs

Impacted groundwater was identified on 319 Richmond Road and 380 Winona Avenue during the initial field programs. During the May 2020 sampling, Paterson was unable to confirm the groundwater results from 380 Winona Avenue, or from BH17-2 located on 319 Richmond Road. The groundwater at both locations met the applicable MECP Standards.

The chloroform results identified at 319 Richmond Road are considered to be an artifact of the municipal water used to core the bedrock. The chloroform concentrations are not considered to exceed the MECP Standards.

5.7 Quality Assurance and Quality Control Results

As per the Sampling and Analysis Plan, a duplicate soil sample was analysed for the purposes of laboratory QA/QC. Based on the results of the soil testing the conclusions of the report are not considered to be materially affected, considering the consistency of the sample results.

All samples submitted as part of the groundwater testing program were handled in accordance with the analytical protocol with respect to holding time, preservation method, storage requirement, and container type.

As per Subsection 47(3) of O.Reg. 153/04 as amended by O.Reg. 269/11, a Certificate of Analysis has been received for each sample submitted for analysis

during the sampling event, and all Certificates of Analysis are appended to this report.

Overall, the quality of the field data collected during this Phase II-ESA is considered to be sufficient in that the decision-making was not affected and the overall objectives of this assessment were met.

5.8 Phase II-ESA Conceptual Site Model

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

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

Areas of Potential Environmental Concern (APECs) identified on site are listed in the table below. Additional Potentially Contaminating Activities were identified within the Phase I-ESA study area but were not considered to represent Areas of Potential Environmental Concern.

Table 4: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1: Former USTs	Southeastern portion of the Phase I Property (319 Richmond Road)	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 2: Former Pump Islands	Southeastern portion of the Phase I Property (319 Richmond Road)	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater

Table 4: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 3: Former Automotive Repair Garage	Southeastern portion of the Phase I Property (319 Richmond Road)	PCA: 52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 4: Former Waste Oil UST	Southwest corner of the garage (319 Richmond Road)	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 5: Former Furnace Oil UST	North side of the garage (319 Richmond Road)	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 6: Fill Material of Unknown Quality	Southern portion of the Phase I Property (specifically the eastern half of 327 Richmond Road and 319 Richmond Road	PCA: 30 - Importation of Fill Material of Unknown Quality	On-site	PAHs Metals including Hg, CrVI	Soil, Groundwater
APEC 7: Former Furnace Oil AST	Within the building at 325 Richmond Road	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 8: Former Furnace Oil AST	Within the building at 327 Richmond Road	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHC (F1-F4)	Soil, Groundwater
APEC 9: Former Dry Cleaners	Southeastern corner of the Phase I Property	PCA: 37 - Operation of Dry Cleaning Equipment (where chemicals are used)	Off-site	VOC	Groundwater
APEC 10: Former Automotive Dealership	Southeast corner of the Phase I Property	PCA: 28 - Gasoline and Associated Products Storage in Fixed Tanks	Off-site	BTEX PHC (F1-F4)	Groundwater

Metals, PAHs, BTEX, PHCs, and VOCs in soil and groundwater are identified as the Contaminants of Concern (COC) with respect to the Phase II-ESA Property potentially resulting from these APECs.

Subsurface Structures and Utilities

Utilities servicing the buildings on the site are functional. Water and sewer services are expected to have been excavated into the bedrock at the subject site. These services are not considered to be within the water table.

Physical Setting

Site Stratigraphy

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is illustrated on the attached cross-sections. Stratigraphy consists of:

- Fill, primarily consisting of gravel and imported sand. Trace debris was identified in some of the boreholes. Groundwater was not observed in this stratigraphic unit.
- Limestone Bedrock underlays the fill material throughout the site. The bedrock surface is observed to be shallow. The bedrock is considered to be the water bearing unit at the subject site.

Hydrogeological Characteristics

The groundwater at the Phase II-ESA Property is contained within the bedrock at the subject site. One monitoring well was installed in the fill material in the historical tank nest, however the tank nest was also excavated into the bedrock. Although a water sample was collected from the fill material, the bedrock at the site is considered to be the main and only water bearing unit.

Based on the groundwater elevations from the monitoring events, a groundwater flow direction was determined. The general groundwater flow at the Phase II-ESA Property was in a northwesterly direction, towards the Ottawa River.

Approximate Depth to Bedrock

Bedrock was encountered in all boreholes, generally at a depth of less than 2m.

Approximate Depth to Water Table

The water table was encountered at the Phase II ESA property approximately 3.0m below the existing grade. This groundwater level is subject to seasonal fluctuations.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) do not apply to the Phase II-ESA Property. A search for areas of natural significance and features was completed as part of the Phase I-ESA within the Phase I-ESA study area (250 m radius from site boundary) was conducted on the Ontario Ministry of Natural Resources (MNR) website and the search did not reveal any areas of natural significance, or environmentally areas within the Phase I-ESA study.

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

Water Bodies

The Ottawa River is located approximately 700m to the west of the subject site at its nearest point. No water bodies are located within the Phase I ESA Study Area.

Areas of Natural Significance

A search for areas of natural significance and features within the Phase I-ESA study area was conducted on the Ontario Ministry of Natural Resources (MNR) website and the search did not reveal any areas of natural significance within the Phase I-ESA study area.

Fill Placement

Deleterious fill material is present throughout the Phase II ESA property. The fill material generally consists of a silty sand with gravel. Trace debris was identified in some boreholes.

Proposed Buildings and Other Structures

It is our understanding that the site is to be redeveloped as part of a mixed used residential and/or commercial development with an underground parking structure covering the entire footprint of the property.

Existing Buildings and Structures

381 Churchill is occupied by a 3-storey residential apartment building. The building, considered to have been constructed circa 1928, is of a poured concrete foundation construction with an exterior finished in red brick with a flat, tar-and-gravel style roof.

381 Winona Avenue is occupied by a 2-storey residential apartment building constructed circa 1928 with an addition constructed circa 1970. The building foundation is of a poured concrete construction with an exterior finished in red brick with a sloped shingle style roof.

319 Richmond Road is occupied by a single-storey automotive garage with a partial basement level. The building constructed circa 1976 is of a slab-on-grade construction with a partial basement on the eastern side of the building and a concrete block foundation. The building exterior is finished with red brick with a flat, tar-and-gravel style roof. The garage is presently unoccupied by any active business and used solely for storing landscaping equipment.

325 Richmond Road is occupied by a 2-storey commercial building with a full basement. The building was constructed circa 1956 with a poured concrete foundation and is finished on the exterior with brick and has a flat, tar-and-gravel style roof. The building is presently vacant.

327 Richmond Road is occupied by a 2-storey mixed-use building, containing store fronts on the ground level and residential apartments on the upper level. The building was constructed circa 1928 with a limestone block foundation, finished in red brick and a flat, tar-and-gravel style roof. The building is presently vacant.

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

Environmental Condition

Areas Where Contaminants are Present

Based on analytical results, impacted fill material exists on 319 Richmond Road and 381 Churchill Avenue N.

Based on screening and analytical results, the groundwater on 319 Richmond Road and 380 Winona Avenue is impacted.

Types of Contaminants

The impacts observed in the soil on the subject site consist of PHCs, BTEX, PAHs, and Metals (including Mercury).

The impacts observed in the groundwater on the subject site consist of PHCs, BTEX, VOCs, and PAHs.

Contaminated Media

Based on the analytical testing results from the Phase II-ESA, impacted fill material (soil) and groundwater were encountered on the subject site.

What Is Known About Areas where Contaminants are Present

The impacted fill material in considered to be representative of the quality of the fill material imported to the site during construction and decommissioning of the former retail fuel outlet and the result of the use of 319 Richmond Road as a retail fuel outlet.

Distribution and Migration of Contaminants

Impacts within the fill material are present on both 319 Richmond Road and 381 Churchill Avenue N. The impacts on 381 Churchill Avenue N are not considered to have migrated between the soil and groundwater. The contaminants at 319 Richmond Road are considered to have migrated between the soil and groundwater due to the excavations undertaken to install the infrastructure for the former gas station.

Discharge of Contaminants

The discharge of contaminants is related to the placement of poor quality fill material and the former use of the subject site as a retail fuel outlet.

Migration of Contaminants

The migration of contaminants is considered to be low, based on the removal of the main contaminating sources at the site (former USTs). The contaminants identified in the fill material are not considered to migrate or partition between the soil and groundwater readily.

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.

Potential for Vapour Intrusion

The potential for vapour intrusion is present in the basement area of 319 Richmond Road, however, as the space is not currently occupied, the risk is low. No other significant potential for vapour intrusion is present on the site.

6.0 Conclusions

Assessment

A Phase II-ESA was conducted for 381 Churchill Avenue N, 319, 325, and 327 Richmond Road, and 380 Winona Avenue, Ottawa, Ontario. The purpose of the Phase II-ESA was to address the areas of potential environmental concern identified during the Phase I-ESA, in particular a former use 319 Richmond Road as a former retail fuel outlet and automotive service garage. The subsurface investigations at the subject site were carried out by several consultants and consisted of 15 boreholes and four excavations.

Soil samples obtained from the boreholes and excavations were analysed for potential impacts using a combination of visual, olfactory and vapour screening methods. A total of 27 soil samples from the boreholes and excavations were submitted for laboratory analysis of PHCs (F_1-F_4), BTEX, VOCs, metals, and/or PAHs. Several sampling locations exceeded the MECP Table 7 Standards for PHCs, BTEX, PAHs, and metals.

Groundwater samples were obtained from the onsite monitoring wells during several sampling events. Impacted groundwater was identified on 319 Richmond Road and 380 Winona Avenue as part of the original groundwater sampling programs. Any monitoring wells re-tested by Paterson as part of the May 2020 Phase II ESA were in compliance with the MECP Table 7 Standards, including the monitoring wells at 319 Richmond Road and 380 Winona Avenue.

Supplemental groundwater monitoring at 319 Richmond Road in August 2020 identified impacted groundwater at several monitoring wells.

Recommendations

Prior to the filing of an RSC for the Phase II ESA property, a remedial program is required to address impacted soil exceeding MECP Table 7 standards for residential land use. The current report is considered suitable for an assessment of the property.

Prior to redevelopment of the property groundwater monitoring should be completed to update the groundwater quality at the site.

It is our understanding that the Phase II-ESA Property is to be redeveloped primarily as residential with several dwellings and buildings. Upon

acknowledgement of the RSC by the MECP, any monitoring wells, which are encountered and are no longer in use, should be abandoned according to Ontario Regulation 903.

Following the completion of a soil and groundwater remediation an RSC will be submitted to the MECP. The RSC will indicate that the soil and groundwater contamination identified in the Phase II ESA has been remediated and the soil and groundwater on the RSC property site meets the applicable MECP Standards.

7.0 Statement of Limitations

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

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

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

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

Paterson Group Inc.

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

Mark D'Arcy, P.Eng., QP_{ESA}

Report Distribution:

- Richmond Churchill Limited Partnership
- Paterson Group

FIGURES

DRAWING PE4909-3 - TEST HOLE LOCATION PLAN

DRAWING PE4909-4 - ANALYTICAL TESTING PLAN – SOIL

DRAWING PE4909-4A - CROSS-SECTION A-A' – SOIL

DRAWING PE4909-4B - CROSS-SECTION B-B' – SOIL

DRAWING PE4909-4C - CROSS-SECTION C-C' – SOIL

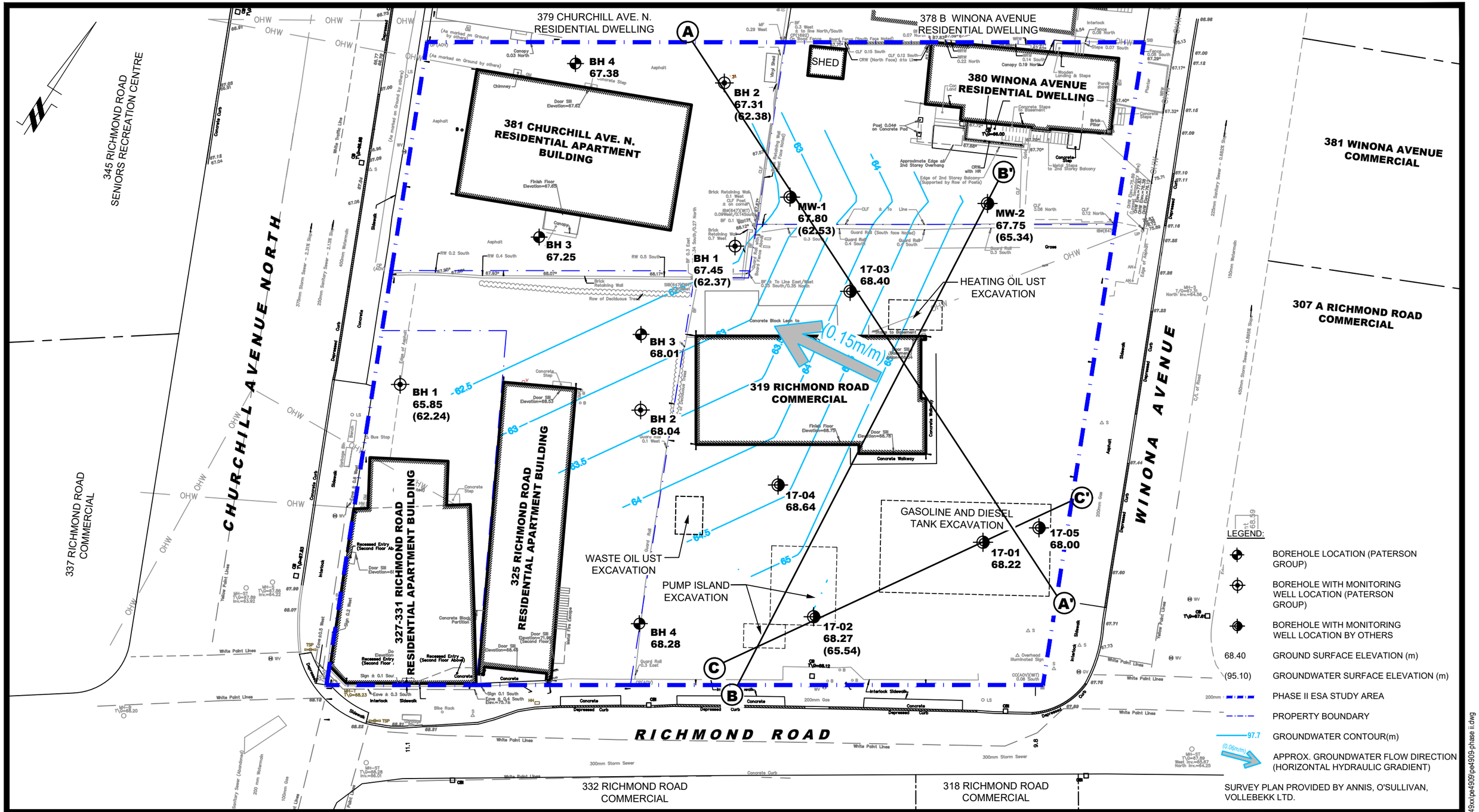
DRAWING PE4909-5 – ANALYTICAL TESTING PLAN – GROUNDWATER

DRAWING PE4909-5A - CROSS-SECTION A-A' – GROUNDWATER

DRAWING PE4909-5B - CROSS-SECTION B-B' – GROUNDWATER

DRAWING PE4909-4C - CROSS-SECTION C-C' – GROUNDWATER

DRAWING PE4909-6 – ANALYTICAL TESTING PLAN - REMEDIATION



patersongroup
consulting engineers

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

NO.	REVISIONS	DATE	INITIAL

RICHMOND CHURCHILL LIMITED PARTNERSHIP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD

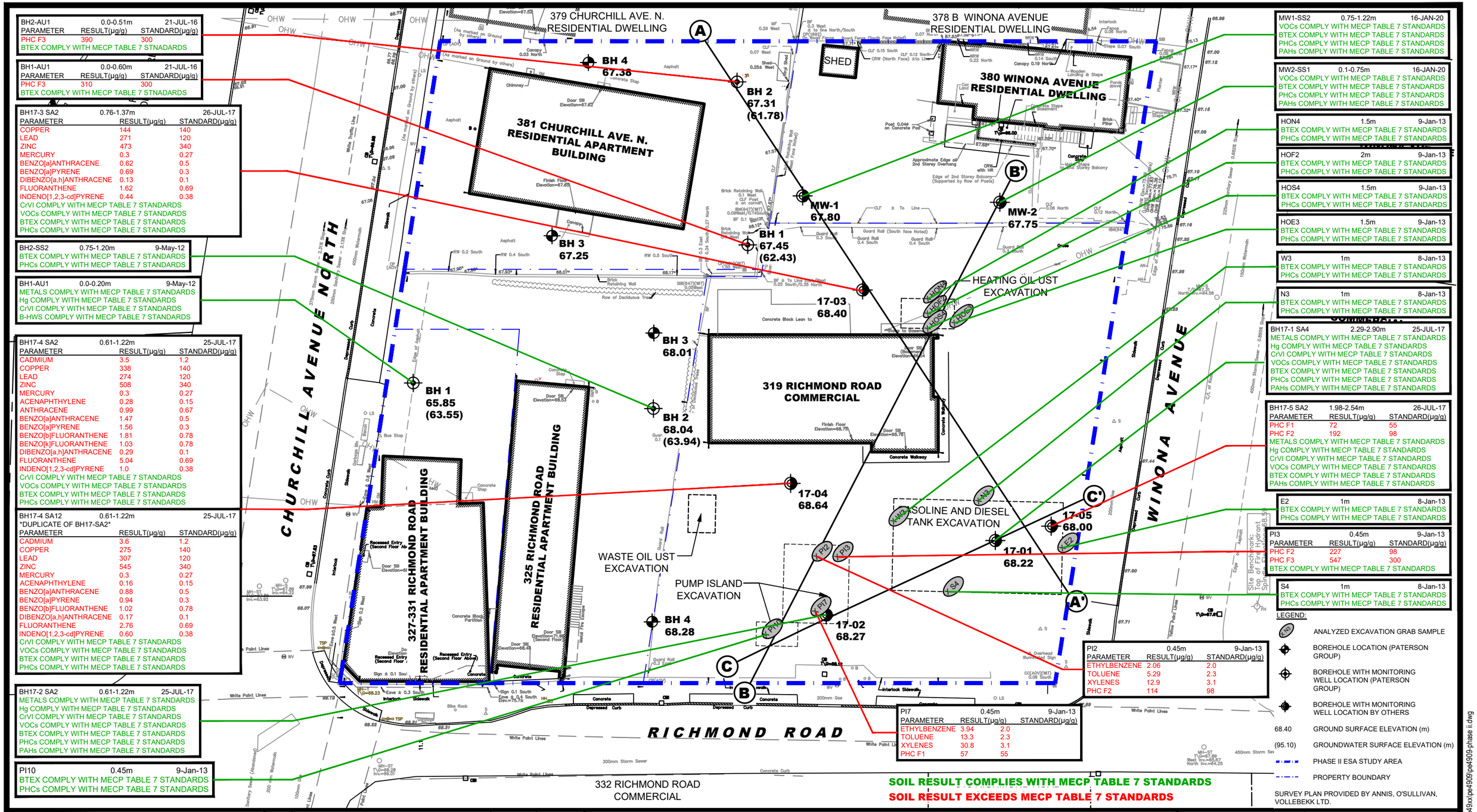
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:300	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-3
Approved by: MSD	Revision No.:

