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Phase II – Environmental Site Assessment

1166 Bank Street
Ottawa, Ontario

Prepared For

Ambassador Realty Inc.

June 23, 2022

Report: PE5590-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the property addressed 1166 Bank Street, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II Property.

A subsurface investigation, carried out by Golder Associates Ltd., was conducted for the Phase II Property on March 29 and March 30, 2021. At that time, four boreholes (MW21-01 to MW21-04) were advanced throughout the property and terminated within the overburden at depths ranging from approximately 6.6 to 7.6 m below ground surface. Upon completion, all boreholes were equipped with monitoring wells to allow for the collection of groundwater samples.

The subsurface investigation for this assessment was conducted on May 3, 2022, and consisted of drilling three boreholes (BH1-22 to BH3-22) throughout the Phase II Property, all three of which were equipped with monitoring wells to allow for the collection of groundwater samples. The boreholes were advanced to depths ranging from approximately 6.10 m to 7.62 m below the existing ground surface and terminated within an overburden layer of dense brown silty sand.

In general, the subsurface soil profile encountered at the borehole locations consists of a surficial pavement structure (asphaltic concrete and granular sub-grade fill), underlain by fill material (brown silty sand with some clay, gravel, and cobbles) over top of multiple layers of compact to dense native brown sand with varying silt and clay contents, turning grey at deeper depths in line with the long-term water table. Bedrock was not encountered in any of the boreholes during the field drilling program, however, a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 9.25 m below ground surface.

Between the 2021 and 2022 subsurface investigations, a total of ten soil samples were submitted for laboratory analysis of VOCs, PHCs (F_1-F_4), metals, PAHs, lead, EC, SAR, and pH parameters. Based on the analytical test results, the concentration of PHCs (F_1) in Sample MW21-04-07 was in excess of the MECP Table 3 coarse-grained residential soil standards. It should be noted that this borehole is located in the vicinity of the former underground fuel storage tank nest in the southern portion of the Phase II Property.

Some elevated levels of EC and SAR were identified within the shallow fill material in BH1-22 as well as the deeper native soils in BH3-22. It should be noted that these EC and SAR exceedances are considered to be the result of a substance which has been applied to the site surface for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both, which according to Section 49.1 of O. Reg. 153/04, the standards for these parameters are considered to have been met. As a result, these exceedances are not considered to represent a contaminant issue to the Phase II Property.

Groundwater samples were recovered from MW21-01 to MW21-04 as part of the 2021 subsurface investigation on April 8, 2021 and submitted for laboratory analysis of VOCs and PHCs (F_1-F_4). Based on the analytical test results, the concentration of chloroform in Sample MW21-02, as well as the concentrations of chloroform, 1-2-Dichloroethane, and benzene in Sample MW21-04 were in excess of the MECP Table 3 non-potable groundwater in coarse-grained soil standards.

The elevated concentrations of chloroform were suspected to be the result of the use of municipal water during the drilling process, and thus was not considered to present a contaminant issue to the property. The benzene exceedance was suspected to be the result of the historical presence of the former on-site retail fuel outlet. It should be noted that this benzene exceedance was identified in the monitoring well placed within the location of the former underground fuel storage tank nest in the southern portion of the site. The presence of 1-2-Dichloroethane, which is not typical of fuel related impacts, was suspected to be related to the historical use of solvents in an auto service garage which was formerly present on the property.

As part of this current assessment, groundwater samples were recovered from BH1-22 to BH3-22, as well as MW21-02 and MW21-04, and submitted for laboratory analysis of VOCs and PHC (F_1-F_4) parameters. Based on the analytical test results, all detected VOC parameter concentrations in the groundwater samples analyzed are in compliance with the selected MECP Table 3 non-potable groundwater in coarse-grained soil standards. It should be noted that no chloroform was detected in the samples analyzed as part of the 2022 groundwater sampling program, confirming our theory that the initial concentrations identified in the 2021 sampling program were likely the result of the use of municipal water. The benzene concentration detected in MW21-04 as part of the 2022 groundwater sampling program was also significantly lower than initially identified in the 2021 sampling program. It is possible that the initially identified elevated levels of benzene could be the result of suspended sediment collected in the water samples due to improperly established wells.

Recommendations

Soil

Based on the findings of this assessment, PHC impacted soil was identified in the southern portion of the Phase II Property, in the vicinity of the former on-site underground fuel storage tank nest.

It is our understanding that the Phase II Property is to be redeveloped in the future, thus it is recommended that this contaminated soil be remediated at the time of site redevelopment. This contaminated soil will require disposal at a licensed waste disposal facility.

Prior to off-site disposal of impacted soil at a licensed waste disposal facility, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with Ontario Regulation 347/558.

It is recommended that Paterson personnel be present on-site during remediation activities to direct the excavation and segregation of impacted soil, as well as to conduct confirmatory sampling as required.

Based on the soil test results, the majority of the on-site soils comply with the MECP Table 2.1 Excess Soil Quality Standards (Ontario Regulation 406/19), for off-site disposal. Additional excess soil testing may be required prior to future site excavation activities.

Groundwater

Should the results of two consecutive rounds of groundwater testing comply with the site standards, the groundwater is therefore considered to be clean. To verify its quality, it is recommended that the groundwater be re-tested, in particular the monitoring wells at MW21-02 and MW21-04, prior to site redevelopment activities.

Monitoring Wells

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned according to Ontario Regulation 903 (Ontario Water Resources Act), however, we recommend that the wells be maintained for future sampling purposes, at least until the excavation for the foundation has commenced. The monitoring wells will be registered with the MECP under this regulation. Further information can be provided upon request in this regard.

1.0 INTRODUCTION

At the request of Ambassador Realty Inc., Paterson Group (Paterson) conducted a Phase II – Environmental Site Assessment (Phase II ESA) for the property addressed 1166 Bank Street, in the City of Ottawa, Ontario. Henceforth, this property shall be referred to as the "Phase II Property".

The purpose of this Phase II ESA has been to address the areas of potential environmental concern (APECs) identified on the Phase II Property as a result the findings of the Phase I ESA.

1.1 Site Description

Address:	1166 Bank Street, Ottawa, Ontario.
Legal Description:	Part of Lot L, Concession C (Rideau Front), Formerly the Township of Nepean, in the City of Ottawa, Ontario.
Location:	The Phase II Property is located on the northwest corner of the intersection of Bank Street and Grove Avenue, in the City of Ottawa, Ontario. Refer to Figure 1 – Key Plan, appended to this report.
Latitude and Longitude:	45° 23' 33" N, 75° 40' 57" W.

Site Description:

Configuration:	Rectangular.
Site Area:	1,020 m^2 (approximate).
Zoning:	TM – Traditional Main Street Zone.
Current Uses:	The Phase II Property is currently occupied with a one-storey commercial retail building (*Quickie Convenience Store*).
Services:	The Phase II Property is located within a municipally serviced area.

1.2 Property Ownership

The Phase II Property is currently owned by Ambassador Realty Inc. Paterson was retained to complete this Phase II ESA by Mr. Arthur Loeb of Ambassador Realty Inc., whose offices are located at 185 Somerset Street West, Ottawa, Ontario. Mr. Loeb can be contacted via telephone at 613-233-1104.

1.3 Applicable Site Condition Standard

The site condition standards for the subject property were obtained from Table 3 of the document entitled, *"Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act"*, prepared by the Ministry of the Environment, Conservation and Parks (MECP), and dated April 15, 2011. The selected MECP standards are based on the following considerations:

- ❒ Full depth soil conditions;
- ❒ Coarse-grained soil conditions;
- ❒ Non-potable groundwater conditions;
- ❒ Residential land use.

Grain size analysis was not conducted as part of this assessment, and as such, the coarse-grained soil standards were selected as a conservative approach.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is currently occupied with a one-storey commercial retail building, located in the western portion of the property. The remainder of the site is largely paved with an asphaltic concrete parking lot, though a small, landscaped area is present within the southeastern corner of the property.

The site topography appears to slope down towards the south, in the general direction of the Rideau River, which is consistent with the greater regional topography. The Phase II Property is considered to be at grade with respect to the adjacent streets and the neighbouring properties.

Water drainage on the Phase II Property occurs primarily via surface runoff towards catch basins located in the exterior parking lot or the adjacent streets. No ponded water, stressed vegetation, surficial staining, or any other indications of potential sub-surface contamination were observed on the Phase II Property at time of the site inspection.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigations

March 2021

A subsurface investigation, carried out by Golder Associates Ltd., was conducted for the Phase II Property on March 29 and March 30, 2021. At that time, four boreholes (MW21-01 to MW21-04) were advanced throughout the property and terminated within the overburden at depths ranging from approximately 6.6 to 7.6 m below ground surface. Upon completion, all boreholes were equipped with monitoring wells to allow for the collection of groundwater samples.

May 2022

The subsurface investigation for this assessment was conducted on May 3, 2022, and consisted of drilling three boreholes (BH1-22 to BH3-22) throughout the Phase II Property, all three of which were equipped with monitoring wells to allow for the collection of groundwater samples.

The boreholes were advanced to depths ranging from approximately 6.10 m to 7.62 m below the existing ground surface and terminated within an overburden layer of dense brown silty sand. It should be noted that a dynamic cone penetration test was carried out at BH1-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 9.25 m below ground surface.

3.2 Media Investigated

During the course of this subsurface investigation, soil and groundwater samples were obtained from the Phase II Property and submitted for laboratory analysis. The rationale for sampling and analyzing these media is based on the contaminants of potential concern identified in the Phase I ESA.

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

- Volatile Organic Compounds (VOCs);
- Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F_1-F_4);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Metals (including Mercury and Hexavalent Chromium);

- ❒ Electrical Conductivity (EC);
- ❒ Sodium Adsorption Ratio (SAR).

3.3 Phase I ESA Conceptual Site Model

Geological and Hydrogeological Setting

Based on the available mapping information, the bedrock beneath the Phase II Property generally consists of shale of the Billings Formation, while the surficial geology consists largely of offshore marine sediments (erosional terraces) with an overburden ranging in thickness from approximately 5 m to 10 m.

Groundwater is anticipated to be encountered within the overburden and flow in a southerly direction towards the Ottawa River.

Water Bodies and Areas of Natural and Scientific Interest

No water bodies or areas of natural and scientific interest were identified within the Phase I Study Area.

The nearest named water body with respect to the Phase II Property is the Rideau River, located approximately 360 m to the south.

Drinking Water Wells

Based on the availability of municipal services, no drinking water wells are expected to be present within the Phase I Study Area.

Existing Buildings and Structures

The Phase II Property is currently occupied with a one-storey commercial retail building.

Neighbouring Land Use

The surrounding lands within the Phase I Study Area consist largely of residential properties, with the exception of commercial properties and some institutional land present along Bank Street.

Current and Future Property Use

The Phase II Property is currently being used for commercial purposes.

It is our understanding that the Phase II Property is to be redeveloped with a six-storey mixed-use building, with one level of underground parking.

Due to the change to a more sensitive land use (commercial to residential), this will require that a record of site condition (RSC) be filed with the MECP.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 7.1 of the Phase I ESA report, six potentially contaminating activities (PCAs), resulting in areas of potential environmental concern (APECs), were identified on the Phase II Property. These APECs include:

- A former auto service garage, located in the northwestern portion of the Phase II Property.
- A former underground fuel storage tank nest, located in the southern portion of the Phase II Property.
- A former fuel pump island, located in the eastern portion of the Phase II Property.
- Fill material of unknown quality, located beneath the asphaltic concrete parking lot throughout the northern, eastern, and southern portions of the Phase II Property.
- The application of road salt during snow and/or ice conditions, located beneath the asphaltic concrete parking lot throughout the northern, eastern, and southern portions of the Phase II Property.
- A former auto service garage and retail fuel outlet, located approximately 20 m to the east of the Phase II Property (1159 Bank Street).

Other off-site PCAs were identified within the Phase I Study Area but were deemed not to be of any environmental concern to the Phase II Property based on their separation distances as well as their inferred down-gradient or cross-gradient orientation with respect to anticipated groundwater flow.

Contaminants of Potential Concern

The contaminants of potential concern (CPCs) associated with the aforementioned APECs are considered to be:

- Volatile Organic Compounds (VOCs);
- Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F_1-F_4);
- Polycyclic Aromatic Hydrocarbons (PAHs);

- ❒ Metals (including Mercury and Hexavalent Chromium);
- ❒ Electrical Conductivity (EC);
- ❒ Sodium Adsorption Ratio (SAR).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of the Phase I ESA is considered to be sufficient to conclude that there are PCAs and APECs associated with the Phase II Property.

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

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation for this assessment was conducted on May 3, 2022, and consisted of drilling three boreholes (BH1-22 to BH3-22) throughout the Phase II Property, all three of which were equipped with groundwater monitoring wells.

The boreholes were advanced to depths ranging from approximately 6.10 m to 7.62 m below the existing ground surface and terminated within an overburden layer of dense brown silty sand. It should be noted that a dynamic cone penetration test was carried out at BH1-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 9.25 m below ground surface.

Under the full-time supervision of Paterson personnel, the boreholes were drilled using a low-clearance drill rig provided by George Downing Estate Drilling of Hawkesbury, Ontario. The locations of the boreholes are illustrated on *"Drawing PE5590-3 – Test Hole Location Plan"*, appended to this report.

4.2 Soil Sampling

Soil 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.

The samples were recovered using a stainless-steel split spoon, while wearing protective gloves (changed after each sample), and immediately placed into plastic bags. If significant contamination was encountered, the samples were instead placed into glass jars. Sampling equipment was routinely washed in soapy water and rinsed with methylhydrate after each split spoon to prevent any cross contamination of the samples. The samples were also stored in coolers to reduce analyte volatilization during transportation.

A total of 31 soil samples were obtained from the boreholes by means of auger and split spoon sampling. The depths at which auger and split spoon samples were obtained from the boreholes are shown as "**AU**" and "**SS**", respectively, on the Soil Profile and Test Data Sheets, appended to this report.

4.3 Field Screening Measurements

All soil samples collected were subjected to a preliminary screening procedure, which included visual screening for colour and evidence of metals, as well as soil vapour screening with a Photo Ionization Detector.

The recovered soil samples were placed immediately into airtight plastic bags with nominal headspace. All lumps of soil inside the bags were broken by hand, and the soil was allowed to come to room temperature prior to conducting the vapour survey, ensuring consistency of readings between samples. To measure the soil vapours, the analyser probe was inserted into the nominal headspace above the sample. The sample was then agitated and manipulated gently by hand as the measurement was taken. The peak reading registered within the first 15 seconds was recorded as the vapour measurement. The parts per million (ppm) scale was used to measure concentrations of organic vapours.

The results of the vapour survey are presented on the Soil Profile and Test Data Sheets, appended to this report.

4.4 Groundwater Monitoring Well Installation

Three groundwater monitoring wells were installed on the Phase II Property as part of this assessment. These monitoring wells were constructed using 50 mm diameter Schedule 40 threaded PVC risers and screens.

A sand pack consisting of silica sand was placed around the screen with a bentonite seal placed above to minimize cross-contamination.

A summary of the monitoring well construction details are listed below in Table 1 as well as on the Soil Profile and Test Data Sheets provided in Appendix 1.

Upon completion, the groundwater monitoring wells were developed using a dedicated inertial lift pump, with a minimum of three well volumes being removed from the wells at the time of installation. The wells were developed until the appearance of the water was noted to have stabilized. In addition, the ground surface elevations of each borehole were subsequently surveyed with respect to a known geodetic elevation.

Table 1
Monitoring Well Construction Details

Well ID	Ground Surface Elevation (m ASL)	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1-22	62.80	7.62	4.62-7.62	5.79-7.62	0.31-5.79	Flushmount
BH2-22	62.88	6.10	3.10-6.10	2.74-6.10	0.31-2.74	Flushmount
BH3-22	62.33	6.86	3.86-6.86	3.35-6.86	0.31-3.35	Flushmount

4.5 Field Measurement of Water Quality Parameters

Groundwater monitoring and sampling was conducted at MW21-02, MW21-04, and BH1-22 to BH3-22 on May 11, 2022. Following their development and stabilization, water quality parameters were measured at each monitoring well location using a multi-reader probe, the results of which are summarized below in Table 2.

Table 2
Measurement of Water Quality Parameters

Well ID	Temperature (˚C)	Conductivity (µS)	pH (Units)
BH1-22	13.6	2,258	7.29
BH2-22	16.7	>3,999	6.44
BH3-22	-	-	-
MW21-02	13.6	2,565	7.26
MW21-04	-	-	-

Due to high amounts of suspended sediment in the recovered groundwater, no water quality parameters were measured at BH3-22 and MW21-04.

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.

Standing water was purged from each monitoring well prior to the recovery of the groundwater samples using dedicated sampling equipment. The samples were then stored in coolers to reduce possible analyte volatilization during their transportation. Further details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan, appended to this report.

4.7 Analytical Testing

The following soil and groundwater samples were submitted for laboratory analysis:

Table 3
Testing Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed									Rationale
		VOCs	PHCs (F_1-F_4)	Metals	Hg+	Cr^{VI}	PAHs	EC	SAR	pH	
BH1-22-SS3/SS4A	1.52 – 2.44 m Fill Material	X	X					X	X		To assess for potential impacts resulting from the presence of a former auto service garage and the use of road salt for de-icing purposes.
BH1-22-SS8	5.33 – 5.94 m Silty Sand	X	X							X	To assess for potential impacts resulting from the presence of a former on-site auto service garage.
BH2-22-SS4A	2.29 – 2.44 m Fill Material			X	X	X					To assess for potential impacts resulting from the presence of fill material of unknown quality.
BH2-22-SS5	3.05 – 3.66 m Silty Sand	X	X	X[1]							To assess for potential impacts resulting from the presence of a former on-site fuel pump island and a former off-site auto service garage.
BH3-22-SS3	1.52 – 2.13 m Fill Material			X	X	X	X	X	X	X	To assess for potential impacts resulting from the presence of fill material of unknown quality and the use of road salt for de-icing purposes.

1 – Lead content only

Table 3 (Continued)
Testing Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed									Rationale
		VOCs	PHCs (F_1-F_4)	Metals	Hg+	Cr^{VI}	PAHs	EC	SAR	pH	
BH3-22-SS6	3.81 – 4.42 m Silty Sand	X	X	X[1]							To assess for potential impacts resulting from the presence of a former on-site underground fuel storage tank nest.
DUP-1[2]	3.81 – 4.42 m Silty Sand	X									For laboratory QA/QC purposes.

1 – Lead content only
2 – Duplicate sample of BH3-22-SS6

Table 4
Testing Parameters for Submitted Groundwater Samples

Sample ID	Screened Interval & Stratigraphic Unit	Parameters Analyzed		Rationale
		VOCs	PHCs (F_1-F_4)	
MW21-02-GW2	4.82 – 7.82 m Silty Sand	X		To verify the initial results obtained during the previous 2021 Phase II ESA.
MW21-04-GW2	3.10 – 6.10 m Silty Sand	X	X	To assess for potential impacts resulting from the presence of a former on-site underground fuel storage tank nest.
BH1-22-GW1	4.62 – 7.62 m Silty Sand	X	X	To assess for potential impacts resulting from the presence of a former on-site auto service garage.
BH2-22-GW1	3.10 – 6.10 m Silty Sand	X	X	To assess for potential impacts resulting from the presence of a former on-site fuel pump island and a former off-site auto service garage.
BH3-22-GW1	3.86 – 6.86 m Silty Sand	X	X	To assess for potential impacts resulting from the presence of a former on-site underground fuel storage tank nest.
DUP-1[1]	3.86 – 6.86 m Silty Sand	X		For laboratory QA/QC purposes.

1 – Duplicate sample of BH3-22-GW1

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

4.8 Residue Management

All soil cuttings were removed from the site following the field program, while all purge water and equipment cleaning fluids were retained on-site.

4.9 Elevation Surveying

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

4.10 Quality Assurance and Quality Control Measures

A summary of the quality assurance and quality control (QA/QC) measures, undertaken as part of this assessment, is provided in the Sampling and Analysis Plan in Appendix 1.

5.0 REVIEW AND EVALUATION

5.1 Geology

In general, the subsurface soil profile encountered at the borehole locations consists of a surficial pavement structure (asphaltic concrete and granular sub-grade fill), underlain by fill material (brown silty sand with some clay, gravel, and cobbles) over top of multiple layers of compact to dense native brown sand with varying silt and clay contents, turning grey at deeper depths in line with the long-term water table.

Bedrock was not encountered in any of the boreholes during the field drilling program, however, a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 9.25 m below ground surface.

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

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured using an electronic water level meter at boreholes MW21-01 to MW21-04 and BH1-22 to BH3-22 on May 11, 2022. The groundwater levels are summarized below in Table 5.

Table 5
Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1-22	62.80	5.49	57.31	May 11, 2022
BH2-22	62.88	5.48	57.40	
BH3-22	62.33	4.93	57.40	
MW21-01	62.96	5.35	57.61	
MW21-02	62.95	5.65	57.30	
MW21-03	62.39	5.05	57.34	
MW21-04	62.41	5.11	57.30	

The groundwater at the Phase II Property was encountered within the overburden at depths ranging from approximately 4.93 m to 5.65 m below the existing ground surface.

No unusual visual observations were identified within the recovered groundwater samples, with the exception of the groundwater purged from MW21-04, which was noted to contain a slight petroleum hydrocarbon odour.

Using the groundwater elevations recorded during the sampling event, groundwater contour mapping was completed as part of this assessment. According to the mapped contour data, illustrated on *"Drawing PE5590-3 – Test Hole Location Plan"* in the appendix, the groundwater flow on the subject site was calculated to be in a westerly direction. A horizontal hydraulic gradient of approximately 0.02 m/m was also calculated as part of this assessment.

It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations.

5.3 Fine/Coarse Soil Texture

Grain size analysis was not completed as part of this investigation. As a result, the coarse-grained soil standards were chosen as a conservative approach.

5.4 Field Screening

Field screening of the soil samples collected during the drilling program resulted in organic vapour readings ranging from 0.3 ppm to 3.8 ppm, with one notable exception. In general, the organic vapour readings obtained from the field screening indicate that there is a negligible potential for the presence of volatile substances, however, the vapour measurement of one particular sample (BH2-22-SS5) returned an outlier reading of 92.4 ppm. Upon recovery, this sample was noted to contain a distinct fuel-like odour, though no unusual discolouration or fuel staining was observed.

This sample was obtained from the borehole placed within the footprint of a former fuel pump island, at a depth of approximately 3.05 to 3.66 m below ground surface. As a result of the high vapour reading, this sample was selected for further laboratory testing.

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

As part of the previous 2021 Phase II ESA completed by Golder, four soil samples were submitted for laboratory analysis of VOCs, PHCs (F_1-F_4), and metal parameters. The results of the 2021 analytical testing are presented below in Tables 6 to 8, as well as on the laboratory certificates of analysis included in Appendix 1.

Table 6
Analytical Test Results – Soil (2021 Phase II ESA)
Volatile Organic Compounds (VOCs)

Parameter	MDL (µg/g)	Soil Samples (ug/g)				MECP Table 3 Coarse-Grained Residential Soil Standards (µg/g)
		March 29, 2021	March 30, 2021			
		MW21-01-09	MW21-02-10	MW21-03-01	MW21-04-07	
		Sample Depth (m bgs)				
		6.10 – 6.60	5.49 – 6.10	0.15 – 0.61	3.66 – 4.27	
Acetone	0.50	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	3.5
1,2-Dichloroethane	0.05	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	0.05
cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	3.4
trans-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	0.084
1,2-Dichloropropane	0.05	nd	nd	nd	nd	0.05
1,3-Dichloropropene	0.05	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	2
Ethylene Dibromide	0.05	nd	nd	nd	nd	0.05

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

Table 6 (Continued)
Analytical Test Results – Soil (2021 Phase II ESA)
Volatile Organic Compounds (VOCs)

Parameter	MDL (µg/g)	Soil Samples (ug/g)				MECP Table 3 Coarse-Grained Residential Soil Standards (µg/g)
		March 29, 2021	March 30, 2021			
		MW21-01-09	MW21-02-10	MW21-03-01	MW21-04-07	
		Sample Depth (m bgs)				
		6.10 – 6.60	5.49 – 6.10	0.15 – 0.61	3.66 – 4.27	
Hexane	0.05	nd	nd	nd	nd	2.8
Methyl Ethyl Ketone	0.50	nd	nd	nd	nd	16
Methyl Isobutyl Ketone	0.50	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	0.28
Toluene	0.05	nd	nd	nd	nd	2.3
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	0.38
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	0.05
Trichloroethylene	0.05	nd	nd	nd	nd	0.061
Trichlorofluoromethane	0.05	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	0.02
Xylenes	0.05	nd	nd	nd	nd	3.1

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

No VOC parameter were detected in the soil samples analyzed as part of the 2021 Phase II ESA. The results are considered to be in compliance with the selected MECP Table 3 coarse-grained residential soil standards.

Table 7
Analytical Test Results – Soil (2021 Phase II ESA)
PHCs (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Coarse-Grained Residential Soil Standards (µg/g)
		March 29, 2021	March 30, 2021			
		MW21-01-09	MW21-02-10	MW21-03-01	MW21-04-07	
		Sample Depth (m bgs)				
		6.10 – 6.60	5.49 – 6.10	0.15 – 0.61	3.66 – 4.27	
PHCs F_1	7	nd	nd	nd	**78.4**	55
PHCs F_2	4	nd	nd	nd	nd	98
PHCs F_3	8	nd	nd	nd	nd	300
PHCs F_4	6	nd	nd	nd	nd	2,800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

The concentration of PHCs F_1 detected in soil sample MW21-04-07 was in excess of the MECP Table 3 coarse-grained residential soil standards. All other PHC parameters were non-detect in the remaining soil samples analyzed as part of the 2021 Phase II ESA.

Table 8
Analytical Test Results – Soil (2021 Phase II ESA)
Metals

Parameter	MDL (µg/g)	Soil Samples (ug/g)				MECP Table 3 Coarse-Grained Residential Soil Standards (µg/g)
		March 29, 2021	March 30, 2021			
		MW21-01-09	MW21-02-10	MW21-03-01	MW21-04-07	
		Sample Depth (m bgs)				
		6.10 – 6.60	5.49 – 6.10	0.15 – 0.61	3.66 – 4.27	
Antimony	1.0	nd	nd	nd	nd	7.5
Arsenic	1.0	1	1	3	1	18
Barium	1.0	18.4	15.8	151	44	390
Beryllium	0.5	nd	nd	nd	nd	4
Boron	5.0	nd	nd	5	nd	120
Cadmium	0.5	nd	nd	nd	nd	1.2
Chromium	5.0	6	5	15	8	160
Chromium VI	0.2	nt	nt	nt	nt	8
Cobalt	1.0	2.8	2.8	6.9	3.8	22
Copper	5.0	5.9	6.2	15.3	8.2	140
Lead	1.0	2	2	17	2	120
Mercury	0.1	nt	nt	nt	nt	0.27
Molybdenum	1.0	nd	nd	1.5	nd	6.9
Nickel	5.0	4	4	17	7	100
Selenium	1.0	nd	nd	nd	nd	2.4
Silver	0.3	nd	nd	nd	nd	20
Thallium	1.0	nd	nd	nd	nd	1
Uranium	1.0	0.58	nd	0.75	nd	23
Vanadium	10.0	12.8	11.1	21.2	18.8	86
Zinc	20.0	11	9	42	15	340

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- nt – not tested for this parameter
- **Bold and Underlined** – value exceeds selected MECP standards

All detected metal parameter concentrations in the soil samples analyzed as part of the 2021 Phase II ESA were in compliance with the selected MECP Table 3 coarse-grained residential soil standards.

As part of this current Phase II ESA, six soil samples were submitted for laboratory analysis of VOCs, PHCs (F_1-F_4), metals, PAHs, lead, EC, SAR, and pH parameters. The results of the analytical testing are presented below in Tables 9 to 13, as well as on the laboratory certificates of analysis included in Appendix 1.

