DOLYN CONSTRUCTION LTD.

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT REPORT

627 AND 637 KIRKWOOD AVENUE, OTTAWA, ON

FEBRUARY 17, 2021

wsp

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627 AND 637 KIRKWOOD AVENUE, OTTAWA, ON

DOLYN CONSTRUCTION LTD.

PROJECT NO.: 201-10687-01
DATE: FEBRUARY 17, 2021

WSP
SUITE 300
2611 QUEENSVIEW DRIVE
OTTAWA, ON, CANADA K2B 8K2

T: +1 613 829-2800
F: +1 613 829-8299
WSP.COM

February 17, 2021

Dolyn Construction Ltd.
1-888 Lady Ellen Place
Ottawa, Ontario
K1Z 5L5

Attention: Douglas W. Burnside, President

Subject: Phase Two Environmental Site Assessment Report – 2019 and 2020 Investigations at 627 and 637 Kirkwood Avenue, Ottawa, ON

We are pleased to forward our Phase Two Environmental Site Assessment Report completed for the above-noted subject site.

We trust that this information is sufficient for your current needs. Please do not hesitate to contact the undersigned should you have any questions or require further assistance.

Yours sincerely,

Derek Stewart, M.Sc., P.Geo, QP_{ESA}
Senior Project Manager
Environmental Management

WSP ref.: 201-10687-01

SUITE 300
2611 QUEENSVIEW DRIVE
OTTAWA, ON, CANADA K2B 8K2

T: +1 613 829-2800
F: +1 613 829-8299
wsp.com

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This limitations statement is considered an integral part of this report.

CONTRIBUTORS

WSP

Senior Project Manager	Derek Stewart
Environmental Scientist	Lubo Saltchev
Junior Geoscientist	Steven Wheeler

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EXECUTIVE SUMMARY

WSP Canada Inc. (WSP) was retained by Mr. Douglas W. Burnside, President of Dolyn Developments Inc. and Dolyn Construction Ltd (Dolyn) to provide a Phase Two Environmental Site Assessment (ESA) report summarizing soil and groundwater sampling completed at 627 Kirkwood Avenue in 2019 and soil and groundwater sampling completed along the adjacent southern property line shared with 637 Kirkwood Avenue in 2020. The area encompassing investigations completed in 2019 and 2020 is herein referred to as the "subject site".

This report is a consolidation of the soil and groundwater information from the 2019 and 2020 investigations discussed above. No additional soil and groundwater sampling events, or any other intrusive investigations were conducted or included in this report.

The subject site is located on Kirkwood Avenue, north of Sebring Avenue, in Ottawa, Ontario and is a rectangular parcel of land owned by Young Israel of Ottawa encompassing an area of approximately 2,266m^2. The subject site is occupied by a vacant synagogue, and a partially vacant detached residence. The subject site is bordered to the west by Kirkwood Avenue, and to the north, east and south by single family homes.

The subject site is classified as residential. It is unknown as to the intended proposed future use(s) of the subject site.

In 2019, WSP completed an intrusive soil and groundwater sampling investigation at 627 Kirkwood Avenue for a different perspective buyer of the property for due diligence purposes and sought to characterize soil and groundwater quality across 627 Kirkwood Avenue. The investigation targeted and analyzed soil and groundwater for the following contaminants of concern in Table 0-1:

Table 0-1 Contaminants of Concern

2019 INVESTIGATION CONTAMINANTS OF CONCERN	
Soil	BTEX/PHCs, VOCs, PAHs, Metals
Groundwater	BTEX/PHCs, VOCs, PAHs

BTEX: Benzene, Toluene, Ethylbenzene, Xylene
PHCs: Petroleum Hydrocarbons F1-F4
VOCs: Volatile Organic Compounds
Metals: Bulk Metals by ICP

The 2019 investigation resulted in the identification of petroleum hydrocarbons (PHCs) and polycyclic aromatic hydrocarbons (PAHs) in soil and groundwater above the Ministry of Environment, Conservation and Parks Table 3 (coarse soils) site condition standards (MECP SCS) near the property boundary of 627 and 637 Kirkwood Avenue.

Soil Exceedances

- PHCs (F1-F4)
  - F1: BH19-1-SS4, BH19-05-SS5
  - F2: BH19-1-SS4
  - F3: BH19-1-SS4

- PAHs (2019)
  - 2-Methylnaphthalene: BH19-05-SS5
  - Methylnaphthalene (1&2): BH19-05-SS5

Groundwater Exceedances

- PHCs (F1-F4)
  - F2: BH19-1-GW1

The 2020 investigation supplemented the 2019 prospective buyer investigation by assessing the neighbouring property (637 Kirkwood) for potential off-site migration of hydrocarbon-related impacts from the 627 Kirkwood property.