p:\autocad drawings\environmental\pe4909x\pe4909\pe4909-phase II.dwg



BH2-AU1 0.0-0.51m 21-JUL-16

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
PHC F3	390	300

BTEX COMPLY WITH MECP TABLE 7 STNADARDS

BH1-AU1 0.0-0.60m 21-JUL-16

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
PHC F3	310	300

BTEX COMPLY WITH MECP TABLE 7 STNADARDS

BH17-3 SA2 0.76-1.37m 26-JUL-17

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
COPPER	144	140
LEAD	271	120
ZINC	473	340
MERCURY	0.3	0.27
BENZO[a]ANTHRACENE	0.62	0.5
BENZO[a]PYRENE	0.69	0.3
DIBENZO[a,h]ANTHRACENE	0.13	0.1
FLUORANTHENE	1.62	0.69
INDENO[1,2,3-cd]PYRENE	0.44	0.38

CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH2-SS2 0.75-1.20m 9-May-12
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH1-AU1 0.0-0.20m 9-May-12
METALS COMPLY WITH MECP TABLE 7 STANDARDS
Hg COMPLY WITH MECP TABLE 7 STANDARDS
CrVI COMPLY WITH MECP TABLE 7 STANDARDS
B-HWS COMPLY WITH MECP TABLE 7 STANDARDS

BH17-4 SA2 0.61-1.22m 25-JUL-17

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
CADMIUM	3.5	1.2
COPPER	338	140
LEAD	274	120
ZINC	508	340
MERCURY	0.3	0.27
ACENAPHTHYLENE	0.28	0.15
ANTHRACENE	0.99	0.67
BENZO[a]ANTHRACENE	1.47	0.5
BENZO[a]PYRENE	1.56	0.3
BENZO[b]FLUORANTHENE	1.81	0.78
BENZO[k]FLUORANTHENE	1.03	0.78
DIBENZO[a,h]ANTHRACENE	0.29	0.1
FLUORANTHENE	5.04	0.69
INDENO[1,2,3-cd]PYRENE	1.0	0.38

CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-4 SA12 0.61-1.22m 25-JUL-17
DUPLICATE OF BH17-SA2

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
CADMIUM	3.6	1.2
COPPER	275	140
LEAD	307	120
ZINC	545	340
MERCURY	0.3	0.27
ACENAPHTHYLENE	0.16	0.15
BENZO[a]ANTHRACENE	0.88	0.5
BENZO[a]PYRENE	0.94	0.3
BENZO[b]FLUORANTHENE	1.02	0.78
DIBENZO[a,h]ANTHRACENE	0.17	0.1
FLUORANTHENE	2.76	0.69
INDENO[1,2,3-cd]PYRENE	0.60	0.38

CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-2 SA2 0.61-1.22m 25-JUL-17
METALS COMPLY WITH MECP TABLE 7 STANDARDS
Hg COMPLY WITH MECP TABLE 7 STANDARDS
CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

PI10 0.45m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

MW1-SS2 0.75-1.22m 16-JAN-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

MW2-SS1 0.1-0.75m 16-JAN-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

HON4 1.5m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

HOF2 2m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

HOS4 1.5m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

HOE3 1.5m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

W3 1m 8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

N3 1m 8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-1 SA4 2.29-2.90m 25-JUL-17
METALS COMPLY WITH MECP TABLE 7 STANDARDS
Hg COMPLY WITH MECP TABLE 7 STANDARDS
CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-5 SA2 1.98-2.54m 26-JUL-17

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
PHC F1	72	55
PHC F2	192	98

METALS COMPLY WITH MECP TABLE 7 STANDARDS
Hg COMPLY WITH MECP TABLE 7 STANDARDS
CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

E2 1m 8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

PI3 0.45m 9-Jan-13

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
PHC F2	227	98
PHC F3	547	300

BTEX COMPLY WITH MECP TABLE 7 STANDARDS

S4 1m 8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

PI2 0.45m 9-Jan-13

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
ETHYLBENZENE	2.06	2.0
TOLUENE	5.29	2.3
XYLENES	12.9	3.1
PHC F2	114	98

PI7 0.45m 9-Jan-13

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
ETHYLBENZENE	3.94	2.0
TOLUENE	13.3	2.3
XYLENES	30.8	3.1
PHC F1	57	55

LEGEND:

- ANALYZED EXCAVATION GRAB SAMPLE
- BOREHOLE LOCATION (PATERSON GROUP)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS
- 68.40 GROUND SURFACE ELEVATION (m)
- (95.10) GROUNDWATER SURFACE ELEVATION (m)
- PHASE II ESA STUDY AREA
- PROPERTY BOUNDARY

SURVEY PLAN PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

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

NO.	REVISIONS	DATE	INITIAL

RICHMOND CHURCHILL LIMITED PARTNERSHIP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

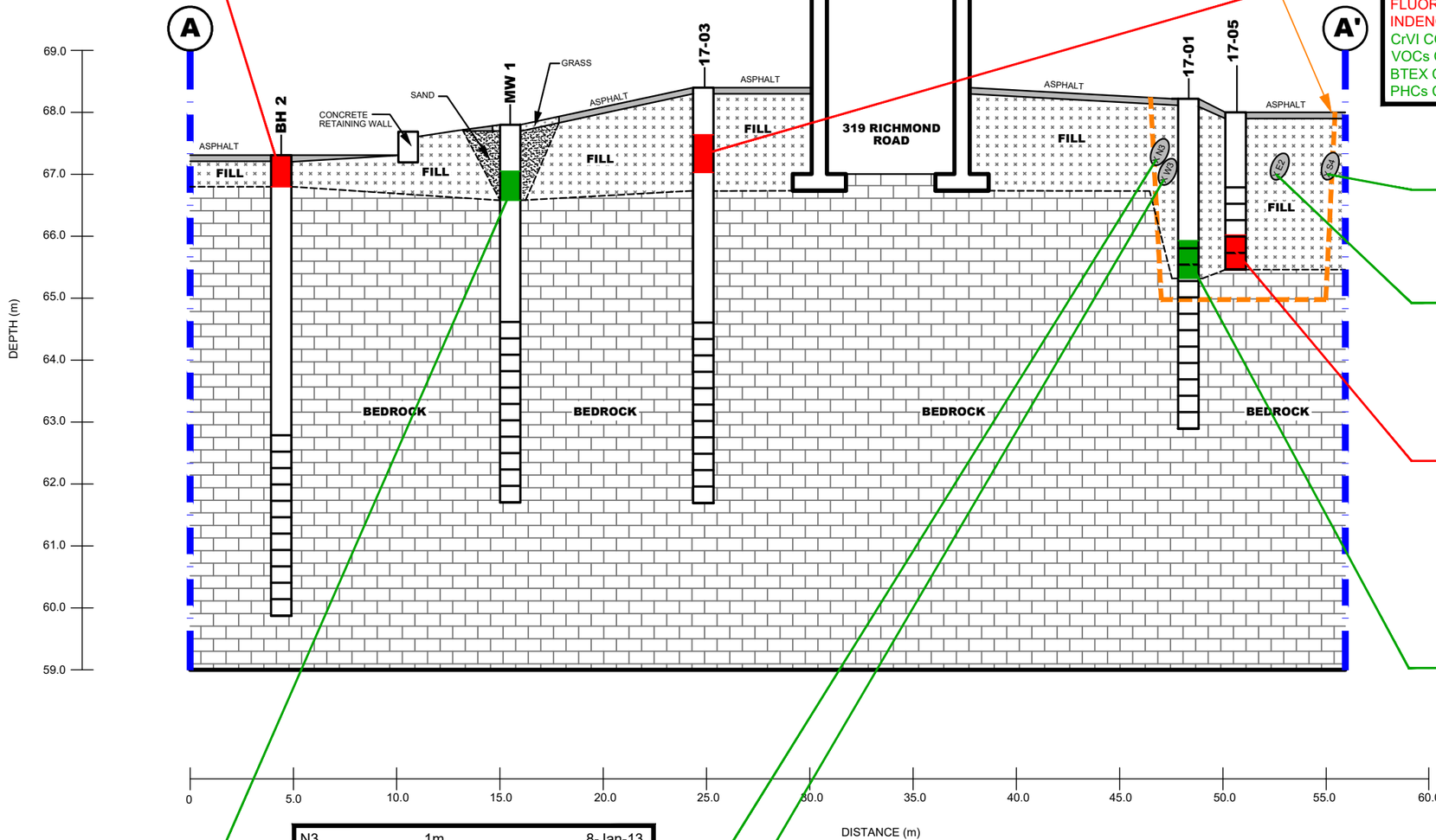
Scale: 1:300	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-4
Approved by: MSD	Revision No.:

p:\autocad drawings\environmental\pe49xx\pe4909\pe4909-phase ii.dwg

BH2-AU1	0.0-0.51m	21-JUL-16
PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
PHC F3	390	300
BTEX COMPLY WITH MECP TABLE 7 STNADARDS		

BH17-3 SA2	0.76-1.37m	26-JUL-17
PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
COPPER	144	140
LEAD	271	120
ZINC	473	340
MERCURY	0.3	0.27
BENZO[a]ANTHRACENE	0.62	0.5
BENZO[a]PYRENE	0.69	0.3
DIBENZO[a,h]ANTHRACENE	0.13	0.1
FLUORANTHENE	1.62	0.69
INDENO[1,2,3-cd]PYRENE	0.44	0.38
CrVI COMPLY WITH MECP TABLE 7 STANDARDS		
VOCs COMPLY WITH MECP TABLE 7 STANDARDS		
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		

EXTENT OF GASOLINE AND DIESEL TANK EXCAVATION



S4	1m	8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		

E2	1m	8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		

BH17-5 SA2	1.98-2.54m	26-JUL-17
PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
PHC F1	72	55
PHC F2	192	98
METALS COMPLY WITH MECP TABLE 7 STANDARDS		
Hg COMPLY WITH MECP TABLE 7 STANDARDS		
CrVI COMPLY WITH MECP TABLE 7 STANDARDS		
VOCs COMPLY WITH MECP TABLE 7 STANDARDS		
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PAHs COMPLY WITH MECP TABLE 7 STANDARDS		

BH17-1 SA4	2.29-2.90m	25-JUL-17
METALS COMPLY WITH MECP TABLE 7 STANDARDS		
Hg COMPLY WITH MECP TABLE 7 STANDARDS		
CrVI COMPLY WITH MECP TABLE 7 STANDARDS		
VOCs COMPLY WITH MECP TABLE 7 STANDARDS		
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		
PAHs COMPLY WITH MECP TABLE 7 STANDARDS		

MW1-SS2	0.75-1.22m	16-JAN-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS		
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		
PAHs COMPLY WITH MECP TABLE 7 STANDARDS		

N3	1m	8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		

W3	1m	8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		

SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS
SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

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

NO.	REVISIONS	DATE	INITIAL

RICHMOND CHURCHILL LIMITED PARTNERSHIP
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD
OTTAWA, ONTARIO

Title:
CROSS SECTION A-A' - SOIL

Scale: AS SHOWN	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-4A
Approved by: MSD	Revision No.:

p:\autocad drawings\environmental\pe49xx\pe4909\pe4909-phase ii.dwg

BH17-4 SA2 0.61-1.22m 25-JUL-17

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
CADMIUM	3.5	1.2
COPPER	338	140
LEAD	274	120
ZINC	508	340
MERCURY	0.3	0.27
ACENAPHTHYLENE	0.28	0.15
ANTHRACENE	0.99	0.67
BENZO[a]ANTHRACENE	1.47	0.5
BENZO[a]PYRENE	1.56	0.3
BENZO[b]FLUORANTHENE	1.81	0.78
BENZO[k]FLUORANTHENE	1.03	0.78
DIBENZO[a,h]ANTHRACENE	0.29	0.1
FLUORANTHENE	5.04	0.69
INDENO[1,2,3-cd]PYRENE	1.0	0.38

CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-4 SA12 0.61-1.22m 25-JUL-17
DUPLICATE OF BH17-SA2

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
CADMIUM	3.6	1.2
COPPER	275	140
LEAD	307	120
ZINC	545	340
MERCURY	0.3	0.27
ACENAPHTHYLENE	0.16	0.15
BENZO[a]ANTHRACENE	0.88	0.5
BENZO[a]PYRENE	0.94	0.3
BENZO[b]FLUORANTHENE	1.02	0.78
DIBENZO[a,h]ANTHRACENE	0.17	0.1
FLUORANTHENE	2.76	0.69
INDENO[1,2,3-cd]PYRENE	0.60	0.38

CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

PI10 0.45m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

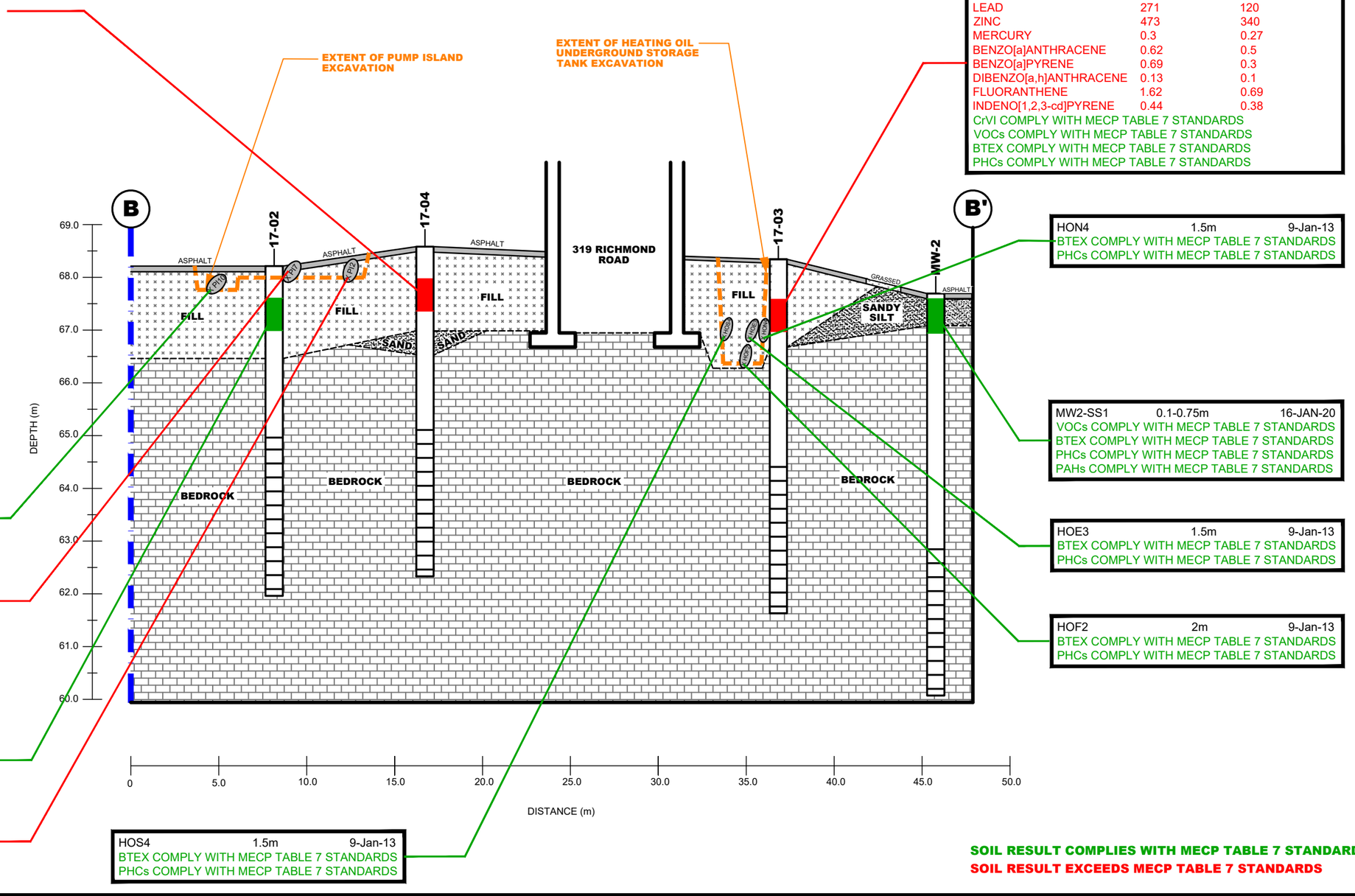
PI7 0.45m 9-Jan-13

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
ETHYLBENZENE	3.94	2.0
TOLUENE	13.3	2.3
XYLENES	30.8	3.1
PHC F1	57	55