Table 9
Analytical Test Results – Soil (2022 Phase II ESA)
Volatile Organic Compounds (VOCs)

Parameter	MDL (µg/g)	Soil Samples (ug/g)				MECP Table 3 Coarse-Grained Residential Soil Standards (µg/g)
		May 3, 2022				
		BH1-22-SS3/SS4A	BH1-22-SS8	BH2-22-SS5	BH3-22-SS6	
		Sample Depth (m bgs)				
		1.52 – 2.44	5.33 – 5.94	3.05 – 3.66	3.81 – 4.42	
Acetone	0.50	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	3.5
1,2-Dichloroethane	0.05	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	0.05
cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	3.4
trans-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	0.084
1,2-Dichloropropane	0.05	nd	nd	nd	nd	0.05
1,3-Dichloropropene	0.05	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	2
Ethylene Dibromide	0.05	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	2.8
Methyl Ethyl Ketone	0.50	nd	nd	nd	nd	16
Methyl Isobutyl Ketone	0.50	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	0.28
Toluene	0.05	nd	nd	nd	nd	2.3
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	0.38
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	0.05
Trichloroethylene	0.05	nd	nd	nd	nd	0.061
Trichlorofluoromethane	0.05	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	0.02
Xylenes	0.05	nd	nd	nd	nd	3.1

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

No VOC parameters were detected in any of the soil samples analyzed. The results are considered to be in compliance with the selected MECP Table 3 coarse-grained residential soil standards.

Table 10
Analytical Test Results – Soil (2022 Phase II ESA)
PHCs (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (ug/g)				MECP Table 3 Coarse-Grained Residential Soil Standards (µg/g)
		May 3, 2022				
		BH1-22-SS3/SS4A	BH1-22-SS8	BH2-22-SS5	BH3-22-SS6	
		Sample Depth (m bgs)				
		1.52 – 2.44	5.33 – 5.94	3.05 – 3.66	3.81 – 4.42	
PHCs F_1	7	nd	nd	nd	nd	55
PHCs F_2	4	nd	nd	35	nd	98
PHCs F_3	8	38	nd	10	nd	300
PHCs F_4	6	66	nd	nd	nd	2,800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

All detected PHC parameter concentrations in the soil samples analyzed are in compliance are considered to be in compliance with the selected MECP Table 3 coarse-grained residential soil standards.

Table 11
Analytical Test Results – Soil (2022 Phase II ESA)
Metals

Parameter	MDL (µg/g)	Soil Samples (ug/g)		MECP Table 3 Coarse-Grained Residential Soil Standards (µg/g)
		May 3, 2022		
		BH2-22-SS4A	BH3-22-SS3	
		Sample Depth (m bgs)		
		2.29 – 2.44	1.52 – 2.13	
Antimony	1.0	2.8	1.0	7.5
Arsenic	1.0	3.0	4.8	18
Barium	1.0	38.1	161	390
Beryllium	0.5	nd	0.7	4
Boron	5.0	7.2	9.0	120
Cadmium	0.5	nd	nd	1.2
Chromium VI	0.2	nd	nd	8
Chromium	5.0	15.9	22.5	160
Cobalt	1.0	5.6	8.3	22
Copper	5.0	13.1	23.0	140
Lead	1.0	48.0	26.2	120
Mercury	0.1	nd	nd	0.27
Molybdenum	1.0	nd	nd	6.9
Nickel	5.0	14.7	18.7	100
Selenium	1.0	nd	nd	2.4
Silver	0.3	nd	nd	20
Thallium	1.0	nd	nd	1
Uranium	1.0	nd	nd	23
Vanadium	10.0	26.6	36.0	86
Zinc	20.0	37.1	59.9	340

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

All detected metal parameter concentrations in the soil samples analyzed are in compliance with the selected MECP Table 3 coarse-grained residential soil standards.

Table 12
Analytical Test Results – Soil (2022 Phase II ESA)
PAHs

Parameter	MDL (µg/g)	Soil Samples (ug/g)	MECP Table 3 Coarse-Grained Residential Soil Standards (µg/g)
		May 3, 2022	
		BH3-22-SS3	
		Sample Depth (m bgs)	
		1.52 – 2.13	
Acenaphthene	0.02	nd	7.9
Acenaphthylene	0.02	0.04	0.15
Anthracene	0.02	0.02	0.67
Benzo[a]anthracene	0.02	0.06	0.5
Benzo[a]pyrene	0.02	0.08	0.3
Benzo[b]fluoranthene	0.02	0.10	0.78
Benzo[g,h,i]perylene	0.02	0.06	6.6
Benzo[k]fluoranthene	0.02	0.05	0.78
Chrysene	0.02	0.08	7
Dibenzo[a,h]anthracene	0.02	nd	0.1
Fluoranthene	0.02	0.15	0.69
Fluorene	0.02	nd	62
Indeno [1,2,3-cd] pyrene	0.02	0.05	0.38
1-Methylnaphthalene	0.02	nd	0.99
2-Methylnaphthalene	0.02	nd	0.99
Methylnaphthalene (1&2)	0.04	nd	0.99
Naphthalene	0.01	nd	0.6
Phenanthrene	0.02	0.08	6.2
Pyrene	0.02	0.14	78

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

All detected PAH parameter concentrations in the soil samples analyzed are in compliance with the selected MECP Table 3 coarse-grained residential soil standards.

Table 13
Analytical Test Results – Soil (2022 Phase II ESA)
Inorganics

Parameter	MDL	Soil Samples (ug/g)					MECP Table 3 Coarse-Grained Residential Soil Standards
		May 3, 2022					
		BH1-22-SS3/SS4A	BH1-22-SS8	BH2-22-SS5	BH3-22-SS3	BH3-22-SS6	
		Sample Depth (m bgs)					
		1.52 – 2.44	5.33 – 5.94	3.05 – 3.66	1.52 – 2.13	3.81 – 4.42	
Lead	1.0 µg/g	nt	nt	5	26.2	2	120 µg/g
EC	5.0 µS/cm	**1,670**	nt	nt	**2,760**	nt	700 µS/cm
SAR	0.01	**13.5**	nt	nt	**14.1**	nt	5.00
pH	0.05 pH units	nt	7.49	nt	7.30	nt	5.00 – 11.00 pH units

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- nt – not tested for this parameter
- **Bold and Underlined** – value exceeds selected MECP standards

The EC and SAR levels detected in Samples BH1-22-SS3/SS4A and BH3-22-SS6 are in excess of the selected MECP Table 3 coarse-grained residential soil standards.

It should be noted that these EC and SAR exceedances are considered to be the result of a substance which has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both, which according to Section 49.1 of O. Reg. 153/04, the standards for these parameters are considered to have been met. As a result, these exceedances are not considered to represent a contaminant issue to the Phase I Property.

Table 14
Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Sample ID	Depth Interval (m BGS)
Antimony	2.8	BH2-22-SS4A	2.29 – 2.44
Arsenic	4.8	BH3-22-SS3	1.52 – 2.13
Barium	161	BH3-22-SS3	1.52 – 2.13
Beryllium	0.7	BH3-22-SS3	1.52 – 2.13
Boron	9.0	BH3-22-SS3	1.52 – 2.13
Chromium	15	MW21-03-01	0.15 – 0.61
Cobalt	8.3	BH3-22-SS3	1.52 – 2.13
Copper	23.0	BH3-22-SS3	1.52 – 2.13
Lead	48.0	BH2-22-SS4A	2.29 – 2.44
Molybdenum	1.5	MW21-03-01	0.15 – 0.61
Nickel	18.7	BH3-22-SS3	1.52 – 2.13
Uranium	0.75	MW21-03-01	0.15 – 0.61
Vanadium	36.0	BH3-22-SS3	1.52 – 2.13
Zinc	59.9	BH3-22-SS3	1.52 – 2.13

Notes:
- **Bold and Underlined** – value exceeds selected MECP standards

Table 14 (Continued)
Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Sample ID	Depth Interval (m BGS)
PHCs F_1	**78.4**	MW21-04-07	3.66 – 4.27
PHCs F_2	35	BH2-22-SS5	3.05 – 3.66
PHCs F_3	38	BH1-22-SS3/SS4A	1.52 – 2.44
PHCs F_4	66	BH1-22-SS3/SS4A	1.52 – 2.44
Acenaphthylene	0.04	BH3-22-SS3	1.52 – 2.13
Anthracene	0.02	BH3-22-SS3	1.52 – 2.13
Benzo[a]anthracene	0.06	BH3-22-SS3	1.52 – 2.13
Benzo[a]pyrene	0.08	BH3-22-SS3	1.52 – 2.13
Benzo[b]fluoranthene	0.10	BH3-22-SS3	1.52 – 2.13
Benzo[g,h,i]perylene	0.06	BH3-22-SS3	1.52 – 2.13
Benzo[k]fluoranthene	0.05	BH3-22-SS3	1.52 – 2.13
Chrysene	0.08	BH3-22-SS3	1.52 – 2.13
Fluoranthene	0.15	BH3-22-SS3	1.52 – 2.13
Indeno [1,2,3-cd] pyrene	0.05	BH3-22-SS3	1.52 – 2.13
Phenanthrene	0.08	BH3-22-SS3	1.52 – 2.13
Pyrene	0.14	BH3-22-SS3	1.52 – 2.13
EC	**2,760**	BH3-22-SS6	3.81 – 4.42
SAR	**14.1**	BH3-22-SS6	3.81 – 4.42
pH	7.49	BH1-22-SS8	5.33 – 5.94

Notes:
- **Bold and Underlined** – value exceeds selected MECP standards

All other parameter concentrations analyzed were below the laboratory detection limits. The laboratory certificates of analysis are provided in Appendix 1.

5.6 Groundwater Quality

As part of the previous 2021 Phase II ESA, four groundwater samples were submitted for laboratory analysis of VOCs and PHC (F_1-F_4) parameters. The results of the 2021 analytical testing are presented below in Tables 15 and 16, as well as on the laboratory certificates of analysis included in Appendix 1.

Table 15
Analytical Test Results – Groundwater (2021 Phase II ESA)
Volatile Organic Compounds (VOCs)

Parameter	MDL (µg/L)	Groundwater Samples (ug/L)				MECP Table 3 Coarse-Grained Non-Potable Groundwater Standards (µg/L)
		April 8, 2021				
		53-MW21-1	53-MW21-2	53-MW21-3	53-MW21-4	
		Screening Interval (m bgs)				
		5.00 – 6.50	4.82 – 7.82	3.58 – 6.58	3.10 – 6.10	
Acetone	5.0	nd	nd	nd	nd	130,000
Benzene	0.5	0.46	0.25	nd	**70.7**	44
Bromodichloromethane	0.5	nd	nd	nd	nd	85,000
Bromoform	0.5	nd	nd	nd	nd	380
Bromomethane	0.5	nd	nd	nd	nd	5.6

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

Table 15 (Continued)
Analytical Test Results – Groundwater (2021 Phase II ESA)
Volatile Organic Compounds (VOCs)

Parameter	MDL (µg/L)	Groundwater Samples (ug/L)				MECP Table 3 Coarse-Grained Non-Potable Groundwater Standards (µg/L)
		April 8, 2021				
		53-MW21-1	53-MW21-2	53-MW21-3	53-MW21-4	
		Screening Interval (m bgs)				
		5.00 – 6.50	4.82 – 7.82	3.58 – 6.58	3.10 – 6.10	
Carbon Tetrachloride	0.2	nd	nd	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	nd	nd	630
Chloroform	0.5	0.54	**3.49**	0.91	**4.61**	2.4
Dibromochloromethane	0.5	nd	nd	nd	nd	82,000
Dichlorodifluoromethane	1.0	nd	nd	nd	nd	4,400
1,2-Dichlorobenzene	0.5	nd	nd	nd	nd	4,600
1,3-Dichlorobenzene	0.5	nd	nd	nd	nd	9,600
1,4-Dichlorobenzene	0.5	nd	nd	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	nd	**5.31**	1.6
1,1-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	nd	16
1,3-Dichloropropene	0.5	nd	nd	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	nd	108	2,300
Ethylene Dibromide	0.2	nd	nd	nd	nd	0.25
Hexane	1.0	nd	nd	nd	nd	51
Methyl Ethyl Ketone	5.0	nd	nd	nd	nd	470,000
Methyl Isobutyl Ketone	5.0	nd	nd	nd	nd	140,000
Methyl tert-butyl ether	2.0	nd	nd	nd	nd	190
Methylene Chloride	5.0	nd	nd	nd	nd	610
Styrene	0.5	nd	nd	nd	nd	1,300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	nd	nd	1.6
Toluene	0.5	nd	nd	nd	10.9	18,000
1,1,1-Trichloroethane	0.5	nd	nd	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	nd	nd	1.6
Trichlorofluoromethane	1.0	nd	nd	nd	nd	2,500
Vinyl Chloride	0.5	nd	nd	nd	nd	0.5
Xylenes	0.5	nd	nd	nd	55.1	4,200

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

The concentration of chloroform in Sample MW21-02, as well as the concentrations of chloroform, 1-2-Dichloroethane, and benzene in Sample MW21-04 were in excess of the MECP Table 3 non-potable groundwater in coarse-grained soil standards.

The elevated concentrations of chloroform were suspected to be the result of the use of municipal water during the drilling process, and thus are not considered to present a contaminant issue to the property.

The benzene exceedance was suspected to be the result of the historical presence of the former on-site retail fuel outlet. It should be noted that this benzene exceedance was identified in the monitoring well placed within the location of the former underground fuel storage tank nest in the southern portion of the site.

The presence of 1-2-Dichloroethane, which is not typical of fuel related impacts, was suspected to be related to the historical use of solvents in an auto service garage which was formerly present on the property.

Table 16
Analytical Test Results – Groundwater (2021 Phase II ESA)
PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (ug/L)				MECP Table 3 Coarse-Grained Non-Potable Groundwater Standards (µg/L)
		April 8, 2021				
		53-MW21-1	53-MW21-2	53-MW21-3	53-MW21-4	
		Screening Interval (m bgs)				
		5.00 – 6.50	4.82 – 7.82	3.58 – 6.58	3.10 – 6.10	
PHCs F_1	25	nd	nd	nd	528	750
PHCs F_2	100	nd	nd	nd	nd	150
PHCs F_3	100	nd	nd	nd	nd	500
PHCs F_4	100	nd	nd	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

All detected PHC parameter concentrations in the groundwater samples analyzed were in compliance with the selected MECP Table 3 non-potable groundwater in coarse-grained soil standards.

As part of this current Phase II ESA, five groundwater samples were submitted for laboratory analysis of VOCs and PHC (F_1-F_4) parameters. The results of the analytical testing are presented below in Tables 17 and 18, as well as on the laboratory certificates of analysis included in Appendix 1.

Table 17
Analytical Test Results – Groundwater (2022 Phase II ESA)
Volatile Organic Compounds (VOCs)

Parameter	MDL (µg/L)	Groundwater Samples (ug/L)					MECP Table 3 Coarse-Grained Non-Potable Groundwater Standards (µg/L)
		May 11, 2022					
		BH1-22-GW1	BH2-22-GW1	BH3-22-GW1	MW21-02-GW2	MW21-04-GW2	
		Screening Interval (m bgs)					
		4.62 – 7.62	3.10 – 6.10	3.86 – 6.86	4.82 – 7.82	3.10 – 6.10	
Acetone	5.0	nd	nd	nd	nd	nd	130,000

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

Table 17 (Continued)
Analytical Test Results – Groundwater (2022 Phase II ESA)
Volatile Organic Compounds (VOCs)

Parameter	MDL (µg/L)	Groundwater Samples (ug/L)					MECP Table 3 Coarse-Grained Non-Potable Groundwater Standards (µg/L)
		May 11, 2022					
		BH1-22-GW1	BH2-22-GW1	BH3-22-GW1	MW21-02-GW2	MW21-04-GW2	
		Screening Interval (m bgs)					
		4.62 – 7.62	3.10 – 6.10	3.86 – 6.86	4.82 – 7.82	3.10 – 6.10	
Benzene	0.5	nd	nd	nd	nd	5.0	44
Bromodichloromethane	0.5	nd	nd	nd	nd	nd	85,000
Bromoform	0.5	nd	nd	nd	nd	nd	380
Bromomethane	0.5	nd	nd	nd	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	nd	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	nd	nd	nd	630
Chloroform	0.5	nd	nd	nd	nd	nd	2.4
Dibromochloromethane	0.5	nd	nd	nd	nd	nd	82,000
Dichlorodifluoromethane	1.0	nd	nd	nd	nd	nd	4,400
1,2-Dichlorobenzene	0.5	nd	nd	nd	nd	nd	4,600
1,3-Dichlorobenzene	0.5	nd	nd	nd	nd	nd	9,600
1,4-Dichlorobenzene	0.5	nd	nd	nd	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	nd	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	nd	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	nd	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	nd	nd	16
1,3-Dichloropropene	0.5	nd	nd	nd	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	nd	nd	38.2	2,300
Ethylene Dibromide	0.2	nd	nd	nd	nd	nd	0.25
Hexane	1.0	nd	nd	nd	nd	nd	51
Methyl Ethyl Ketone	5.0	nd	nd	nd	nd	nd	470,000
Methyl Isobutyl Ketone	5.0	nd	nd	nd	nd	nd	140,000
Methyl tert-butyl ether	2.0	nd	nd	nd	nd	nd	190
Methylene Chloride	5.0	nd	nd	nd	nd	nd	610
Styrene	0.5	nd	nd	nd	nd	nd	1,300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	nd	nd	nd	1.6
Toluene	0.5	nd	nd	nd	nd	1.1	18,000
1,1,1-Trichloroethane	0.5	nd	nd	nd	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	nd	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	nd	nd	nd	1.6
Trichlorofluoromethane	1.0	nd	nd	nd	nd	nd	2,500
Vinyl Chloride	0.5	nd	nd	nd	nd	nd	0.5
Xylenes	0.5	nd	nd	nd	nd	1.8	4,200

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

All detected VOC parameter concentrations in the groundwater samples analyzed are in compliance with the selected MECP Table 3 non-potable groundwater in coarse-grained soil standards.

Table 18
Analytical Test Results – Groundwater (2022 Phase II ESA)
PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (ug/L)					MECP Table 3 Coarse-Grained Non-Potable Groundwater Standards (µg/L)
		May 11, 2022					
		BH1-22-GW1	BH2-22-GW1	BH3-22-GW1	MW21-02-GW2	MW21-04-GW2	
		Screening Interval (m bgs)					
		4.62 – 7.62	3.10 – 6.10	3.86 – 6.86	4.82 – 7.82	3.10 – 6.10	
PHCs F_1	25	nd	nd	nd	nt	nd	750
PHCs F_2	100	nd	nd	nd	nt	nd	150
PHCs F_3	100	nd	nd	nd	nt	nd	500
PHCs F_4	100	nd	nd	nd	nt	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

No PHC parameter concentrations were detected in the groundwater samples analyzed. The results are in compliance with the selected MECP Table 3 non-potable groundwater in coarse-grained soil standards.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of this Phase II ESA were handled in accordance with the analytical protocols 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 the Environmental Protection Act, the certificates of analysis have been received for each sample submitted for laboratory analysis and have been appended to this report.

As per the Sampling and Analysis Plan, a duplicate soil sample was obtained from sample BH3-22-SS6 and submitted for laboratory analysis of VOC parameters. The relative percent difference (RPD) calculations for the original and duplicate samples are provided below in Table 19.

Table 19
QA/QC Calculations – Soil

Parameter	MDL (µg/g)	BH3-22-SS6	DUP-1	RPD (%)	QA/QC Result (Target: <20% RPD)
Acetone	0.50	nd	nd	0	Meets Target
Benzene	0.02	nd	nd	0	Meets Target
Bromodichloromethane	0.05	nd	nd	0	Meets Target
Bromoform	0.05	nd	nd	0	Meets Target
Bromomethane	0.05	nd	nd	0	Meets Target
Carbon Tetrachloride	0.05	nd	nd	0	Meets Target

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

Table 19 (Continued)
QA/QC Calculations – Soil

Parameter	MDL (µg/g)	BH3-22-SS6	DUP-1	RPD (%)	QA/QC Result (Target: <20% RPD)
Chlorobenzene	0.05	nd	nd	0	Meets Target
Chloroform	0.05	nd	nd	0	Meets Target
Dibromochloromethane	0.05	nd	nd	0	Meets Target
Dichlorodifluoromethane	0.05	nd	nd	0	Meets Target
1,2-Dichlorobenzene	0.05	nd	nd	0	Meets Target
1,3-Dichlorobenzene	0.05	nd	nd	0	Meets Target
1,4-Dichlorobenzene	0.05	nd	nd	0	Meets Target
1,1-Dichloroethane	0.05	nd	nd	0	Meets Target
1,2-Dichloroethane	0.05	nd	nd	0	Meets Target
1,1-Dichloroethylene	0.05	nd	nd	0	Meets Target
cis-1,2-Dichloroethylene	0.05	nd	nd	0	Meets Target
trans-1,2-Dichloroethylene	0.05	nd	nd	0	Meets Target
1,2-Dichloropropane	0.05	nd	nd	0	Meets Target
1,3-Dichloropropene	0.05	nd	nd	0	Meets Target
Ethylbenzene	0.05	nd	nd	0	Meets Target
Ethylene Dibromide	0.05	nd	nd	0	Meets Target
Hexane	0.05	nd	nd	0	Meets Target
Methyl Ethyl Ketone	0.50	nd	nd	0	Meets Target
Methyl Isobutyl Ketone	0.50	nd	nd	0	Meets Target
Methyl tert-butyl ether	0.05	nd	nd	0	Meets Target
Methylene Chloride	0.05	nd	nd	0	Meets Target
Styrene	0.05	nd	nd	0	Meets Target
1,1,1,2-Tetrachloroethane	0.05	nd	nd	0	Meets Target
1,1,2,2-Tetrachloroethane	0.05	nd	nd	0	Meets Target
Tetrachloroethylene	0.05	nd	nd	0	Meets Target
Toluene	0.05	nd	nd	0	Meets Target
1,1,1-Trichloroethane	0.05	nd	nd	0	Meets Target
1,1,2-Trichloroethane	0.05	nd	nd	0	Meets Target
Trichloroethylene	0.05	nd	nd	0	Meets Target
Trichlorofluoromethane	0.05	nd	nd	0	Meets Target
Vinyl Chloride	0.02	nd	nd	0	Meets Target
Xylenes	0.05	nd	nd	0	Meets Target

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

The relative percent difference (RPD) calculated for all parameters fell within of the acceptable range of 20%, and as such, is considered to meet the data quality objectives outlined in the Sampling and Analysis Plan, appended to this report.

Similarly, a duplicate groundwater sample was obtained from sample BH3-22-GW1 and submitted for laboratory analysis of VOC parameters. The relative percent difference (RPD) calculations for the original and duplicate samples are provided below in Table 20.

Table 19
QA/QC Calculations – Groundwater

Parameter	MDL (µg/L)	BH3-22-GW1	DUP-1	RPD (%)	QA/QC Result (Target: <20% RPD)
Acetone	5.0	nd	nd	0	Meets Target
Benzene	0.5	nd	nd	0	Meets Target
Bromodichloromethane	0.5	nd	nd	0	Meets Target
Bromoform	0.5	nd	nd	0	Meets Target
Bromomethane	0.5	nd	nd	0	Meets Target
Carbon Tetrachloride	0.2	nd	nd	0	Meets Target
Chlorobenzene	0.5	nd	nd	0	Meets Target
Chloroform	0.5	nd	nd	0	Meets Target
Dibromochloromethane	0.5	nd	nd	0	Meets Target
Dichlorodifluoromethane	1.0	nd	nd	0	Meets Target
1,2-Dichlorobenzene	0.5	nd	nd	0	Meets Target
1,3-Dichlorobenzene	0.5	nd	nd	0	Meets Target
1,4-Dichlorobenzene	0.5	nd	nd	0	Meets Target
1,1-Dichloroethane	0.5	nd	nd	0	Meets Target
1,2-Dichloroethane	0.5	nd	nd	0	Meets Target
1,1-Dichloroethylene	0.5	nd	nd	0	Meets Target
cis-1,2-Dichloroethylene	0.5	nd	nd	0	Meets Target
trans-1,2-Dichloroethylene	0.5	nd	nd	0	Meets Target
1,2-Dichloropropane	0.5	nd	nd	0	Meets Target
1,3-Dichloropropene	0.5	nd	nd	0	Meets Target
Ethylbenzene	0.5	nd	0.6	N/A	Does Not Meet Target
Ethylene Dibromide	0.2	nd	nd	0	Meets Target
Hexane	1.0	nd	nd	0	Meets Target
Methyl Ethyl Ketone	5.0	nd	nd	0	Meets Target
Methyl Isobutyl Ketone	5.0	nd	nd	0	Meets Target
Methyl tert-butyl ether	2.0	nd	nd	0	Meets Target
Methylene Chloride	5.0	nd	nd	0	Meets Target
Styrene	0.5	nd	nd	0	Meets Target
1,1,1,2-Tetrachloroethane	0.5	nd	nd	0	Meets Target
1,1,2,2-Tetrachloroethane	0.5	nd	nd	0	Meets Target
Tetrachloroethylene	0.5	nd	nd	0	Meets Target
Toluene	0.5	nd	0.5	N/A	Does Not Meet Target
1,1,1-Trichloroethane	0.5	nd	nd	0	Meets Target
1,1,2-Trichloroethane	0.5	nd	nd	0	Meets Target
Trichloroethylene	0.5	nd	nd	0	Meets Target
Trichlorofluoromethane	1.0	nd	nd	0	Meets Target
Vinyl Chloride	0.5	nd	nd	0	Meets Target
Xylenes	0.5	nd	nd	0	Meets Target

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

The relative percent difference (RPD) calculated for the majority of the parameters fell within of the acceptable range of 20%, with two exceptions. Due to the low concentrations measured, which are marginally in excess of the laboratory method detection limits and comply with the site specific standards, the results are considered sufficient to meet the data quality objectives outlined in the Sampling and Analysis Plan, appended to this report.

Based on the results of the QA/QC analysis, the quality of the field data collected during this Phase II ESA is considered to be sufficient to meet the overall objectives of this assessment.

5.8 Phase II Conceptual Site Model

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

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

As described in Section 7.1 of the Phase I ESA report, as well as Section 2.2 of this report, the following PCAs, as defined by Table 2 of O. Reg. 153/04, are considered to result in APECs on the Phase II Property:

Table 21
Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of APEC on Phase I Property	Potentially Contaminating Activity (Table 2 – O. Reg. 153/04)	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC #1 Former Auto Service Garage	Northwestern Portion of Phase I Property	*"Item 52: Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems"*	On-Site	VOCs PHCs (F_1-F_4)	Soil and/or Groundwater
APEC #2 Former Underground Fuel Storage Tank Nest	Southern Portion of Phase I Property	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"*	On-Site	VOCs PHCs (F_1-F_4)	Soil and/or Groundwater
APEC #3 Former Fuel Pump Island	Eastern Portion of Phase I Property	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"*	On-Site	VOCs PHCs (F_1-F_4)	Soil and/or Groundwater
APEC #4 Fill Material of Unknown Quality	Eastern and Southern Portions of Phase I Property	*"Item 30: Importation of Fill Material of Unknown Quality"*	On-Site	PAHs Metals	Soil
APEC #5 Application of Road Salt During Snow/Ice Conditions	Northern, Eastern, and Southern Portions of Phase I Property	*"No Item Number: Application of Road Salt During Snow and Ice Conditions"*	On-Site	EC SAR	Soil

Table 21 (Continued)
Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of APEC on Phase I Property	Potentially Contaminating Activity (Table 2 – O. Reg. 153/04)	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC #6 Former Auto Service Garage	Eastern Portion of Phase I Property	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"* *"Item 52: Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems"*	Off-Site (20 m East)	VOCs PHCs (F_1-F_4)	Groundwater

Contaminants of Potential Concern (CPCs)

The contaminants of potential concern (CPCs) associated with the aforementioned APECs are considered to be:

- ❒ Volatile Organic Compounds (VOCs);
- ❒ Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F_1-F_4);
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs);
- ❒ Metals (including Mercury and Hexavalent Chromium);
- ❒ Electrical Conductivity (EC);
- ❒ Sodium Adsorption Ratio (SAR).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

Subsurface Structures and Utilities

Underground service locates were completed prior to the subsurface investigation. Underground utilities on the Phase II Property included electrical cables, natural gas pipelines, as well as municipal water and wastewater services.