All 2020 investigation soil and groundwater samples met the applicable MECP Table 3 SCS.

Subject Site Geology

The soil stratigraphy beneath the subject site generally consisted of silty sand fill underlain by loose silty sand, soft silty clay or clay native material. Fill material was noted to extend to depths ranging between 0.0 m and 4.0 mgs.

Bedrock was not encountered at any borehole locations.

For the purposes of this assessment, the analytical results have been compared to the 2011 MECP Table 3 for full depth generic site conditions in a non-potable groundwater condition, coarse textured soils.

Subject Site Hydrogeology

The groundwater levels were measured in each of the eight (8) monitoring wells (including three from GHD, a previous consultant) on the subject site prior to groundwater purging and sampling activities.

The depth to groundwater in monitoring wells on 627 Kirkwood Avenue (BH19-1 to BH19-3 and GHD1 to GHD3) were approximately 2.9 to 5.5 mbgs, corresponding to elevations between 74.0 and 76.1 meters above sea level (masl).

The depth to groundwater in monitoring wells on 637 Kirkwood Avenue (BH20-1 and BH20-2) were approximately 2.21 to 2.27 mbgs, corresponding to elevations between 76.54 and 76.56 masl.

Based on groundwater elevations, the inferred groundwater flow direction at the subject site is in a north direction, towards the Ottawa River.

Recommendations

Based on the investigation findings, MECP Table 3 regulatory exceedances of PHCs and PAHs in soil and PHCs in groundwater were identified at the 627 Kirkwood portion of the subject site and no MECP Table 3 regulatory exceedances of PHCs/BTEX and PAHs in soil and groundwater were identified at the 637 Kirkwood portion of the subject site.

If the 627 Kirkwood portion of the subject site is to be re-developed, it is recommended that further investigations to delineate the extent of the soil and groundwater impacts and follow-up site remediation be completed to support the municipal site plan/building permit approval process and to minimize the environmental risk/liability associated with these impacts.

It is further recommended that any of the monitoring wells which will not be used in the future should be appropriately decommissioned as per Ontario Regulation 903.

1 INTRODUCTION

1.1 BACKGROUND

WSP Canada Inc. (WSP) was retained by Mr. Douglas W. Burnside, President of Dolyn Developments Inc. and Dolyn Construction Ltd (Dolyn) to complete a Phase Two Environmental Site Assessment (ESA) report summarizing soil and groundwater sampling completed at 627 Kirkwood Avenue in 2019 and soil and groundwater sampling completed along the adjacent southern property line shared with 637 Kirkwood Avenue in 2020. The area encompassing the investigations completed in 2019 and 2020 is herein referred to as the "subject site". The subject site is currently occupied by a vacant synagogue and a partially vacant residence in a predominantly residential area just north of Sebring Avenue on Kirkwood Avenue in Ottawa, Ontario. The location of the subject site is shown in **Figure 1.**

In 2019, WSP completed a Phase I ESA and a Phase II ESA soil and groundwater sampling investigation at 627 Kirkwood Avenue for a previous prospective buyer. The Phase II ESA investigation consisted of advancing five (5) boreholes, three (3) of which were instrumented with monitoring wells, across 627 Kirkwood Avenue to characterize soil and groundwater quality across the property. The investigation identified impacted soil and groundwater, above the applicable regulatory criteria, near the southern property line, and the prospective buyer opted to not pursue the acquisition of the property. As a result, the Phase II ESA field and analytical investigation was not documented into a Phase II ESA report.

In December 2020, Dolyn purchased from WSP the relevant information from the above-noted Phase II ESA field and analytical investigation (borehole logs and analytical laboratory results), which was provided to the previous prospective buyer. In addition, Dolyn retained WSP for additional soil and groundwater sampling on the adjacent property at 637 Kirkwood Avenue to support property acquisition environmental due diligence by Dolyn's client.

The investigation consisted of advancing two (2) boreholes, both instrumented with monitoring wells, soil and groundwater sampling (including re-sampling groundwater from the closest existing well on 627 Kirkwood Avenue) and laboratory analysis of representative samples. The results were summarized and provided to Dolyn in a letter report dated December 17, 2020. This additional 2020 investigation supplemented the 2019 prospective buyer investigation by assessing the neighbouring property (637 Kirkwood) for potential off-site migration of hydrocarbon-related impacts from the 627 Kirkwood property. The borehole locations of both investigations are shown in **Figure 2.**

This report is a consolidation of the soil and groundwater information from the 2019 and 2020 investigations discussed above. No additional soil and groundwater sampling events, or any other intrusive investigations were conducted or included in this report.