BH17-2 SA2 0.61-1.22m 25-JUL-17
METALS COMPLY WITH MECP TABLE 7 STANDARDS
Hg COMPLY WITH MECP TABLE 7 STANDARDS
CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

PI2 0.45m 9-Jan-13

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
ETHYLBENZENE	2.06	2.0
TOLUENE	5.29	2.3
XYLENES	12.9	3.1
PHC F2	114	98



BH17-3 SA2 0.76-1.37m 26-JUL-17

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
COPPER	144	140
LEAD	271	120
ZINC	473	340
MERCURY	0.3	0.27
BENZO[a]ANTHRACENE	0.62	0.5
BENZO[a]PYRENE	0.69	0.3
DIBENZO[a,h]ANTHRACENE	0.13	0.1
FLUORANTHENE	1.62	0.69
INDENO[1,2,3-cd]PYRENE	0.44	0.38

CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

HON4 1.5m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

MW2-SS1 0.1-0.75m 16-JAN-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

HOE3 1.5m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

HOF2 2m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

HOS4 1.5m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS
SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

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

NO.	REVISIONS	DATE	INITIAL

RICHMOND CHURCHILL LIMITED PARTNERSHIP
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD
OTTAWA, ONTARIO

Title:
CROSS SECTION B-B' - SOIL

Scale: AS SHOWN	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-4B
Approved by: MSD	Revision No.:

p:\autocad drawings\environmental\pe4909x\pe4909\pe4909-phase ii.dwg

PI2	0.45m	9-Jan-13
PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
ETHYLBENZENE	2.06	2.0
TOLUENE	5.29	2.3
XYLENES	12.9	3.1
PHC F2	114	98

PI7	0.45m	9-Jan-13
PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
ETHYLBENZENE	3.94	2.0
TOLUENE	13.3	2.3
XYLENES	30.8	3.1
PHC F1	57	55

PI10 0.45m 9-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-2 SA2 0.61-1.22m 25-JUL-17
METALS COMPLY WITH MECP TABLE 7 STANDARDS
Hg COMPLY WITH MECP TABLE 7 STANDARDS
CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

S4 1m 8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

N3 1m 8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

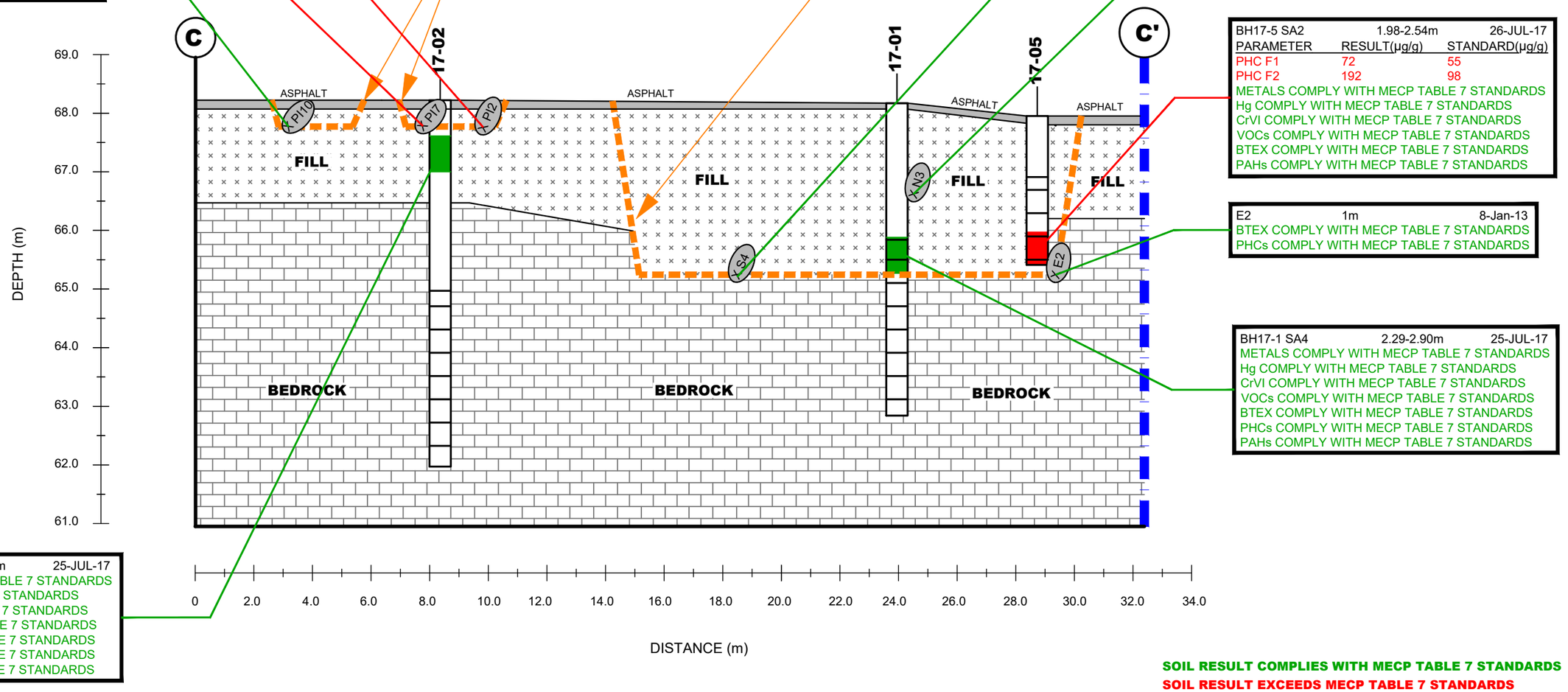
BH17-5 SA2 1.98-2.54m 26-JUL-17

PARAMETER	RESULT(µg/g)	STANDARD(µg/g)
PHC F1	72	55
PHC F2	192	98

METALS COMPLY WITH MECP TABLE 7 STANDARDS
Hg COMPLY WITH MECP TABLE 7 STANDARDS
CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

E2 1m 8-Jan-13
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-1 SA4 2.29-2.90m 25-JUL-17
METALS COMPLY WITH MECP TABLE 7 STANDARDS
Hg COMPLY WITH MECP TABLE 7 STANDARDS
CrVI COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS



SOIL RESULT COMPLIES WITH MECP TABLE 7 STANDARDS
SOIL RESULT EXCEEDS MECP TABLE 7 STANDARDS

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

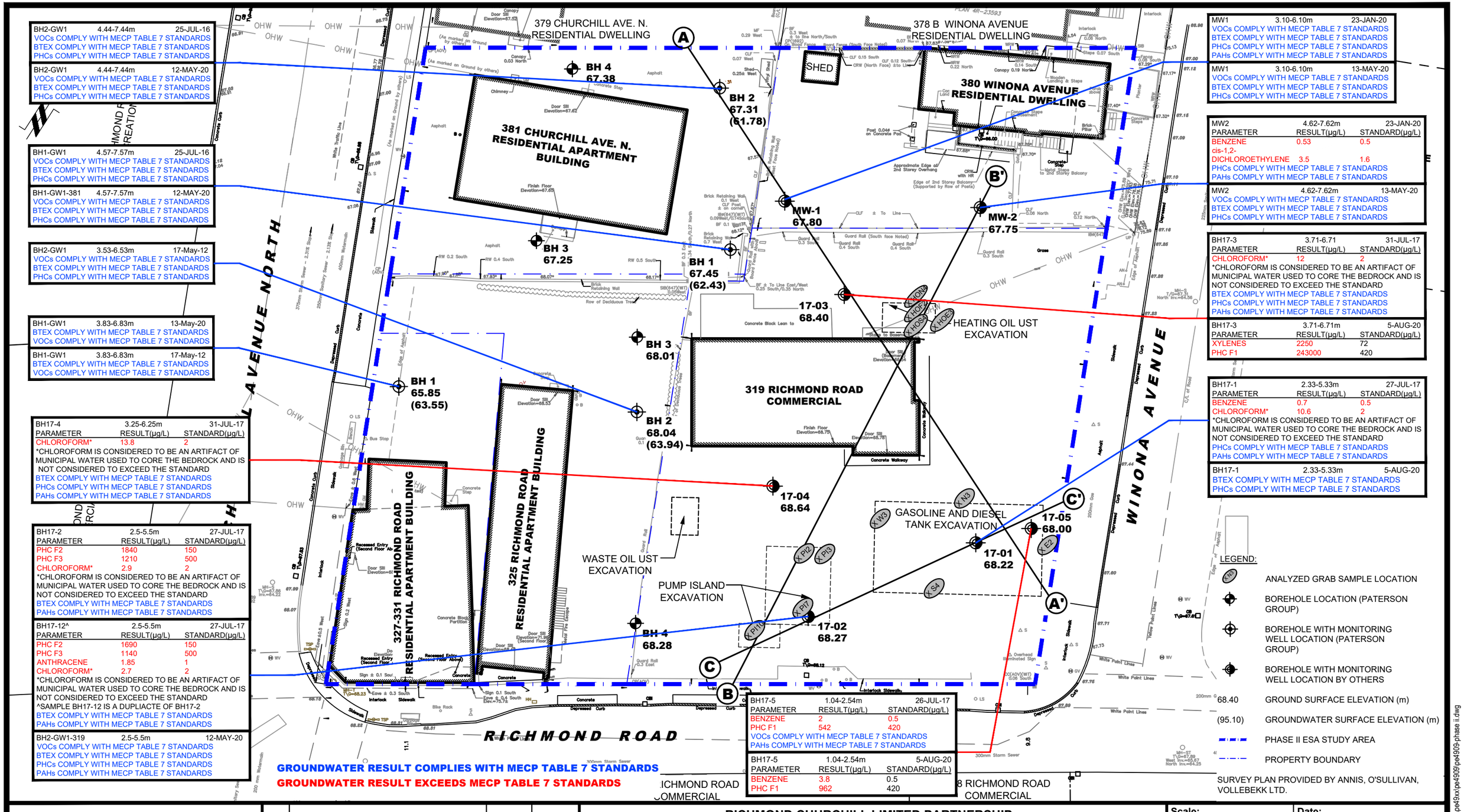
NO.	REVISIONS	DATE	INITIAL

RICHMOND CHURCHILL LIMITED PARTNERSHIP
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD
OTTAWA, ONTARIO

Title:
CROSS SECTION C-C' - SOIL

Scale: AS SHOWN	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-4C
Approved by: MSD	Revision No.:

p:\autocad drawings\environmental\pe4909x\pe4909\pe4909-phase ii.dwg



BH2-GW1 4.44-7.44m 25-JUL-16
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH2-GW1 4.44-7.44m 12-MAY-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH1-GW1 4.57-7.57m 25-JUL-16
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH1-GW1-381 4.57-7.57m 12-MAY-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH2-GW1 3.53-6.53m 17-May-12
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH1-GW1 3.83-6.83m 13-May-20
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS

BH1-GW1 3.83-6.83m 17-May-12
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
VOCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-4 3.25-6.25m 31-JUL-17

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
CHLOROFORM*	13.8	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-2 2.5-5.5m 27-JUL-17

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F2	1840	150
PHC F3	1210	500
CHLOROFORM*	2.9	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-12^ 2.5-5.5m 27-JUL-17

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F2	1690	150
PHC F3	1140	500
ANTHRACENE	1.85	1
CHLOROFORM*	2.7	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
^SAMPLE BH17-12 IS A DUPLIACTE OF BH17-2
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH2-GW1-319 2.5-5.5m 12-MAY-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

MW1 3.10-6.10m 23-JAN-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

MW1 3.10-6.10m 13-MAY-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

MW2 4.62-7.62m 23-JAN-20

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	0.53	0.5
cis-1,2-DICHLOROETHYLENE	3.5	1.6

PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

MW2 4.62-7.62m 13-MAY-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-3 3.71-6.71 31-JUL-17

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
CHLOROFORM*	12	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-3 3.71-6.71m 5-AUG-20

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
XYLENES	2250	72
PHC F1	243000	420

BH17-1 2.33-5.33m 27-JUL-17

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	0.7	0.5
CHLOROFORM*	10.6	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-1 2.33-5.33m 5-AUG-20
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-5 1.04-2.54m 26-JUL-17

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	2	0.5
PHC F1	542	420

VOCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-5 1.04-2.54m 5-AUG-20

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	3.8	0.5
PHC F1	962	420

LEGEND:

- ANALYZED GRAB SAMPLE LOCATION
- BOREHOLE LOCATION (PATERSON GROUP)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS
- 68.40 GROUND SURFACE ELEVATION (m)
- (95.10) GROUNDWATER SURFACE ELEVATION (m)
- PHASE II ESA STUDY AREA
- PROPERTY BOUNDARY

SURVEY PLAN PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

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

NO.	REVISIONS	DATE	INITIAL

RICHMOND CHURCHILL LIMITED PARTNERSHIP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - GROUNDWATER

Scale: 1:300	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-5
Approved by: MSD	Revision No.:

p:\autocad drawings\environmental\pe4909xx\pe4909\pe4909-phase ii.dwg

MW1	3.10-6.10m	23-JAN-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS		
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		
PAHs COMPLY WITH MECP TABLE 7 STANDARDS		

MW1	3.10-6.10m	13-MAY-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS		
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		

EXTENT OF GASOLINE AND DIESEL TANK EXCAVATION

BH17-3	3.71-6.71	31-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
CHLOROFORM*	12	2
*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD		
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		
PAHs COMPLY WITH MECP TABLE 7 STANDARDS		

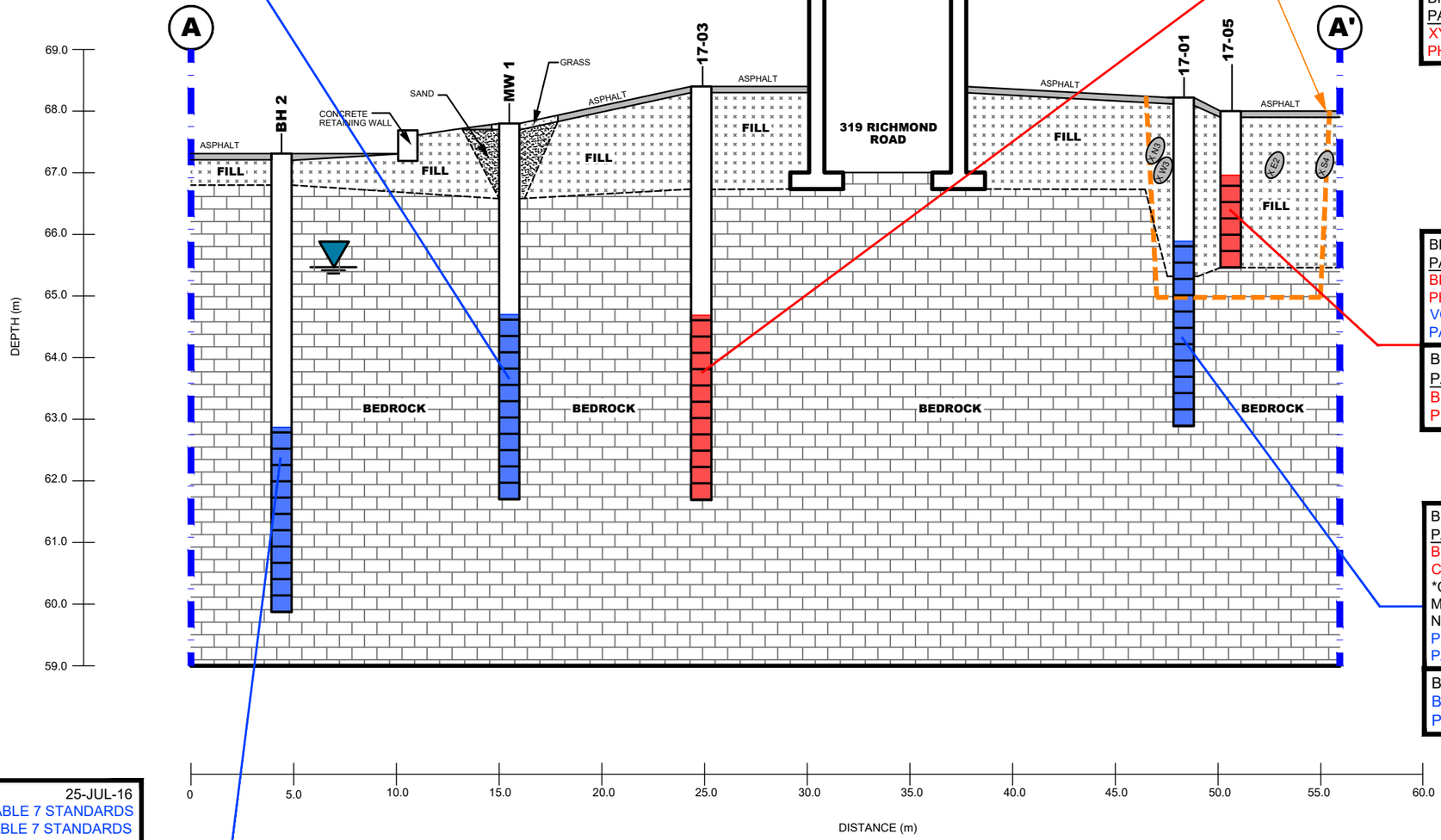
BH17-3	3.71-6.71m	5-AUG-20
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
XYLENES	2250	72
PHC F1	243000	420