Physical Setting

Site Stratigraphy

The stratigraphy of the Phase II Property generally consists of:

- ❒ Pavement structure (asphaltic concrete over crushed stone with gravel); encountered at ground level and extending to depths of approximately 0.20 m below ground surface.
- ❒ Fill material (brown silty sand with some clay, and gravel); extending to depths ranging from approximately 2.44 m to 2.97 m below ground surface.
- ❒ Compact reddish brown silty sand; extending to depths ranging from approximately 2.97 m to 4.34 m below ground surface.
- ❒ Grey silty clay with some sand and gravel; extending to depths ranging from approximately 3.66 m to 5.18 m below ground surface (BH1-22 and BH3-22 only).
- ❒ Dense brown silty sand to sandy silt with some clay and gravel; extending to depths ranging from approximately 4.27 m to 4.50 m below ground surface (BH1-22 and BH2-22 only).
- ❒ Dense light brown silty sand; extending to depths ranging from approximately 6.10 m to 7.62 m below ground surface (bottom of boreholes)

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

Hydrogeological Characteristics

The groundwater at the Phase II Property was encountered within an overburden layer of grey silty sand at depths ranging from approximately 4.93 m to 5.65 m below the existing ground surface.

Based on the measured groundwater levels, the groundwater was calculated to flow in a westerly direction.

Approximate Depth to Bedrock

Bedrock was not confirmed in any of the boreholes during the field drilling program, however, a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 9.25 m below ground surface.

Approximate Depth to Water Table

The depth to the water table is approximately 4.93 m to 5.65 m below the existing ground surface.

Sections 41 and 43.1 of Ontario Regulation 153/04

Section 41 of the Regulation does not apply to the Phase II Property, as there are no bodies of water or areas of natural significance located on or within 30 m of the Phase II Property. The Phase II Property is therefore not considered to be environmentally sensitive.

Section 43.1 of the Regulation does not apply to the Phase II Property, since the bedrock is situated at depths greater than 2 m below ground surface, and thus is not considered to be a shallow soil property.

Water Bodies and Areas of Natural and Scientific Interest

No water bodies or areas of natural and scientific interest were identified within the Phase I Study Area.

The nearest named water body with respect to the Phase II Property is the Rideau River, located approximately 360 m to the south.

Existing Buildings and Structures

The Phase II Property is currently occupied with a one-storey commercial retail building.

Environmental Condition

Areas Where Contaminants are Present

Based on the analytical test results of the 2021 Phase II ESA and this current assessment, petroleum hydrocarbon impacted soil was identified in MW21-04, which is located in the vicinity of the former underground fuel storage tank nest in the southern portion of the Phase II Property.

Some elevated levels of EC and SAR were identified within the shallow fill material in BH1-22 as well as the deeper native soils in BH3-22. It should be noted that these EC and SAR exceedances are considered to be the result of a substance which has been applied to the site surface for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both, which according to Section 49.1 of O. Reg. 153/04, the standards for these parameters are considered to have been met. As a result, these exceedances are not considered to represent a contaminant issue to the Phase II Property.

Based on the analytical test results, no contaminants were identified in the groundwater beneath the Phase II Property.

Types of Contaminants

The soil in MW21-04 contains a level of PHCs (F_1) in excess of the selected MECP Table 3 coarse-grained residential soil standards.

Elevated levels of EC and SAR were also identified within the shallow fill material in BH1-22 as well as the deeper native soils in BH3-22, however, these concentrations are considered to meet the site standards according to Section 49.1 of O. Reg. 153/04.

No contaminants were identified in the groundwater beneath the Phase II Property.

Contaminated Media

Based on the findings of the 2021 Phase II ESA, the soil within the vicinity of the former underground fuel storage tank nest in the southern portion of the Phase II Property is contaminated with PHCs (F_1).

No contaminants were identified in the groundwater beneath the Phase II Property.

What Is Known About Areas Where Contaminants Are Present

PHC impacted soil was identified in MW21-04, which is located in the vicinity of the former underground fuel storage tank nest in the southern portion of the Phase II Property. Based on the sample depth (3.66 to 4.27 m below ground surface), the source of this contaminant is suspected to have been the result of possible leaks or spillages from the former underground fuel storage tanks at this location.

The exceedances of EC and SAR, though not posing a contaminant issue to the Phase II Property, is considered to be a result of the use of a substance for safety purposes during conditions of snow or ice or both, and thus is deemed to meet the site standards.

No contaminants were identified in the groundwater beneath the Phase II Property.

Distribution and Migration of Contaminants

As previously noted, PHC impacted soil was identified in the vicinity of MW21-04, located within the southern portion of the Phase II Property. Based on the clean groundwater test results, this contamination is anticipated to be limited to the soil within this location.

Discharge of Contaminants

The PHC impacted soil identified in the vicinity of MW21-04 is suspected to have been the result of possible leaks or spillages from the former underground fuel storage tanks at this location.

Climatic and Meteorological Conditions

In general, climatic and meteorological conditions have the potential to affect contaminant distribution. Two (2) ways by which climatic and meteorological conditions may affect contaminant distribution include the downward leaching of contaminants via the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally.

The downward migration of PHC contaminants in the vicinity of MW21-04 is not suspected to have occurred, due to the clean groundwater test results.

Potential for Vapour Intrusion

During redevelopment of the Phase II Property, all soils exceeding the selected MECP Table 3 coarse-grained residential soil standards will be removed and disposed of off-site. As such, there is no anticipated potential for future vapour intrusion at the Phase II Property.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the property addressed 1166 Bank Street, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II Property.

A subsurface investigation, carried out by Golder Associates Ltd., was conducted for the Phase II Property on March 29 and March 30, 2021. At that time, four boreholes (MW21-01 to MW21-04) were advanced throughout the property and terminated within the overburden at depths ranging from approximately 6.6 to 7.6 m below ground surface. Upon completion, all boreholes were equipped with monitoring wells to allow for the collection of groundwater samples.

The subsurface investigation for this assessment was conducted on May 3, 2022, and consisted of drilling three boreholes (BH1-22 to BH3-22) throughout the Phase II Property, all three of which were equipped with monitoring wells to allow for the collection of groundwater samples. The boreholes were advanced to depths ranging from approximately 6.10 m to 7.62 m below the existing ground surface and terminated within an overburden layer of dense brown silty sand.

In general, the subsurface soil profile encountered at the borehole locations consists of a surficial pavement structure (asphaltic concrete and granular sub-grade fill), underlain by fill material (brown silty sand with some clay, gravel, and cobbles) over top of multiple layers of compact to dense native brown sand with varying silt and clay contents, turning grey at deeper depths in line with the long-term water table. Bedrock was not encountered in any of the boreholes during the field drilling program, however, a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 9.25 m below ground surface.

Between the 2021 and 2022 subsurface investigations, a total of ten soil samples were submitted for laboratory analysis of VOCs, PHCs (F_1-F_4), metals, PAHs, lead, EC, SAR, and pH parameters. Based on the analytical test results, the concentration of PHCs (F_1) in Sample MW21-04-07 was in excess of the MECP Table 3 coarse-grained residential soil standards. It should be noted that this borehole is located in the vicinity of the former underground fuel storage tank nest in the southern portion of the Phase II Property.

Some elevated levels of EC and SAR were identified within the shallow fill material in BH1-22 as well as the deeper native soils in BH3-22. It should be noted that these EC and SAR exceedances are considered to be the result of a substance which has been applied to the site surface for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both, which according to Section 49.1 of O. Reg. 153/04, the standards for these parameters are considered to have been met. As a result, these exceedances are not considered to represent a contaminant issue to the Phase II Property.

Groundwater samples were recovered from MW21-01 to MW21-04 as part of the 2021 subsurface investigation on April 8, 2021 and submitted for laboratory analysis of VOCs and PHCs (F_1-F_4). Based on the analytical test results, the concentration of chloroform in Sample MW21-02, as well as the concentrations of chloroform, 1-2-Dichloroethane, and benzene in Sample MW21-04 were in excess of the MECP Table 3 non-potable groundwater in coarse-grained soil standards.

The elevated concentrations of chloroform were suspected to be the result of the use of municipal water during the drilling process, and thus was not considered to present a contaminant issue to the property. The benzene exceedance was suspected to be the result of the historical presence of the former on-site retail fuel outlet. It should be noted that this benzene exceedance was identified in the monitoring well placed within the location of the former underground fuel storage tank nest in the southern portion of the site. The presence of 1-2-Dichloroethane, which is not typical of fuel related impacts, was suspected to be related to the historical use of solvents in an auto service garage which was formerly present on the property.

As part of this current assessment, groundwater samples were recovered from BH1-22 to BH3-22, as well as MW21-02 and MW21-04, and submitted for laboratory analysis of VOCs and PHC (F_1-F_4) parameters. Based on the analytical test results, all detected VOC parameter concentrations in the groundwater samples analyzed are in compliance with the selected MECP Table 3 non-potable groundwater in coarse-grained soil standards. It should be noted that no chloroform was detected in the samples analyzed as part of the 2022 groundwater sampling program, confirming our theory that the initial concentrations identified in the 2021 sampling program were likely the result of the use of municipal water. The benzene concentration detected in MW21-04 as part of the 2022 groundwater sampling program was also significantly lower than initially identified in the 2021 sampling program. It is possible that the initially identified elevated levels of benzene could be the result of suspended sediment collected in the water samples due to improperly established wells.

Recommendations

Soil

Based on the findings of this assessment, PHC impacted soil was identified in the southern portion of the Phase II Property, in the vicinity of the former on-site underground fuel storage tank nest.

It is our understanding that the Phase II Property is to be redeveloped in the future, thus it is recommended that this contaminated soil be remediated at the time of site redevelopment. This contaminated soil will require disposal at a licensed waste disposal facility.

Prior to off-site disposal of impacted soil at a licensed waste disposal facility, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with Ontario Regulation 347/558.

It is recommended that Paterson personnel be present on-site during remediation activities to direct the excavation and segregation of impacted soil, as well as to conduct confirmatory sampling as required.

Based on the soil test results, the majority of the on-site soils comply with the MECP Table 2.1 Excess Soil Quality Standards (Ontario Regulation 406/19), for off-site disposal. Additional excess soil testing may be required prior to future site excavation activities.

Groundwater

Should the results of two consecutive rounds of groundwater testing comply with the site standards, the groundwater is therefore considered to be clean. To verify its quality, it is recommended that the groundwater be re-tested, in particular the monitoring wells at MW21-02 and MW21-04, prior to site redevelopment activities.

Monitoring Wells

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned according to Ontario Regulation 903 (Ontario Water Resources Act), however, we recommend that the wells be maintained for future sampling purposes, at least until the excavation for the foundation has commenced. The monitoring wells will be registered with the MECP under this regulation. Further information can be provided upon request in this regard.

7.0 STATEMENT OF LIMITATIONS

This Phase II – Environmental Site Assessment report has been prepared in general accordance with O.Reg. 153/04, as amended, and 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 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 Ambassador Realty Inc. Permission and notification from Ambassador Realty Inc. and Paterson Group will be required prior to the release of this report to any other party.

Paterson Group Inc.

Nick Sullivan, B.Sc.

Mark D'Arcy, P.Eng., QP$_{ESA}$

Report Distribution:

- Ambassador Realty Inc.
- Paterson Group Inc.

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE5590-1 – SITE PLAN

DRAWING PE5590-2 – SURROUNDING LAND USE PLAN

DRAWING PE5590-3 – TEST HOLE LOCATION PLAN

DRAWING PE5590-4 – ANALYTICAL TESTING PLAN – SOIL (VOCs, METALS, PAHs, LEAD, EC, SAR, pH)

DRAWING PE5590-4A – CROSS SECTION A-A' – SOIL (VOCs, METALS, PAHs, LEAD, EC, SAR, pH)

DRAWING PE5590-4B – CROSS SECTION B-B' – SOIL (VOCs, METALS, PAHs, LEAD, EC, SAR, pH)

DRAWING PE5590-5 – ANALYTICAL TESTING PLAN – SOIL (PHCs)

DRAWING PE5590-5A – CROSS SECTION A-A' – SOIL (PHCs)

DRAWING PE5590-5B – CROSS SECTION B-B' – SOIL (PHCs)

DRAWING PE5590-6 – ANALYTICAL TESTING PLAN – GROUNDWATER (PHCs)

DRAWING PE5590-6A – CROSS SECTION A-A' – GROUNDWATER (PHCs)

DRAWING PE5590-6B – CROSS SECTION B-B' – GROUNDWATER (PHCs)

DRAWING PE5590-7 – ANALYTICAL TESTING PLAN – GROUNDWATER (VOCs)

DRAWING PE5590-7A – CROSS SECTION A-A' – GROUNDWATER (VOCs)

DRAWING PE5590-7B – CROSS SECTION B-B' – GROUNDWATER (VOCs)

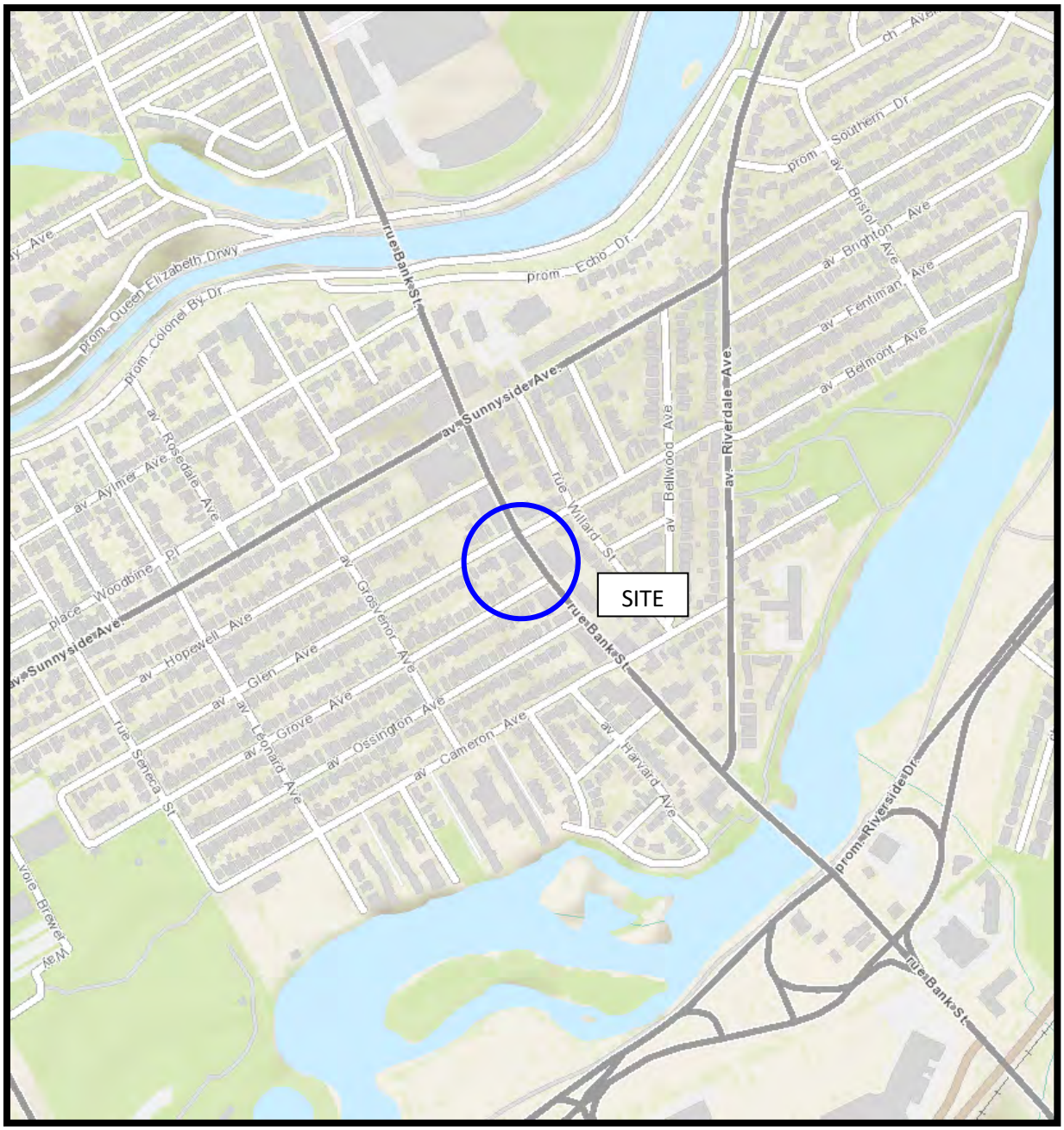
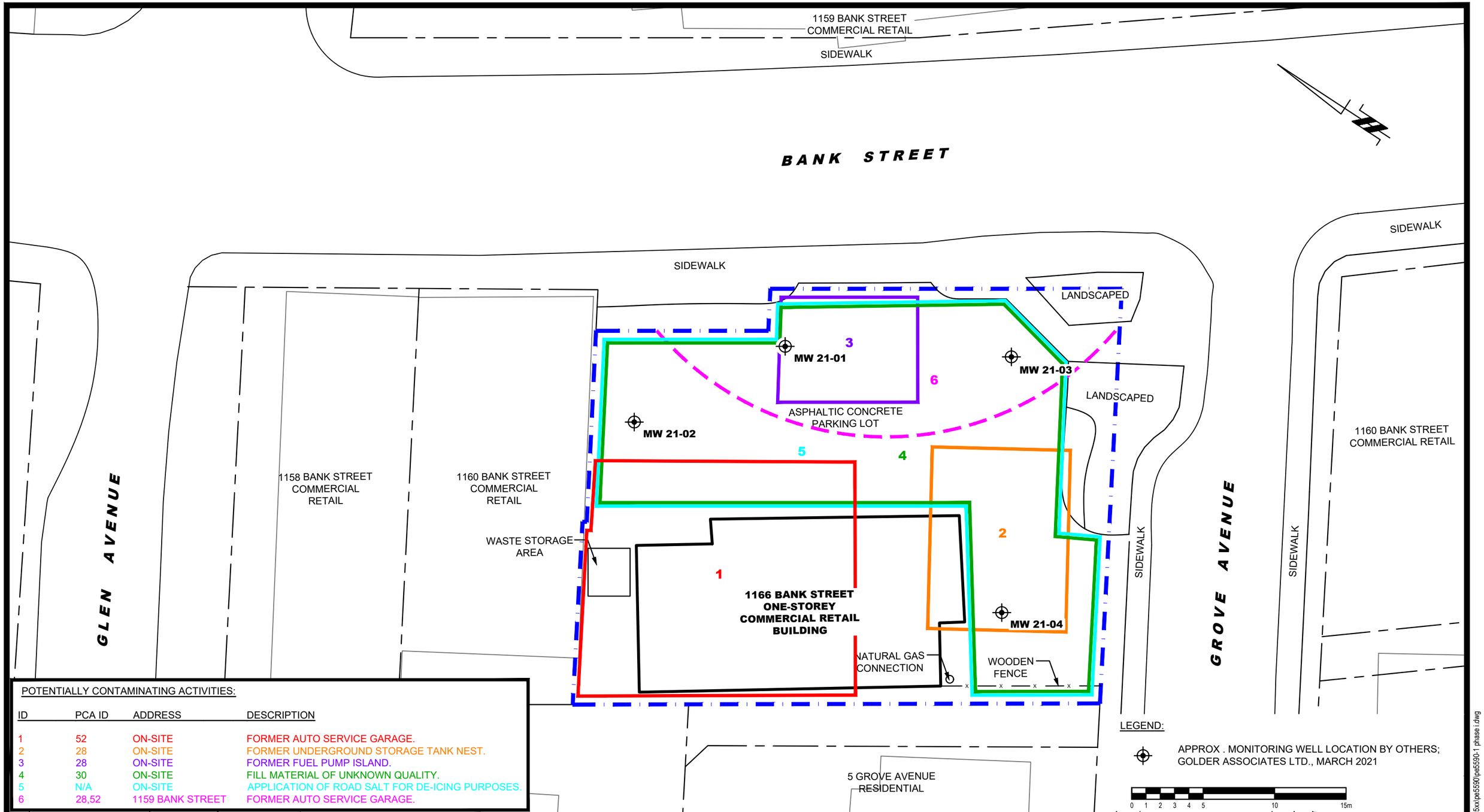


FIGURE 1

KEY PLAN



POTENTIALLY CONTAMINATING ACTIVITIES:

ID	PCA ID	ADDRESS	DESCRIPTION
1	52	ON-SITE	FORMER AUTO SERVICE GARAGE.
2	28	ON-SITE	FORMER UNDERGROUND STORAGE TANK NEST.
3	28	ON-SITE	FORMER FUEL PUMP ISLAND.
4	30	ON-SITE	FILL MATERIAL OF UNKNOWN QUALITY.
5	N/A	ON-SITE	APPLICATION OF ROAD SALT FOR DE-ICING PURPOSES.
6	28,52	1159 BANK STREET	FORMER AUTO SERVICE GARAGE.

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consulting engineers

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
1166 BANK STREET

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:250	Date: 03/2022
Drawn by: JM	Report No.: PE5590-1
Checked by: NS	Dwg. No.: PE5590-1
Approved by: MSD	Revision No.:

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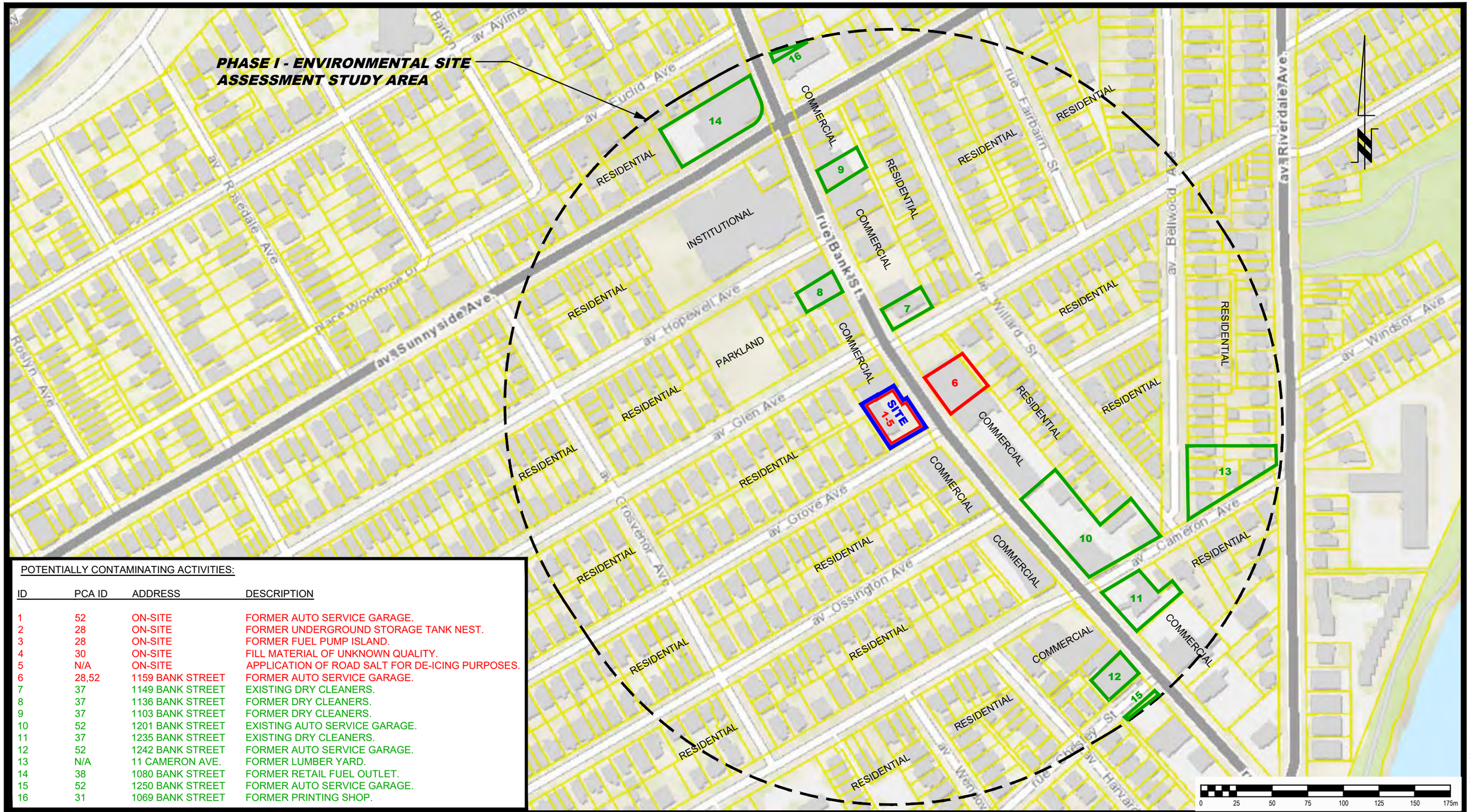

POTENTIALLY CONTAMINATING ACTIVITIES:

ID	PCA ID	ADDRESS	DESCRIPTION
1	52	ON-SITE	FORMER AUTO SERVICE GARAGE.
2	28	ON-SITE	FORMER UNDERGROUND STORAGE TANK NEST.
3	28	ON-SITE	FORMER FUEL PUMP ISLAND.
4	30	ON-SITE	FILL MATERIAL OF UNKNOWN QUALITY.
5	N/A	ON-SITE	APPLICATION OF ROAD SALT FOR DE-ICING PURPOSES.
6	28,52	1159 BANK STREET	FORMER AUTO SERVICE GARAGE.
7	37	1149 BANK STREET	EXISTING DRY CLEANERS.
8	37	1136 BANK STREET	FORMER DRY CLEANERS.
9	37	1103 BANK STREET	FORMER DRY CLEANERS.
10	52	1201 BANK STREET	EXISTING AUTO SERVICE GARAGE.
11	37	1235 BANK STREET	EXISTING DRY CLEANERS.
12	52	1242 BANK STREET	FORMER AUTO SERVICE GARAGE.
13	N/A	11 CAMERON AVE.	FORMER LUMBER YARD.
14	38	1080 BANK STREET	FORMER RETAIL FUEL OUTLET.
15	52	1250 BANK STREET	FORMER AUTO SERVICE GARAGE.
16	31	1069 BANK STREET	FORMER PRINTING SHOP.