1.2 SITE DESCRIPTION AND PROPERTY OWNERSHIP

The subject site is located on Kirkwood Avenue, north of Sebring Avenue, in the Ottawa, Ontario (shown in Table 1-1). The subject site is a rectangular parcel of land owned by Young Israel of Ottawa and occupied by a vacant synagogue, and partially vacant detached residence.

The subject site is bordered to the west by Kirkwood Avenue, and to the north, east and south by single family homes. The subject site encompasses an area of approximately 2,266m^2. The NAD83, Zone 18 UTM coordinated for the centroid of the subject site are 441963 E, 5026206 N.

Table 1-1 Subject Site Property Information

PROPERTY INFORMATION	
Municipal Address	627 Kirkwood Avenue, Ottawa, ON
Current Property Owner	Young Israel of Ottawa
Property Identification Numbers (PINs)	04025-0086 (LT)
Legal Descriptions	SYNAGOGUE OFFICE PLAN 152; W116 LOT 10 KIRKWOOD E

Source: Domston Title Search Inc.

1.3 CURRENT AND PROPOSED FUTURE USES

The subject site is currently occupied by a vacant two-storey synagogue, as well as a detached two-storey partially vacant residence. The subject site is classified as residential. It is unknown as to the intended proposed future use(s) of the subject site.

1.4 APPLICABLE SITE CONDITION STANDARDS

Soil and groundwater analytical results for this Phase Two ESA report were compared to standards identified in the Ministry of the Environment, Conservation and Parks (MECP) publication, "*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*," published on April 15, 2011 (hereinafter referred to as the "MECP SCS").

This selection of the applicable standard was applied based on the following:

- The land use is residential/institutional;
- The water supply is the municipal water supplied by the City of Ottawa;
- The subject site is not considered to be environmentally sensitive as per Section 41 of Ontario Regulation (O. Reg.) 153/04; and
- The subject site is not a shallow soil property based on overburden thickness, or a property that includes all or part of a water body or is adjacent to a water body or includes land that is within 30 meters of a water body, as per Section 43.1 of O. Reg. 153/04.

Based on the conditions noted above, the MECP Table 3 SCS apply to the subject site assuming residential, parkland, and institutional (RPI) property use for coarse-textured soils.

2 BACKGROUND INFORMATION

2.1 PHYSICAL SETTING

Below is a summary of records review that were undertaken by WSP that provide general information regarding the physical setting of the subject site and specific contaminants of concern (CoCs) associated with the 2019 and 2020 investigations.

2.1.1 PHYSIOGRAPHY

Based on physiography maps available through the OGS earth website (Chapman and Putnam, 1984), the subject site is situated within the physiographic region known as Ottawa Valley Clay Plains. The Ottawa Valley Clay Plains divide into two parts: above and below Ottawa. The sediments are deep silty clays.

2.1.2 TOPOGRAPHY AND SURFACE DRAINAGE

Topographic mapping available through the Natural Resources of Canada Website (http://atlas.nrcan.gc.ca) was reviewed for the subject site by WSP.

The surface topography of the subject site is generally flat, with no significant topographic features. The mapping indicates that the topography generally slopes to the north, heading towards the Ottawa River (2 km to the north). Surface water drainage on-site is considered to occur through surface run-off to catch basins along Kirkwood Avenue and through infiltration within grass covered areas.

There are no water bodies within or in close proximity of the subject site.

2.1.3 SURFICIAL GEOLOGY

Native soil in the subject site consists of deposits of sand, gravel, clay and silt, with possible organic inclusions (MNDM, 2016). This appears to be consistent with the intrusive field investigations in 2019 and 2020 on the subject site that showed native soils comprising of loose silty sands underlain by silty clays.

2.1.4 BEDROCK GEOLOGY

Bedrock geology within the subject site consists of shale of the limestone, dolostone, shale and sandstone of the Gull River formation (OGS, Armstrong, Derek K.; Dodge, J. E. P., 2007).

2.1.5 AREAS OF NATURAL SIGNIFICANCE

There are no areas of natural significance on or in close proximity of the subject site.

2.1.6 FILL MATERIAL

Fill material was encountered in both 2019 and 2020 investigations and varied in thickness between 0 meters (BH19-1) to 4.0 meters (BH20-1) below ground surface. The fill material on 627 Kirkwood Avenue consists of sand

and gravel, and fill material near the northern property line of 637 Kirkwood Avenue consists of topsoil and silty sand.