BH17-5	1.04-2.54m	26-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	2	0.5
PHC F1	542	420
VOCs COMPLY WITH MECP TABLE 7 STANDARDS		
PAHs COMPLY WITH MECP TABLE 7 STANDARDS		

BH17-5	1.04-2.54m	5-AUG-20
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	3.8	0.5
PHC F1	962	420

BH17-1	2.33-5.33m	27-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	0.7	0.5
CHLOROFORM*	10.6	2
*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		
PAHs COMPLY WITH MECP TABLE 7 STANDARDS		

BH17-1	2.33-5.33m	5-AUG-20
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		



BH2-GW1	4.44-7.44m	25-JUL-16
VOCs COMPLY WITH MECP TABLE 7 STANDARDS		
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		

BH2-GW1	4.44-7.44m	12-MAY-20
VOCs COMPLY WITH MECP TABLE 7 STANDARDS		
BTEX COMPLY WITH MECP TABLE 7 STANDARDS		
PHCs COMPLY WITH MECP TABLE 7 STANDARDS		

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 7 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 7 STANDARDS

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

NO.	REVISIONS	DATE	INITIAL

RICHMOND CHURCHILL LIMITED PARTNERSHIP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD
OTTAWA, ONTARIO

Title:
CROSS SECTION A-A' - GROUNDWATER

Scale: AS SHOWN	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-5A
Approved by: MSD	Revision No.:

p:\autocad drawings\environmental\pe49xx\pe4909\pe4909-phase ii.dwg

BH17-2	2.5-5.5m	27-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F2	1840	150
PHC F3	1210	500
CHLOROFORM*	2.9	2

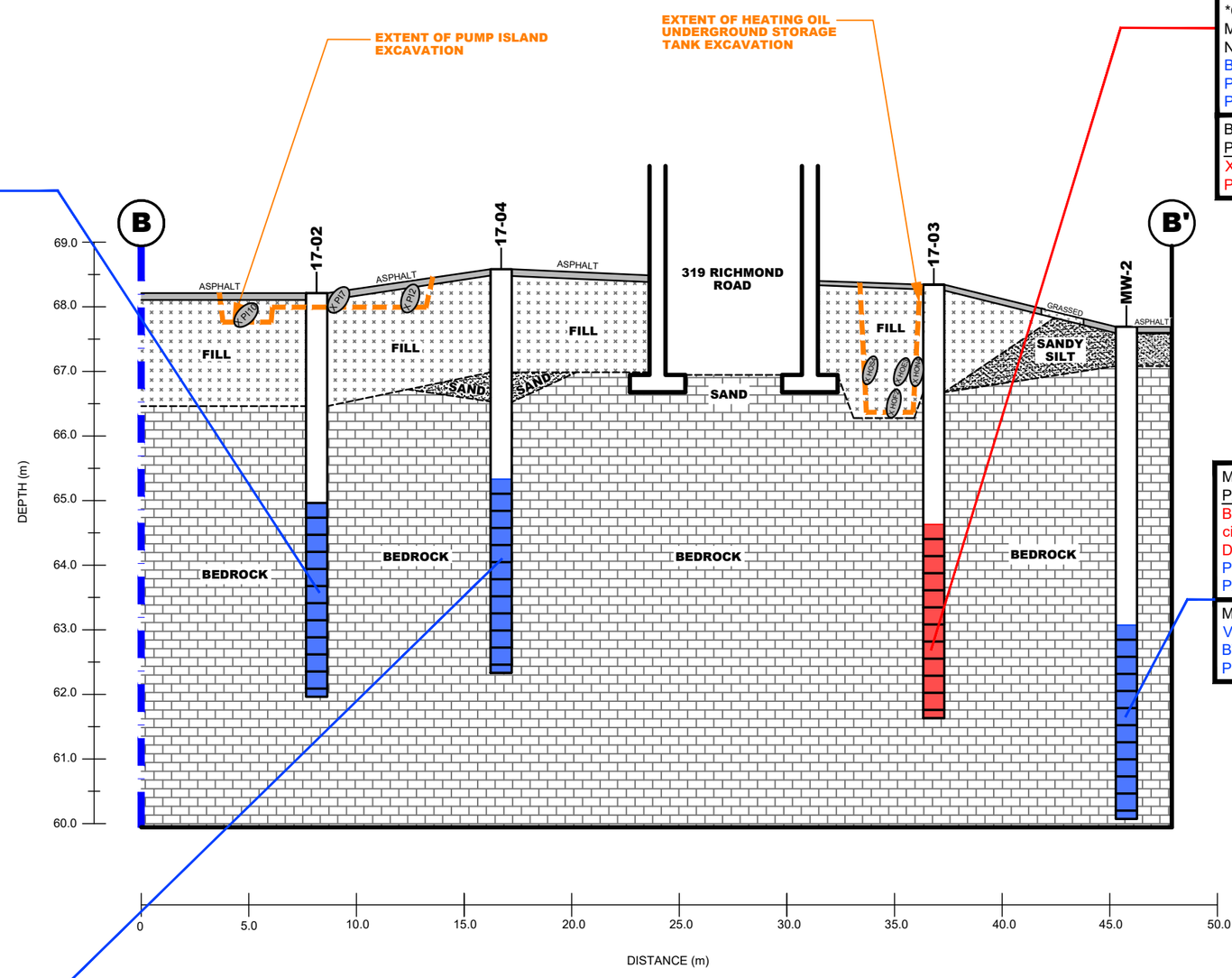
*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-12^	2.5-5.5m	27-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F2	1690	150
PHC F3	1140	500
ANTHRACENE	1.85	1
CHLOROFORM*	2.7	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
^SAMPLE BH17-12 IS A DUPLIACTE OF BH17-2
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH2-GW1-319	2.5-5.5m	12-MAY-20

VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS



BH17-3	3.71-6.71	31-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
CHLOROFORM*	12	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-3	3.71-6.71m	5-AUG-20
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
XYLENES	2250	72
PHC F1	243000	420

MW2	4.62-7.62m	23-JAN-20
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	0.53	0.5
cis-1,2-DICHLOROETHYLENE	3.5	1.6

PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

MW2	4.62-7.62m	13-MAY-20

VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-4	3.25-6.25m	31-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
CHLOROFORM*	13.8	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 7 STANDARDS
GROUNDWATER RESULT EXCEEDS MECP TABLE 7 STANDARDS

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

NO.	REVISIONS	DATE	INITIAL

RICHMOND CHURCHILL LIMITED PARTNERSHIP
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD
OTTAWA, ONTARIO

Title:
CROSS SECTION B-B' - GROUNDWATER

Scale: AS SHOWN	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-5B
Approved by: MSD	Revision No.:

p:\autocad drawings\environmental\pe49xx\pe4909\pe4909-phase ii.dwg

BH17-2	2.5-5.5m	27-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F2	1840	150
PHC F3	1210	500
CHLOROFORM*	2.9	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-12^	2.5-5.5m	27-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F2	1690	150
PHC F3	1140	500
ANTHRACENE	1.85	1
CHLOROFORM*	2.7	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
^SAMPLE BH17-12 IS A DUPLIACTE OF BH17-2
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH2-GW1-319	2.5-5.5m	12-MAY-20

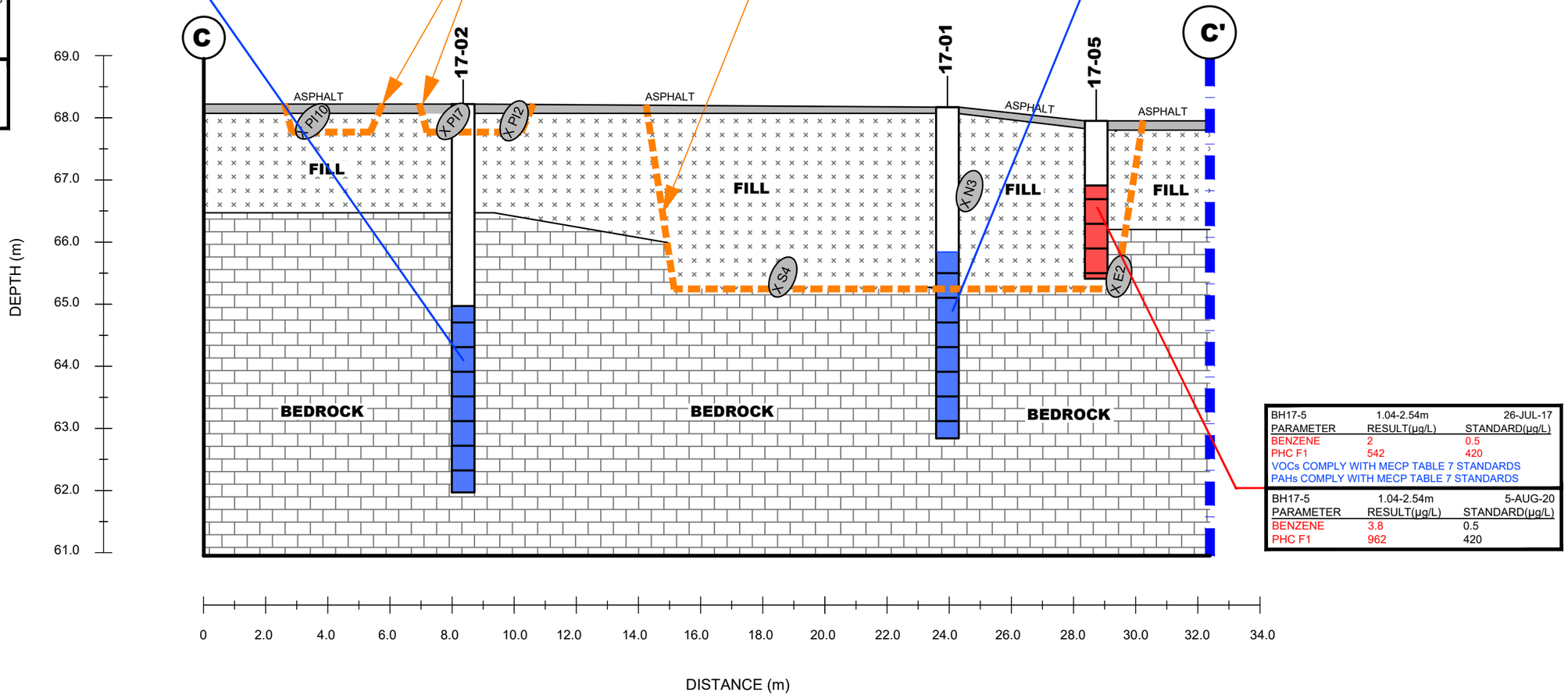
VOCs COMPLY WITH MECP TABLE 7 STANDARDS
BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-1	2.33-5.33m	27-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	0.7	0.5
CHLOROFORM*	10.6	2

*CHLOROFORM IS CONSIDERED TO BE AN ARTIFACT OF MUNICIPAL WATER USED TO CORE THE BEDROCK AND IS NOT CONSIDERED TO EXCEED THE STANDARD
PHCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-1	2.33-5.33m	5-AUG-20

BTEX COMPLY WITH MECP TABLE 7 STANDARDS
PHCs COMPLY WITH MECP TABLE 7 STANDARDS



BH17-5	1.04-2.54m	26-JUL-17
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	2	0.5
PHC F1	542	420

VOCs COMPLY WITH MECP TABLE 7 STANDARDS
PAHs COMPLY WITH MECP TABLE 7 STANDARDS

BH17-5	1.04-2.54m	5-AUG-20
PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
BENZENE	3.8	0.5
PHC F1	962	420

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 7 STANDARDS
GROUNDWATER RESULT EXCEEDS MECP TABLE 7 STANDARDS

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

NO.	REVISIONS	DATE	INITIAL

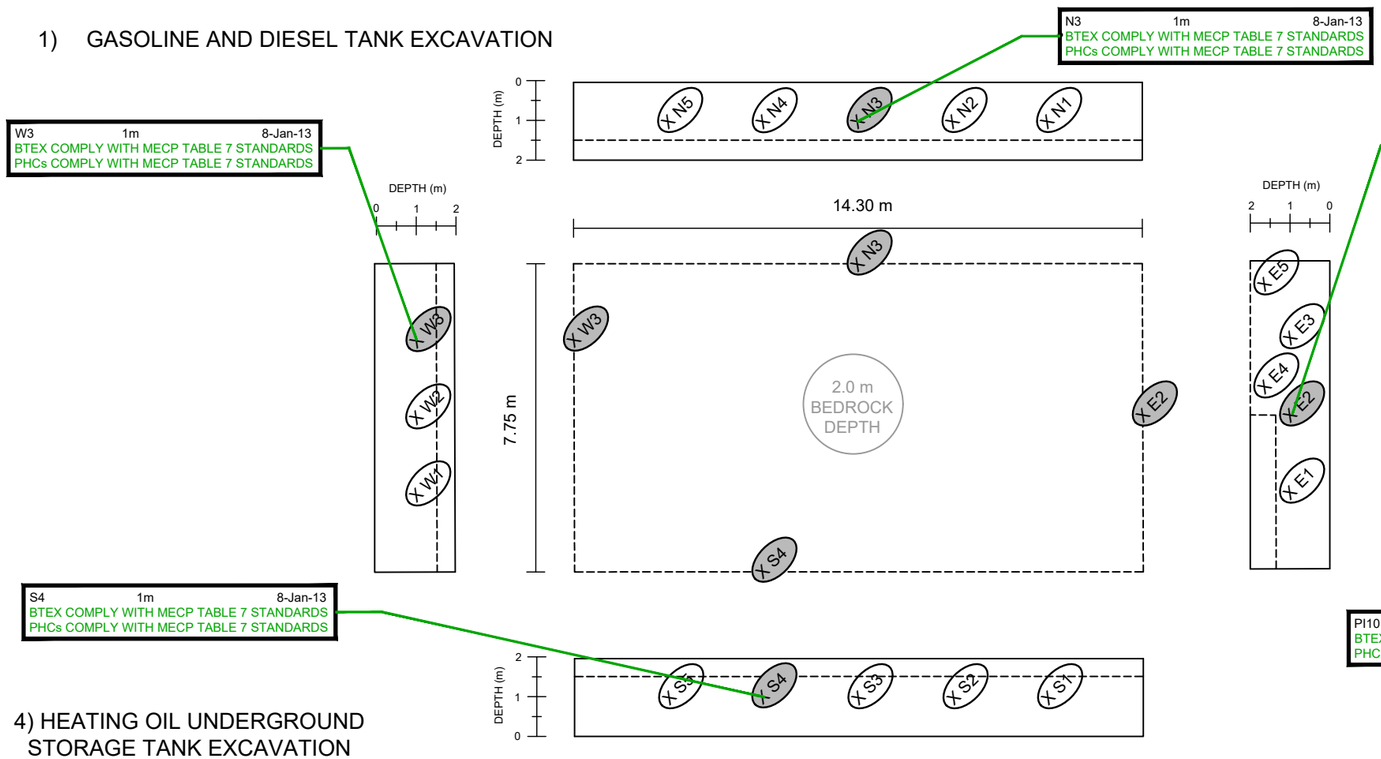
RICHMOND CHURCHILL LIMITED PARTNERSHIP
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD
OTTAWA, ONTARIO

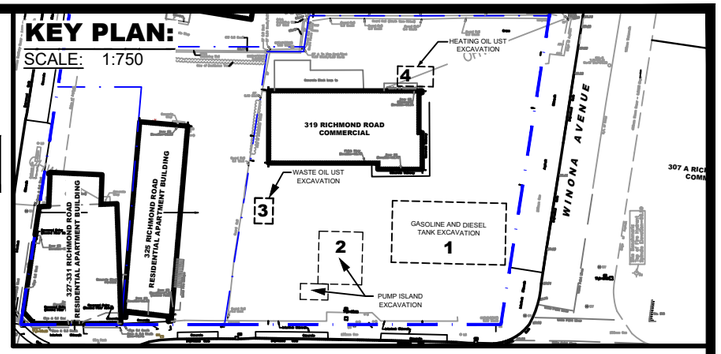
Title:
CROSS SECTION C-C' - GROUNDWATER

Scale: AS SHOWN	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-5C
Approved by: MSD	Revision No.:

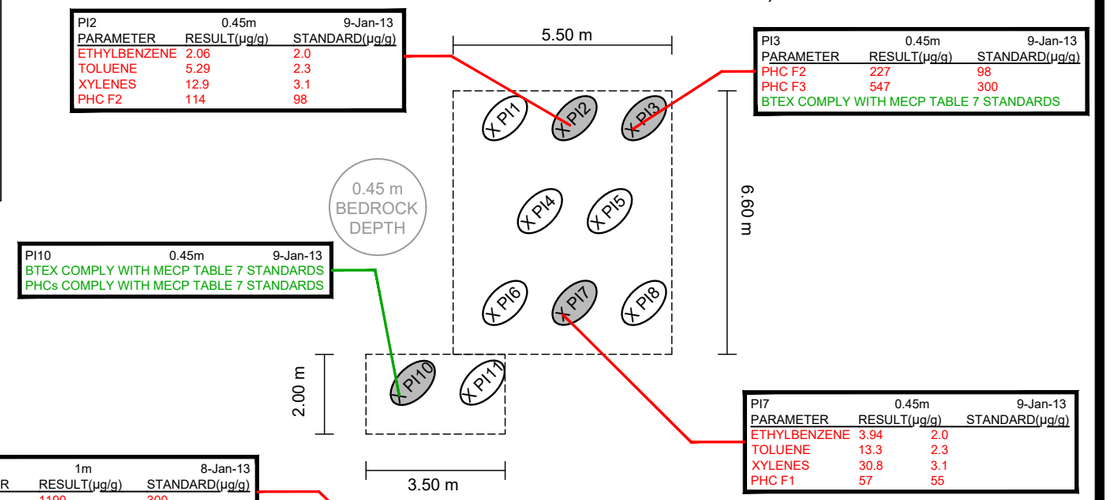
p:\autocad drawings\environmental\pe49xx\pe4909\pe4909-phase ii.dwg

1) GASOLINE AND DIESEL TANK EXCAVATION

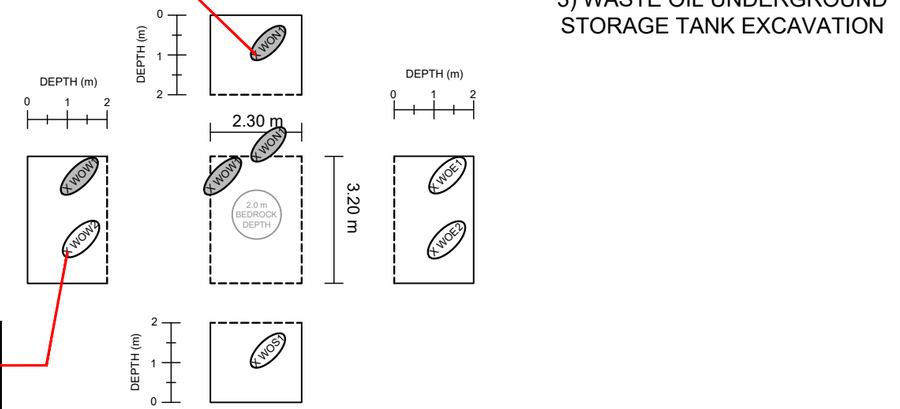




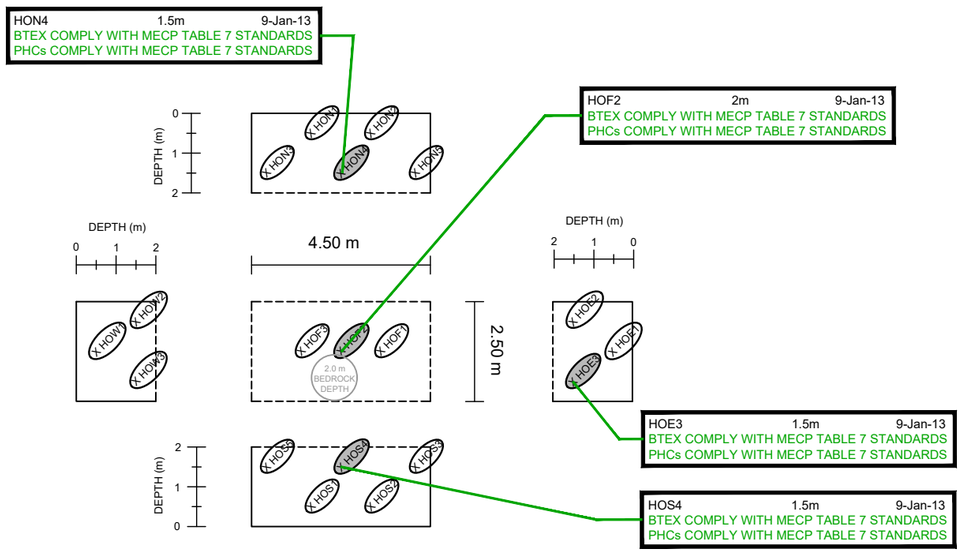
2) PUMP ISLAND EXCAVATION



3) WASTE OIL UNDERGROUND STORAGE TANK EXCAVATION



4) HEATING OIL UNDERGROUND STORAGE TANK EXCAVATION



patersongroup
consulting engineers

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

NO.	REVISIONS	DATE	INITIAL

RICHMOND CHURCHILL LIMITED PARTNERSHIP

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
327 RICHMOND ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - REMEDIATION

Scale: 1:150	Date: 11/2020
Drawn by: YA	Report No.: PE4909-2
Checked by: MB	Dwg. No.: PE4909-6
Approved by: MSD	Revision No.:

p:\autocad drawings\environmental\pe49xx\pe4909\pe4909-phase ii.dwg

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

APPENDIX 2

SOIL QUALITY

GROUNDWATER QUALITY

LABORATORY CERTIFICATES OF ANALYSIS

Property				325-331 Richmond Road	319 Richmond Road					
Parameter	**Units**	**MDL**	**Regulation**	**BH1-AU2**	**BH17-1-SA4**	**BH17-2 SA2**	**BH17-3 SA2**	**BH17-4 SA2**	**DUP**	**BH17-5 SA4**
Sample Depth (m)			**Table 7 Residential, Coarse**	**0.60-1.20**	**2.29-2.90**	**0.61-1.22**	**0.76-1.37**	**0.61-1.22**	**0.61-1.22**	**1.98-2.54**
Sample Date				**9-May-12**	**25-Jul-17**	**17-Oct-12**	**31-Oct-12**	**16-Oct-12**	**18-Oct-12**	**31-Oct-12**
Metals										
Chromium (VI)	ug/g dry	0.2	8 ug/g dry	ND (0.2)	ND (0.2)	0.30	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Mercury	ug/g dry	0.1	0.27 ug/g dry	0.07	ND (0.01)	ND (0.01)	0.30	0.30	0.30	ND (0.05)
Antimony	ug/g dry	1.0	7.5 ug/g dry	ND (0.2)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Arsenic	ug/g dry	1.0	18 ug/g dry	4.00	ND (1.0)	ND (1.0)	16.20	8.80	9.10	ND (0.1)
Barium	ug/g dry	1.0	390 ug/g dry	35	37.8	60.8	253	282	303	57
Beryllium	ug/g dry	1.0	4 ug/g dry	ND (0.2)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Boron	ug/g dry	1.0	120 ug/g dry	ND (5)	3.7	7.4	10.8	14.3	37.6	3.5
Cadmium	ug/g dry	0.5	1.2 ug/g dry	ND (0.1)	ND (0.5)	ND (0.5)	1.20	3.50	3.60	0.50
Chromium	ug/g dry	1.0	160 ug/g dry	8	8.8	16.9	24.3	17.3	19.5	9.8
Cobalt	ug/g dry	1.0	22 ug/g dry	4	3.7	6	8.3	7.1	7.4	3.7
Copper	ug/g dry	1.0	140 ug/g dry	9.5	10.9	23.4	144	338	275	25.5
Lead	ug/g dry	1.0	120 ug/g dry	17	26	106	271	274	307	46.9
Molybdenum	ug/g dry	1.0	6.9 ug/g dry	0.80	ND (1.0)	ND (1.0)	2.30	2.10	2.40	ND (1.0)
Nickel	ug/g dry	1.0	100 ug/g dry	6.7	6.9	11.6	20.6	27.7	29.1	8.1
Selenium	ug/g dry	1.0	2.4 ug/g dry	ND (0.5)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Silver	ug/g dry	0.5	20 ug/g dry	ND (0.2)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Thallium	ug/g dry	1.0	1 ug/g dry	0.09	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Uranium	ug/g dry	1.0	23 ug/g dry	0.43	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vanadium	ug/g dry	1.0	86 ug/g dry	15	19.4	28.3	33.9	21.6	23.2	19.1
Zinc	ug/g dry	1.0	340 ug/g dry	28	432	105	473	508	545	104

2	Sample exceeds MECP Table 7 Residential Standard
ND (0.5)	No concentrations identified above the MDL

Property			380 Winona Avenue		325-331 Richmond Road	381 Churchill Avenue N		319 Richmond Road					
Parameter	Units	Regulation	MW1-SS2	MW2-SS1	BH12-1 SA4	BH1-AU1	BH2-AU1	BH17-1-SA4	BH17-2 SA2	BH17-3 SA2	BH17-4 SA2	DUP	BH17-5 SA4
Sample Depth (m)		Table 7 Residential, Coarse	0.75-1.52	1.20-1.80	2.45-3.05	0.0-0.60	0.0-0.51	2.29-2.90	0.61-1.22	0.76-1.37	0.61-1.22	0.61-1.22	1.98-2.54
Sample Date			16-Jan-20	16-Jan-20	17-Oct-12	16-Oct-12	31-Oct-12	25-Jul-17	17-Oct-12	31-Oct-12	16-Oct-12	18-Oct-12	31-Oct-12
Volatiles													
Acetone	ug/g dry	16 ug/g dry	ND (0.50)	ND (0.50)	NA	NA	NA	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Benzene	ug/g dry	0.21 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.15
Bromodichloromethane	ug/g dry	13 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Bromoform	ug/g dry	0.27 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Bromomethane	ug/g dry	0.05 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Carbon Tetrachloride	ug/g dry	0.05 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Chlorobenzene	ug/g dry	2.4 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Chloroform	ug/g dry	0.05 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Dibromochloromethane	ug/g dry	9.4 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Dichlorodifluoromethane	ug/g dry	16 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,2-Dichlorobenzene	ug/g dry	3.4 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,3-Dichlorobenzene	ug/g dry	4.8 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,4-Dichlorobenzene	ug/g dry	0.083 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1-Dichloroethane	ug/g dry	3.5 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,2-Dichloroethane	ug/g dry	0.05 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1-Dichloroethylene	ug/g dry	0.05 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
cis-1,2-Dichloroethylene	ug/g dry	3.4 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
trans-1,2-Dichloroethylene	ug/g dry	0.084 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,2-Dichloropropane	ug/g dry	0.05 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
cis-1,3-Dichloropropylene	ug/g dry		ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
trans-1,3-Dichloropropylene	ug/g dry		ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,3-Dichloropropene, total	ug/g dry	0.05 ug/g dry	ND (0.04)	ND (0.04)	NA	NA	NA	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
Ethylbenzene	ug/g dry	2 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.38
Ethylene dibromide	ug/g dry	0.05 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Hexane	ug/g dry	2.8 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Methyl Ethyl Ketone	ug/g dry	16 ug/g dry	ND (0.50)	ND (0.50)	NA	NA	NA	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Methyl Isobutyl Ketone	ug/g dry	1.7 ug/g dry	ND (0.50)	ND (0.50)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ug/g dry	0.75 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Methylene Chloride	ug/g dry	0.1 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Styrene	ug/g dry	0.7 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1,1,2-Tetrachloroethane	ug/g dry	0.058 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1,2,2-Tetrachloroethane	ug/g dry	0.05 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Tetrachloroethylene	ug/g dry	0.28 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Toluene	ug/g dry	2.3 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.41
1,1,1-Trichloroethane	ug/g dry	0.38 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1,2-Trichloroethane	ug/g dry	0.05 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Trichloroethylene	ug/g dry	0.061 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Trichlorofluoromethane	ug/g dry	4 ug/g dry	ND (0.05)	ND (0.05)	NA	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Vinyl Chloride	ug/g dry	0.02 ug/g dry	ND (0.02)	ND (0.02)	NA	NA	NA	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
m/p-Xylene	ug/g dry							ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	1.07
o-Xylene	ug/g dry							ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.15
Xylenes, total	ug/g dry	3.1 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	1.22

2	Sample exceeds MECP Table 7 Residential Standards
ND (0.5)	No concentrations identified above the MDL

Property			319 Richmond Road							
Parameter	Units	Regulation	E2	W3	S4	N3	WO W2	WO N1	HOF2	HOE3
Sample Depth (m)		Table 7 Residential, Coarse	Excavation	Excavation	Excavation	Excavation	Excavation	Excavation	Excavation	Excavation
Sample Date			8-Jan-13	8-Jan-13	8-Jan-13	8-Jan-13	8-Jan-13	8-Jan-13	9-Jan-13	9-Jan-13
Volatiles										
Acetone	ug/g dry	16 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ug/g dry	0.21 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Bromodichloromethane	ug/g dry	13 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	ug/g dry	0.27 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	ug/g dry	2.4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	ug/g dry	9.4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	ug/g dry	16 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	ug/g dry	3.4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	ug/g dry	4.8 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	ug/g dry	0.083 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	ug/g dry	3.5 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethylene	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethylene	ug/g dry	3.4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethylene	ug/g dry	0.084 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropylene	ug/g dry		NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropylene	ug/g dry		NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichloropropene, total	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	ug/g dry	2 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Ethylene dibromide	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Hexane	ug/g dry	2.8 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	ug/g dry	16 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Isobutyl Ketone	ug/g dry	1.7 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ug/g dry	0.75 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	ug/g dry	0.1 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	ug/g dry	0.7 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1,2-Tetrachloroethane	ug/g dry	0.058 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethylene	ug/g dry	0.28 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	ug/g dry	2.3 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1,1-Trichloroethane	ug/g dry	0.38 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethylene	ug/g dry	0.061 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	ug/g dry	4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	ug/g dry	0.02 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
m/p-Xylene	ug/g dry		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	3.1 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)

2	Sample exceeds MECP Table 7 Residential Standards
ND (0.5)	No concentrations identified above the MDL

Property			319 Richmond Road							
Parameter	Units	Regulation	HOS4	HON4	PI2	PI3	PI7	PI10	WOW3	E4
Sample Depth (m)		Table 7 Residential, Coarse	Excavation	Excavation	Excavation	Excavation	Excavation	Excavation	Excavation	Excavation
Sample Date			9-Jan-13	9-Jan-13	9-Jan-13	9-Jan-13	9-Jan-13	9-Jan-13	17-Jan-13	17-Jan-13
Volatiles										
Acetone	ug/g dry	16 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ug/g dry	0.21 ug/g dry	ND (0.02)	ND (0.02)	0.09	0.03	0.17	ND (0.02)	ND (0.02)	ND (0.02)
Bromodichloromethane	ug/g dry	13 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	ug/g dry	0.27 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	ug/g dry	2.4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	ug/g dry	9.4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	ug/g dry	16 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	ug/g dry	3.4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	ug/g dry	4.8 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	ug/g dry	0.083 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	ug/g dry	3.5 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethylene	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethylene	ug/g dry	3.4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethylene	ug/g dry	0.084 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropylene	ug/g dry		NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropylene	ug/g dry		NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichloropropene, total	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	ug/g dry	2 ug/g dry	ND (0.05)	ND (0.05)	2.06	0.11	3.94	ND (0.05)	ND (0.05)	ND (0.05)
Ethylene dibromide	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Hexane	ug/g dry	2.8 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	ug/g dry	16 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Isobutyl Ketone	ug/g dry	1.7 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ug/g dry	0.75 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	ug/g dry	0.1 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	ug/g dry	0.7 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1,2-Tetrachloroethane	ug/g dry	0.058 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethylene	ug/g dry	0.28 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	ug/g dry	2.3 ug/g dry	ND (0.05)	ND (0.05)	5.29	0.37	13.3	ND (0.05)	ND (0.05)	ND (0.05)
1,1,1-Trichloroethane	ug/g dry	0.38 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	ug/g dry	0.05 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethylene	ug/g dry	0.061 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	ug/g dry	4 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	ug/g dry	0.02 ug/g dry	NA	NA	NA	NA	NA	NA	NA	NA
m/p-Xylene	ug/g dry		ND (0.05)	ND (0.05)	8.9	0.38	20.2	ND (0.05)	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry		ND (0.05)	ND (0.05)	4	0.21	10.6	ND (0.05)	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	3.1 ug/g dry	ND (0.05)	ND (0.05)	12.9	0.59	30.8	ND (0.05)	ND (0.05)	ND (0.05)