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT

1166 BANK STREET

OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

Scale: 1:2500	Date: 03/2022
Drawn by: JM	Report No.: PE5590-1
Checked by: NS	Dwg. No.: PE5590-2
Approved by: MSD	Revision No.:

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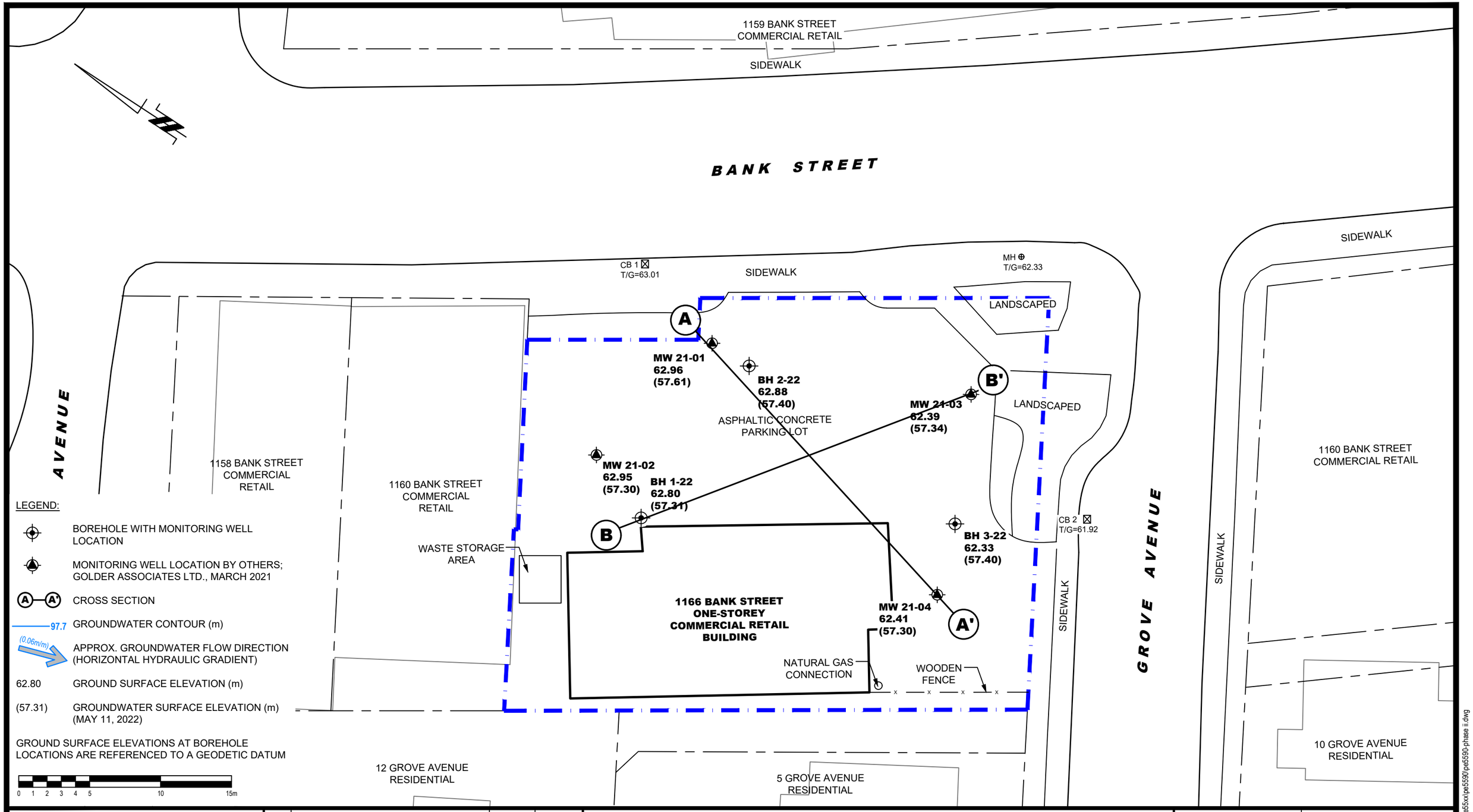

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- MONITORING WELL LOCATION BY OTHERS; GOLDER ASSOCIATES LTD., MARCH 2021
- A — A' CROSS SECTION
- 97.7 GROUNDWATER CONTOUR (m)
- (0.06m/m) APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)
- 62.80 GROUND SURFACE ELEVATION (m)
- (57.31) GROUNDWATER SURFACE ELEVATION (m) (MAY 11, 2022)

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

0 1 2 3 4 5 10 15m

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1166 BANK STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:250	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-3
Approved by: MSD	Revision No.:

11x17

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1159 BANK STREET
COMMERCIAL RETAIL

SIDEWALK

BANK STREET

BH2-22-SS4A 2.29-2.44 m 3-May-2022
Metals comply with MECP Table 3 Standards

BH2-22-SS5 3.05-3.66 m 3-May-2022
VOCs & Lead comply with MECP Table 3 Standards

MW21-01-09 6.10-6.60 m 29-Mar-2021
VOCs & Metals comply with MECP Table 3 Standards

CB 1
T/G=63.01

SIDEWALK

MH
T/G=62.33

LANDSCAPED

MW21-03-01 0.15-0.61 m 30-Mar-2021
VOCs & Metals comply with MECP Table 3 Standards

SIDEWALK

A

MW21-02-10 5.49-6.10 m 30-Mar-2021
VOCs & Metals comply with MECP Table 3 Standards

MW 21-01
62.96
(57.61)

BH 2-22
62.88
(57.40)

ASPHALTIC CONCRETE
PARKING LOT

MW 21-03
62.39
(57.34)

B'

LANDSCAPED

BH3-22-SS3 1.52-2.13 m 3-May-2022
PAHs & Metals comply with MECP Table 3 Standards

BH3-22-SS6 3.81-4.42 m 3-May-2022
VOCs, Lead & pH comply with MECP Table 3 Standards
EC & SAR comply with MECP Table 3 Standards (S.49.1 O.Reg 153/04)

BH1-22-SS3/SS4A 1.52-2.44 m 3-May-2022
VOCs comply with MECP Table 3 Standards
EC & SAR comply with MECP Table 3 Standards (S.49.1 O.Reg 153/04)

BH1-22-SS8 5.33-5.94 m 3-May-2022
VOCs & pH comply with MECP Table 3 Standards

MW 21-02
62.95
(57.30)

BH 1-22
62.80
(57.31)

STREET
RCIAL
RETAIL

RETAIL

B

WASTE STORAGE
AREA

BH 3-22
62.33
(57.40)

CB 2
T/G=61.92

MW21-04-07 3.66-4.27 m 30-Mar-2021
VOCs & Metals comply with MECP Table 3 Standards

1166 BANK STREET
ONE-STOREY
COMMERCIAL RETAIL
BUILDING

MW 21-04
62.41
(57.30)

A'

SIDEWALK

GROVE AVENUE

SID

NATURAL GAS
CONNECTION

WOODEN
FENCE

10 GROVE AVENUE
RESIDENTIAL

5 GROVE AVENUE
RESIDENTIAL

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- MONITORING WELL LOCATION BY OTHERS; GOLDER ASSOCIATES LTD., MARCH 2021
- A—A' CROSS SECTION
- 62.80 GROUND SURFACE ELEVATION (m)
- (57.31) GROUNDWATER SURFACE ELEVATION (m) (MAY 11, 2022)

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

0 1 2 3 4 5 10 15m

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1166 BANK STREET
OTTAWA, ONTARIO

Title:
ANALYTICAL TESTING PLAN - SOIL (METALS, PAHs & VOCs)

Scale: 1:250	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-4
Approved by: MSD	Revision No.:

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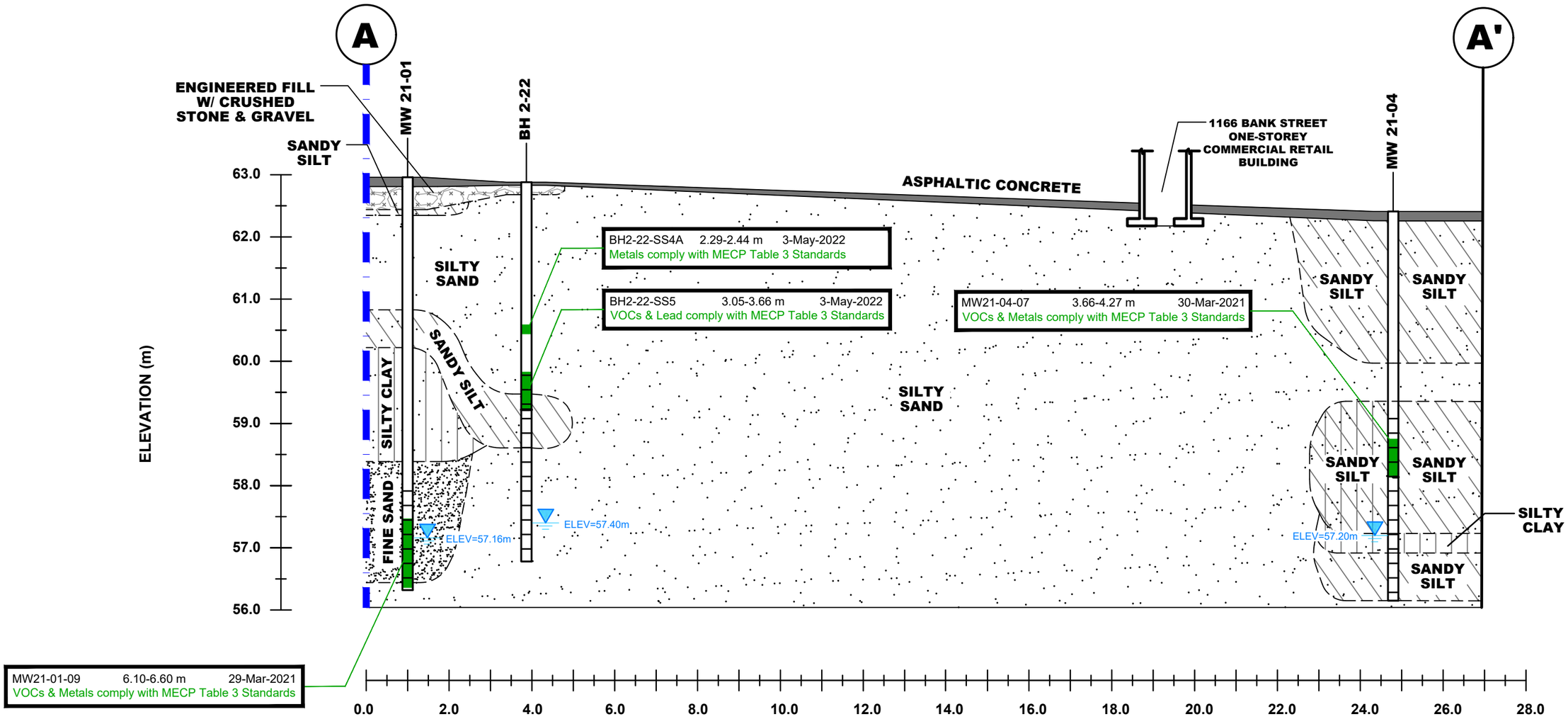

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1166 BANK STREET

OTTAWA, ONTARIO

Title: **CROSS SECTION A-A' - SOIL (PAHs, METALS & VOCs)**

Scale: AS SHOWN	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-4A
Approved by: MSD	Revision No.:

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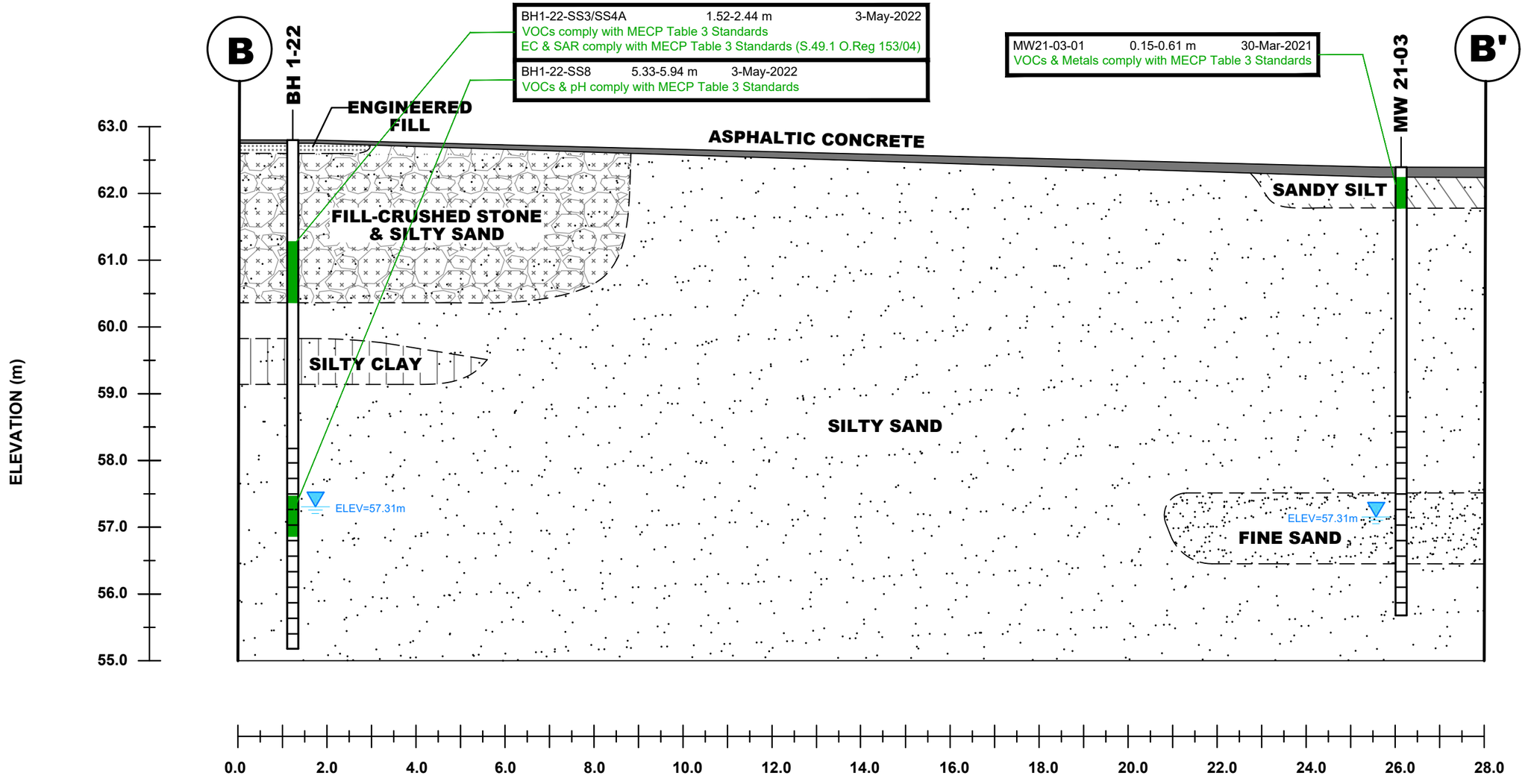

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1166 BANK STREET

OTTAWA, ONTARIO

Title: CROSS SECTION B-B' - SOIL (PAHs, METALS & VOCs)

Scale: AS SHOWN	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-4B
Approved by: MSD	Revision No.:

11x17

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1159 BANK STREET
COMMERCIAL RETAIL

SIDEWALK

BANK STREET

MW21-01-09 6.10-6.60 m 29-Mar-2021
PHCs comply with MECP Table 3 Standards

BH2-22-SS5 3.05-3.66 m 3-May-2022
PHCs comply with MECP Table 3 Standards

CB 1
T/G=63.01

SIDEWALK

MH
T/G=62.33

LANDSCAPED

MW21-03-01 0.15-0.61 m 30-Mar-2021
PHCs comply with MECP Table 3 Standards

A

MW 21-01
62.96
(57.61)

BH 2-22
62.88
(57.40)

ASPHALTIC CONCRETE
PARKING LOT

MW 21-03
62.39
(57.34)

B'

LANDSCAPED

MW21-02-10 5.49-6.10 m 30-Mar-2021
PHCs comply with MECP Table 3 Standards

BH1-22-SS3/SS4A 1.52-2.44 m 3-May-2022
PHCs comply with MECP Table 3 Standards

BH1-22-SS8 5.33-5.94 m 3-May-2022
PHCs comply with MECP Table 3 Standards

BH3-22-SS6 3.81-4.42 m 3-May-2022
PHCs comply with MECP Table 3 Standards

1160 BANK STREET
COMMERCIAL RETAIL

1158 BANK STREET
COMMERCIAL
RETAIL

1160 BANK STREET
COMMERCIAL
RETAIL

MW 21-02
62.95
(57.30)

BH 1-22
62.80
(57.31)

CB 2
T/G=61.92

BH 3-22
62.33
(57.40)

B

WASTE STORAGE
AREA

MW21-04-07 3.66-4.27 m 30-Mar-2021

Parameter	Result(µg/g)	Standard(µg/g)
PHCs F1	78.4	55

Remaining Metals comply with MECP Table 3 Standards

1166 BANK STREET
ONE-STOREY
COMMERCIAL RETAIL
BUILDING

MW 21-04
62.41
(57.30)

A'

SIDEWALK

GROVE AVENUE

NATURAL GAS
CONNECTION

WOODEN
FENCE

10 GROVE AVENUE
RESIDENTIAL

5 GROVE AVENUE
RESIDENTIAL

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- MONITORING WELL LOCATION BY OTHERS; GOLDER ASSOCIATES LTD., MARCH 2021
- A—A' CROSS SECTION
- 62.80 GROUND SURFACE ELEVATION (m)
- (57.31) GROUNDWATER SURFACE ELEVATION (m) (MAY 11, 2022)

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

0 1 2 3 4 5 10 15m

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1166 BANK STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (PHCs)

Scale: 1:250	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-5
Approved by: MSD	Revision No.:

11x17

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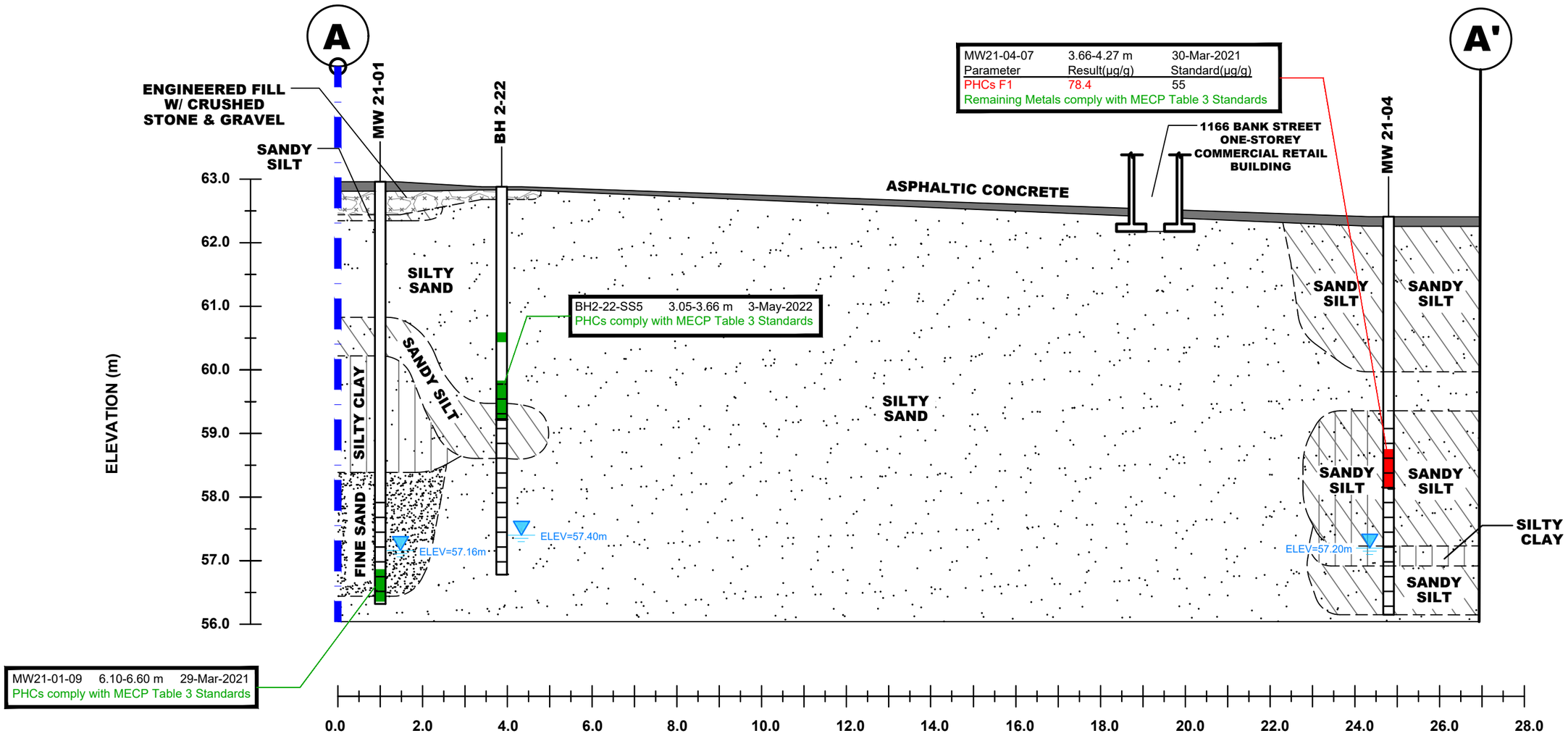

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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Ottawa, Ontario K2E 7J5
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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1166 BANK STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (PHCs)

Scale: AS SHOWN	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-5A
Approved by: MSD	Revision No.:

11x17

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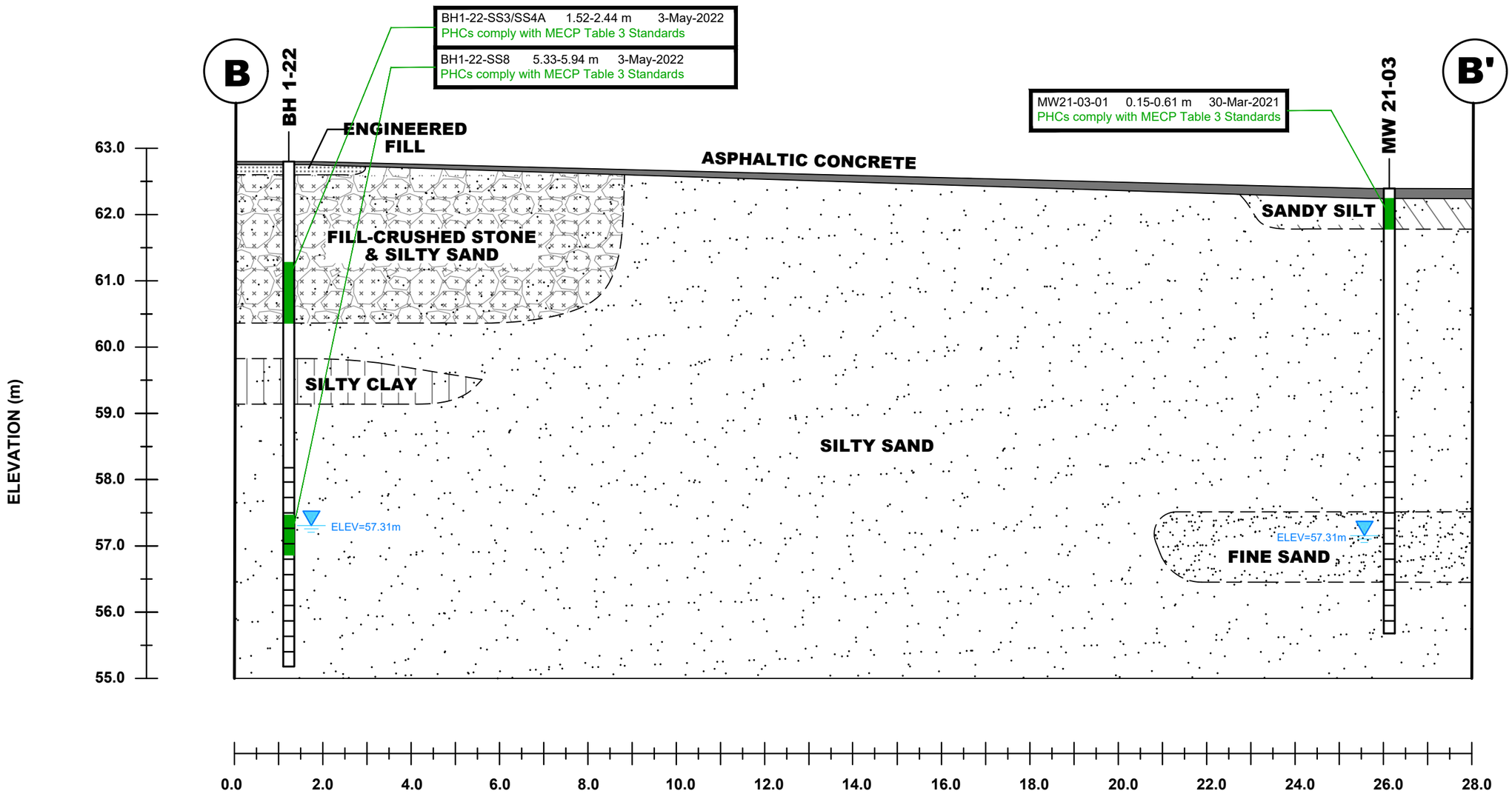

SOIL RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1166 BANK STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (PHCs)

Scale: AS SHOWN	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-5B
Approved by: MSD	Revision No.:

11x17

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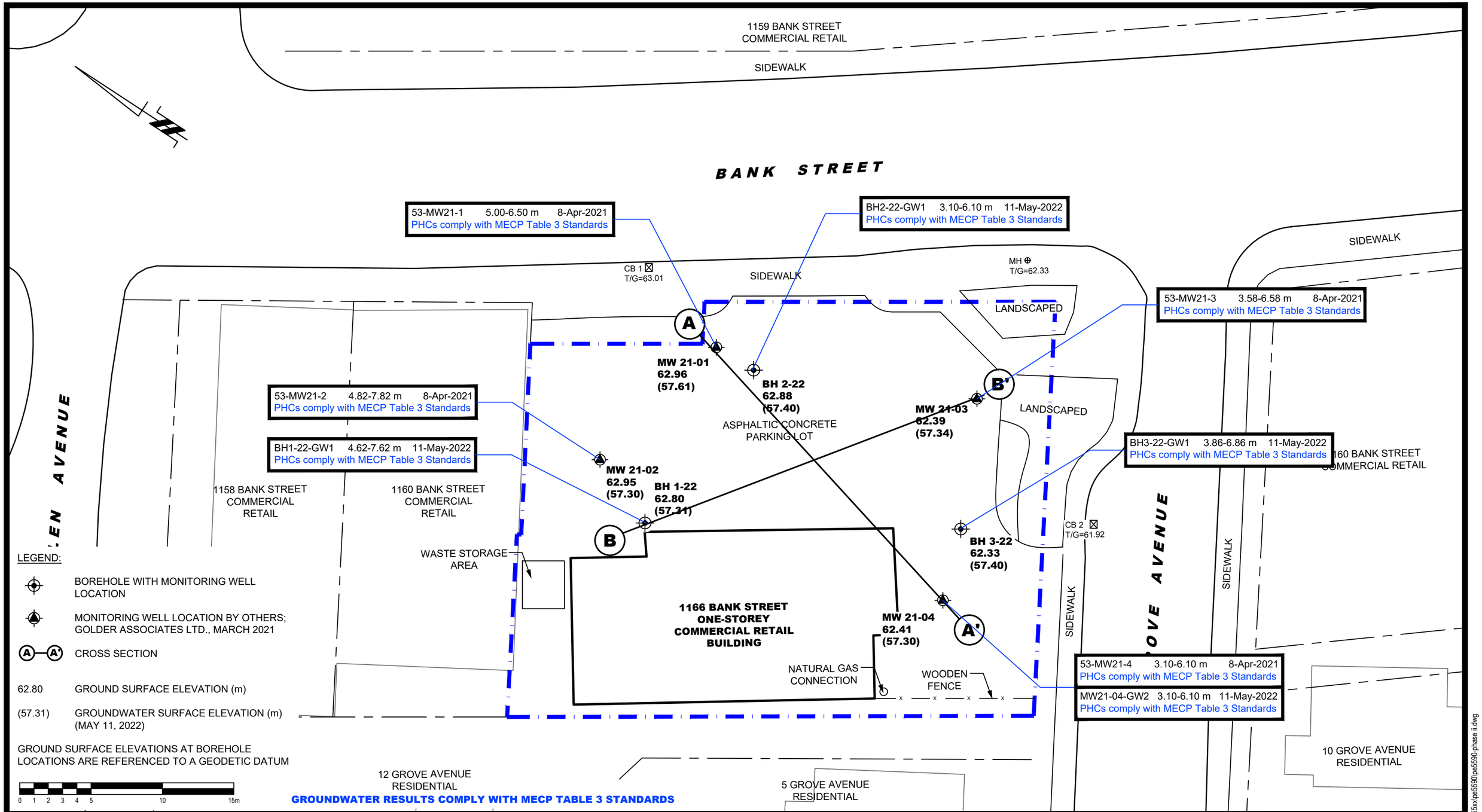