2.2 CONTAMINANTS OF CONCERN

In 2019, WSP completed a soil and groundwater sampling investigation at 627 Kirkwood Avenue for a different perspective buyer of the property for due diligence purposes and sought to characterize soil and groundwater quality across 627 Kirkwood Avenue. The investigation targeted and analyzed soil and groundwater for the following contaminants of concern in Table 2-1:

Table 2-1 Contaminants of Concern

2019 INVESTIGATION CONTAMINANTS OF CONCERN	
Soil	BTEX/PHCs, VOCs, PAHs, Metals
Groundwater	BTEX/PHCs, VOCs, PAHs

BTEX: Benzene, Toluene, Ethylbenzene, Xylene
PHCs: Petroleum Hydrocarbons F1-F4
VOCs: Volatile Organic Compounds
PAHs: Polycyclic Aromatic Hydrocarbons
Metals: ICP Metals

The 2019 investigation resulted in the identification of PHCs and PAHs in soil and groundwater above the MECP SCS near the property boundary of 627/637 Kirkwood Avenue.

The 2020 investigation for Dolyn was completed to supplement the 2019 investigation by assessing for the presence or absence of BTEX/PHCs and PAHs in soil and groundwater just south of the property line on the adjacent property to the south at 637 Kirkwood Avenue.

3 SCOPE OF THE INVESTIGATION

3.1 OVERVIEW OF THE SUBJECT SITE INVESTIGATION

The Phase II ESA investigation work was conducted in general accordance with the general and specific objectives outlined in O. Reg. 153/04, as amended. The sampling methods complied with the requirements established by the MECP in the Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, 1997 and technical updates provided to support regulatory amendments.

All soil and groundwater samples were submitted to a Canadian Association for Laboratory Accreditation (CALA) qualified laboratory (Paracel Laboratories Ltd) for laboratory analysis, including quality assurance/quality control (QA/QC) duplicates. QA/QC duplicate samples were collected at a frequency of a minimum of 10% throughout the investigations, in compliance with regulatory requirements.

The 2019 and 2020 investigations and their respective tasks are summarized below.

2019 investigation (627 Kirkwood Avenue)

- Completed utility locates prior to drilling, including clearances through a private utility locator to confirm the absence of services near the proposed boreholes;
- Advanced five (5) environmental boreholes to a maximum depth of 11.3 meters below surface (BH19-1, BH19-2, BH19-3, BH19-4 and BH19-5) between December 3, 2019 and December 19, 2019;
- Collected representative soil samples from all five (5) boreholes and submitted select samples (6 samples, plus 2 duplicate samples) to Paracel Laboratories Ltd (Paracel) for chemical analysis;
- Submitted soil samples were selected based on field observations and screened with a photoionization device (PID) and combustible gas indicator (CGI) to target and represent worst-case scenarios;
- Installed three (3) groundwater wells in select boreholes (BH19-1, BH19-2, and BH19-3) to intercept and straddle the local shallow aquifer;
- Sampled groundwater from the three (3) installed groundwater wells, plus groundwater from two (2) previously installed wells (GHD-1 and GHD-3) by a previous consultant (GHD), on December 6, 2019 and submitted to Paracel for chemical analysis (5 samples, plus 1 duplicate sample); and
- Compared soil and groundwater analytical results against MECP Table 3 SCS.

2020 investigation (627 and 637 Kirkwood Avenue)

- Prepared a sampling and analysis plan (SAP) for the 2020 investigation based on the COCs identified in the 2019 investigation;
- Completed utility locates prior to drilling, including clearances through a private utility locator to confirm the absence of services near the proposed boreholes;
- Advanced two (2) environmental boreholes to a maximum depth of 7.3 meters below ground surface (BH20-1 and BH20-2) on December 3, 2020;
- Collected representative soil samples from the two (2) boreholes and submitted select samples (4 samples, plus 1 duplicate sample) to Paracel for chemical analysis;
- Submitted soil samples were selected based on field observations and screened with a photoionization device (PID) and combustible gas indicator (CGI) to target and represent worst-case scenarios;
- Submitted a composite soil sample for TCLP analysis;
- Installed two (2) groundwater wells in boreholes BH20-1 and BH20-2 to intercept and straddle the local shallow aquifer;

- Sampled groundwater from the two (2) installed groundwater wells and groundwater from BH19-1 on December 4, 2020 and submitted to Paracel for chemical analysis (3 samples, plus 1 duplicate sample);
- Compared soil and groundwater analytical results against MECP Table 3 SCS.

4 INVESTIGATION METHOD

4.1 GENERAL

All methods used to complete the 2019 and 2020 investigations were in accordance with O. Reg. 153/04 and WSP Standard Operating Procedures (SOPs), and generally accepted industry practices.