2	Sample exceeds MECP Table 7 Residential Standards
ND (0.5)	No concentrations identified above the MDL

Property			380 Winona Avenue		319 Richmond Road					
Parameter	**Units**	**Regulation**	**MW1-SS2**	**MW2-SS1**	**BH17-1-SA4**	**BH17-2 SA2**	**BH17-3 SA2**	**BH17-4 SA2**	**DUP**	**BH17-5 SA4**
Sample Depth (m)		**Table 7 Residential, Coarse**	**0.75-1.52**	**1.20-1.80**	**2.29-2.90**	**0.61-1.22**	**0.76-1.37**	**0.61-1.22**	**0.61-1.22**	**1.98-2.54**
Sample Date			**16-Jan-20**	**16-Jan-20**	**25-Jul-17**	**17-Oct-12**	**31-Oct-12**	**16-Oct-12**	**18-Oct-12**	**31-Oct-12**
Semi-Volatiles										
Acenaphthene	ug/g dry	7.9 ug/g dry	ND (0.005)	ND (0.005)	ND (0.02)	0.03	0.09	0.49	0.27	0.05
Acenaphthylene	ug/g dry	0.15 ug/g dry	0.011	0.012	ND (0.02)	0.06	0.14	0.28	0.16	ND (0.02)
Anthracene	ug/g dry	0.67 ug/g dry	0.013	0.015	ND (0.02)	0.09	0.32	0.99	0.61	ND (0.02)
Benzo[a]anthracene	ug/g dry	0.5 ug/g dry	0.076	0.044	ND (0.02)	0.15	0.62	1.47	0.88	ND (0.02)
Benzo[a]pyrene	ug/g dry	0.3 ug/g dry	0.084	0.055	ND (0.02)	0.2	0.69	1.56	0.94	ND (0.02)
Benzo[b]fluoranthene	ug/g dry	0.78 ug/g dry	0.11	0.085	ND (0.02)	0.21	0.74	1.81	1.02	ND (0.02)
Benzo[g,h,i]perylene	ug/g dry	6.6 ug/g dry	0.066	0.07	ND (0.02)	0.16	0.46	1.03	0.63	ND (0.02)
Benzo[k]fluoranthene	ug/g dry	0.78 ug/g dry	0.037	0.025	ND (0.02)	0.11	0.42	1.03	0.58	ND (0.02)
Chrysene	ug/g dry	7 ug/g dry	0.066	0.046	ND (0.02)	0.2	0.71	1.63	0.99	0.02
Dibenzo[a,h]anthracene	ug/g dry	0.1 ug/g dry	0.017	0.015	ND (0.02)	0.04	0.13	0.29	0.17	ND (0.02)
Fluoranthene	ug/g dry	0.69 ug/g dry	0.12	0.071	ND (0.02)	0.42	1.62	5.04	2.76	0.04
Fluorene	ug/g dry	62 ug/g dry	ND (0.005)	ND (0.005)	ND (0.02)	0.03	0.08	0.47	0.26	0.03
Indeno[1,2,3-cd]pyrene	ug/g dry	0.38 ug/g dry	0.071	0.06	ND (0.02)	0.15	0.44	1	0.6	ND (0.02)
1-Methylnaphthalene	ug/g dry				ND (0.02)	0.02	0.04	0.35	0.2	0.66
2-Methylnaphthalene	ug/g dry				ND (0.02)	0.03	0.06	0.42	0.25	0.12
Methylnaphthalene (1&2)	ug/g dry	0.99 ug/g dry	ND (0.005)	ND (0.005)	ND (0.04)	0.05	0.1	0.77	0.45	0.78
Naphthalene	ug/g dry	0.6 ug/g dry	ND (0.005)	ND (0.005)	ND (0.01)	0.03	0.06	0.4	0.26	0.15
Phenanthrene	ug/g dry	6.2 ug/g dry	0.035	0.03	0.02	0.29	0.99	3.8	2.25	0.06
Pyrene	ug/g dry	78 ug/g dry	0.1	0.061	0.02	0.37	1.37	4.06	2.23	0.04
Styrene	ug/g dry	0.7 ug/g dry	NA	NA	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)

2	Sample exceeds MECP Table 7 Residential Standard
ND (0.5)	No concentrations identified above the MDL

Property			380 Winona Avneue		325-331-Richmond Road	381 Churchill Avenue N		319 Richmond Road				
Parameter	**Units**	**Regulation**	**MW1-SS2**	**MW2-SS1**	**BH2-SS2**	**BH1-AU1**	**BH2-AU1**	**BH17-1-SA4**	**BH17-2 SA2**	**BH17-3 SA2**	**BH17-4 SA2**	**DUP**
Sample Depth (m)		**Table 7 Residential, Coarse**	**0.75-1.52**	**1.20-1.80**	**0.72-1.20**	**0.0-0.60**	**0.0-0.51**	**2.29-2.90**	**0.61-1.22**	**0.76-1.37**	**0.61-1.22**	**0.61-1.22**
Sample Date			**16-Jan-20**	**16-Jan-20**	**9-May-12**	**16-Oct-12**	**31-Oct-12**	**25-Jul-17**	**17-Oct-12**	**31-Oct-12**	**16-Oct-12**	**18-Oct-12**
Hydrocarbons												
F1 PHCs (C6-C10)	ug/g dry	55 ug/g dry	ND (10)	110	ND (10)	ND (10)	ND (10)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	98 ug/g dry	ND (10)	180	ND (10)	ND (10)	ND (10)	16	15	ND (4)	13	14
F3 PHCs (C16-C34)	ug/g dry	300 ug/g dry	89	ND (10)	19	310	390	37	30	42	120	103
F4 PHCs (C34-C50)	ug/g dry	2800 ug/g dry	230	ND (10)	ND (10)	250	270	20	ND (6)	31	42	39

Property			319 Richmond Road									
Parameter	**Units**	**Regulation**	**BH17-5 SA4**	**E2**	**W3**	**S4**	**N3**	**WO W2**	**WO N1**	**HOF2**	**HOE3**	**HOS4**
Sample Depth (m)		**Reg 153/04 (2011)- Table 3 Residential, Coarse**	**1.98-2.54**	**Excavation**	**Excavation**	**Excavation**	**Excavation**	**Excavation**	**Excavation**	**Excavation**	**Excavation**	**Excavation**
Sample Date			**31-Oct-12**	**8-Jan-13**	**8-Jan-13**	**8-Jan-13**	**8-Jan-13**	**8-Jan-13**	**8-Jan-13**	**9-Jan-13**	**9-Jan-13**	**9-Jan-13**
Hydrocarbons												
F1 PHCs (C6-C10)	ug/g dry	55 ug/g dry	72	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	98 ug/g dry	192	ND (4)	ND (4)	ND (4)	ND (4)	86	ND (4)	ND (4)	ND (4)	ND (4)
F3 PHCs (C16-C34)	ug/g dry	300 ug/g dry	42	21	ND (8)	ND (8)	ND (8)	18500	ND (8)	ND (8)	ND (8)	ND (8)
F4 PHCs (C34-C50)	ug/g dry	2800 ug/g dry	14	ND (6)	ND (6)	ND (6)	ND (6)	4310	ND (6)	ND (6)	ND (6)	ND (6)

Property			319 Richmond Road						
Parameter	**Units**	**Regulation**	**HON4**	**PI2**	**PI3**	**PI7**	**PI10**	**WOW3**	**E4**
Sample Depth (m)		**Reg 153/04 (2011)- Table 3 Residential, Coarse**	**Excavation**	**Excavation**	**Excavation**	**Excavation**	**Excavation**	**Excavation**	**Excavation**
Sample Date			**9-Jan-13**	**9-Jan-13**	**9-Jan-13**	**9-Jan-13**	**9-Jan-13**	**17-Jan-13**	**17-Jan-13**
Hydrocarbons									
F1 PHCs (C6-C10)	ug/g dry	55 ug/g dry	ND (7)	ND (7)	ND (7)	57	ND (7)	ND (7)	427
F2 PHCs (C10-C16)	ug/g dry	98 ug/g dry	ND (4)	86	ND (4)	ND (4)	ND (4)	ND (4)	307
F3 PHCs (C16-C34)	ug/g dry	300 ug/g dry	ND (8)	18500	ND (8)	20	34	355	ND (8)
F4 PHCs (C34-C50)	ug/g dry	2800 ug/g dry	ND (6)	4310	ND (6)	ND (6)	ND (6)	94	ND (6)

2	Sample exceeds MECP Table 7 Residential Standards
ND (0.5)	No concentrations identified above the MDL

Table 2B: Groundwater Analytical Test Results
VOCs and BTEX

Property			380 Winona Avenue				325-331 Richmond Road			381 Churchill Avneue N			
Parameter	Units	Regulation	MW1	MW1-GW1	MW2	MW2-GW1	BH1-GW1	325-BH1-GW1	BH2-GW1	BH1-GW1	BH1-GW1-381	BH2-GW1	BH2-GW1-281
Screen Interval (m)		Table 7 Non-Potable Groundwater, Coarse	3.10-6.10		4.62-7.62		3.83-6.83		3.53-6.53	4.57-7.57		2.60-5.60	
Sample Date			23-Jan-20	13-May-20	23-Jan-20	13-May-20	25-Oct-12	13-May-20	17-May-12	25-Jul-16	12-May-20	25-Jul-16	12-May-20
Volatiles													
Acetone	ug/L	100000 ug/L	22	ND (5.0)	ND (10)	ND (5.0)	ND (10)	ND (10)	ND (10)	ND (1)	ND (5.0)	ND (1)	ND (5.0)
Benzene	ug/L	0.5 ug/L	ND (0.2)	ND (0.5)	0.53	ND (0.5)	ND (0.2)	ND (0.2)	0.35	0.24	ND (0.5)	ND (0.5)	ND (0.5)
Bromodichloromethane	ug/L	67000 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.1)	ND (0.1)	0.66	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)
Bromoform	ug/L	5 ug/L	ND (1.0)	ND (0.5)	ND (1.0)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.5)	ND (0.1)	ND (0.5)
Bromomethane	ug/L	0.89 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)
Carbon Tetrachloride	ug/L	0.2 ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Chlorobenzene	ug/L	140 ug/L	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.5)	ND (0.1)	ND (0.5)
Chloroform	ug/L	2 ug/L	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.1)	ND (0.1)	2.9	ND (0.2)	ND (0.5)	0.86	ND (0.5)
Dibromochloromethane	ug/L	65000 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	NA	ND (0.5)	NA	ND (0.5)
Dichlorodifluoromethane	ug/L	3500 ug/L	ND (0.5)	ND (1.0)	ND (0.5)	ND (1.0)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (1.0)	ND (0.2)	ND (1.0)
1,2-Dichlorobenzene	ug/L	150 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.5)	ND (0.1)	ND (0.5)
1,3-Dichlorobenzene	ug/L	7600 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.5)	ND (0.1)	ND (0.5)
1,4-Dichlorobenzene	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.5)	ND (0.1)	ND (0.5)
1,1-Dichloroethane	ug/L	11 ug/L	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.3)	ND (0.5)	ND (0.3)	ND (0.5)
1,2-Dichloroethane	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	0.44	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)
1,1-Dichloroethylene	ug/L	0.5 ug/L	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.3)	ND (0.5)	ND (0.3)	ND (0.5)
cis-1,2-Dichloroethylene	ug/L	1.6 ug/L	ND (0.5)	ND (0.5)	3.5	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.2)	ND (0.5)	1.6	ND (0.5)
trans-1,2-Dichloroethylene	ug/L	1.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)
1,2-Dichloropropane	ug/L	0.58 ug/L	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)
cis-1,3-Dichloropropylene	ug/L		NA	ND (0.5)	NA	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	NA	ND (0.5)	NA	ND (0.5)
trans-1,3-Dichloropropylene	ug/L		NA	ND (0.5)	NA	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	NA	ND (0.5)	NA	ND (0.5)
1,3-Dichloropropene, total	ug/L	0.5 ug/L	ND (0.4)	ND (0.5)	ND (0.4)	ND (0.5)	NA	NA	NA	ND (0.3)	ND (0.5)	ND (0.3)	ND (0.5)
Ethylbenzene	ug/L	54 ug/L	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.5)	ND (0.1)	ND (0.5)
Ethylene dibromide	ug/L	0.2 ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	NA	ND (0.2)	NA	ND (0.2)
Hexane	ug/L	5 ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NA	NA	NA	0.78	ND (1.0)	0.78	ND (1.0)
Methyl Ethyl Ketone	ug/L	21000 ug/L	ND (10)	ND (5.0)	ND (10)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (5.0)
Methyl Isobutyl Ketone	ug/L	5200 ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (5.0)
Methyl tert-butyl ether	ug/L	15 ug/L	ND (0.5)	ND (2.0)	ND (0.5)	ND (2.0)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (2.0)	ND (0.2)	ND (2.0)
Methylene Chloride	ug/L	26 ug/L	ND (2)	ND (5.0)	ND (2)	ND (5.0)	10.6	ND (2)	ND (0.5)	ND (0.3)	ND (5.0)	ND (0.3)	ND (5.0)
Styrene	ug/L	43 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.5)	ND (0.1)	ND (0.5)
1,1,1,2-Tetrachloroethane	ug/L	1.1 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.5)	ND (0.1)	ND (0.5)
1,1,2,2-Tetrachloroethane	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.5)	ND (0.1)	ND (0.5)
Tetrachloroethylene	ug/L	0.5 ug/L	ND (0.2)	ND (0.5)	0.21	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.2)	ND (0.5)	0.45	ND (0.5)
Toluene	ug/L	320 ug/L	ND (0.2)	ND (0.5)	0.42	ND (0.5)	ND (0.2)	ND (0.2)	1.9	0.56	ND (0.5)	0.69	ND (0.5)
1,1,1-Trichloroethane	ug/L	23 ug/L	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.3)	ND (0.5)	ND (0.3)	ND (0.5)
1,1,2-Trichloroethane	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)
Trichloroethylene	ug/L	0.5 ug/L	ND (0.2)	ND (0.5)	0.34	ND (0.5)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.2)	ND (0.5)	0.35	ND (0.5)
Trichlorofluoromethane	ug/L	2000 ug/L	ND (0.5)	ND (1.0)	ND (0.5)	ND (1.0)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.4)	ND (1.0)	ND (0.4)	ND (1.0)
Vinyl Chloride	ug/L	0.5 ug/L	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.17)	ND (0.5)	ND (0.17)	ND (0.5)
m/p-Xylene	ug/L		NA	ND (0.5)	NA	ND (0.5)	NA	NA	NA	NA	ND (0.5)	NA	ND (0.5)
o-Xylene	ug/L		NA	ND (0.5)	NA	ND (0.5)	NA	NA	NA	NA	ND (0.5)	NA	ND (0.5)
Xylenes, total	ug/L	72 ug/L	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)

2	Sample exceeds MECP Table 7 Residential Standard
ND (0.5)	No concentrations identified above the MDL
NA	Parameter Not Analysed

Table 2B: Groundwater Analytical Test Results
VOCs and BTEX

Property			319 Richmond Road									
Parameter	Units	Regulation	BH17-1	BH17-2	BH17-2 (dup)	BH2-GW1-319	BH17-3	BH17-4	BH17-5	BH17-01	BH17-03	BH17-05
Screen Interval (m)		Table 7 Non-Potable Groundwater, Coarse	2.33-5.33	2.5-5.5			3.71-6.71	3.25-6.25	1.04-2.54	2.33-5.33	3.71-6.71	1.04-2.54
Sample Date			27-Jul-17	27-Jul-17	27-Jul-17	12-May-20	31-Jul-17	31-Jul-17	26-Jul-17	05-Aug-20	05-Aug-20	05-Aug-20
Volatiles												
Acetone	ug/L	100000 ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	19.2	35.4	ND (5.0)	N/A	N/A	N/A
Benzene	ug/L	0.5 ug/L	0.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	2	ND (0.5)	ND (0.5)	3.8
Bromodichloromethane	ug/L	67000 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.7	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Bromoform	ug/L	5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Bromomethane	ug/L	0.89 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Carbon Tetrachloride	ug/L	0.2 ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	N/A	N/A	N/A
Chlorobenzene	ug/L	140 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Chloroform	ug/L	2 ug/L	10.6	2.9	2.7	ND (0.5)	12	13.8	ND (0.5)	N/A	N/A	N/A
Dibromochloromethane	ug/L	65000 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Dichlorodifluoromethane	ug/L	3500 ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	N/A	N/A	N/A
1,2-Dichlorobenzene	ug/L	150 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,3-Dichlorobenzene	ug/L	7600 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,4-Dichlorobenzene	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,1-Dichloroethane	ug/L	11 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,2-Dichloroethane	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,1-Dichloroethylene	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
cis-1,2-Dichloroethylene	ug/L	1.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
trans-1,2-Dichloroethylene	ug/L	1.6 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,2-Dichloropropane	ug/L	0.58 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
cis-1,3-Dichloropropylene	ug/L		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
trans-1,3-Dichloropropylene	ug/L		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,3-Dichloropropene, total	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Ethylbenzene	ug/L	54 ug/L	2.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	4.5	ND (0.5)	23.9	5.7
Ethylene dibromide	ug/L	0.2 ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	N/A	N/A	N/A
Hexane	ug/L	5 ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	N/A	N/A	N/A
Methyl Ethyl Ketone	ug/L	21000 ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	14.6	N/A	N/A	N/A
Methyl Isobutyl Ketone	ug/L	5200 ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	N/A	N/A	N/A
Methyl tert-butyl ether	ug/L	15 ug/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	N/A	N/A	N/A
Methylene Chloride	ug/L	26 ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	N/A	N/A	N/A
Styrene	ug/L	43 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,1,1,2-Tetrachloroethane	ug/L	1.1 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Tetrachloroethylene	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Toluene	ug/L	320 ug/L	1	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.6
1,1,1-Trichloroethane	ug/L	23 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
1,1,2-Trichloroethane	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Trichloroethylene	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
Trichlorofluoromethane	ug/L	2000 ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	N/A	N/A	N/A
Vinyl Chloride	ug/L	0.5 ug/L	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	N/A	N/A	N/A
m/p-Xylene	ug/L		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.8	ND (0.5)	2250	4.4
o-Xylene	ug/L		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Xylenes, total	ug/L	72 ug/L	0.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.8	ND (0.5)	2250	4.4