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- MONITORING WELL LOCATION BY OTHERS; GOLDER ASSOCIATES LTD., MARCH 2021
- A — A' CROSS SECTION
- 62.80 GROUND SURFACE ELEVATION (m)
- (57.31) GROUNDWATER SURFACE ELEVATION (m) (MAY 11, 2022)

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

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1166 BANK STREET
OTTAWA, ONTARIO

Title:
ANALYTICAL TESTING PLAN - GROUNDWATER (PHCs)

Scale: 1:250	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-6
Approved by: MSD	Revision No.:

11x17

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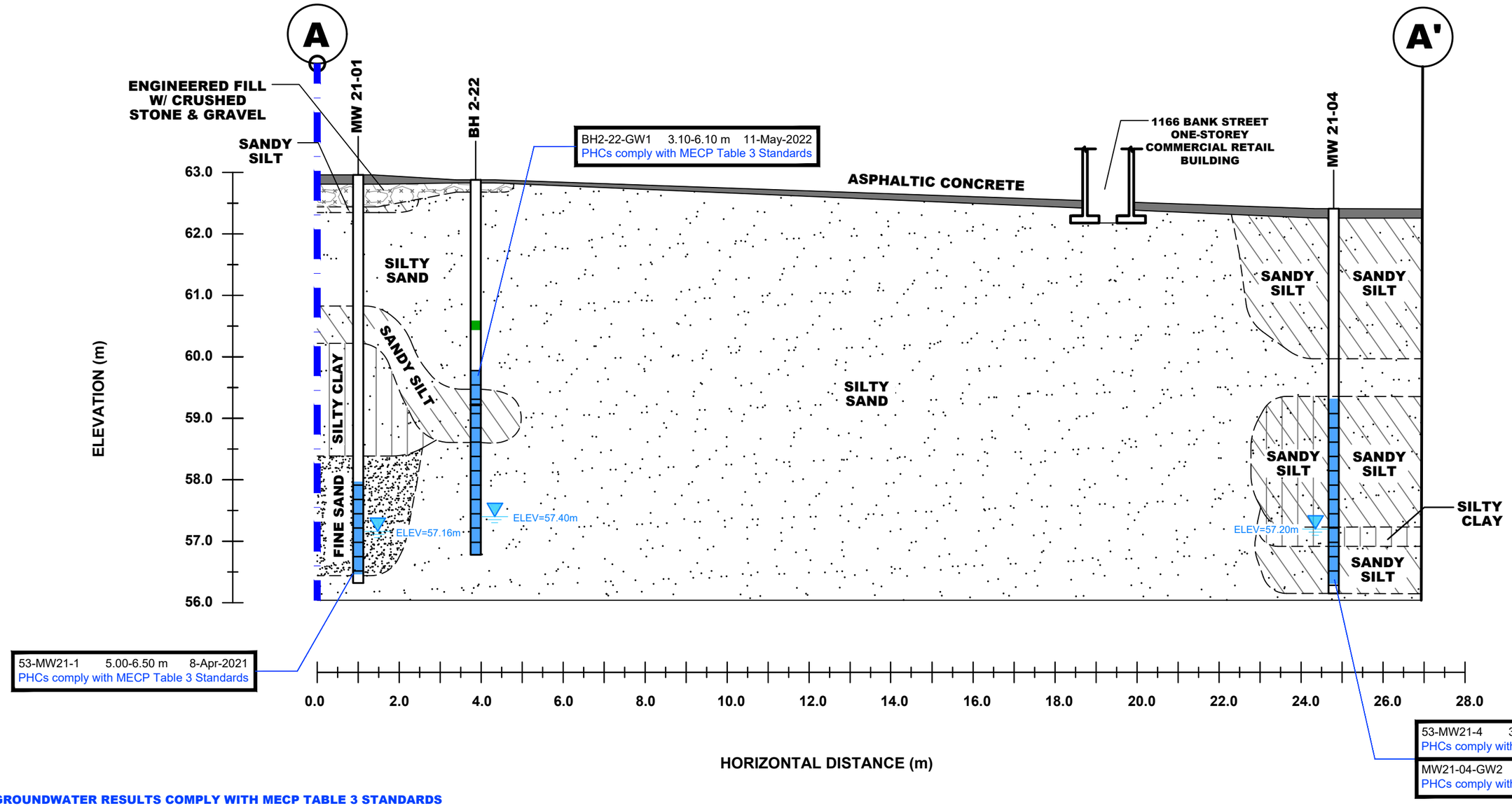

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

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Ottawa, Ontario K2E 7J5
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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1166 BANK STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - GROUNDWATER (PHCs)

Scale: AS SHOWN	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-6A
Approved by: MSD	Revision No.:

11x17

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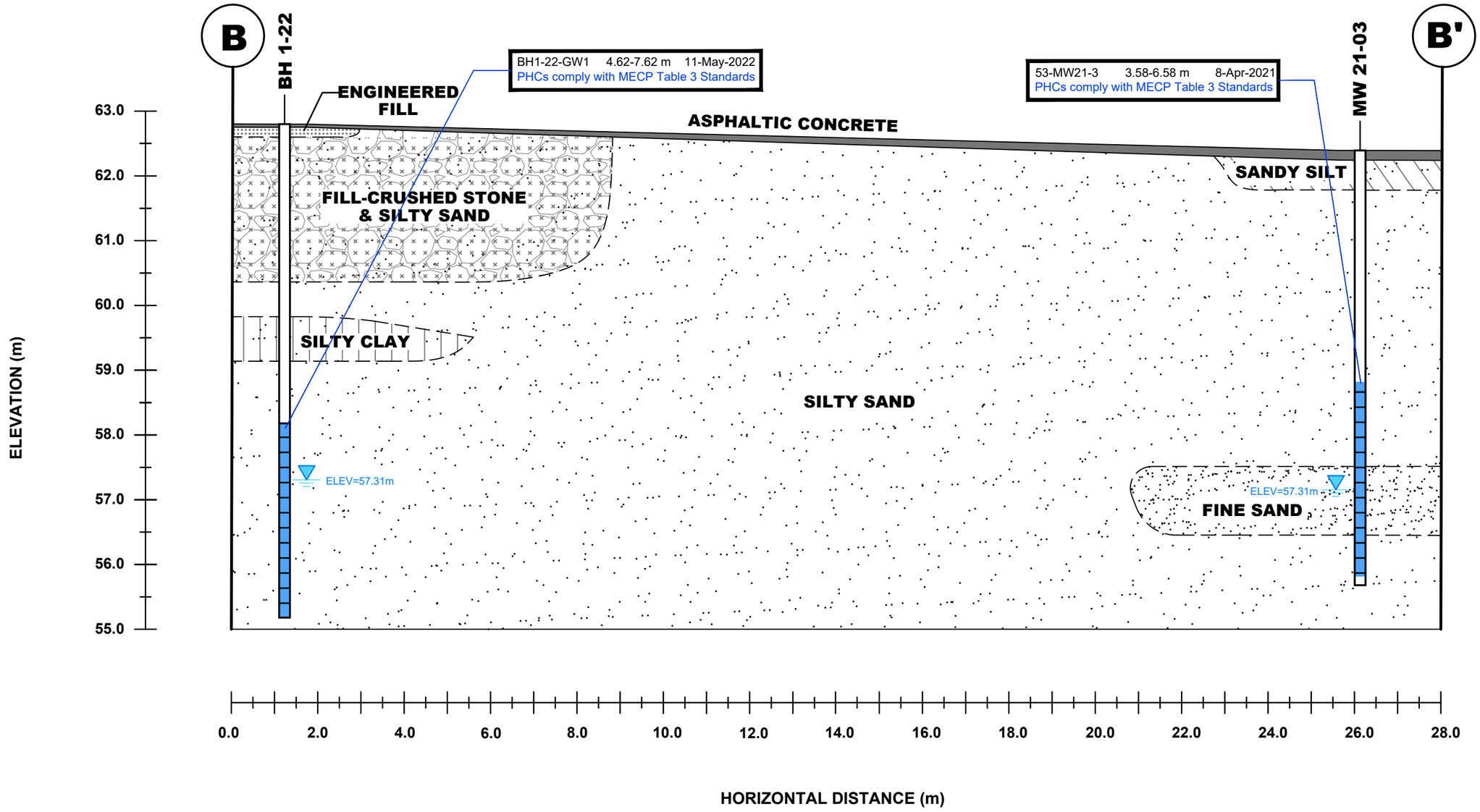

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1166 BANK STREET

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: **PE5590-6B**
Approved by: MSD	Revision No.:

11x17

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1159 BANK STREET
COMMERCIAL RETAIL

SIDEWALK

BANK STREET

53-MW21-1 5.00-6.50 m 8-Apr-2021
VOCs comply with MECP Table 3 Standards

BH2-22-GW1 3.10-6.10 m 11-May-2022
VOCs comply with MECP Table 3 Standards

CB 1
T/G=63.01

SIDEWALK

MH
T/G=62.33

LANDSCAPED

53-MW21-3 3.58-6.58 m 8-Apr-2021
VOCs comply with MECP Table 3 Standards

SIDEWALK

A

B'

MW 21-01
62.96
(57.61)

BH 2-22
62.88
(57.40)

ASPHALTIC CONCRETE
PARKING LOT

MW 21-03
62.39
(57.34)

LANDSCAPED

BH3-22-GW1 3.86-6.86 m 11-May-2022
VOCs comply with MECP Table 3 Standards

1160 BANK STREET
COMMERCIAL RETAIL

53-MW21-2 4.82-7.82 m 8-Apr-2021

Parameter	Result(µg/L)	Standard(µg/L)
Chloroform	3.49	2.4

Remaining VOCs comply with MECP Table 3 Standards

MW21-02-GW2 4.82-7.82 m 11-May-2022
VOCs comply with MECP Table 3 Standards

MW 21-02
62.95
(57.30)

BH 1-22
62.80
(57.31)

BH1-22-GW1 4.62-7.62 m 11-May-2022
VOCs comply with MECP Table 3 Standards

ANK STREET
MMERCIAL
RETAIL

B

WASTE STORAGE
AREA

BH 3-22
62.33
(57.40)

CB 2
T/G=61.92

53-MW21-4 3.10-6.10 m 8-Apr-2021

Parameter	Result(µg/L)	Standard(µg/L)
Benzene	70.7	44
Chloroform	4.61	2.4
1-2-Dichloroethane	5.31	1.6

Remaining VOCs comply with MECP Table 3 Standards

MW21-04-GW2 3.10-6.10 m 11-May-2022
VOCs comply with MECP Table 3 Standards

1166 BANK STREET
ONE-STOREY
COMMERCIAL RETAIL
BUILDING

MW 21-04
62.41
(57.30)

A'

SIDEWALK

GROVE

NATURAL GAS
CONNECTION

WOODEN
FENCE

10 GROVE AVENUE
RESIDENTIAL

5 GROVE AVENUE
RESIDENTIAL

LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- MONITORING WELL LOCATION BY OTHERS; GOLDER ASSOCIATES LTD., MARCH 2021
- A—A' CROSS SECTION
- 62.80 GROUND SURFACE ELEVATION (m)
- (57.31) GROUNDWATER SURFACE ELEVATION (m) (MAY 11, 2022)

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

0 1 2 3 4 5 10 15m

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULTS EXCEED MECP TABLE 3 STANDARDS

patersongroup
consulting engineers

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

NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1166 BANK STREET

OTTAWA, ONTARIO

Title:
ANALYTICAL TESTING PLAN - GROUNDWATER (VOCs)

Scale: 1:250	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-7
Approved by: MSD	Revision No.:

11x17

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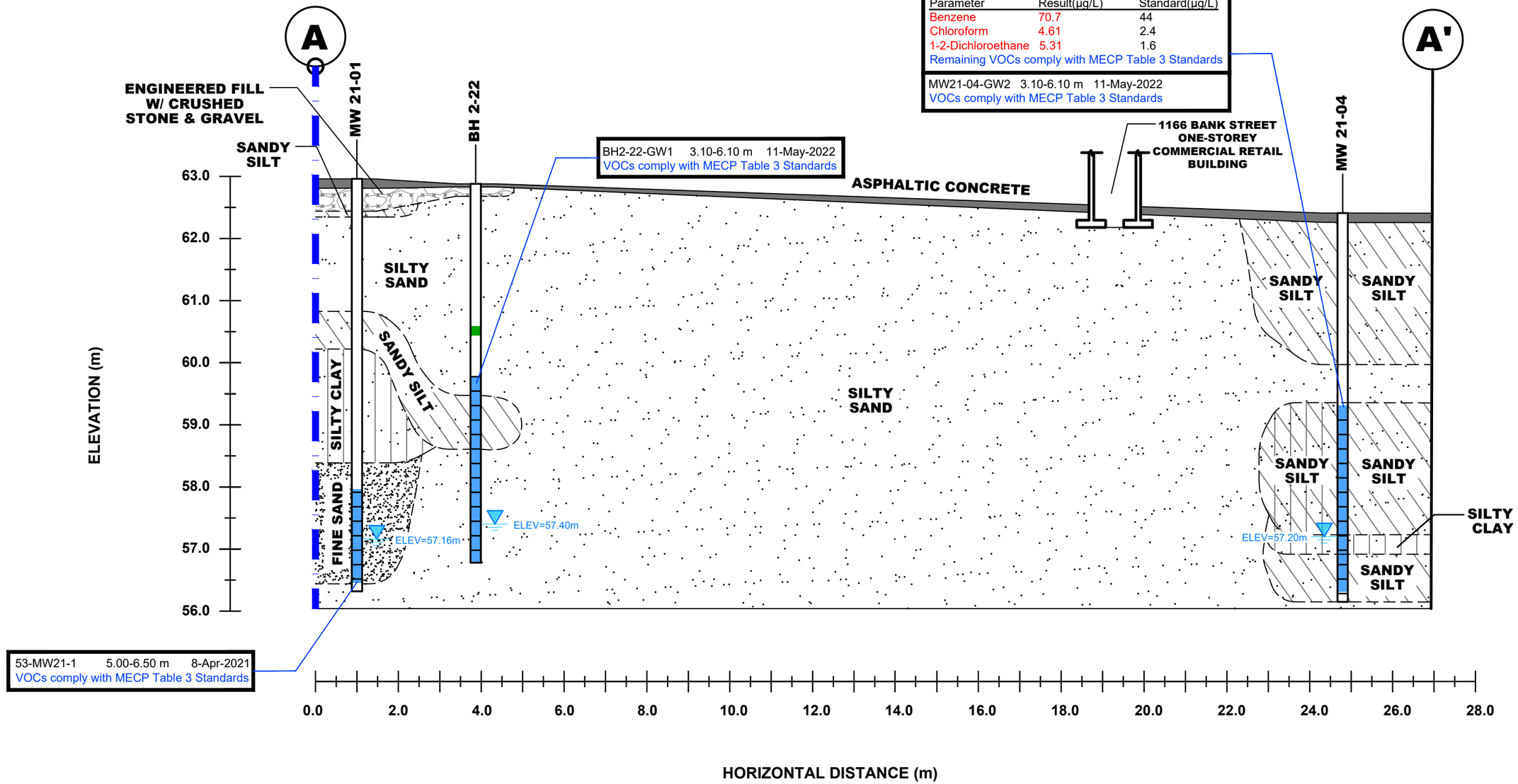

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULTS EXCEED MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1166 BANK STREET

OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-7A
Approved by: MSD	Revision No.:

11x17

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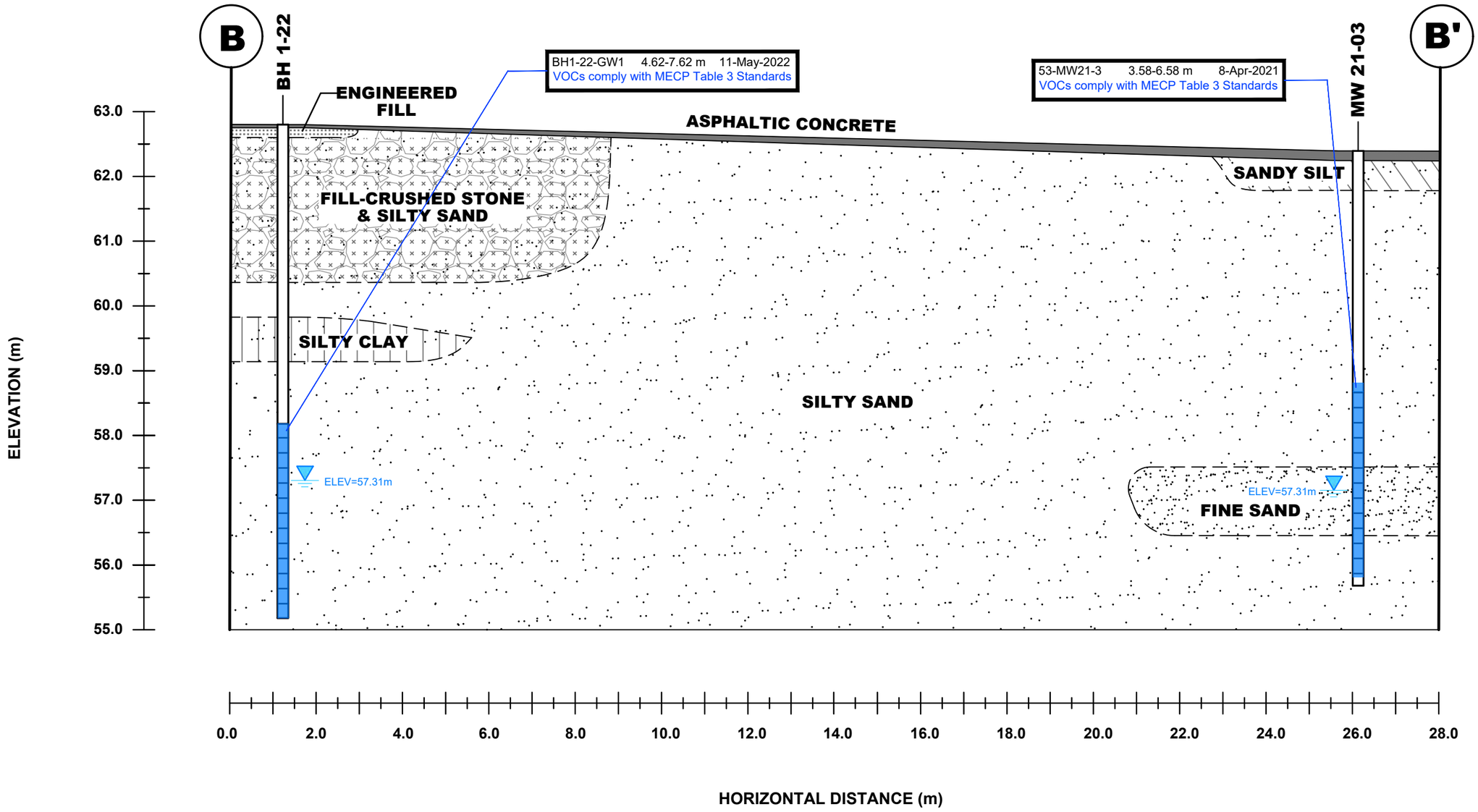

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1166 BANK STREET
OTTAWA, ONTARIO

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

Scale: AS SHOWN	Date: 05/2022
Drawn by: JM	Report No.: PE5590-2
Checked by: NS	Dwg. No.: PE5590-7B
Approved by: MSD	Revision No.:

11x17

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Paterson Group Inc.

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patersongroup

Sampling & Analysis Plan

Phase II – Environmental Site Assessment
1166 Bank Street
Ottawa, Ontario

Prepared For

Ambassador Realty Inc.

May 1, 2022

Report: PE5590-SAP

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Ambassador Realty Inc., to conduct a Phase II – Environmental Site Assessment (Phase II ESA) for the property addressed 1166 Bank Street, in the City of Ottawa, Ontario.

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

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-22	Northwestern portion of the subject site; to assess for potential impacts resulting from the presence of a former auto service garage and the use of road salt for de-icing purposes.	5-8 m; for geotechnical purposes and to intercept the groundwater table for the purpose of installing a groundwater monitoring well.
BH2-22	Northeastern portion of the subject site; to assess for potential impacts resulting from the presence of fill material of unknown quality, a former on-site fuel pump island, and a former off-site auto service garage.	5-8 m; for geotechnical purposes and to intercept the groundwater table for the purpose of installing a groundwater monitoring well.
BH3-22	Southern portion of the subject site; to assess for potential impacts resulting from the presence of fill material of unknown quality, the use of road salt for de-icing purposes, and a former on-site underground fuel storage tank nest.	5-8 m; for geotechnical purposes and to intercept the groundwater table for the purpose of installing a groundwater monitoring well.

Borehole locations are shown on “Drawing PE5590-3 – Test Hole Location Plan”, appended to the main report.

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

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

2.0 ANALYTICAL TESTING PROGRAM

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

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

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

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

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

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

Equipment

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

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

Determining Borehole Locations

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

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

Drilling Procedure

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

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

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

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

3.2 Monitoring Well Installation Procedure

Equipment

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

Procedure

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

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

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

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS

Physical impediments to the Sampling and Analysis plan may include:

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

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

PROJECT: 21458827

RECORD OF MONITORING WELL: 21-01

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: March 29, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 20 40 60 80) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-4} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200 mm Diam. (Hollow Stem)	GROUND SURFACE		100.59						
		ASPHALTIC CONCRETE		0.00						Flush Mount Casing
		GRAVEL, medium to coarse		0.15 / 100.07	1	SS	-	⊕ ND		
		Sandy SILT, trace gravel, fine; light brown		0.52						
1		SILTY SAND; brown, contains cobbles; loose		0.61	2	SS	-	□ ⊕ ND		
				99.07						
		SILTY SAND, trace gravel; brown; moist, loose		1.52	3	SS	-	□ ⊕ ND		
2				98.46						
		Sandy SILT, fine; light brown; moist, very loose		2.13	4	SS	-	□ ⊕ ND		
				97.85						Bentonite Seal
		SILTY CLAY; brown; moist, soft to firm		2.74	5	SS	-	□ ⊕		
3				96.78						
		SILTY CLAY; brown with orange mottling; moist, firm		3.81	6	SS	-	□ ⊕		
				96.02						
4		SAND, medium; light brown; moist to wet, loose		4.57	7	SS	-	□ ⊕ ND		Silica Sand
					8	SS	-	□ ⊕ ND		
5										32 mm Diam. PVC #10 Slot Screen
					9	SS	-	□ ⊕ ND		
				93.07						
6		BEDROCK		6.92 / 6.64						
										WL in Screen at Elev. 94.79 m in April, 2021
7										
8										
9										
10										

DEPTH SCALE 1 : 50

GOLDER

LOGGED: BD

CHECKED:

MIS-BH8 001 1166 BANK OTTAWA.GPJ GAL-MIS.GDT 4-28-21 JEM

PROJECT: 21458827

RECORD OF MONITORING WELL: 21-02

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: March 30, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected	HYDRAULIC CONDUCTIVITY, k, cm/s	WATER CONTENT PERCENT Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		100.43									
		ASPHALTIC CONCRETE		0.00									Flush Mount Casing
		SAND, some silt, trace gravel, fine; light brown; moist, loose		0.15	1		-	ND					
				99.82									
		No Recovery		0.61	2		-						
1				99.21									
		Sandy SILT, trace gravel, fine; brown; moist, soft		1.22	3		-	ND					
				98.60									
		SILTY SAND, trace gravel, fine; light brown; moist, loose		1.83	4		-	ND					Bentonite Seal
2					5		-						
				97.38									
	Power Auger 200 mm Diam. (Hollow Stem)	Sandy SILT, trace gravel, fine; brown; moist, soft		3.66	6		-	ND					
				96.77									
		SAND, some silt; brown; moist, loose		3.66	7		>50						
				96.53									
		No Recovery		3.90	8		-						
3													
					9		30						Silica Sand
				94.84									
		SAND, some silt; brown; moist, loose		5.49	10		35						
4													
					11		15	ND					32 mm Diam. PVC #10 Slot Screen
				94.63									
		No Recovery		5.40									
	Rotary Drill NQ Core												
5													
				92.81									
				7.62									WL in Screen at Elev. 94.70 m in April, 2021
6													
7													
8													
9													
10													

DEPTH SCALE
1 : 50

GOLDER

LOGGED: BD
CHECKED:

MIS-BHS 001 1166 BANK OTTAWA.GPJ GAL-MIS.GDT 4-28-21 JEM

PROJECT: 21458827

RECORD OF MONITORING WELL: 21-03

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: March 29, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (20 40 60 80)	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT Wp — W — Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200 mm Diam. (Hollow Stem)	GROUND SURFACE		100.00									
		ASPHALTIC CONCRETE		0.00									Flush Mount Casing
		Sandy SILT, trace gravel, coarse; brown; moist, loose		0.15	1	SS	7	ND					
				99.39									
1		SILTY SAND, trace gravel, fine; brown; moist, loose		0.61	2	SS	9	ND					
					3	SS	6	ND					
				98.17									Bentonite Seal
2		SILTY SAND; brown, contains cobbles; moist, loose		1.83	4	SS	16	ND					
				97.88									
		No Recovery		2.44	5	SS	21	ND					
3				96.95									
		SILTY SAND; brown, contains cobbles; moist, loose		3.05	6	SS	61	ND					Silica Sand
				96.34									
		No Recovery		3.66									
4				95.73									
		SILTY SAND; brown; moist, compact		4.27	8	SS	38	ND					
				95.12									
5		SAND, medium; brown; moist, loose		4.88	9	SS	23	ND					32 mm Diam. PVC #10 Slot Screen
				94.51									
		SAND, medium; brown; wet, loose		5.49	10	SS	51	ND					
				94.06									
6		SILTY SAND; brown; wet, soft		5.94	11	SS	42	ND					
				93.29									
		End of Borehole		6.71									WL in Screen at Elev. 94.75 m in April, 2021
7													
8													
9													
10													

DEPTH SCALE
1 : 50

GOLDER

LOGGED: BD
CHECKED:

PROJECT: 21458827

RECORD OF MONITORING WELL: 21-04

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: March 30, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected; HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected	HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		100.01							
0		ASPHALTIC CONCRETE		0.00							Flush Mount Casing
		Sandy SILT, trace gravel, fine to coarse; brown; moist, loose		0.15	1	SS	23	ND			
1					2	SS	19				
					3	SS	18	ND			Bentonite Seal
				98.18							
2		Lost		1.83	4	SS	11				
				97.57							
		SILTY SAND, trace gravel, fine; brown; moist, loose		2.44	5	SS	5	ND			Silica Sand
				96.96							
3	Power Auger 200 mm Diam. (Hollow Stem)	Sandy SILT; brown; moist, soft		3.05	6	SS	9	ND			
				96.25							
		Sandy SILT; grey with black staining; moist to wet, soft		3.76	7	SS	20				
4											
					8	SS	15				32 mm Diam. PVC #10 Slot Screen
5											
				94.83	9	SS	28				
		SILTY CLAY; brown; moist, soft		5.18							
				94.52							
		Sandy SILT, trace gravel, fine; brown; moist, soft		5.49	10	SS	27				
6											
				93.76							
		End of Borehole		6.25							Wl. in Screen at Elev. 94.80 m in April, 2021
7											
8											
9											
10											

DEPTH SCALE 1 : 50

GOLDER

LOGGED: BD

CHECKED:

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1166 Bank Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5590