4.2 DRILLING

A WSP field representative inspected the subject site and identified the preferred borehole locations as per the SAP during each investigation program. The borehole plan is depicted in **Figure 2**.

WSP arranged for the public and private service locates to be completed at the subject site for both investigations through Ontario One Call (ON1Call) and multiVIEW Locates Inc, respectively.

Borehole drilling and well installation for the 2019 investigation was completed between December 3, 2019 and December 19, 2019, by MECP's licensed drillers Strata Drilling Group and Marathon Underground. The drilling was completed using a Geoprobe 8722DT drill rig (BH19-1 to BH19-3) and an Explo modular rig (BH19-4 and BH19-5). A total of five (5) boreholes (BH19-1 to BH19-5), three of which included monitoring wells (BH19-1, BH19-2 and BH19-3) were completed.

Borehole drilling and well installation for the 2020 investigation was completed on December 3, 2020 by MECP's licensed driller Strata Drilling Group. The drilling was completed using a Geoprobe 420M drill rig. A total of two (2) boreholes, each instrumented with a monitoring well (BH20-1 and BH20-2), were completed.

All drilling operations were conducted under full-time WSP supervision. The borehole logs are included in **Appendix A**.

4.3 SOIL SAMPLING

Soil samples from the boreholes were collected and handled by WSP in accordance with generally accepted sampling and handling procedures used by the environmental consulting industry, WSP SOPs, and in general accordance with O. Reg. 153/04 and the guidelines provided by the MECP's Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario.

During the 2019 investigation, soil samples were collected through continuous split spoon (SS) sampling in conjunction with standard auger drilling. Soil samples were collected from split spoons and directly placed in laboratory-supplied jars, methanol preserved vials and labeled polyethylene bags for screening. All non-dedicated equipment used at the environmental sampling locations was brushed, washed, and rinsed prior to being reused during the sampling program. Disposable nitrile gloves were used during sample collection and changed between each sample to minimize the potential for cross-contamination. Soil samples were described in the field by WSP field staff and observations were recorded in a dedicated field book. Representative soil samples were stored in a cooler at a temperature between one and 10°C. Samples selected for laboratory analysis were handled under standard chain of custody procedures and maintained on ice until received at the laboratory. The soil samples selected for laboratory analysis were considered representative of worst-case conditions, based on field screening results and visual and olfactory observations.

During the 2020 investigation, soil samples were collected through continuous sampling in conjunction with direct push drilling. Soil samples were collected from inert, single use sample liners and directly placed in laboratory-supplied jars, methanol preserved vials and labeled polyethylene bags for screening. All non-dedicated equipment used at the environmental sampling locations was brushed, washed, and rinsed prior to being reused during the sampling program. Disposable nitrile gloves were used during sample collection and changed between each sample

to minimize the potential for cross-contamination. Soil samples were described in the field by WSP field staff and observations were recorded in a dedicated field book.

Representative soil samples were stored in a cooler at a temperature between one and 10°C. Samples selected for laboratory analysis were handled under standard chain of custody procedures and maintained on ice until received at the laboratory. The soil samples selected for laboratory analysis were considered representative of worst-case conditions, based on field screening results and visual and olfactory observations.

Table 4-1 provides a summary of the submitted and analyzed soil samples from the 2019 and 2020 investigations.

Table 4-1 Summary of Soil Samples Submitted for Chemical Analysis

SAMPLE ID	SAMPLE DEPTH (MBGS)	FIELD VAPOUR READING CGI/PID (PPM)	BTEX	PHCS	VOCS	PAHS	METALS
2019							
BH19-1-SS4	2.3 - 2.9	170/184	X	X	X		
BH19-1-SS6	3.8 - 4.4	10/0	X	X	X	X	
BH19-2-SS2	0.8 - 1.4	0/0	X	X	X	X	X
BH19-3-SS3	1.5 - 2.1	0/0	X	X	X	X	
DUP (field duplicate of BH19-3-SS3)	1.5 - 2.1	0/0			X		
BH19-4-SS3	1.5 - 2.1	15/0	X	X	X	X	
DUP1 (field duplicate of BH19-4-SS3)	1.5 - 2.1	15/0				X	
BH19-5-SS5	2.4 - 3.0	0/11	X	X	X	X	
2020							
BH20-1-ST3	2.4 - 3.7	10/0		X		X	
BH20-1-ST4B	4.0 - 4.8	0/0		X		X	
BH20-2-ST3	2.5 - 3.6	220/0	X	X		X	
BH20-DUP (field duplicate of BH20-2-ST3)	2.5 - 3.6	220/0		X		X	
BH20-2-ST5	4.9 - 6.1	10/0		X		X	

mbgs – meters below ground surface
ppm – parts per million

4.4 FIELD SCREENING MEASUREMENTS

A portion of each soil sample was collected in laboratory prepared vials and soil jars with the balance of the sample sealed in polyethylene bags and broken up to release soil vapours. Vapour readings were measured within the headspace of the polyethylene bags using an RKI Eagle II portable gas detector which operates as a photoionization detector (PID) and combustible gas indicator (CGI).