2	Sample exceeds MECP Table 7 Residential Standard
ND (0.5)	No concentrations identified above the MDL
NA	Parameter Not Analysed

Property			380 Winona Avenue		319 Richmond Road					
Parameter	**Units**	**Regulation**	**MW1-SS2**	**MW2-SS1**	**BH17-1**	**BH17-2**	**BH17-2 (dup)**	**BH17-3**	**BH17-4**	**BH17-5**
Screen Interval (m)		**Table 7 Non-Potable Groundwater, Coarse**	**3.10-6.10**	**4.62-7.62**	**2.33-5.33**	**2.5-5.5**		**3.71-6.71**	**3.25-6.25**	**1.04-2.54**
Sample Date			**23-Jan-20**	**23-Jan-20**	**27-Jul-17**	**27-Jul-17**	**27-Jul-17**	**31-Jul-17**	**31-Jul-17**	**26-Jul-17**
Semi-Volatiles										
Acenaphthene	ug/L	17 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.3
Acenaphthylene	ug/L	1 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	0.22	0.17	ND (0.05)	ND (0.05)	ND (0.05)
Anthracene	ug/L	1 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	1.85	0.12	ND (0.05)	ND (0.05)
Benzo[a]anthracene	ug/L	1.8 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.01	0.03	ND (0.05)	ND (0.05)
Benzo[a]pyrene	ug/L	0.81 ug/L	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	0.04	ND (0.01)	ND (0.01)
Benzo[b]fluoranthene	ug/L	0.75 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[g,h,i]perylene	ug/L	0.2 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[k]fluoranthene	ug/L	0.4 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Chrysene	ug/L	0.7 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Dibenzo[a,h]anthracene	ug/L	0.4 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Fluoranthene	ug/L	44 ug/L	ND (0.05)	ND (0.05)	ND (0.01)	0.09	ND (0.01)	0.1	0.13	ND (0.01)
Fluorene	ug/L	290 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	0.55	0.36	ND (0.05)	ND (0.05)	ND (0.05)
Indeno[1,2,3-cd]pyrene	ug/L	0.2 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1-Methylnaphthalene	ug/L		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.08	4.49
2-Methylnaphthalene	ug/L		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.14	ND (0.05)
Methylnaphthalene (1&2)	ug/L	1500 ug/L	ND (0.05)	ND (0.05)	ND (0.071)	ND (0.071)	ND (0.071)	ND (0.071)	0.22	4.51
Naphthalene	ug/L	7 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	0.18	0.23	0.06	0.13	0.29
Phenanthrene	ug/L	380 ug/L	ND (0.03)	ND (0.03)	ND (0.03)	0.23	1.89	0.11	0.22	ND (0.03)
Pyrene	ug/L	5.7 ug/L	ND (0.05)	ND (0.05)	ND (0.05)	0.62	0.42	0.09	0.11	ND (0.05)
styrene	ug/L	43 ug/L	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)

2	Sample exceeds MECP Table 7 Residential Standard
ND (0.5)	No concentrations identified above the MDL
NA	Parameter Not Analysed

Property			380 Winona Avenue				325-331 Richmond Road	381 Churchill			
Parameter	**Units**	**Regulation**	**MW1**		**MW2**		**BH2-GW1**	**BH1-GW1**	**BH1-GW1-381**	**BH2-GW1**	**BH2-GW1-381**
Screen Inverval (m)		**Table 7 Non-Potable Groundwater, Coarse**	**3.10-6.10**		**4.62-7.62**		**3.53-6.53**	**4.57-7.57**		**4.44-7.44**	
Sample Date			**23-Jan-20**	**13-May-20**	**23-Jan-20**	**13-May-20**	**17-May-12**	**25-Jul-16**	**12-May-20**	**25-Jul-16**	**12-May-20**
Hydrocarbons											
F1 PHCs (C6-C10)	ug/g dry	420 ug/L	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)
F2 PHCs (C10-C16)	ug/g dry	150 ug/L	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)
F3 PHCs (C16-C34)	ug/g dry	500 ug/L	ND (200)	ND (200)	ND (200)	ND (200)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)
F4 PHCs (C34-C50)	ug/g dry	500 ug/L	ND (200)	ND (200)	ND (200)	ND (200)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)

Property			319 Richmond Road									
Parameter	**Units**	**Regulation**	**BH17-1**	**BH17-2**	**BH17-2 (dup)**	**BH2-GW1-319**	**BH17-3**	**BH17-4**	**BH17-5**	**BH17-01**	**BH17-03**	**BH17-05**
Screen Inverval (m)		**Table 7 Non-Potable Groundwater, Coarse**	**2.33-5.33**	**2.5-5.5**			**3.71-6.71**	**3.25-6.25**	**1.04-2.54**	**2.33-5.33**	**3.71-6.71**	**1.04-2.54**
Sample Date			**27-Jul-17**	**27-Jul-17**	**27-Jul-17**	**12-May-20**	**31-Jul-17**	**31-Jul-17**	**26-Jul-17**	**05-Aug-20**	**05-Aug-20**	**05-Aug-20**
Hydrocarbons												
F1 PHCs (C6-C10)	ug/g dry	420 ug/L	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	542	ND (25)	243000	962
F2 PHCs (C10-C16)	ug/g dry	150 ug/L	ND (100)	1840	1690	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	N/A	ND (100)
F3 PHCs (C16-C34)	ug/g dry	500 ug/L	ND (100)	1210	1140	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	N/A	ND (100)
F4 PHCs (C34-C50)	ug/g dry	500 ug/L	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	N/A	ND (100)

2	Sample exceeds MECP Table 7 Residential Standard
ND (0.5)	No concentrations identified above the MDL

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 30109
Project: PE4909
Custody: 125464

Report Date: 15-May-2020
Order Date: 13-May-2020

Order #: 2020214

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

Paracel ID	Client ID
2020214-01	BH2-GW1-319
2020214-02	BH1-GW1-381
2020214-03	BH2-GW1-381

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 15-May-2020

Client: Paterson Group Consulting Engineers

Order Date: 13-May-2020

Client PO: 30109

Project Description: PE4909

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	13-May-20	14-May-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	13-May-20	14-May-20
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	13-May-20	15-May-20
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	13-May-20	14-May-20

Certificate of Analysis

Report Date: 15-May-2020

Client: Paterson Group Consulting Engineers

Order Date: 13-May-2020

Client PO: 30109

Project Description: PE4909

	Client ID:	BH2-GW1-319	BH1-GW1-381	BH2-GW1-381	-
	Sample Date:	12-May-20 09:00	12-May-20 09:00	12-May-20 09:00	-
	Sample ID:	2020214-01	2020214-02	2020214-03	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	-
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	-
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-

Certificate of Analysis

Report Date: 15-May-2020

Client: **Paterson Group Consulting Engineers**

Order Date: 13-May-2020

Client PO: **30109**

Project Description: **PE4909**

	Client ID:	BH2-GW1-319	BH1-GW1-381	BH2-GW1-381	-
	Sample Date:	12-May-20 09:00	12-May-20 09:00	12-May-20 09:00	-
	Sample ID:	2020214-01	2020214-02	2020214-03	-
	MDL/Units	Water	Water	Water	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
4-Bromofluorobenzene	Surrogate	116%	116%	114%	-
Dibromofluoromethane	Surrogate	98.6%	98.8%	99.0%	-
Toluene-d8	Surrogate	115%	114%	113%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-
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	-	-	-
2-Fluorobiphenyl	Surrogate	76.6%	-	-	-
Terphenyl-d14	Surrogate	115%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	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	*18.6*		*ug/L*		*93.0*	*50-140*			
Surrogate: Terphenyl-d14	*22.8*		*ug/L*		*114*	*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, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*93.6*		*ug/L*		*117*	*50-140*			
Surrogate: Dibromofluoromethane	*79.2*		*ug/L*		*99.0*	*50-140*			
Surrogate: Toluene-d8	*94.0*		*ug/L*		*118*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*93.4*		*ug/L*		*117*	*50-140*			
Surrogate: Dibromofluoromethane	*79.2*		*ug/L*		*99.1*	*50-140*			
Surrogate: Toluene-d8	*91.3*		*ug/L*		*114*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1810	25	ug/L	ND	90.3	68-117			
F2 PHCs (C10-C16)	1600	100	ug/L	ND	100	60-140			
F3 PHCs (C16-C34)	3870	100	ug/L	ND	98.6	60-140			
F4 PHCs (C34-C50)	2390	100	ug/L	ND	96.3	60-140			
Semi-Volatiles									
Acenaphthene	5.06	0.05	ug/L	ND	101	50-140			
Acenaphthylene	5.07	0.05	ug/L	ND	101	50-140			
Anthracene	3.88	0.01	ug/L	ND	77.7	50-140			
Benzo [a] anthracene	4.27	0.01	ug/L	ND	85.3	50-140			
Benzo [a] pyrene	4.53	0.01	ug/L	ND	90.7	50-140			
Benzo [b] fluoranthene	5.34	0.05	ug/L	ND	107	50-140			
Benzo [g,h,i] perylene	4.47	0.05	ug/L	ND	89.4	50-140			
Benzo [k] fluoranthene	5.72	0.05	ug/L	ND	114	50-140			
Chrysene	4.95	0.05	ug/L	ND	99.0	50-140			
Dibenzo [a,h] anthracene	4.46	0.05	ug/L	ND	89.3	50-140			
Fluoranthene	4.49	0.01	ug/L	ND	89.9	50-140			
Fluorene	5.20	0.05	ug/L	ND	104	50-140			
Indeno [1,2,3-cd] pyrene	4.63	0.05	ug/L	ND	92.7	50-140			
1-Methylnaphthalene	5.18	0.05	ug/L	ND	104	50-140			
2-Methylnaphthalene	5.50	0.05	ug/L	ND	110	50-140			
Naphthalene	4.80	0.05	ug/L	ND	96.0	50-140			
Phenanthrene	4.50	0.05	ug/L	ND	89.9	50-140			
Pyrene	4.57	0.01	ug/L	ND	91.5	50-140			
Surrogate: 2-Fluorobiphenyl	*21.3*		*ug/L*		*106*	*50-140*			
Surrogate: Terphenyl-d14	*22.7*		*ug/L*		*114*	*50-140*			
Volatiles									
Acetone	100	5.0	ug/L	ND	100	50-140			
Benzene	42.2	0.5	ug/L	ND	106	60-130			
Bromodichloromethane	36.1	0.5	ug/L	ND	90.3	60-130			
Bromoform	37.7	0.5	ug/L	ND	94.3	60-130			
Bromomethane	28.8	0.5	ug/L	ND	72.1	50-140			
Carbon Tetrachloride	34.6	0.2	ug/L	ND	86.4	60-130			
Chlorobenzene	40.6	0.5	ug/L	ND	102	60-130			
Chloroform	38.4	0.5	ug/L	ND	96.0	60-130			
Dibromochloromethane	34.9	0.5	ug/L	ND	87.2	60-130			
Dichlorodifluoromethane	30.5	1.0	ug/L	ND	76.4	50-140			
1,2-Dichlorobenzene	38.4	0.5	ug/L	ND	96.0	60-130			
1,3-Dichlorobenzene	38.6	0.5	ug/L	ND	96.4	60-130			
1,4-Dichlorobenzene	39.1	0.5	ug/L	ND	97.7	60-130			
1,1-Dichloroethane	41.9	0.5	ug/L	ND	105	60-130			
1,2-Dichloroethane	38.6	0.5	ug/L	ND	96.6	60-130			
1,1-Dichloroethylene	41.2	0.5	ug/L	ND	103	60-130			
cis-1,2-Dichloroethylene	39.9	0.5	ug/L	ND	99.8	60-130			
trans-1,2-Dichloroethylene	39.9	0.5	ug/L	ND	99.8	60-130			
1,2-Dichloropropane	40.2	0.5	ug/L	ND	101	60-130			
cis-1,3-Dichloropropylene	38.0	0.5	ug/L	ND	95.0	60-130			
trans-1,3-Dichloropropylene	35.6	0.5	ug/L	ND	89.0	60-130			
Ethylbenzene	43.4	0.5	ug/L	ND	108	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylene dibromide (dibromoethane, 1,2-	41.2	0.2	ug/L	ND	103	60-130			
Hexane	48.6	1.0	ug/L	ND	122	60-130			
Methyl Ethyl Ketone (2-Butanone)	99.8	5.0	ug/L	ND	99.8	50-140			
Methyl Isobutyl Ketone	103	5.0	ug/L	ND	103	50-140			
Methyl tert-butyl ether	111	2.0	ug/L	ND	111	50-140			
Methylene Chloride	38.1	5.0	ug/L	ND	95.2	60-130			
Styrene	45.0	0.5	ug/L	ND	112	60-130			
1,1,1,2-Tetrachloroethane	37.8	0.5	ug/L	ND	94.4	60-130			
1,1,2,2-Tetrachloroethane	40.9	0.5	ug/L	ND	102	60-130			
Tetrachloroethylene	38.2	0.5	ug/L	ND	95.5	60-130			
Toluene	41.1	0.5	ug/L	ND	103	60-130			
1,1,1-Trichloroethane	35.5	0.5	ug/L	ND	88.7	60-130			
1,1,2-Trichloroethane	32.8	0.5	ug/L	ND	82.0	60-130			
Trichloroethylene	33.2	0.5	ug/L	ND	83.1	60-130			
Trichlorofluoromethane	36.3	1.0	ug/L	ND	90.8	60-130			
Vinyl chloride	40.7	0.5	ug/L	ND	102	50-140			
m,p-Xylenes	89.1	0.5	ug/L	ND	111	60-130			
o-Xylene	43.3	0.5	ug/L	ND	108	60-130			
Surrogate: 4-Bromofluorobenzene	*82.6*		*ug/L*		*103*	*50-140*			
Surrogate: Dibromofluoromethane	*79.2*		*ug/L*		*99.0*	*50-140*			
Surrogate: Toluene-d8	*84.3*		*ug/L*		*105*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PAF LABORA

Paracel ID: 2020214

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

Paracel Order Number (Lab Use Only): 2020214

Chain Of Custody (Lab Use Only) Nº 125464

Client Name: Paterson
Contact Name: Mark D'arcy
Address: 154 Colonade Rd
Telephone: 613-226-7381

Project Ref: PE4909
Quote #:
PO #: 30109
E-mail: mdarcy@patersongroup.ca

Page 1 of 1

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

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH2-GW1-319	GW		4	5/12/2020		✓	✓	✓				
2	BH1-GW1-381	GW		3	↓		✓	✓					
3	BH2-GW1-381	GW		3	↓		✓	✓					
4													
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Jeremy Camposarcone	Date/Time:	Date/Time: 05-13-20 11:30	Date/Time: 05-13-20 11:30
Date/Time: 5/13/2020 9:15 AM	Temperature: °C	Temperature: 1.9° °C	pH Verified: ☐ By:

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 30117
Project: PE4909
Custody: 52366

Report Date: 19-May-2020
Order Date: 14-May-2020

Order #: 2020332

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

Paracel ID	Client ID
2020332-01	MW1-GW1
2020332-02	MW2-GW1
2020332-03	325-BH1-GW1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 19-May-2020

Client: Paterson Group Consulting Engineers

Order Date: 14-May-2020

Client PO: 30117

Project Description: PE4909

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	15-May-20	16-May-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	15-May-20	15-May-20
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	15-May-20	16-May-20

Certificate of Analysis

Report Date: 19-May-2020

Client: Paterson Group Consulting Engineers

Order Date: 14-May-2020

Client PO: 30117

Project Description: PE4909

	Client ID:	MW1-GW1	MW2-GW1	325-BH1-GW1	-
	Sample Date:	13-May-20 09:00	13-May-20 09:00	13-May-20 09:00	-
	Sample ID:	2020332-01	2020332-02	2020332-03	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	-
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	-
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-

Certificate of Analysis

Report Date: 19-May-2020

Client: Paterson Group Consulting Engineers

Order Date: 14-May-2020

Client PO: 30117

Project Description: PE4909

	Client ID:	MW1-GW1	MW2-GW1	325-BH1-GW1	-
	Sample Date:	13-May-20 09:00	13-May-20 09:00	13-May-20 09:00	-
	Sample ID:	2020332-01	2020332-02	2020332-03	-
	MDL/Units	Water	Water	Water	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
4-Bromofluorobenzene	Surrogate	120%	118%	124%	-
Dibromofluoromethane	Surrogate	99.4%	95.0%	95.4%	-
Toluene-d8	Surrogate	106%	108%	112%	-
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: 19-May-2020