REMARKS

HOLE NO. BH 1-22

BORINGS BY CME-55 Low Clearance Drill **DATE** May 3, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.05						0	62.80
FILL: Crushed stone 0.20		AU	1				
FILL: Brown silty sand with gravel, some crushed stone		SS	2	17	14	1	61.80
- some clay by 1.4m depth		SS	3	42	7	2	60.80
2.44							
Compact, brown **SILTY SAND**		SS	4	50	14	3	59.80
2.97							
Dark grey **SILTY CLAY** with sand and gravel, occasional cobbles		SS	5	83	24	4	58.80
3.66							
Dense, brown **SILTY SAND to SANDY SILT** with gravel, occasional cobbles, trace clay		SS	6	100	50		
4.50							
		SS	7	75	45	5	57.80
Dense to very dense, light brown to brown **SILTY SAND**		SS	8	50	45	6	56.80
- with gravel by 6.7m depth		SS	9	82	50+		
		SS	10	67	63	7	55.80
7.62							
End of Borehole							
(GWL @ 5.49m - May 11, 2022)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1166 Bank Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5590

REMARKS

HOLE NO. BH 2-22

BORINGS BY CME-55 Low Clearance Drill **DATE** May 3, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Asphaltic concrete 0.05						0	62.88
FILL: Crushed stone with gravel 0.20		AU	1				
FILL: Brown silty sand with gravel		SS	2	8	7	1	61.88
- some clay by 0.8m depth		SS	3	8	8	2	60.88
2.44							
Compact, reddish brown **SILTY SAND**		SS	4	58	12	3	59.88
2.97							
Compact, dark brown to brown **SILTY SAND to SANDY SILT,** some gravel, trace clay		SS	5	75	17		
		SS	6	100	50+	4	58.88
4.27							
Very dense, light brown to brown **SILTY SAND**		SS	7	75	62	5	57.88
		SS	8	83	52		
6.10							
End of Borehole							
(GWL @ 5.48m - May 11, 2022)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
1166 Bank Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5590

REMARKS

HOLE NO. BH 3-22

BORINGS BY CME-55 Low Clearance Drill **DATE** May 3, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	62.33
Asphaltic concrete 0.05							
FILL: Crushed stone with gravel 0.20		AU	1				
		SS	2	75	13	1	61.33
FILL: Brown silty sand with gravel, trace clay, occasional cobbles		SS	3	67	10	2	60.33
		SS	4		27		
2.97						3	59.33
		SS	5	100	22		
Compact, brown **SILTY SAND** with gravel, occasional cobbles		SS	6	58	29	4	58.33
4.34							
Hard, dark grey **SILTY CLAY** with sand and gravel		SS	7	92	32	5	57.33
5.18							
		SS	8	83	58		
Very dense, brown **SILTY SAND** with gravel, occasional cobbles and boulders		SS	9	100	50+	6	56.33
		SS	10	36	50+	7	55.33
7.47							
End of Borehole							
(GWL @ 4.93m - May 11, 2022)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

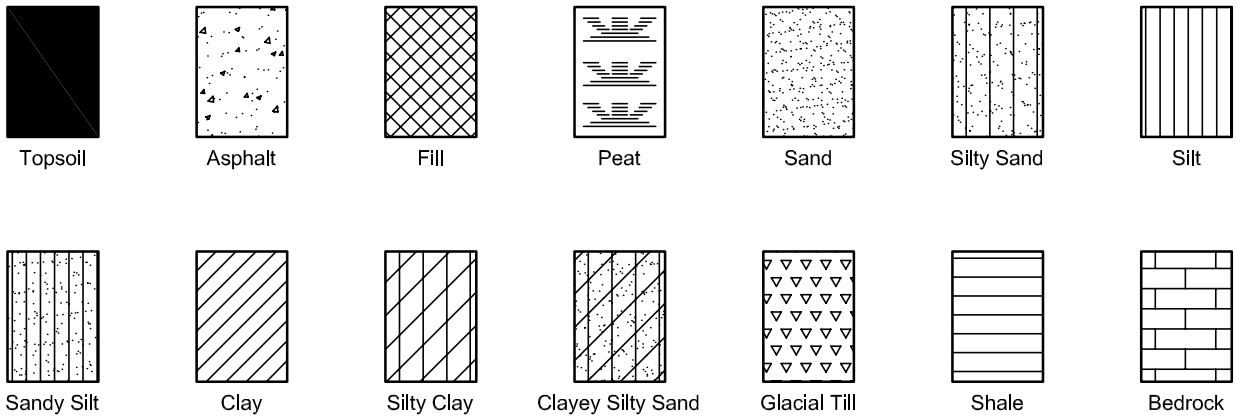
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

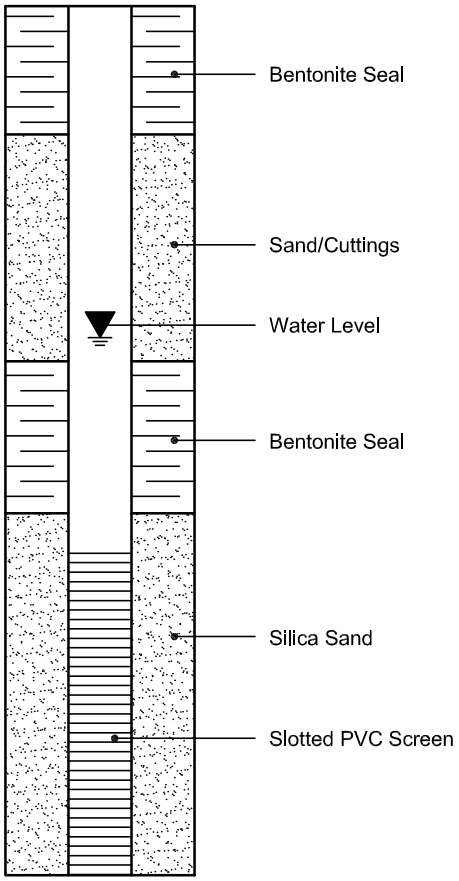
SYMBOLS AND TERMS (continued)

STRATA PLOT

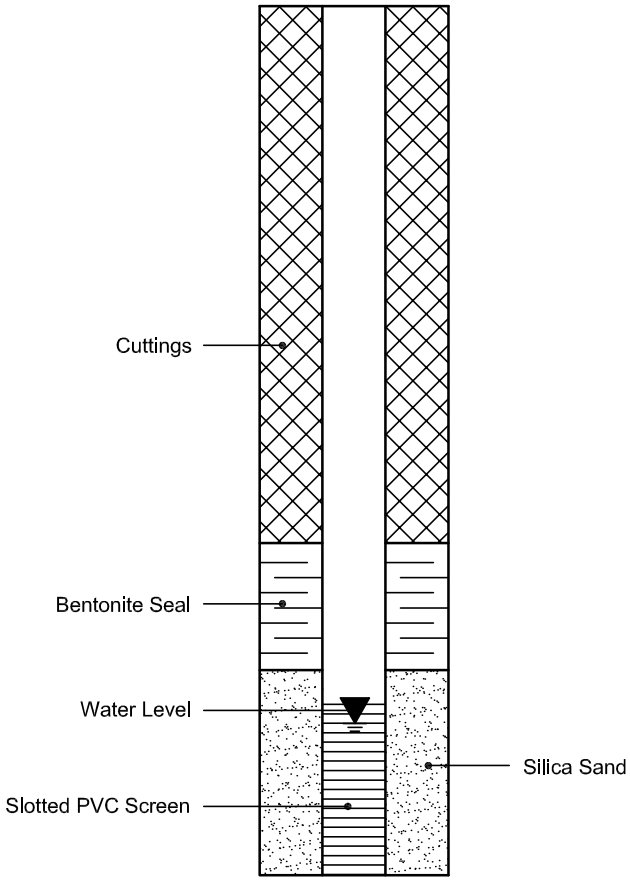


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



AGAT Laboratories

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CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: James Doyle

PROJECT: 21458827

AGAT WORK ORDER: 21Z730619

SOIL ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Apr 16, 2021

PAGES (INCLUDING COVER): 17

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

***Notes**

Disclaimer:

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Certificate of Analysis

AGAT WORK ORDER: 21Z730619
PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: James Doyle
SAMPLED BY:

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2021-04-07

DATE REPORTED: 2021-04-16

SAMPLE DESCRIPTION:				MW21-01-09	DUP A	MW21-02-10	MW21-03-01	MW21-04-07	DUP
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2021-03-29	2021-03-29	2021-03-30	2021-03-29	2021-03-30	2021-03-30
Parameter	Unit	G / S	RDL	2322004	2322005	2322006	2322007	2322008	2322009
Antimony	µg/g		0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g		1	1	1	1	3	1	2
Barium	µg/g		2.0	18.4	17.6	15.8	151	44.0	69.9
Beryllium	µg/g		0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Boron	µg/g		5	<5	<5	<5	5	<5	<5
Boron (Hot Water Soluble)	µg/g		0.10	<0.10	<0.10	<0.10	0.22	<0.10	<0.10
Cadmium	µg/g		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g		5	6	6	5	15	8	13
Cobalt	µg/g		0.5	2.8	2.8	2.8	6.9	3.8	4.8
Copper	µg/g		1.0	5.9	6.1	6.2	15.3	8.2	10.7
Lead	µg/g		1	2	2	2	17	2	4
Molybdenum	µg/g		0.5	<0.5	<0.5	<0.5	1.5	<0.5	1.0
Nickel	µg/g		1	4	4	4	17	7	10
Selenium	µg/g		0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g		0.50	0.58	0.50	<0.50	0.75	<0.50	0.56
Vanadium	µg/g		0.4	12.8	13.6	11.1	21.2	18.8	22.1
Zinc	µg/g		5	11	10	9	42	15	21
Chromium, Hexavalent	µg/g		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, Free	µg/g		0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g		0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm		0.005	0.283	0.294	0.168	1.16	0.227	0.297
Sodium Adsorption Ratio (2:1) (Calc.)	N/A		N/A	2.68	2.74	1.70	20.5	3.88	4.83
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.76	7.83	7.85	7.84	7.83	7.80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2322004-2322009 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

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Certificate of Analysis

AGAT WORK ORDER: 21Z730619
PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: James Doyle
SAMPLED BY:

O. Reg. 558 Metals and Inorganics

DATE RECEIVED: 2021-04-07

DATE REPORTED: 2021-04-16

		SAMPLE DESCRIPTION:		TCLP
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2021-03-30
Parameter	Unit	G / S	RDL	2322010
Arsenic Leachate	mg/L	2.5	0.010	<0.010
Barium Leachate	mg/L	100	0.010	1.11
Boron Leachate	mg/L	500	0.050	<0.050
Cadmium Leachate	mg/L	0.5	0.010	<0.010
Chromium Leachate	mg/L	5	0.050	<0.050
Lead Leachate	mg/L	5	0.010	<0.010
Mercury Leachate	mg/L	0.1	0.01	<0.01
Selenium Leachate	mg/L	1	0.010	<0.010
Silver Leachate	mg/L	5	0.010	<0.010
Uranium Leachate	mg/L	10	0.050	<0.050
Fluoride Leachate	mg/L	150	0.05	0.16
Cyanide Leachate	mg/L	20	0.05	<0.05
(Nitrate + Nitrite) as N Leachate	mg/L	1000	0.70	<0.70

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

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Certificate of Analysis

AGAT WORK ORDER: 21Z730619

PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)

DATE RECEIVED: 2021-04-07 **DATE REPORTED: 2021-04-16**

		SAMPLE DESCRIPTION:		MW21-01-09	DUP A	MW21-02-10	MW21-03-01	MW21-04-07	DUP
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-03-29	2021-03-29	2021-03-30	2021-03-29	2021-03-30	2021-03-30
Parameter	Unit	G / S	RDL	2322004	2322005	2322006	2322007	2322008	2322009
F1 (C6 - C10)	µg/g		5	<5	<5	<5	<5	78.4	55.9
F1 (C6 to C10) minus BTEX	µg/g		5	<5	<5	<5	<5	78	56
F2 (C10 to C16)	µg/g		10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g		50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g		50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	14.0	9.5	16.1	11.2	12.6	12.7
Surrogate	Unit	Acceptable Limits							
Toluene-d8	% Recovery	50-140		108	105	91	87	86	82
Terphenyl	%	60-140		76	78	60	86	78	70

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2322004-2322009 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: NPopnikolof

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Certificate of Analysis

AGAT WORK ORDER: 21Z730619
PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD
SAMPLING SITE:

ATTENTION TO: James Doyle
SAMPLED BY:

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2021-04-07

DATE REPORTED: 2021-04-16

		SAMPLE DESCRIPTION:		MW21-01-09	DUP A	MW21-02-10	MW21-03-01	MW21-04-07	DUP
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-03-29	2021-03-29	2021-03-30	2021-03-29	2021-03-30	2021-03-30
Parameter	Unit	G / S	RDL	2322004	2322005	2322006	2322007	2322008	2322009
Dichlorodifluoromethane	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g		0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g		0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g		0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: N Popovkof

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Certificate of Analysis

AGAT WORK ORDER: 21Z730619

PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2021-04-07 **DATE REPORTED: 2021-04-16**

		SAMPLE DESCRIPTION:		MW21-01-09	DUP A	MW21-02-10	MW21-03-01	MW21-04-07	DUP
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2021-03-29	2021-03-29	2021-03-30	2021-03-29	2021-03-30	2021-03-30
Parameter	Unit	G / S	RDL	2322004	2322005	2322006	2322007	2322008	2322009
Bromoform	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	14.0	<0.1	16.1	11.2	12.64	12.7
Surrogate	Unit	Acceptable Limits							
Toluene-d8	% Recovery	50-140		96	96	96	100	95	100
4-Bromofluorobenzene	% Recovery	50-140		86	86	86	86	94	96

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2322004-2322009 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: NPopnickoff

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Certificate of Analysis

AGAT WORK ORDER: 21Z730619

PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:

SAMPLED BY:

O. Reg. 558 - VOCs

DATE RECEIVED: 2021-04-07

DATE REPORTED: 2021-04-16

		SAMPLE DESCRIPTION:		TCLP
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2021-03-30
Parameter	Unit	G / S	RDL	2322010
Vinyl Chloride Leachate	mg/L	0.2	0.030	<0.030
1,1 Dichloroethene Leachate	mg/L	1.4	0.020	<0.020
Dichloromethane Leachate	mg/L	5.0	0.030	<0.030
Methyl Ethyl Ketone Leachate	mg/L	200	0.090	<0.090
Chloroform Leachate	mg/L	10.0	0.020	<0.020
1,2-Dichloroethane Leachate	mg/L	0.5	0.020	<0.020
Carbon Tetrachloride Leachate	mg/L	0.5	0.020	<0.020
Benzene Leachate	mg/L	0.5	0.020	<0.020
Trichloroethene Leachate	mg/L	5.0	0.020	<0.020
Tetrachloroethene Leachate	mg/L	3.0	0.050	<0.050
Chlorobenzene Leachate	mg/L	8.0	0.010	<0.010
1,2-Dichlorobenzene Leachate	mg/L	20.0	0.010	<0.010
1,4-Dichlorobenzene Leachate	mg/L	0.5	0.010	<0.010
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	50-140		82
4-Bromofluorobenzene	% Recovery	50-140		84

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

2322010 Sample was prepared using Regulation 558 protocol and a zero headspace extractor.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: 21458827
SAMPLING SITE:

AGAT WORK ORDER: 21Z730619
ATTENTION TO: James Doyle
SAMPLED BY:

Soil Analysis

RPT Date: Apr 16, 2021

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	2324942		<0.8	<0.8	NA	< 0.8	126%	70%	130%	101%	80%	120%	77%	70%	130%
Arsenic	2324942		5	5	0.0%	< 1	114%	70%	130%	100%	80%	120%	100%	70%	130%
Barium	2324942		69.1	67.3	2.6%	< 2.0	102%	70%	130%	100%	80%	120%	92%	70%	130%
Beryllium	2324942		0.6	0.5	NA	< 0.4	85%	70%	130%	114%	80%	120%	82%	70%	130%
Boron	2324942		5	6	NA	< 5	74%	70%	130%	101%	80%	120%	72%	70%	130%
Boron (Hot Water Soluble)	2322004	2322004	<0.10	<0.10	NA	< 0.10	79%	60%	140%	94%	70%	130%	92%	60%	140%
Cadmium	2324942		<0.5	<0.5	NA	< 0.5	109%	70%	130%	101%	80%	120%	103%	70%	130%
Chromium	2324942		20	21	NA	< 5	88%	70%	130%	97%	80%	120%	91%	70%	130%
Cobalt	2324942		8.8	8.8	0.0%	< 0.5	93%	70%	130%	100%	80%	120%	93%	70%	130%
Copper	2324942		20.7	20.4	1.5%	< 1.0	87%	70%	130%	103%	80%	120%	87%	70%	130%
Lead	2324942		10	10	0.0%	< 1	100%	70%	130%	97%	80%	120%	87%	70%	130%
Molybdenum	2324942		<0.5	<0.5	NA	< 0.5	110%	70%	130%	101%	80%	120%	101%	70%	130%
Nickel	2324942		17	17	0.0%	< 1	92%	70%	130%	102%	80%	120%	91%	70%	130%
Selenium	2324942		<0.8	<0.8	NA	< 0.8	125%	70%	130%	105%	80%	120%	104%	70%	130%
Silver	2324942		<0.5	<0.5	NA	< 0.5	102%	70%	130%	105%	80%	120%	95%	70%	130%
Thallium	2324942		<0.5	<0.5	NA	< 0.5	91%	70%	130%	102%	80%	120%	96%	70%	130%
Uranium	2324942		0.55	0.54	NA	< 0.50	99%	70%	130%	100%	80%	120%	99%	70%	130%
Vanadium	2324942		32.9	33.6	2.1%	< 0.4	92%	70%	130%	96%	80%	120%	96%	70%	130%
Zinc	2324942		51	51	0.0%	< 5	99%	70%	130%	104%	80%	120%	98%	70%	130%
Chromium, Hexavalent	2324734		<0.2	<0.2	NA	< 0.2	102%	70%	130%	84%	80%	120%	74%	70%	130%
Cyanide, Free	2320472		<0.040	<0.040	NA	< 0.040	106%	70%	130%	102%	80%	120%	77%	70%	130%
Mercury	2324942		<0.10	<0.10	NA	< 0.10	108%	70%	130%	102%	80%	120%	102%	70%	130%
Electrical Conductivity (2:1)	2322004	2322004	0.283	0.276	2.5%	< 0.005	97%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	2322004	2322004	2.68	2.57	4.2%	NA									
pH, 2:1 CaCl2 Extraction	2326707		7.33	7.43	1.4%	NA	100%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

O. Reg. 558 Metals and Inorganics															
Arsenic Leachate	2322099		<0.010	<0.010	NA	< 0.010	102%	70%	130%	108%	80%	120%	123%	70%	130%
Barium Leachate	2322099		1.14	1.25	9.2%	< 0.010	100%	70%	130%	104%	80%	120%	120%	70%	130%
Boron Leachate	2322099		0.052	0.056	NA	< 0.050	95%	70%	130%	98%	80%	120%	89%	70%	130%
Cadmium Leachate	2322099		<0.010	<0.010	NA	< 0.010	99%	70%	130%	100%	80%	120%	102%	70%	130%
Chromium Leachate	2322099		<0.050	<0.050	NA	< 0.050	103%	70%	130%	109%	80%	120%	112%	70%	130%
Lead Leachate	2322099		<0.010	<0.010	NA	< 0.010	99%	70%	130%	96%	80%	120%	90%	70%	130%
Mercury Leachate	2322099		<0.01	<0.01	NA	< 0.01	101%	70%	130%	100%	80%	120%	106%	70%	130%
Selenium Leachate	2322099		<0.010	<0.010	NA	< 0.010	105%	70%	130%	113%	80%	120%	124%	70%	130%
Silver Leachate	2322099		<0.010	<0.010	NA	< 0.010	102%	70%	130%	102%	80%	120%	94%	70%	130%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 21458827

SAMPLING SITE:

AGAT WORK ORDER: 21Z730619

ATTENTION TO: James Doyle

SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Apr 16, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Uranium Leachate	2322099		<0.050	<0.050	NA	< 0.050	102%	70%	130%	102%	80%	120%	101%	70%	130%
Fluoride Leachate	2322099		0.18	0.18	NA	< 0.05	104%	90%	110%	103%	90%	110%	103%	70%	130%
Cyanide Leachate	2322099		<0.05	<0.05	NA	< 0.05	106%	70%	130%	102%	80%	120%	98%	70%	130%
(Nitrate + Nitrite) as N Leachate	2322099		<0.70	<0.70	NA	< 0.70	98%	80%	120%	95%	80%	120%	96%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Iris Verástegui

AGAT Laboratories

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: 21458827
SAMPLING SITE:

AGAT WORK ORDER: 21Z730619
ATTENTION TO: James Doyle
SAMPLED BY:

Trace Organics Analysis

RPT Date: Apr 16, 2021

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)															
F1 (C6 - C10)	2321501		<5	<5	NA	< 5	91%	60%	140%	99%	60%	140%	93%	60%	140%
F2 (C10 to C16)	2322009	232009	< 10	< 10	NA	< 10	101%	60%	140%	78%	60%	140%	84%	60%	140%
F3 (C16 to C34)	2322009	232009	< 50	< 50	NA	< 50	91%	60%	140%	80%	60%	140%	89%	60%	140%
F4 (C34 to C50)	2322009	232009	< 50	< 50	NA	< 50	90%	60%	140%	85%	60%	140%	81%	60%	140%
O. Reg. 153(511) - VOCs (Soil)															
Dichlorodifluoromethane	2322009	2322009	<0.05	<0.05	NA	< 0.05	93%	50%	140%	106%	50%	140%	87%	50%	140%
Vinyl Chloride	2322009	2322009	<0.02	<0.02	NA	< 0.02	93%	50%	140%	71%	50%	140%	82%	50%	140%
Bromomethane	2322009	2322009	<0.05	<0.05	NA	< 0.05	80%	50%	140%	72%	50%	140%	74%	50%	140%
Trichlorofluoromethane	2322009	2322009	<0.05	<0.05	NA	< 0.05	94%	50%	140%	72%	50%	140%	71%	50%	140%
Acetone	2322009	2322009	<0.50	<0.50	NA	< 0.50	81%	50%	140%	97%	50%	140%	86%	50%	140%
1,1-Dichloroethylene	2322009	2322009	<0.05	<0.05	NA	< 0.05	90%	50%	140%	84%	60%	130%	73%	50%	140%
Methylene Chloride	2322009	2322009	<0.05	<0.05	NA	< 0.05	95%	50%	140%	80%	60%	130%	114%	50%	140%
Trans- 1,2-Dichloroethylene	2322009	2322009	<0.05	<0.05	NA	< 0.05	89%	50%	140%	90%	60%	130%	73%	50%	140%
Methyl tert-butyl Ether	2322009	2322009	<0.05	<0.05	NA	< 0.05	91%	50%	140%	85%	60%	130%	88%	50%	140%
1,1-Dichloroethane	2322009	2322009	<0.02	<0.02	NA	< 0.02	97%	50%	140%	76%	60%	130%	97%	50%	140%
Methyl Ethyl Ketone	2322009	2322009	<0.50	<0.50	NA	< 0.50	76%	50%	140%	97%	50%	140%	80%	50%	140%
Cis- 1,2-Dichloroethylene	2322009	2322009	<0.02	<0.02	NA	< 0.02	82%	50%	140%	73%	60%	130%	95%	50%	140%
Chloroform	2322009	2322009	<0.04	<0.04	NA	< 0.04	100%	50%	140%	92%	60%	130%	106%	50%	140%
1,2-Dichloroethane	2322009	2322009	<0.03	<0.03	NA	< 0.03	99%	50%	140%	110%	60%	130%	84%	50%	140%
1,1,1-Trichloroethane	2322009	2322009	<0.05	<0.05	NA	< 0.05	92%	50%	140%	83%	60%	130%	80%	50%	140%
Carbon Tetrachloride	2322009	2322009	<0.05	<0.05	NA	< 0.05	78%	50%	140%	91%	60%	130%	71%	50%	140%
Benzene	2322009	2322009	<0.02	<0.02	NA	< 0.02	88%	50%	140%	73%	60%	130%	109%	50%	140%
1,2-Dichloropropane	2322009	2322009	<0.03	<0.03	NA	< 0.03	81%	50%	140%	76%	60%	130%	89%	50%	140%
Trichloroethylene	2322009	2322009	<0.03	<0.03	NA	< 0.03	96%	50%	140%	84%	60%	130%	112%	50%	140%
Bromodichloromethane	2322009	2322009	<0.05	<0.05	NA	< 0.05	78%	50%	140%	76%	60%	130%	82%	50%	140%
Methyl Isobutyl Ketone	2322009	2322009	<0.50	<0.50	NA	< 0.50	74%	50%	140%	96%	50%	140%	99%	50%	140%
1,1,2-Trichloroethane	2322009	2322009	<0.04	<0.04	NA	< 0.04	104%	50%	140%	113%	60%	130%	93%	50%	140%
Toluene	2322009	2322009	<0.05	<0.05	NA	< 0.05	115%	50%	140%	94%	60%	130%	83%	50%	140%
Dibromochloromethane	2322009	2322009	<0.05	<0.05	NA	< 0.05	84%	50%	140%	79%	60%	130%	80%	50%	140%
Ethylene Dibromide	2322009	2322009	<0.04	<0.04	NA	< 0.04	101%	50%	140%	109%	60%	130%	86%	50%	140%
Tetrachloroethylene	2322009	2322009	<0.05	<0.05	NA	< 0.05	102%	50%	140%	104%	60%	130%	74%	50%	140%
1,1,1,2-Tetrachloroethane	2322009	2322009	<0.04	<0.04	NA	< 0.04	94%	50%	140%	84%	60%	130%	100%	50%	140%
Chlorobenzene	2322009	2322009	<0.05	<0.05	NA	< 0.05	99%	50%	140%	105%	60%	130%	77%	50%	140%
Ethylbenzene	2322009	2322009	<0.05	<0.05	NA	< 0.05	108%	50%	140%	88%	60%	130%	85%	50%	140%
m & p-Xylene	2322009	2322009	<0.05	<0.05	NA	< 0.05	104%	50%	140%	96%	60%	130%	81%	50%	140%
Bromoform	2322009	2322009	<0.05	<0.05	NA	< 0.05	74%	50%	140%	72%	60%	130%	72%	50%	140%
Styrene	2322009	2322009	<0.05	<0.05	NA	< 0.05	103%	50%	140%	86%	60%	130%	83%	50%	140%
1,1,2,2-Tetrachloroethane	2322009	2322009	<0.05	<0.05	NA	< 0.05	111%	50%	140%	81%	60%	130%	95%	50%	140%
o-Xylene	2322009	2322009	<0.05	<0.05	NA	< 0.05	95%	50%	140%	103%	60%	130%	90%	50%	140%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: 21458827
SAMPLING SITE:

AGAT WORK ORDER: 21Z730619
ATTENTION TO: James Doyle
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Apr 16, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,3-Dichlorobenzene	2322009	2322009	<0.05	<0.05	NA	< 0.05	96%	50%	140%	107%	60%	130%	86%	50%	140%
1,4-Dichlorobenzene	2322009	2322009	<0.05	<0.05	NA	< 0.05	107%	50%	140%	90%	60%	130%	99%	50%	140%
1,2-Dichlorobenzene	2322009	2322009	<0.05	<0.05	NA	< 0.05	101%	50%	140%	91%	60%	130%	100%	50%	140%
n-Hexane	2322009	2322009	<0.05	<0.05	NA	< 0.05	78%	50%	140%	110%	60%	130%	82%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popnikolof

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 21458827

SAMPLING SITE:

AGAT WORK ORDER: 21Z730619

ATTENTION TO: James Doyle

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, Free	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6036	modified from MSA PART 3, CH 14 and SM 2510 B	EC METER
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER
Arsenic Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Barium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Boron Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Cadmium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Chromium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

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SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Lead Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Mercury Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Selenium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Silver Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Uranium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Fluoride Leachate	INOR-93-6018	EPA 1311 & modified from SM4500-F-C	ION SELECTIVE ELECTRODE
Cyanide Leachate	INOR-93-6052	EPA 1311 modified from MOE 3015 SM 4500 CN-I,G387	TECHNICON AUTO ANALYZER
(Nitrate + Nitrite) as N Leachate	INOR-93-6053	EPA SW 846-1311 & modified from SM 4500 - NO3- I	LACHAT FIA

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 21458827

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SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 - C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Moisture Content	ORG-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 21Z730619

PROJECT: 21458827

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Vinyl Chloride Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
1,1 Dichloroethene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Dichloromethane Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Chloroform Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Benzene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS

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AGAT WORK ORDER: 21Z730619

ATTENTION TO: James Doyle

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trichloroethene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Tetrachloroethene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Chlorobenzene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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CONDITIONS OF CARRIAGE

IMPORTANT - PLEASE READ: The consignor agrees that the act of tendering the shipment to the carrier for transportation shall be sufficient to constitute signature of this bill of lading by the consignor and shall bind the consignor to the conditions of carriage stated below.