The PID was equipped with a 10.6 electron-volt (eV) lamp, which was calibrated with a known concentration of isobutylene. This instrument detects VOCs that emit below an ionization potential of 10.6 eV, which includes a wide range of chemicals such as solvents and fuels. The detection limit of the instrument ranges from 0 to 15,000 ppm and accuracy is +/- 10% for VOCs in the range of 0 and 2,000 ppm and +/- 20% of the reading above 2,000 ppm. The resolution of this instrument is 0.1 ppm for VOCs in the range of 0 and 1,000 ppm and 1 ppm for readings above 1,000 ppm. The PID provides an indication of total organic contamination in soil but does not measure concentrations of individual contaminants.

The CGI detects combustible vapours such as those associated with fuels. This instrument measures total combustible gases, calibrated to a known concentration of hexane. The instrument was operated in the methane elimination mode. The detection limit of the instrument ranges from 0 to 11,000 ppm (i.e., 100 % LEL of hexane). The CGI has an accuracy of 25 ppm below 1,000 ppm and 5% of the lower explosive limit (LEL) between 1,000 ppm and 100% LEL. As with the PID, it provides an indication of contamination but not specific chemical concentrations.

The portable gas detector was calibrated on a regular basis, including prior to the use on this project, to ensure consistent results.

In addition, soil samples were screened by the on-site WSP field technician for olfactory and visual signs of contamination.

4.5 GROUNDWATER: MONITORING WELL INSTALLATION

During the 2019 investigation, groundwater monitoring wells were installed at three (3) borehole locations (BH19-1, BH19-2 and BH19-3). Nitrile gloves were used to handle the well casings and screens during installation to minimize the potential for cross-contamination. The monitoring wells were screened to intersect the inferred local groundwater table, based on field observations of the soil conditions during borehole advancement (i.e. elevated moisture and colour change). Each monitoring well was instrumented with a 51-millimeter (2 inch) diameter well and included a 3.1m well screen (slot 10). Monitoring well BH19-1 was installed with a stick-up monument casing, while monitoring wells BH19-2 and BH19-3 were installed with flushmount casings.

During the 2020 investigation, groundwater monitoring wells were installed at the two (2) borehole locations (BH20-1 and BH20-2). Nitrile gloves were used to handle the well casings and screens during installation to minimize the potential for cross-contamination. The monitoring wells were screened to intersect the inferred local groundwater table, based on field observations of the soil conditions during borehole advancement (i.e. elevated moisture and colour change). Borehole BH20-1 was instrumented with a 25.4-millimeter (1 inch) diameter well and BH20-2 was instrumented with a 38.1-mm (1.5 inch) diameter well. Both installations included a 3.1-m well screen (slot 10). At BH20-1 sand pack was placed in the borehole annulus around the well screen from the bottom of the well to approximately 0.3 m above the well screen. At borehole BH20-2, the silty soils sloughed into the borehole, resulting in the well screen being pushed into the slough. The top 0.5-m of the screen had sand pack in the borehole annulus around the well screen to approximately 0.3 m above the well screen. Bentonite hole plug seal was placed above the sand pack of both monitoring wells to 0.3 meters below grade surface. The wells were completed with flush mount casings.

The monitoring well construction details are shown on the borehole logs in **Appendix A**.

4.6 GROUNDWATER: FIELD MEASUREMENT OF WATER QUALITY PARAMETERS

Field measurements of water quality parameters were collected using a YSI multi-meter including field pH, electrical conductivity (EC), oxidation reduction potential (ORP), and temperature. Field parameters were periodically measured and allowed to stabilize prior to sampling to ensure fresh aquifer groundwater was sampled.

4.7 GROUNDWATER: MONITORING AND SAMPLING

For the 2019 investigation, monitoring wells BH19-1 to BH19-3, GHD-1 and GHD-3 were developed and sampled on Dec 6, 2019. Development was completed using Waterra inertia foot valve and tubing by purging at each well dry at least three (3) times or three (3) well volumes of water were removed, which every occurred first.