Client: Paterson Group Consulting Engineers

Order Date: 14-May-2020

Client PO: 30117

Project Description: PE4909

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*94.6*		*ug/L*		*118*	*50-140*			
Surrogate: Dibromofluoromethane	*70.7*		*ug/L*		*88.4*	*50-140*			
Surrogate: Toluene-d8	*89.0*		*ug/L*		*111*	*50-140*			

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 30117

Report Date: 19-May-2020

Order Date: 14-May-2020

Project Description: PE4909

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*93.5*		*ug/L*		*117*	*50-140*			
Surrogate: Dibromofluoromethane	*73.2*		*ug/L*		*91.5*	*50-140*			
Surrogate: Toluene-d8	*93.0*		*ug/L*		*116*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1690	25	ug/L	ND	84.6	68-117			
F2 PHCs (C10-C16)	1580	100	ug/L	ND	98.8	60-140			
F3 PHCs (C16-C34)	3940	100	ug/L	ND	100	60-140			
F4 PHCs (C34-C50)	2440	100	ug/L	ND	98.5	60-140			
Volatiles									
Acetone	86.8	5.0	ug/L	ND	86.8	50-140			
Benzene	25.5	0.5	ug/L	ND	63.7	60-130			
Bromodichloromethane	33.3	0.5	ug/L	ND	83.2	60-130			
Bromoform	48.8	0.5	ug/L	ND	122	60-130			
Bromomethane	24.0	0.5	ug/L	ND	60.0	50-140			
Carbon Tetrachloride	41.0	0.2	ug/L	ND	103	60-130			
Chlorobenzene	43.3	0.5	ug/L	ND	108	60-130			
Chloroform	34.1	0.5	ug/L	ND	85.2	60-130			
Dibromochloromethane	46.1	0.5	ug/L	ND	115	60-130			
Dichlorodifluoromethane	35.7	1.0	ug/L	ND	89.3	50-140			
1,2-Dichlorobenzene	40.5	0.5	ug/L	ND	101	60-130			
1,3-Dichlorobenzene	40.7	0.5	ug/L	ND	102	60-130			
1,4-Dichlorobenzene	42.8	0.5	ug/L	ND	107	60-130			
1,1-Dichloroethane	28.8	0.5	ug/L	ND	71.9	60-130			
1,2-Dichloroethane	39.8	0.5	ug/L	ND	99.4	60-130			
1,1-Dichloroethylene	26.3	0.5	ug/L	ND	65.6	60-130			
cis-1,2-Dichloroethylene	27.8	0.5	ug/L	ND	69.6	60-130			
trans-1,2-Dichloroethylene	26.9	0.5	ug/L	ND	67.2	60-130			
1,2-Dichloropropane	24.0	0.5	ug/L	ND	60.0	60-130			
cis-1,3-Dichloropropylene	24.3	0.5	ug/L	ND	60.8	60-130			
trans-1,3-Dichloropropylene	24.5	0.5	ug/L	ND	61.2	60-130			
Ethylbenzene	38.7	0.5	ug/L	ND	96.7	60-130			
Ethylene dibromide (dibromoethane, 1,2-	41.8	0.2	ug/L	ND	104	60-130			
Hexane	31.7	1.0	ug/L	ND	79.2	60-130			
Methyl Ethyl Ketone (2-Butanone)	62.5	5.0	ug/L	ND	62.5	50-140			
Methyl Isobutyl Ketone	57.3	5.0	ug/L	ND	57.3	50-140			
Methyl tert-butyl ether	78.4	2.0	ug/L	ND	78.4	50-140			
Methylene Chloride	25.8	5.0	ug/L	ND	64.4	60-130			
Styrene	35.6	0.5	ug/L	ND	89.0	60-130			
1,1,1,2-Tetrachloroethane	47.4	0.5	ug/L	ND	118	60-130			
1,1,2,2-Tetrachloroethane	25.3	0.5	ug/L	ND	63.2	60-130			
Tetrachloroethylene	38.0	0.5	ug/L	ND	95.0	60-130			
Toluene	36.9	0.5	ug/L	ND	92.2	60-130			
1,1,1-Trichloroethane	38.8	0.5	ug/L	ND	97.1	60-130			
1,1,2-Trichloroethane	28.2	0.5	ug/L	ND	70.6	60-130			
Trichloroethylene	37.2	0.5	ug/L	ND	92.9	60-130			
Trichlorofluoromethane	42.3	1.0	ug/L	ND	106	60-130			
Vinyl chloride	40.0	0.5	ug/L	ND	99.9	50-140			
m,p-Xylenes	80.4	0.5	ug/L	ND	100	60-130			
o-Xylene	41.7	0.5	ug/L	ND	104	60-130			
Surrogate: 4-Bromofluorobenzene	*85.5*		*ug/L*		*107*	*50-140*			
Surrogate: Dibromofluoromethane	*72.7*		*ug/L*		*90.9*	*50-140*			
Surrogate: Toluene-d8	*77.0*		*ug/L*		*96.2*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2020332

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2020332	Nº 52366

Client Name: Paterson Group	Project Ref: PE4909	Page 1 of 1
Contact Name: Mark D'Arcy	Quote #:	Turnaround Time
Address: 154 Colonnade Rd. S.	PO #: 30117	☐ 1 day ☐ 3 day
Telephone: 613-226-7381	E-mail: mdarcy@patersongroup.ca	☐ 2 day ☒ Regular
		Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analysis: PHCs F1-F4	Required Analysis: VOCs
1	MW1-GW1	GW		3	May 13/20		X	X
2	MW2-GW1	GW		3	May 13/20		X	X
3	325-BH1-GW1	GW		2	May 13/20			X
4								
5								
6								
7								
8								
9								
10								

Comments:

Method of Delivery: paracel

Relinquished By (Sign): N. Sullivan	Received By Driver/Depot:	Received at Lab:	Verified By: SCT
Relinquished By (Print): Nick Sullivan	Date/Time:	Date/Time: 05/14/2020 15:55	Date/Time: May 15/20 8:19a
Date/Time: May 14/2020	Temperature: °C	Temperature: 6.1 °C	pH Verified: ☐ By: N/A

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 30439
Project: PE4909
Custody: 128511

Report Date: 16-Sep-2020
Order Date: 7-Aug-2020

Order #: 2032464

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

Paracel ID	Client ID
2032464-01	17-01
2032464-02	17-03
2032464-03	17-05

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 30439

Report Date: 16-Sep-2020

Order Date: 7-Aug-2020

Project Description: PE4909

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	8-Aug-20	8-Aug-20
PHC F1	CWS Tier 1 - P&T GC-FID	7-Aug-20	11-Aug-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	11-Aug-20	11-Aug-20

Certificate of Analysis

Report Date: 16-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 7-Aug-2020

Client PO: 30439

Project Description: PE4909

	Client ID:	17-01	17-03	17-05	-
	Sample Date:	05-Aug-20 09:00	05-Aug-20 09:00	05-Aug-20 09:00	-
	Sample ID:	2032464-01	2032464-02	2032464-03	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Benzene	0.5 ug/L	<0.5	<5.0 [1]	3.8	-
Ethylbenzene	0.5 ug/L	<0.5	23.9	5.7	-
Toluene	0.5 ug/L	<0.5	<5.0 [1]	0.6	-
m,p-Xylenes	0.5 ug/L	<0.5	2250	4.4	-
o-Xylene	0.5 ug/L	<0.5	<5.0 [1]	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	2250	4.4	-
Toluene-d8	Surrogate	102%	105%	120%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	243000	962	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	<100	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*82.4*		*ug/L*		*103*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*82.3*		*ug/L*		*103*	*50-140*			

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 30439

Report Date: 16-Sep-2020

Order Date: 7-Aug-2020

Project Description: PE4909

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1700	25	ug/L	ND	85.0	68-117			
F2 PHCs (C10-C16)	1670	100	ug/L	ND	104	60-140			
F3 PHCs (C16-C34)	4570	100	ug/L	ND	117	60-140			
F4 PHCs (C34-C50)	3070	100	ug/L	ND	124	60-140			
Volatiles									
Benzene	38.7	0.5	ug/L	ND	96.6	60-130			
Ethylbenzene	37.8	0.5	ug/L	ND	94.6	60-130			
Toluene	39.4	0.5	ug/L	ND	98.5	60-130			
m,p-Xylenes	78.8	0.5	ug/L	ND	98.5	60-130			
o-Xylene	39.9	0.5	ug/L	ND	99.8	60-130			
Surrogate: Toluene-d8	*79.7*		*ug/L*		*99.6*	*50-140*			

Certificate of Analysis

Report Date: 16-Sep-2020

Client: Paterson Group Consulting Engineers

Order Date: 7-Aug-2020

Client PO: 30439

Project Description: PE4909

Qualifier Notes:

Login Qualifiers :

Container(s) - Bottle and COC sample ID don't match - PHCs read 17-02

Applies to samples: 17-05

Sample Qualifiers :

1 : Elevated detection limit due to dilution required because of high target analyte concentration.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2032464

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2032464	Nº 128511

Client Name: Paterson Group | Project Ref: PE4909 | Page 1 of 1

Contact Name: Mike Beaudoin | Quote #:

Address: 154 Colonnade Rd. S. | PO #: 30439

E-mail: mbeaudoin@patersongroup.ca

Telephone: 613-226-7381

Turnaround Time

☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular

Date Required:

Regulation 153/04

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

Other Regulation

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analysis: PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	17-01	GW		3	Aug 5/20	AM	X						
2	17-03	"		"	"	"	X						
3	17-05	"		"	"	"	X						
4													
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot: M. Tousse	Received at Lab: Jurreporn Dimmai	Verified By:
Relinquished By (Print):	Date/Time: 07/08/20 10:16	Date/Time: AUG 07, 2020 11.55	Date/Time: Aug 07, 2020 12:45
Date/Time:	Temperature: °C AM	Temperature: 5.4 °C	pH Verified: ☐ By:

APPENDIX 3

SAMPLING AND ANALYSIS PLAN

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

Paterson Group Inc.

Consulting Engineers
154 Colonnade Road South
Ottawa (Nepean), Ontario
Canada K2E 7J5

Tel: (613) 226-7381
Fax: (613) 226-6344
www.patersongroup.ca

patersongroup

Sampling & Analysis Plan

Phase II Environmental Site Assessment
381 Churchill Avenue N
319, 325, and 327 Richmond Road
380 Winona Avenue
Ottawa, Ontario

Prepared For

Richmond Churchill Limited Partnership

May 2020

Report: PE4909-SAP

Table of Contents

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Richmond Churchill Limited Partnership to prepare a Phase II Environmental Site Assessment (ESA) at 381 Churchill Avenue N, 319, 325, and 327 Richmond Road, and 380 Winona Avenue, Ottawa, Ontario, in the City of Ottawa, Ontario. Based on previous Phase II ESAs, a subsurface investigation program, consisting of groundwater sampling, was developed.

Borehole	Location & Rationale
All encountered	Investigate each site to identify any intact monitoring wells present. Sample each monitoring well, based on the site history identified in the Phase II ESA.

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

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

2.0 ANALYTICAL TESTING PROGRAM

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

- ❒ At least one sample from each borehole should be submitted, in order to delineate the horizontal extent of contamination across the site.
- ❒ At least one sample from each stratigraphic unit should be submitted, in order to delineate the vertical extent of contamination at the site.
- ❒ In boreholes where there is visual or olfactory evidence of contamination, or where organic vapour meter or photoionization detector readings indicate the presence of contamination, the 'worst-case' sample from each borehole should be submitted for comparison with MOECC site condition standards.

- ❒ In boreholes with evidence of contamination as described above, a sample should be submitted from the stratigraphic unit below the 'worst-case' sample to determine whether the contaminant(s) have migrated downward.
- ❒ Parameters analyzed should be consistent with the Contaminants of Potential Concern identified in the Phase I ESA.

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

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

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

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

Equipment

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

- ❒ glass soil sample jars
- ❒ two buckets

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

Determining Borehole Locations

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

After drilling is completed a plan with the borehole locations must be provided. Distances and orientations of boreholes with respect to site features (buildings, roadways, etc.) must be provided. Distances should be measured using a measuring tape or wheel rather than paced off. Ground surface elevations at each borehole should be surveyed relative to a fire hydrant located on south side of Lisgar Street (300 Lisgar Street), with geodetic elevation of 72.57m above sea level (asl).

Drilling Procedure

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

- ❒ Continuous split spoon samples (every 0.6 m or 2') or semi-continuous (every 0.76 m or 2'6") are required.
- ❒ Make sure samples are well sealed in plastic bags with no holes prior to screening and are kept cool but unfrozen.
- ❒ If sampling for VOCs, BTEX, or PHCs F1, a soil core from each soil sample which may be analyzed must be taken and placed in the laboratory-provided methanol vial.
- ❒ Note all and any odours or discolouration of samples.
- ❒ Split spoon samplers must be washed between samples.
- ❒ If obvious contamination is encountered, continue sampling until vertical extent of contamination is delineated.

- ❒ As a general rule, environmental boreholes should be deep enough to intercept the groundwater table (unless this is impossible/impractical - call project manager to discuss).
- ❒ If at all possible, soil samples should be submitted to a preliminary screening procedure on site, either using a RKI Eagle, PID, etc. depending on type of suspected contamination.

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

- ❒ Samples should be brought to room temperature; this is specifically important in colder weather. Soil must not be frozen.
- ❒ Turn instrument on and allow to come to zero - calibrate if necessary
- ❒ If using RKI Eagle, ensure instrument is in methane elimination mode unless otherwise directed.

- ❒ Ensure measurement units are ppm (parts per million) initially. RKI Eagle will automatically switch to %LEL (lower explosive limit) if higher concentrations are encountered.
- ❒ Break up large lumps of soil in the sample bag, taking care not to puncture bag.
- ❒ Insert probe into soil bag, creating a seal with your hand around the opening.
- ❒ Gently manipulate soil in bag while observing instrument readings.
- ❒ Record the highest value obtained in the first 15 to 25 seconds
- ❒ Make sure to indicate scale (ppm or LEL); also note which instrument was used (RKI Eagle 1 or 2, or MiniRae).
- ❒ Jar samples and refrigerate as per Sampling and Analysis Plan.

3.2 Monitoring Well Installation Procedure

Equipment

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

Procedure

- ❒ Drill borehole to required depth, using drilling and sampling procedures described above.
- ❒ If borehole is deeper than required monitoring well, backfill with bentonite chips to required depth. This should only be done on wells where contamination is not suspected, in order to prevent downward migration of contamination.
- ❒ Only one monitoring well should be installed per borehole.
- ❒ Monitoring wells should not be screened across more than one stratigraphic unit to prevent potential migration of contaminants between units.
- ❒ Where LNAPLs are the suspected contaminants of concern, monitoring wells should be screened straddling the water table in order to capture any free product floating on top of the water table.

- ❒ Thread the end cap onto a section of screen. Thread second section of screen if required. Thread risers onto screen. Lower into borehole to required depth. Ensure slip-cap or J-plug is inserted to prevent backfill materials entering well.
- ❒ As drillers remove augers, backfill borehole annulus with silica sand until the level of sand is approximately 0.3 m above the top of the screen.
- ❒ Backfill with holeplug until at least 0.3 m of holeplug is present above the top of the silica sand.
- ❒ Backfill remainder of borehole with holeplug or with auger cuttings (if contamination is not suspected).
- ❒ Install flushmount casing. Seal space between flushmount and borehole annulus with concrete, cold patch, or holeplug to match surrounding ground surface.

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

- ❒ Locate well and use socket wrench or Allan key to open metal flush mount protector cap. Remove plastic well cap.
- ❒ Measure water level, with respect to existing ground surface, using water level meter or interface probe. If using interface probe on suspected NAPL site, measure the thickness of free product.
- ❒ Measure total depth of well.
- ❒ Clean water level tape or interface probe using methanol and water. Change gloves between wells.
- ❒ Calculate volume of standing water within well and record.

- ❒ Insert polyethylene tubing into well and attach to peristaltic pump. Turn on peristaltic pump and purge into graduated bucket. Purge at least three well volumes of water from the well. Measure and record field chemistry. Continue to purge, measuring field chemistry after every well volume purged, until appearance or field chemistry stabilizes.
- ❒ Note appearance of purge water, including colour, opacity (clear, cloudy, silty), sheen, presence of LNAPL, and odour. Note any other unusual features (particulate matter, effervescence (bubbling) of dissolved gas, etc.).
- ❒ Fill required sample bottles. If sampling for metals, attach 75-micron filter to discharge tube and filter metals sample. If sampling for VOCs, use low flow rate to ensure continuous stream of non-turbulent flow into sample bottles. Ensure no headspace is present in VOC vials.
- ❒ Replace well cap and flushmount casing cap.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

- ❒ All non-dedicated sampling equipment (split spoons) will be decontaminated according to the SOPs listed above.

- ❒ All groundwater sampling equipment is dedicated (polyethylene and flexible peristaltic tubing is replaced for each well).

- ❒ Where groundwater samples are to be analyzed for VOCs, one laboratory-provided trip blank will be submitted for analysis with every laboratory submission.

- ❒ Approximately one (1) field duplicate will be submitted for every ten (10) samples submitted for laboratory analysis. A minimum of one (1) field duplicate per project will be submitted. Field duplicates will be submitted for soil and groundwater samples

- ❒ Where combo pens are used to measure field chemistry, they will be calibrated on an approximately monthly basis, according to frequency of use.

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

- ❒ The location of underground utilities

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

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