RECEIPT Carrier acknowledges receiving from the shipper, at the point of origin and on the date specified, the shipment described in this bill of lading in apparent good order, except as noted (contents and conditions of contents of shipment unknown), and agrees to carry and deliver the shipment to the receiver at the destination set out in this bill of lading, subject to payment of all lawful charges. "Carrier" refers to Purolator Inc. and any connecting and/or successive carriers involved in the transportation of the shipment herein described, including any of their respective subsidiaries, controlled entities, and their respective employees, agents and independent contractors

LIMITATION ON LIABILITY Carrier's liability in respect of the shipment described in this bill of lading (including for any loss, damage, delay, misdelivery, non-delivery or failure to deliver) is limited to $2.00 per pound ($4.41 per kilogram) computed on the total weight of the shipment, unless a higher value is declared in the specially marked Purolator Online Shipping user entry field, "Declared Value for Insurance ($)". Notwithstanding any disclosure of the nature or value of the goods carried or any special agreement to the contrary, carrier is not liable under any circumstances for the consequences of delay, or for any indirect or consequential damages (including lost profits) howsoever caused.

NOTICE OF CLAIM Carrier is not liable for any loss, damage or delay to any goods carried under this bill of lading unless notice of the claim setting out particulars of the origin, destination and date of shipment of the goods and the estimated amount claimed in respect of such loss, damage or delay is given in writing to the carrier within sixty (60) days after the delivery of the goods, or, in the case of failure to make delivery, within nine (9) months from the date of shipment. Subject to any overriding statutory provisions, the final statement of the claim must be filed within nine (9) months from the date of shipment, together with a copy of the paid freight bill. If the Convention applies, other notice periods may govern. No claim will be entertained until all transportation charges due in connection with this bill of lading have been paid in full. All claims are subject to proof of amount of loss.

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MISCELLANEOUS Unless otherwise indicated, the consignor's name and address is the sender's name and address indicated on this bill of lading, and the latter is the place of execution and the place of departure; the consignee's name and address is the receiver's name and address indicated on this bill of lading, and the latter is the place of destination; and the date indicated on this bill of lading is the date of execution. There are no specific stopping places which are agreed to, and the carrier reserves the right to select the route and the mode of transportation that the carrier deems appropriate. The consignor warrants that the shipment is properly described on this bill of lading and on any accompanying documentation, and that the shipment is properly marked, addressed and packed to ensure safe transportation in accordance with the carrier's ordinary care in handling. Unless otherwise indicated on this bill of lading, the consignor waives its right to determine the volume or dimensions of the shipment, and to indicate same on this bill of lading. The consignor appoints the carrier as its agent for the performance of customs clearance and selecting a customs broker

ENTIRE AGREEMENT The terms and conditions contained in this bill of lading, including those incorporated herein by reference, constitute the entire agreement relating to the carriage of the shipment described in this bill of lading, and no agent, servant or representative of the carrier or consignor has the authority to alter, waive or otherwise modify any provision of this agreement. In tendering the shipment described herein for carriage, the consignor agrees to these terms and conditions on his own behalf and on behalf of the consignee and any other party claiming an interest in this shipment.

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CLIENT NAME: GOLDER ASSOCIATES LTD
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OTTAWA, ON K2H5B7
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ATTENTION TO: James Doyle

PROJECT: 21458827

AGAT WORK ORDER: 21Z732096

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Apr 19, 2021

PAGES (INCLUDING COVER): 13

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 21Z732096

PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: James Doyle

SAMPLING SITE:Bank #53

SAMPLED BY:S. Olthof

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)

DATE RECEIVED: 2021-04-09

DATE REPORTED: 2021-04-19

				SAMPLE DESCRIPTION:	53-MW21-1	53-MW21-2	53-MW21-3	53-MW21-4
				SAMPLE TYPE:	Water	Water	Water	Water
				DATE SAMPLED:	2021-04-08 11:30	2021-04-08 12:15	2021-04-08 10:15	2021-04-08 11:00
Parameter	Unit	G / S	RDL		2330088	2330108	2330109	2330113
F1 (C6 - C10)	µg/L		25		<25	<25	<25	528
F1 (C6 to C10) minus BTEX	µg/L		25		<25	<25	<25	283
F2 (C10 to C16)	µg/L		100		<100	<100	<100	<100
F3 (C16 to C34)	µg/L		100		<100	<100	<100	<100
F4 (C34 to C50)	µg/L		100		<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500		NA	NA	NA	NA
Sediment					Yes	Yes	Yes	Yes
Surrogate	Unit	Acceptable Limits						
Toluene-d8	% Recovery	50-140			118	106	98.8	98.2
Terphenyl	%	60-140			71	76	69	66

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2330088-2330113 The C6-C10 fraction is calculated using Toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

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Certificate of Analysis

AGAT WORK ORDER: 21Z732096
PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD
SAMPLING SITE:Bank #53

ATTENTION TO: James Doyle
SAMPLED BY:S. Olthof

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2021-04-09

DATE REPORTED: 2021-04-19

		SAMPLE DESCRIPTION:		53-MW21-1	53-MW21-2	53-MW21-3	53-MW21-4
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		2021-04-08 11:30	2021-04-08 12:15	2021-04-08 10:15	2021-04-08 11:00
Parameter	Unit	G / S	RDL	2330088	2330108	2330109	2330113
Dichlorodifluoromethane	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Vinyl Chloride	µg/L		0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L		0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L		1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L		0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L		0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L		0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L		1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L		0.20	0.54	3.49	0.91	4.61
1,2-Dichloroethane	µg/L		0.20	<0.20	<0.20	<0.20	5.31
1,1,1-Trichloroethane	µg/L		0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L		0.20	0.46	0.25	<0.20	70.7
1,2-Dichloropropane	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L		1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L		0.20	<0.20	<0.20	<0.20	10.9
Dibromochloromethane	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L		0.10	<0.10	<0.10	<0.10	108

Certified By: N Popowkolof

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Certificate of Analysis

AGAT WORK ORDER: 21Z732096
PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD
SAMPLING SITE:Bank #53

ATTENTION TO: James Doyle
SAMPLED BY:S. Olthof

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2021-04-09

DATE REPORTED: 2021-04-19

		SAMPLE DESCRIPTION:		53-MW21-1	53-MW21-2	53-MW21-3	53-MW21-4
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		2021-04-08 11:30	2021-04-08 12:15	2021-04-08 10:15	2021-04-08 11:00
Parameter	Unit	G / S	RDL	2330088	2330108	2330109	2330113
m & p-Xylene	µg/L		0.20	<0.20	<0.20	<0.20	53.2
Bromoform	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	<0.10	<0.10	<0.10	1.88
1,3-Dichlorobenzene	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L		0.30	<0.30	<0.30	<0.30	<0.30
Xylenes (Total)	µg/L		0.20	<0.20	<0.20	<0.20	55.1
n-Hexane	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits					
Toluene-d8	% Recovery	50-140		70	73	77	80
4-Bromofluorobenzene	% Recovery	50-140		95	102	111	103

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2330088-2330113 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Poprawski

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Certificate of Analysis

AGAT WORK ORDER: 21Z732096
PROJECT: 21458827

CLIENT NAME: GOLDER ASSOCIATES LTD
SAMPLING SITE:Bank #53

ATTENTION TO: James Doyle
SAMPLED BY:S. Olthof

O. Reg. 153(511) - Metals (Including Hydrides) (Water)

DATE RECEIVED: 2021-04-09

DATE REPORTED: 2021-04-19

		SAMPLE DESCRIPTION:		53-MW21-1	53-MW21-2	53-MW21-3	53-MW21-4
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		2021-04-08 11:30	2021-04-08 12:15	2021-04-08 10:15	2021-04-08 11:00
Parameter	Unit	G / S	RDL	2330088	2330108	2330109	2330113
Dissolved Antimony	µg/L		1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Arsenic	µg/L		1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Barium	µg/L		2.0	165	185	90.7	216
Dissolved Beryllium	µg/L		0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Boron	µg/L		10.0	43.2	35.4	35.3	53.1
Dissolved Cadmium	µg/L		0.20	<0.20	<0.20	<0.20	<0.20
Dissolved Chromium	µg/L		2.0	<2.0	<2.0	<2.0	<2.0
Dissolved Cobalt	µg/L		0.50	2.94	4.20	1.22	3.46
Dissolved Copper	µg/L		1.0	1.6	11.5	1.5	1.0
Dissolved Lead	µg/L		0.50	<0.50	1.58	<0.50	<0.50
Dissolved Molybdenum	µg/L		0.50	2.70	2.24	0.90	2.75
Dissolved Nickel	µg/L		3.0	4.5	16.3	<3.0	<3.0
Dissolved Selenium	µg/L		1.0	4.1	1.7	<1.0	<1.0
Dissolved Silver	µg/L		0.20	<0.20	0.58	0.34	<0.20
Dissolved Thallium	µg/L		0.30	<0.30	<0.30	<0.30	<0.30
Dissolved Uranium	µg/L		0.50	1.80	1.36	1.26	5.34
Dissolved Vanadium	µg/L		0.40	<0.40	1.03	<0.40	0.88
Dissolved Zinc	µg/L		5.0	<5.0	14.5	<5.0	<5.0

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
2330088-2330113 Metals analysis completed on a filtered sample.
Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: 21458827
SAMPLING SITE:Bank #53

AGAT WORK ORDER: 21Z732096
ATTENTION TO: James Doyle
SAMPLED BY:S. Olthof

Trace Organics Analysis

RPT Date: Apr 19, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	2334169		<0.20	<0.20	NA	< 0.20	83%	50%	140%	91%	50%	140%	99%	50%	140%
Vinyl Chloride	2334169		<0.17	<0.17	NA	< 0.17	103%	50%	140%	93%	50%	140%	106%	50%	140%
Bromomethane	2334169		<0.20	<0.20	NA	< 0.20	106%	50%	140%	115%	50%	140%	90%	50%	140%
Trichlorofluoromethane	2334169		<0.40	<0.40	NA	< 0.40	109%	50%	140%	108%	50%	140%	103%	50%	140%
Acetone	2334169		<1.0	<1.0	NA	< 1.0	103%	50%	140%	113%	50%	140%	117%	50%	140%
1,1-Dichloroethylene	2334169		<0.30	<0.30	NA	< 0.30	96%	50%	140%	90%	60%	130%	118%	50%	140%
Methylene Chloride	2334169		<0.30	<0.30	NA	< 0.30	107%	50%	140%	105%	60%	130%	109%	50%	140%
trans- 1,2-Dichloroethylene	2334169		<0.20	<0.20	NA	< 0.20	95%	50%	140%	89%	60%	130%	95%	50%	140%
Methyl tert-butyl ether	2334169		<0.20	<0.20	NA	< 0.20	103%	50%	140%	107%	60%	130%	91%	50%	140%
1,1-Dichloroethane	2334169		<0.30	<0.30	NA	< 0.30	109%	50%	140%	100%	60%	130%	102%	50%	140%
Methyl Ethyl Ketone	2334169		<1.0	<1.0	NA	< 1.0	105%	50%	140%	99%	50%	140%	99%	50%	140%
cis- 1,2-Dichloroethylene	2334169		<0.20	<0.20	NA	< 0.20	93%	50%	140%	102%	60%	130%	107%	50%	140%
Chloroform	2334169		<0.20	<0.20	NA	< 0.20	100%	50%	140%	89%	60%	130%	105%	50%	140%
1,2-Dichloroethane	2334169		<0.20	<0.20	NA	< 0.20	103%	50%	140%	96%	60%	130%	88%	50%	140%
1,1,1-Trichloroethane	2334169		<0.30	<0.30	NA	< 0.30	79%	50%	140%	83%	60%	130%	89%	50%	140%
Carbon Tetrachloride	2334169		<0.20	<0.20	NA	< 0.20	96%	50%	140%	94%	60%	130%	109%	50%	140%
Benzene	2334169		<0.20	<0.20	NA	< 0.20	99%	50%	140%	100%	60%	130%	78%	50%	140%
1,2-Dichloropropane	2334169		<0.20	<0.20	NA	< 0.20	111%	50%	140%	107%	60%	130%	102%	50%	140%
Trichloroethylene	2334169		<0.20	<0.20	NA	< 0.20	110%	50%	140%	90%	60%	130%	96%	50%	140%
Bromodichloromethane	2334169		<0.20	<0.20	NA	< 0.20	115%	50%	140%	96%	60%	130%	110%	50%	140%
Methyl Isobutyl Ketone	2334169		<1.0	<1.0	NA	< 1.0	84%	50%	140%	81%	50%	140%	81%	50%	140%
1,1,2-Trichloroethane	2334169		<0.20	<0.20	NA	< 0.20	106%	50%	140%	93%	60%	130%	104%	50%	140%
Toluene	2334169		<0.20	<0.20	NA	< 0.20	88%	50%	140%	76%	60%	130%	94%	50%	140%
Dibromochloromethane	2334169		<0.10	<0.10	NA	< 0.10	90%	50%	140%	88%	60%	130%	89%	50%	140%
Ethylene Dibromide	2334169		<0.10	<0.10	NA	< 0.10	102%	50%	140%	87%	60%	130%	101%	50%	140%
Tetrachloroethylene	2334169		<0.20	<0.20	NA	< 0.20	95%	50%	140%	100%	60%	130%	109%	50%	140%
1,1,1,2-Tetrachloroethane	2334169		<0.10	<0.10	NA	< 0.10	76%	50%	140%	77%	60%	130%	92%	50%	140%
Chlorobenzene	2334169		<0.10	<0.10	NA	< 0.10	101%	50%	140%	96%	60%	130%	117%	50%	140%
Ethylbenzene	2334169		<0.10	<0.10	NA	< 0.10	86%	50%	140%	78%	60%	130%	97%	50%	140%
m & p-Xylene	2334169		<0.20	<0.20	NA	< 0.20	94%	50%	140%	107%	60%	130%	105%	50%	140%
Bromoform	2334169		<0.10	<0.10	NA	< 0.10	100%	50%	140%	101%	60%	130%	97%	50%	140%
Styrene	2334169		<0.10	<0.10	NA	< 0.10	88%	50%	140%	80%	60%	130%	99%	50%	140%
1,1,2,2-Tetrachloroethane	2334169		<0.10	<0.10	NA	< 0.10	104%	50%	140%	98%	60%	130%	98%	50%	140%
o-Xylene	2334169		<0.10	<0.10	NA	< 0.10	91%	50%	140%	91%	60%	130%	103%	50%	140%
1,3-Dichlorobenzene	2334169		<0.10	<0.10	NA	< 0.10	89%	50%	140%	117%	60%	130%	105%	50%	140%
1,4-Dichlorobenzene	2334169		<0.10	<0.10	NA	< 0.10	98%	50%	140%	112%	60%	130%	108%	50%	140%
1,2-Dichlorobenzene	2334169		<0.10	<0.10	NA	< 0.10	99%	50%	140%	98%	60%	130%	113%	50%	140%
n-Hexane	2334169		<0.20	<0.20	NA	< 0.20	93%	50%	140%	78%	60%	130%	107%	50%	140%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: 21458827
SAMPLING SITE:Bank #53

AGAT WORK ORDER: 21Z732096
ATTENTION TO: James Doyle
SAMPLED BY:S. Olthof

Trace Organics Analysis (Continued)

RPT Date: Apr 19, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)															
F1 (C6 - C10)	2330212		<25	<25	NA	< 25	101%	60%	140%	101%	60%	140%	103%	60%	140%
F2 (C10 to C16)	2337275		< 100	< 100	NA	< 100	101%	60%	140%	78%	60%	140%	76%	60%	140%
F3 (C16 to C34)	2337275		< 100	< 100	NA	< 100	91%	60%	140%	62%	60%	140%	60%	60%	140%
F4 (C34 to C50)	2337275		< 100	< 100	NA	< 100	90%	60%	140%	71%	60%	140%	60%	60%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Poprnikoff

AGAT Laboratories

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: 21458827
SAMPLING SITE:Bank #53

AGAT WORK ORDER: 21Z732096
ATTENTION TO: James Doyle
SAMPLED BY:S. Olthof

Water Analysis

RPT Date: Apr 19, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals (including Hydrides) (Water)															
Dissolved Antimony	2328681		<1.0	<1.0	NA	< 1.0	102%	70%	130%	106%	80%	120%	106%	70%	130%
Dissolved Arsenic	2328681		<1.0	1.9	NA	< 1.0	96%	70%	130%	101%	80%	120%	108%	70%	130%
Dissolved Barium	2328681		96.1	92.4	3.9%	< 2.0	99%	70%	130%	100%	80%	120%	105%	70%	130%
Dissolved Beryllium	2328681		<0.50	<0.50	NA	< 0.50	103%	70%	130%	103%	80%	120%	120%	70%	130%
Dissolved Boron	2328681		35.4	37.3	NA	< 10.0	100%	70%	130%	101%	80%	120%	113%	70%	130%
Dissolved Cadmium	2328681		<0.20	<0.20	NA	< 0.20	102%	70%	130%	105%	80%	120%	100%	70%	130%
Dissolved Chromium	2328681		<2.0	<2.0	NA	< 2.0	91%	70%	130%	96%	80%	120%	99%	70%	130%
Dissolved Cobalt	2328681		2.00	1.90	NA	< 0.50	96%	70%	130%	103%	80%	120%	106%	70%	130%
Dissolved Copper	2328681		<1.0	1.6	NA	< 1.0	91%	70%	130%	99%	80%	120%	94%	70%	130%
Dissolved Lead	2328681		<0.50	<0.50	NA	< 0.50	98%	70%	130%	103%	80%	120%	98%	70%	130%
Dissolved Molybdenum	2328681		<0.50	<0.50	NA	< 0.50	99%	70%	130%	98%	80%	120%	104%	70%	130%
Dissolved Nickel	2328681		<3.0	<3.0	NA	< 3.0	88%	70%	130%	96%	80%	120%	94%	70%	130%
Dissolved Selenium	2328681		<1.0	<1.0	NA	< 1.0	106%	70%	130%	113%	80%	120%	109%	70%	130%
Dissolved Silver	2328681		<0.20	0.24	NA	< 0.20	97%	70%	130%	105%	80%	120%	103%	70%	130%
Dissolved Thallium	2328681		<0.30	<0.30	NA	< 0.30	104%	70%	130%	103%	80%	120%	102%	70%	130%
Dissolved Uranium	2328681		0.52	<0.50	NA	< 0.50	107%	70%	130%	110%	80%	120%	113%	70%	130%
Dissolved Vanadium	2328681		<0.40	<0.40	NA	< 0.40	89%	70%	130%	93%	80%	120%	97%	70%	130%
Dissolved Zinc	2328681		<5.0	<5.0	NA	< 5.0	93%	70%	130%	98%	80%	120%	94%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 21458827

SAMPLING SITE:Bank #53

AGAT WORK ORDER: 21Z732096

ATTENTION TO: James Doyle

SAMPLED BY:S. Olthof

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F1 (C6 - C10)	VOL-91- 5010	modified from MOE PHC E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	modified from MOE PHC E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	modified from MOE PHC E3421	GC / FID
F3 (C16 to C34)	VOL-91-5010	modified from MOE PHC E3421	GC / FID
F4 (C34 to C50)	VOL-91-5010	modified from MOE PHC E3421	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	modified from MOE PHC E3421	BALANCE
Terphenyl	VOL-91-5009	modified from MOE PHC E3421	GC/FID
Sediment			
Dichlorodifluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 21Z732096

PROJECT: 21458827

ATTENTION TO: James Doyle

SAMPLING SITE:Bank #53

SAMPLED BY:S. Olthof

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: 21458827
SAMPLING SITE:Bank #53

AGAT WORK ORDER: 21Z732096
ATTENTION TO: James Doyle
SAMPLED BY:S. Olthof

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Thallium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS

AGAT Laboratories

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Mississauga, Ontario L4Z 1Y2
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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only
Work Order #: 21Z732096
Cooler Quantity: One-ice
Arrival Temperatures: 2.5 2.0 2.5
LT - See attached
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Report Information:
Company: GAL
Contact: Jimmy Doyle
Address:
Phone: 613-298-0765 Fax:
Reports to be sent to:
1. Email: james_doyle@golder.com
2. Email:

Project Information:
Project: 21458827
Site Location: Bank #53
Sampled By: S. Olthof
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis

Invoice Information: Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)
☒ Regulation 153/04 — Table 3 (Indicate One): ☒ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One): ☐ Coarse ☐ Fine
☐ Sewer Use: ☐ Sanitary ☐ Storm; Region ____ (Indicate One); ☐ MISA
☐ Regulation 558 ☐ CCME ☐ Prov. Water Quality Objectives (PWQO) ☐ Other ____ (Indicate One)

Is this submission for a Record of Site Condition? ☐ Yes ☒ No
Report Guideline on Certificate of Analysis: ☐ Yes ☐ No

Turnaround Time (TAT) Required:
Regular TAT ☒ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply): ☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	Metals and Inorganics (O. Reg 153: ☐ All Metals ☐ 153 Metals (excl. Hydrides) ☒ Hydride Metals 153 Metals (incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr6+ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_4 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☒ VOC ☒ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use
53-MW21-1	APR 08	1130	9	GW			X					X	X						
53-MW21-2	↓	1215	9	↓			↓					↓	↓						
53-MW21-3	↓	1015	9	↓			↓					↓	↓						
53-MW21-4	↓	1100	9	↓			↓					↓	↓						

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samantha Olthof [signature]	2021-APR-08	1725	C. Berthelot	21/4/9	1450
[signature]	21/4/9	10hrs	Neil Ramnarain [signature]	April 10/21	11:03 AM

Page 1 of 1
Nº: T 079630

AGAT Laboratories

Sample Temperature Log

Client: Ottawa Branch

COC# or Work Order #:

# of Coolers: 7 Lig

# of Submissions:

	Arrival Temperatures - Branch/Driver	Arrival Temperatures - Laboratory
Cooler #1:	7.2 / 7.8 / 8.3 (bagged ice)	___ / ___ / ___
Cooler #2:	6.5 / 7.1 / 7.0 (ice packs)	___ / ___ / ___
Cooler #3:	7.3 / 7.6 / 7.7 (bagged ice)	___ / ___ / ___
Cooler #4:	5.9 / 6.4 / 5.5 (bagged ice)	___ / ___ / ___
Cooler #5:	9.1 / 7.5 / 9.7 (bagged ice)	___ / ___ / ___
Cooler #6:	3.8 / 3.5 / 4.6 (melted ice)	___ / ___ / ___
Cooler #7:	5.8 / 5.6 / 5.4 (bagged ice)	___ / ___ / ___
Cooler #8	___ / ___ / ___	___ / ___ / ___
Cooler #9:	___ / ___ / ___	___ / ___ / ___
Cooler #10:	___ / ___ / ___	___ / ___ / ___

IR Gun ID:

Taken By:

Date (yyyy/mm/dd): Time: ___:___ AM / PM

IR Gun ID:

Taken By:

Date (yyyy/mm/dd): Time: ___:___ AM / PM

Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)

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www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Nick Sullivan

Client PO: 54500
Project: PE5590
Custody: 64385

Report Date: 12-May-2022
Order Date: 5-May-2022

Order #: 2219554

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

Paracel ID	Client ID
2219554-01	BH1-22-SS3/SS4A
2219554-02	BH1-22-SS8
2219554-03	BH2-22-SS4A
2219554-04	BH2-22-SS5
2219554-05	BH3-22-SS3
2219554-06	BH3-22-SS6
2219554-07	DUP-1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 12-May-2022

Client: Paterson Group Consulting Engineers

Order Date: 5-May-2022

Client PO: 54500

Project Description: PE5590

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	6-May-22	9-May-22
Conductivity	MOE E3138 - probe @25 °C, water ext	9-May-22	9-May-22
Mercury by CVAA	EPA 7471B - CVAA, digestion	10-May-22	10-May-22
Metals, ICP-MS	EPA 6020 - Digestion - ICP-MS	12-May-22	12-May-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	10-May-22	10-May-22
PHC F1	CWS Tier 1 - P&T GC-FID	6-May-22	7-May-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	6-May-22	8-May-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	9-May-22	9-May-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	6-May-22	8-May-22
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	6-May-22	7-May-22
SAR	Calculated	9-May-22	9-May-22
Solids, %	Gravimetric, calculation	6-May-22	9-May-22

Certificate of Analysis

Report Date: 12-May-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 5-May-2022

Client PO: **54500**

Project Description: PE5590

	Client ID:	BH1-22-SS3/SS4A	BH1-22-SS8	BH2-22-SS4A	BH2-22-SS5
	Sample Date:	03-May-22 09:00	03-May-22 09:00	03-May-22 09:00	03-May-22 09:00
	Sample ID:	2219554-01	2219554-02	2219554-03	2219554-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	84.0	83.2	78.3	88.4
General Inorganics					
SAR	0.01 N/A	13.5	-	-	-
Conductivity	5 uS/cm	1670	-	-	-
pH	0.05 pH Units	-	7.49	-	-
Metals					
Antimony	1.0 ug/g dry	-	-	2.8	-
Arsenic	1.0 ug/g dry	-	-	3.0	-
Barium	1.0 ug/g dry	-	-	38.1	-
Beryllium	0.5 ug/g dry	-	-	<0.5	-
Boron	5.0 ug/g dry	-	-	7.2	-
Cadmium	0.5 ug/g dry	-	-	<0.5	-
Chromium	5.0 ug/g dry	-	-	15.9	-
Chromium (VI)	0.2 ug/g dry	-	-	<0.2	-
Cobalt	1.0 ug/g dry	-	-	5.6	-
Copper	5.0 ug/g dry	-	-	13.1	-
Lead	1 ug/g dry	-	-	-	5
Lead	1.0 ug/g dry	-	-	48.0	-
Mercury	0.1 ug/g dry	-	-	<0.1	-
Molybdenum	1.0 ug/g dry	-	-	<1.0	-
Nickel	5.0 ug/g dry	-	-	14.7	-
Selenium	1.0 ug/g dry	-	-	<1.0	-
Silver	0.3 ug/g dry	-	-	<0.3	-
Thallium	1.0 ug/g dry	-	-	<1.0	-
Uranium	1.0 ug/g dry	-	-	<1.0	-
Vanadium	10.0 ug/g dry	-	-	26.6	-
Zinc	20.0 ug/g dry	-	-	37.1	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	<0.50	-	<0.50
Benzene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Bromoform	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Bromomethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	<0.05

Certificate of Analysis

Report Date: 12-May-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 5-May-2022

Client PO: **54500**

Project Description: PE5590

	Client ID:	BH1-22-SS3/SS4A	BH1-22-SS8	BH2-22-SS4A	BH2-22-SS5
	Sample Date:	03-May-22 09:00	03-May-22 09:00	03-May-22 09:00	03-May-22 09:00
	Sample ID:	2219554-01	2219554-02	2219554-03	2219554-04
	MDL/Units	Soil	Soil	Soil	Soil
Chloroform	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Hexane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	-	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	-	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Styrene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Tetrachloroethylene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	-	<0.02
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	-	<0.05
4-Bromofluorobenzene	Surrogate	123%	122%	-	112%