Groundwater field measurements of water quality parameters were collected during the groundwater sampling, as described in **Section 4.6** above. Groundwater sampling was conducted by low-flow sampling techniques using a peristaltic pump following ASTM D6771: Standard Practice for Low Flow Purging and Sampling for Wells and Devices Used for Ground- Water Quality Investigations, as a general guide.

Each well was equipped with dedicated tubing and the peristaltic pump was cleaned with soap and distilled water rinses between wells. The field groundwater quality measurements were obtained during low flow sampling. Samples were collected once measured parameters had stabilized in accordance with the ASTM method. The samples were collected directly into laboratory-supplied bottles, containing preservative where required, stored on ice at a temperature of less than 10°C and handled under standard chain of custody procedures until received at the laboratory. Vials used for VOC analysis were filled to achieve zero headspace.

For the 2020 investigation, the new monitoring wells (BH20-1 and BH20-2) on 637 Kirkwood Ave were developed on December 3, 2020 and BH19-1 (an existing monitoring well on 627 Kirkwood Ave) was re-developed on December 4, 2020 prior to sampling. Development was completed using Waterra inertia foot valve and tubing by purging each of the wells dry at least three (3) times. Groundwater field measurements of water quality parameters were collected during the groundwater sampling, as described in **Section 4.6** above.

Groundwater samples were collected from BH19-1, BH20-1 and BH20-2 on December 4, 2020. Groundwater sampling was conducted by low-flow sampling techniques using a peristaltic pump following ASTM D6771: Standard Practice for Low Flow Purging and Sampling for Wells and Devices Used for Ground- Water Quality Investigations, as a general guide. Each well was equipped with dedicated tubing and the peristaltic pump was cleaned with soap and distilled water rinses between wells. The field groundwater quality measurements were obtained during low flow sampling. Samples were collected once measured parameters had stabilized in accordance with the ASTM method. The samples were collected directly into laboratory-supplied bottles, containing preservative where required, stored on ice at a temperature of less than 10°C and handled under standard chain of custody procedures until received at the laboratory. Vials used for VOC analysis were filled to achieve zero headspace.

Table 4-2 provides a summary of the submitted and analyzed groundwater samples from the 2019 and 2020 investigations.

Table 4-2 Summary of Groundwater Samples Submitted for Chemical Analysis

WELL ID	BTEX	PHCS	VOCS	PAHS
2019				
BH19-1	X	X	X	X
BH19-2			X	
BH19-3	X	X	X	X

GHD-1	X	X		
GHD-3	X	X		
DUP (field duplicate of BH19-1)			X	
2020				
BH19-1	X	X		
BH20-1	X	X		
BH20-2	X	X		
DUP (field duplicate of BH20-1)	X	X		

4.8 ANALYTICAL TESTING

Samples were submitted for chemical analysis to Paracel Laboratories, located in Ottawa, Ontario. Paracel Laboratories is a laboratory certified by the Canadian Association for Laboratory Accreditation (CALA).

4.9 RESIDUE MANAGEMENT PRACTICES

Excess soil cuttings from drilling operations were collected and contained in drums for removal off-site. Purged water collected from groundwater sampling was stored in the drums with the soil. Soil drum removal is at the discretion and responsibility of Dolyn.

4.10 ELEVATION SURVEYING

The ground surface elevations of the completed monitoring wells were surveyed by WSP using a Trimble GPS enabled survey unit, accurate to +/- 0.3cm.

The ground surface elevations are included on the borehole logs in **Appendix A**.

4.11 QUALITY ASSURANCE AND QUALITY CONTROL MEASURES

Quality assurance (QA) and quality control (QC) of the soil and groundwater samples was monitored and maintained in the following ways:

- The field investigation was completed using WSP's standard operating procedures for soil and groundwater sampling;
- Samples were given unique identifications as they were collected, typically identifying the project number, date, sample location and depth. The sample numbers were recorded in field notes for each location;
- All non-dedicated sampling and monitoring equipment (e.g. interface probe) was cleaned using Alconox™ and distilled water following each use;
- A chain-of-custody form was filled out for the samples prior to submitting the samples to the laboratory. The chain-of-custody documented sample movement from collection to receipt at the laboratory and provided sample identification, requested analysis and conditions of samples upon arrival at the laboratory (e.g., temperature, container status, etc.);

- Soil samples were randomly selected by the WSP field staff for duplicate testing. The number of QC samples submitted is equivalent to a minimum of 10% of the total number of samples submitted; and,
- Samples were randomly selected by the laboratory for QA checks. Generally, one sample for every ten samples submitted is checked. For each parameter, there is an acceptable upper and lower limit for the measured concentration of the parameter. Measured concentrations of analysed samples must fall within the upper and lower acceptable limits for the sample to be valid. If a result exceeds the upper or lower acceptable limits, the sample must be re-analysed.