Certificate of Analysis

Report Date: 12-May-2022

Client: Paterson Group Consulting Engineers

Order Date: 5-May-2022

Client PO: 54500

Project Description: PE5590

	Client ID:	BH1-22-SS3/SS4A	BH1-22-SS8	BH2-22-SS4A	BH2-22-SS5
	Sample Date:	03-May-22 09:00	03-May-22 09:00	03-May-22 09:00	03-May-22 09:00
	Sample ID:	2219554-01	2219554-02	2219554-03	2219554-04
	MDL/Units	Soil	Soil	Soil	Soil
Dibromofluoromethane	Surrogate	97.9%	101%	-	105%
Toluene-d8	Surrogate	95.3%	96.9%	-	84.6%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	-	35
F3 PHCs (C16-C34)	8 ug/g dry	38	<8	-	10
F4 PHCs (C34-C50)	6 ug/g dry	66	<6	-	<6

Certificate of Analysis

Report Date: 12-May-2022

Client: Paterson Group Consulting Engineers

Order Date: 5-May-2022

Client PO: 54500

Project Description: PE5590

	Client ID:	BH3-22-SS3	BH3-22-SS6	DUP-1	-
	Sample Date:	03-May-22 12:00	03-May-22 12:00	03-May-22 12:00	-
	Sample ID:	2219554-05	2219554-06	2219554-07	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	83.1	88.0	88.2	-
General Inorganics					
SAR	0.01 N/A	14.1	-	-	-
Conductivity	5 uS/cm	2760	-	-	-
pH	0.05 pH Units	7.30	-	-	-
Metals					
Antimony	1.0 ug/g dry	1.0	-	-	-
Arsenic	1.0 ug/g dry	4.8	-	-	-
Barium	1.0 ug/g dry	161	-	-	-
Beryllium	0.5 ug/g dry	0.7	-	-	-
Boron	5.0 ug/g dry	9.0	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	22.5	-	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	-	-	-
Cobalt	1.0 ug/g dry	8.3	-	-	-
Copper	5.0 ug/g dry	23.0	-	-	-
Lead	1 ug/g dry	-	2	-	-
Lead	1.0 ug/g dry	26.2	-	-	-
Mercury	0.1 ug/g dry	<0.1	-	-	-
Molybdenum	1.0 ug/g dry	<1.0	-	-	-
Nickel	5.0 ug/g dry	18.7	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	<1.0	-	-	-
Vanadium	10.0 ug/g dry	36.0	-	-	-
Zinc	20.0 ug/g dry	59.9	-	-	-
Volatiles					
Acetone	0.50 ug/g dry	-	<0.50	<0.50	-
Benzene	0.02 ug/g dry	-	<0.02	<0.02	-
Bromodichloromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Bromoform	0.05 ug/g dry	-	<0.05	<0.05	-
Bromomethane	0.05 ug/g dry	-	<0.05	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	-	<0.05	<0.05	-
Chlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-

Certificate of Analysis

Report Date: 12-May-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 5-May-2022

Client PO: **54500**

Project Description: PE5590

	Client ID:	BH3-22-SS3	BH3-22-SS6	DUP-1	-
	Sample Date:	03-May-22 12:00	03-May-22 12:00	03-May-22 12:00	-
	Sample ID:	2219554-05	2219554-06	2219554-07	-
	MDL/Units	Soil	Soil	Soil	-
Chloroform	0.05 ug/g dry	-	<0.05	<0.05	-
Dibromochloromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Dichlorodifluoromethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	-	<0.05	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	<0.05	<0.05	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	<0.05	-
Ethylene dibromide (dibromoethane, 1	0.05 ug/g dry	-	<0.05	<0.05	-
Hexane	0.05 ug/g dry	-	<0.05	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	<0.50	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	-	<0.50	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	-	<0.05	<0.05	-
Methylene Chloride	0.05 ug/g dry	-	<0.05	<0.05	-
Styrene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
Toluene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
Trichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Vinyl chloride	0.02 ug/g dry	-	<0.02	<0.02	-
m,p-Xylenes	0.05 ug/g dry	-	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	-	<0.05	<0.05	-
Xylenes, total	0.05 ug/g dry	-	<0.05	<0.05	-

Certificate of Analysis

Report Date: 12-May-2022

Client: Paterson Group Consulting Engineers

Order Date: 5-May-2022

Client PO: 54500

Project Description: PE5590

	Client ID:	BH3-22-SS3	BH3-22-SS6	DUP-1	-
	Sample Date:	03-May-22 12:00	03-May-22 12:00	03-May-22 12:00	-
	Sample ID:	2219554-05	2219554-06	2219554-07	-
	MDL/Units	Soil	Soil	Soil	-
4-Bromofluorobenzene	Surrogate	-	117%	123%	-
Dibromofluoromethane	Surrogate	-	98.8%	112%	-
Toluene-d8	Surrogate	-	90.8%	93.7%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	-	<4	-	-
F3 PHCs (C16-C34)	8 ug/g dry	-	<8	-	-
F4 PHCs (C34-C50)	6 ug/g dry	-	<6	-	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	-	-
Acenaphthylene	0.02 ug/g dry	0.04	-	-	-
Anthracene	0.02 ug/g dry	0.02	-	-	-
Benzo [a] anthracene	0.02 ug/g dry	0.06	-	-	-
Benzo [a] pyrene	0.02 ug/g dry	0.08	-	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	0.10	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.06	-	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	0.05	-	-	-
Chrysene	0.02 ug/g dry	0.08	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	-	-	-
Fluoranthene	0.02 ug/g dry	0.15	-	-	-
Fluorene	0.02 ug/g dry	<0.02	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.05	-	-	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	-	-
Naphthalene	0.01 ug/g dry	<0.01	-	-	-
Phenanthrene	0.02 ug/g dry	0.08	-	-	-
Pyrene	0.02 ug/g dry	0.14	-	-	-
2-Fluorobiphenyl	Surrogate	96.7%	-	-	-
Terphenyl-d14	Surrogate	108%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.58*		*ug/g*		*119*	*50-140*			
Surrogate: Terphenyl-d14	*1.85*		*ug/g*		*139*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2-	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*3.78*		*ug/g*		*118*	*50-140*			
Surrogate: Dibromofluoromethane	*2.63*		*ug/g*		*82.1*	*50-140*			
Surrogate: Toluene-d8	*2.65*		*ug/g*		*82.8*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.10	0.01	N/A	0.10			0.0	30	
Conductivity	407	5	uS/cm	405			0.5	5	
pH	7.25	0.05	pH Units	7.31			0.8	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	7	4	ug/g	6			16.0	30	
F3 PHCs (C16-C34)	17	8	ug/g	14			17.0	30	
F4 PHCs (C34-C50)	6	6	ug/g	ND			NC	30	
Metals									
Antimony	2.3	1.0	ug/g	ND			NC	30	
Arsenic	8.1	1.0	ug/g	7.4			8.8	30	
Barium	86.9	1.0	ug/g	79.2			9.4	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	7.0	5.0	ug/g	6.8			2.6	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	10.7	5.0	ug/g	9.3			13.6	30	
Cobalt	9.4	1.0	ug/g	8.7			7.7	30	
Copper	7.7	5.0	ug/g	12.1			NC	30	
Lead	21.3	1	ug/g	19.0			11.5	30	
Lead	271	1.0	ug/g	246			9.9	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	4.2	1.0	ug/g	3.7			11.9	30	
Nickel	18.7	5.0	ug/g	17.1			9.0	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	17.8	10.0	ug/g	17.3			3.0	30	
Zinc	33.0	20.0	ug/g	27.2			19.3	30	
Physical Characteristics									
% Solids	80.5	0.1	% by Wt.	78.8			2.1	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	ND			NC	40	
Benzo [b] fluoranthene	0.026	0.02	ug/g	0.027			3.7	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	ND	0.02	ug/g	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	ND	0.02	ug/g	0.024			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	ND	0.02	ug/g	0.022			NC	40	
Surrogate: 2-Fluorobiphenyl	*1.46*		*ug/g*		*88.6*	*50-140*			
Surrogate: Terphenyl-d14	*1.67*		*ug/g*		*101*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	ND	0.02	ug/g	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	*5.06*		*ug/g*		*128*	*50-140*			
Surrogate: Dibromofluoromethane	*5.20*		*ug/g*		*131*	*50-140*			
Surrogate: Toluene-d8	*3.73*		*ug/g*		*94.4*	*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)	204	7	ug/g	ND	102	80-120			
F2 PHCs (C10-C16)	88	4	ug/g	6	82.0	60-140			
F3 PHCs (C16-C34)	280	8	ug/g	14	109	60-140			
F4 PHCs (C34-C50)	182	6	ug/g	ND	118	60-140			
Metals									
Antimony	44.8	1.0	ug/g	ND	89.2	70-130			
Arsenic	58.2	1.0	ug/g	3.0	110	70-130			
Barium	87.0	1.0	ug/g	31.7	111	70-130			
Beryllium	52.7	0.5	ug/g	ND	105	70-130			
Boron	54.2	5.0	ug/g	ND	103	70-130			
Cadmium	48.4	0.5	ug/g	ND	96.6	70-130			
Chromium (VI)	2.5	0.2	ug/g	ND	41.5	70-130			QM-05
Chromium	58.1	5.0	ug/g	ND	109	70-130			
Cobalt	55.7	1.0	ug/g	3.5	104	70-130			
Copper	51.9	5.0	ug/g	ND	94.1	70-130			
Lead	61.7	1	ug/g	7.6	108	70-130			
Lead	153	1.0	ug/g	98.2	109	70-130			
Mercury	1.23	0.1	ug/g	ND	82.1	70-130			
Molybdenum	53.2	1.0	ug/g	1.5	103	70-130			
Nickel	58.0	5.0	ug/g	6.8	102	70-130			
Selenium	49.4	1.0	ug/g	ND	98.7	70-130			
Silver	47.4	0.3	ug/g	ND	94.6	70-130			
Thallium	50.9	1.0	ug/g	ND	102	70-130			
Uranium	54.3	1.0	ug/g	ND	108	70-130			
Vanadium	63.2	10.0	ug/g	ND	113	70-130			
Zinc	56.9	20.0	ug/g	ND	92.1	70-130			
Semi-Volatiles									
Acenaphthene	0.167	0.02	ug/g	ND	81.3	50-140			
Acenaphthylene	0.144	0.02	ug/g	ND	69.9	50-140			
Anthracene	0.141	0.02	ug/g	ND	68.3	50-140			
Benzo [a] anthracene	0.144	0.02	ug/g	ND	69.7	50-140			
Benzo [a] pyrene	0.151	0.02	ug/g	ND	73.4	50-140			
Benzo [b] fluoranthene	0.228	0.02	ug/g	0.027	97.7	50-140			
Benzo [g,h,i] perylene	0.155	0.02	ug/g	ND	75.0	50-140			
Benzo [k] fluoranthene	0.184	0.02	ug/g	ND	89.4	50-140			
Chrysene	0.169	0.02	ug/g	ND	82.1	50-140			
Dibenzo [a,h] anthracene	0.157	0.02	ug/g	ND	76.0	50-140			
Fluoranthene	0.160	0.02	ug/g	0.024	66.0	50-140			
Fluorene	0.158	0.02	ug/g	ND	76.6	50-140			
Indeno [1,2,3-cd] pyrene	0.161	0.02	ug/g	ND	78.1	50-140			
1-Methylnaphthalene	0.176	0.02	ug/g	ND	85.5	50-140			
2-Methylnaphthalene	0.185	0.02	ug/g	ND	89.7	50-140			
Naphthalene	0.150	0.01	ug/g	ND	72.9	50-140			
Phenanthrene	0.153	0.02	ug/g	ND	74.2	50-140			
Pyrene	0.161	0.02	ug/g	0.022	67.1	50-140			
Surrogate: 2-Fluorobiphenyl	*1.36*		*ug/g*		*82.4*	*50-140*			
Surrogate: Terphenyl-d14	*1.58*		*ug/g*		*95.9*	*50-140*			
Volatiles									

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Acetone	8.97	0.50	ug/g	ND	89.7	50-140			
Benzene	3.19	0.02	ug/g	ND	79.7	60-130			
Bromodichloromethane	4.35	0.05	ug/g	ND	109	60-130			
Bromoform	2.68	0.05	ug/g	ND	66.9	60-130			
Bromomethane	4.10	0.05	ug/g	ND	102	50-140			
Carbon Tetrachloride	3.57	0.05	ug/g	ND	89.2	60-130			
Chlorobenzene	2.86	0.05	ug/g	ND	71.5	60-130			
Chloroform	4.35	0.05	ug/g	ND	109	60-130			
Dibromochloromethane	4.19	0.05	ug/g	ND	105	60-130			
Dichlorodifluoromethane	4.34	0.05	ug/g	ND	108	50-140			
1,2-Dichlorobenzene	2.64	0.05	ug/g	ND	66.0	60-130			
1,3-Dichlorobenzene	3.27	0.05	ug/g	ND	81.8	60-130			
1,4-Dichlorobenzene	3.88	0.05	ug/g	ND	97.0	60-130			
1,1-Dichloroethane	3.79	0.05	ug/g	ND	94.7	60-130			
1,2-Dichloroethane	3.45	0.05	ug/g	ND	86.2	60-130			
1,1-Dichloroethylene	4.08	0.05	ug/g	ND	102	60-130			
cis-1,2-Dichloroethylene	4.94	0.05	ug/g	ND	124	60-130			
trans-1,2-Dichloroethylene	3.94	0.05	ug/g	ND	98.5	60-130			
1,2-Dichloropropane	3.00	0.05	ug/g	ND	75.0	60-130			
cis-1,3-Dichloropropylene	2.90	0.05	ug/g	ND	72.6	60-130			
trans-1,3-Dichloropropylene	2.68	0.05	ug/g	ND	66.9	60-130			
Ethylbenzene	3.83	0.05	ug/g	ND	95.8	60-130			
Ethylene dibromide (dibromoethane, 1,2	3.71	0.05	ug/g	ND	92.8	60-130			
Hexane	3.30	0.05	ug/g	ND	82.4	60-130			
Methyl Ethyl Ketone (2-Butanone)	12.5	0.50	ug/g	ND	125	50-140			
Methyl Isobutyl Ketone	10.5	0.50	ug/g	ND	105	50-140			
Methyl tert-butyl ether	10.4	0.05	ug/g	ND	104	50-140			
Methylene Chloride	3.46	0.05	ug/g	ND	86.5	60-130			
Styrene	2.65	0.05	ug/g	ND	66.1	60-130			
1,1,1,2-Tetrachloroethane	2.83	0.05	ug/g	ND	70.6	60-130			
1,1,2,2-Tetrachloroethane	3.40	0.05	ug/g	ND	85.1	60-130			
Tetrachloroethylene	2.68	0.05	ug/g	ND	67.1	60-130			
Toluene	2.74	0.05	ug/g	ND	68.4	60-130			
1,1,1-Trichloroethane	3.88	0.05	ug/g	ND	97.0	60-130			
1,1,2-Trichloroethane	3.20	0.05	ug/g	ND	80.1	60-130			
Trichloroethylene	3.67	0.05	ug/g	ND	91.9	60-130			
Trichlorofluoromethane	4.65	0.05	ug/g	ND	116	50-140			
Vinyl chloride	4.59	0.02	ug/g	ND	115	50-140			
m,p-Xylenes	7.23	0.05	ug/g	ND	90.4	60-130			
o-Xylene	3.82	0.05	ug/g	ND	95.4	60-130			
Surrogate: 4-Bromofluorobenzene	*3.25*		*ug/g*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*3.28*		*ug/g*		*103*	*50-140*			
Surrogate: Toluene-d8	*3.00*		*ug/g*		*93.9*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

1 : Complete separation of paint from substrate not possible for this sample and a small amount of substrate has been included in the paint digestion.

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD

Paracel ID: 2219554

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
	№ 64385

Client Name: Paterson	Project Ref: PE5590	Page 1 of 1
Contact Name: Nick Sullivan	Quote #:	Turnaround Time
Address: 154 Colonnade Rd. S. Ottawa, ON	PO #: 54500	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: nsullivan@patersongroup.ca	Date Required:

☒ REG 153/04 ☐ REG 406/19

☐ Table 1 ☒ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☒ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table

For RSC: ☐ Yes ☐ No

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analysis: VOCs	PHCs F1-F4	ICP Metals	Hg	Cr VI	PAHs	EC	SAR	pH			
1	BH1-22-SS3/SS4A	S		2	May 3/22	AM	X	X					X	X				
2	BH1-22-SS8	↓		2	↓	↓	X	X							X			
3	BH2-22-SS4A	↓		1	↓	↓			X	X	X							
4	BH2-22-SS5	↓		2	↓	↓	X	X										
5	BH3-22-SS3	↓		1	↓	PM			X	X	X	X	X	X	X			
6	BH3-22-SS6	↓		2	↓	↓	X	X										
7	DUP-1	↓		1	↓	—	X											
8																		
9																		
10																		

Comments:

Method of Delivery: Drop Box

Relinquished By (Sign): N. Sullivan	Received By Driver/Depot:	Received at Lab: Shreeparn Rahman	Verified By:
Relinquished By (Print): Nick Sullivan	Date/Time:	Date/Time: May 05, 2022 16:51	Date/Time: May 6 2022 9:57
Date/Time: May 4, 2022	Temperature: °C	Temperature: 7.8 °C	pH Verified: ☐ By:

PARACEL LABORATORIES LTD.

TI
RI
RI

Paracel ID: 2219554

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2219554	

Client Name: Paterson Group	Project Ref: PE5590	Page 1 of 1
Contact Name: Nick Sullivan	Quote #:	**Turnaround Time**
Address: 154 Colonnade Rd. S. Ottawa, ON	PO #: 54500	☐ 1 day ☐ 3 day
Telephone: 613-226-7381	E-mail: nsullivan@patersongroup.ca	☐ 2 day ☒ Regular Date Required:

☒ REG 153/04 ☐ REG 406/19

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

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

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	% Soils				
1	DUP-1	S		1	May 3/22									X				
2																		
3	→ This is the missing soil jar which should have gone with the initial work order																	
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments: ** Please add this to Work order #2219554 ** COC#64385

Method of Delivery: Paracel Courier

Relinquished By (Sign): N. Sullivan	Received By Driver/Depot: [signature]	Received at Lab: [signature]	Verified By: [signature]
Relinquished By (Print): Nick Sullivan	Date/Time: 06/05/22 3:01	Date/Time: May 06, 2022 04.20	Date/Time: May 6, 22 16:46
Date/Time: May 6, 2022	Temperature: °C	Temperature: 14.5 C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Nick Sullivan

Client PO: 54648
Project: PE5590
Custody: 136598

Report Date: 19-May-2022
Order Date: 12-May-2022

Order #: 2220555

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

Paracel ID	Client ID
2220555-01	BH1-22-GW1
2220555-02	MW21-02-GW2
2220555-03	BH2-22-GW1
2220555-04	BH3-22-GW1
2220555-05	MW21-04-GW2
2220555-06	Dup-1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 19-May-2022

Client: Paterson Group Consulting Engineers

Order Date: 12-May-2022

Client PO: 54648

Project Description: PE5590

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	16-May-22	17-May-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	18-May-22	18-May-22
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	16-May-22	17-May-22

Certificate of Analysis

Report Date: 19-May-2022

Client: Paterson Group Consulting Engineers

Order Date: 12-May-2022

Client PO: 54648

Project Description: PE5590

	Client ID:	BH1-22-GW1	MW21-02-GW2	BH2-22-GW1	BH3-22-GW1
	Sample Date:	11-May-22 09:00	11-May-22 09:00	11-May-22 09:00	11-May-22 09:00
	Sample ID:	2220555-01	2220555-02	2220555-03	2220555-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Report Date: 19-May-2022

Client: Paterson Group Consulting Engineers

Order Date: 12-May-2022

Client PO: 54648

Project Description: PE5590

	Client ID:	BH1-22-GW1	MW21-02-GW2	BH2-22-GW1	BH3-22-GW1
	Sample Date:	11-May-22 09:00	11-May-22 09:00	11-May-22 09:00	11-May-22 09:00
	Sample ID:	2220555-01	2220555-02	2220555-03	2220555-04
	MDL/Units	Water	Water	Water	Water
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	111%	114%	110%	112%
Dibromofluoromethane	Surrogate	86.3%	83.7%	86.8%	83.1%
Toluene-d8	Surrogate	103%	104%	105%	104%
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

Certificate of Analysis

Report Date: 19-May-2022

Client: Paterson Group Consulting Engineers

Order Date: 12-May-2022

Client PO: 54648

Project Description: PE5590

	Client ID:	MW21-04-GW2	Dup-1	-	-
	Sample Date:	11-May-22 09:00	11-May-22 09:00	-	-
	Sample ID:	2220555-05	2220555-06	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	-	-
Benzene	0.5 ug/L	5.0	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroform	0.5 ug/L	<0.5	<0.5	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	38.2	0.6	-	-
Ethylene dibromide (dibromoethane, 1	0.2 ug/L	<0.2	<0.2	-	-
Hexane	1.0 ug/L	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	1.1	0.5	-	-

Certificate of Analysis

Report Date: 19-May-2022

Client: Paterson Group Consulting Engineers

Order Date: 12-May-2022

Client PO: 54648

Project Description: PE5590

		Client ID:	MW21-04-GW2	Dup-1	-	-
		Sample Date:	11-May-22 09:00	11-May-22 09:00	-	-
		Sample ID:	2220555-05	2220555-06	-	-
	MDL/Units		Water	Water	-	-
1,1,1-Trichloroethane	0.5 ug/L		<0.5	<0.5	-	-
1,1,2-Trichloroethane	0.5 ug/L		<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L		<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L		<1.0	<1.0	-	-
Vinyl chloride	0.5 ug/L		<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L		1.8	<0.5	-	-
o-Xylene	0.5 ug/L		<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L		1.8	<0.5	-	-
4-Bromofluorobenzene	Surrogate		112%	111%	-	-
Dibromofluoromethane	Surrogate		83.9%	83.3%	-	-
Toluene-d8	Surrogate		104%	104%	-	-
Hydrocarbons						
F1 PHCs (C6-C10)	25 ug/L		<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L		<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L		<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L		<100	-	-	-

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	*85.8*		*ug/L*		*107*	*50-140*			
Surrogate: Dibromofluoromethane	*67.1*		*ug/L*		*83.8*	*50-140*			
Surrogate: Toluene-d8	*82.6*		*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	
F2 PHCs (C10-C16)	1230	100	ug/L	1880			41.9	30	QR-04
F3 PHCs (C16-C34)	1110	100	ug/L	1760			45.8	30	QR-04
F4 PHCs (C34-C50)	ND	100	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	*89.2*		*ug/L*		*112*	*50-140*			
Surrogate: Dibromofluoromethane	*66.6*		*ug/L*		*83.2*	*50-140*			
Surrogate: Toluene-d8	*84.1*		*ug/L*		*105*	*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)	1930	25	ug/L	ND	112	68-117			
F2 PHCs (C10-C16)	1640	100	ug/L	ND	103	60-140			
F3 PHCs (C16-C34)	3610	100	ug/L	ND	92.1	60-140			
F4 PHCs (C34-C50)	2460	100	ug/L	ND	99.2	60-140			
Volatiles									
Acetone	63.3	5.0	ug/L	ND	63.3	50-140			
Benzene	29.0	0.5	ug/L	ND	72.5	60-130			
Bromodichloromethane	34.6	0.5	ug/L	ND	86.6	60-130			
Bromoform	39.9	0.5	ug/L	ND	99.8	60-130			
Bromomethane	39.6	0.5	ug/L	ND	99.0	50-140			
Carbon Tetrachloride	30.5	0.2	ug/L	ND	76.3	60-130			
Chlorobenzene	38.5	0.5	ug/L	ND	96.3	60-130			
Chloroform	34.8	0.5	ug/L	ND	87.1	60-130			
Dibromochloromethane	35.4	0.5	ug/L	ND	88.4	60-130			
Dichlorodifluoromethane	32.7	1.0	ug/L	ND	81.8	50-140			
1,2-Dichlorobenzene	38.4	0.5	ug/L	ND	96.0	60-130			
1,3-Dichlorobenzene	39.3	0.5	ug/L	ND	98.2	60-130			
1,4-Dichlorobenzene	39.4	0.5	ug/L	ND	98.5	60-130			
1,1-Dichloroethane	35.6	0.5	ug/L	ND	89.0	60-130			
1,2-Dichloroethane	41.9	0.5	ug/L	ND	105	60-130			
1,1-Dichloroethylene	35.2	0.5	ug/L	ND	88.1	60-130			
cis-1,2-Dichloroethylene	33.2	0.5	ug/L	ND	83.0	60-130			
trans-1,2-Dichloroethylene	33.9	0.5	ug/L	ND	84.8	60-130			
1,2-Dichloropropane	33.6	0.5	ug/L	ND	83.9	60-130			
cis-1,3-Dichloropropylene	31.1	0.5	ug/L	ND	77.8	60-130			
trans-1,3-Dichloropropylene	39.5	0.5	ug/L	ND	98.8	60-130			
Ethylbenzene	38.5	0.5	ug/L	ND	96.3	60-130			
Ethylene dibromide (dibromoethane, 1,2-	31.1	0.2	ug/L	ND	77.7	60-130			
Hexane	42.4	1.0	ug/L	ND	106	60-130			
Methyl Ethyl Ketone (2-Butanone)	80.8	5.0	ug/L	ND	80.8	50-140			
Methyl Isobutyl Ketone	72.6	5.0	ug/L	ND	72.6	50-140			
Methyl tert-butyl ether	73.4	2.0	ug/L	ND	73.4	50-140			
Methylene Chloride	31.2	5.0	ug/L	ND	78.1	60-130			
Styrene	41.5	0.5	ug/L	ND	104	60-130			
1,1,1,2-Tetrachloroethane	38.6	0.5	ug/L	ND	96.4	60-130			
1,1,2,2-Tetrachloroethane	32.3	0.5	ug/L	ND	80.8	60-130			
Tetrachloroethylene	41.2	0.5	ug/L	ND	103	60-130			
Toluene	40.0	0.5	ug/L	ND	99.9	60-130			
1,1,1-Trichloroethane	37.7	0.5	ug/L	ND	94.2	60-130			
1,1,2-Trichloroethane	40.3	0.5	ug/L	ND	101	60-130			
Trichloroethylene	42.1	0.5	ug/L	ND	105	60-130			
Trichlorofluoromethane	37.0	1.0	ug/L	ND	92.4	60-130			
Vinyl chloride	32.1	0.5	ug/L	ND	80.2	50-140			
m,p-Xylenes	75.5	0.5	ug/L	ND	94.4	60-130			
o-Xylene	36.8	0.5	ug/L	ND	92.0	60-130			

Qualifier Notes:

QC Qualifiers :

QR-04 : Duplicate results exceeds RPD limits due to non-homogeneous matrix.

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.

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Chain Of Custody
(Lab Use Only)

№ 136598

Client Name: Paterson	Project Ref: PE5590		Page 1 of 1
Contact Name: Nick Sullivan	Quote #:		**Turnaround Time**
Address: 154 Colonnade Road S	PO #: 5464 8		☐ 1 day ☐ 3 day
	E-mail: NSullivan@patersongroup.ca		☐ 2 day ☑ Regular
Telephone: 613 226 7381	Blee@patersongroup.ca		Date Required:

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

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

Required Analysis

#	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
1	BH1-22-GW1	GW			11-May-2022		X	X										
2	MW21-02-GW2	GW			↓			X										
3	BH2-22-GW1	↓					X	X										
4	BH3-22-GW1						X	X										
5	[redacted]							[redacted]										
6	MW21-04-GW2	↓			↓		X	X										
7	DUP-1	↓			↓			X										
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): Blee	Received By Driver/Depot: M. Trouse	Received at Lab: Suneepam Dk mi	Verified By: SCT
Relinquished By (Print): Bryce Lee	Date/Time: 12/05/22 2:54	Date/Time: May 12 2022 03.50	Date/Time: May 13/22 10:31am
Date/Time: 12-May-2022	Temperature: °C PH.	Temperature: 12.3 °C	pH Verified: ☐ By: N/A