The duplicate samples collected during the 2019 and 2020 investigations are summarized in Table 4-3.

Table 4-3 Summary of Parameters Analyzed (Duplicate Samples)

MEDIA		SAMPLE IDS (DUPLICATE IDS)	PARAMETER ANALYZED
Soil	2019	DUP (field duplicate of BH19-3-SS3)	VOCs
		DUP1 (field duplicate of BH19-4-SS3)	PAHs
	2020	BH20-DUP (field duplicate of BH20-2-ST3)	PHCs, PAHs
Groundwater	2019	DUP (field duplicate of BH19-1)	VOCs
	2020	DUP-GW1 (field duplicate of BH20-1)	BTEX/PHCs

5 REVIEW AND EVALUATION

5.1 GEOLOGY

Based on the findings of the 2019 and 2020 investigations, the soil stratigraphy beneath the subject site generally consisted of silty sand fill underlain by loose silty sand, soft silty clay or clay native material. Fill material was noted to extend to depths ranging between 0.0 m and 4.0 m below ground surface.

Bedrock was not encountered at any borehole locations.

Borehole logs are included in **Appendix A.**

5.2 GROUNDWATER: ELEVATIONS AND FLOW DIRECTION

A summary of the measured groundwater levels and calculated groundwater elevations are presented in **Table 5-1**. The groundwater levels measured on December 6, 2019 are also presented as groundwater elevation contours (**Figure 3**). Based on groundwater elevations, the inferred groundwater flow direction at the subject site is in a north direction, towards the Ottawa River.

Table 5-1 Summary of Groundwater Levels and Groundwater Elevations

	DATE	DEPTH TO WATER (FROM TOP OF PIPE)	CALCULATED GROUNDWATER ELEVATION (MASL)
2019			
BH19-1	Dec 6, 2019	3.560	75.764
BH19-2	Dec 6, 2019	5.560	74.035
BH19-3	Dec 6, 2019	4.470	74.809
GHD1	Dec 6, 2019	3.947	75.838
GHD2	Dec 6, 2019	3.655	76.082
GHD3	Dec 6, 2019	3.932	75.982
2020			
BH19-1	Dec 4, 2020	3.55	75.774
BH20-1	Dec 4, 2020	2.27	76.535
BH20-2	Dec 4, 2020	2.21	76.56

5.3 SOIL TEXTURE

Based on field observations and the high sand and silt content, the subsurface soil conditions are classified as coarse textured.

5.4 SOIL: FIELD SCREENING

Soil headspace combustible and organic vapour concentrations recorded during the field screening procedures collected from environmental boreholes during the 2019 and 2020 investigations ranged between 0 and 220 ppm (CGD) and between 0 and 184 ppm (PID). The readings are recorded on the logs presented in **Appendix A**.

5.5 SOIL QUALITY

The soil analysis results from the 2019 and 2020 investigations are presented in **Table 1** and are discussed below.

Soil samples, with corresponding number of QA/QC samples, collected from the boreholes were submitted to the laboratory and analyzed for the following COCs: Metals, BTEX/PHCs F1-F4, VOCs, and PAHs. One sample from the 2020 investigation was also submitted for analysis of Toxicity Characteristic Leaching Procedure (TCLP), for evaluation of possible landfill disposal options.

The Laboratory Certificates of Analysis for the soil analysis completed during the 2019 and 2020 investigations are provided in **Appendix B**.

5.5.1 METALS

Results for metals in soil from the 2019 and 2020 investigations are summarized in **Table 1**.

2019 Investigation (627 Kirkwood Avenue)

One (1) soil sample was submitted for analysis of metals. No exceedances of MECP Table 3 SCS for metals were identified in the soil sample submitted for analysis.

2020 Investigation (627 and 637 Kirkwood Avenue)

No soil samples were submitted for metals analysis.

5.5.2 PETROLEUM HYDROCARBONS (BTEX/PHCS F1-F4)

Results for BTEX/PHCs F1-F4 in soil from the 2019 and 2020 investigations are summarized in **Table 1.**

2019 Investigation (627 Kirkwood Avenue)

Six (6) soil samples were submitted for analysis of PHCs/BTEX. Laboratory analysis indicated parameter exceedances of MECP SCS for PHCs F1, F2 and F3, noted in **Table 5-2** below. These exceedances are shown in **Figure 4**.

Table 5-2 Summary of PHC Exceedances in Soil (2019 Investigation)

SAMPLE ID	DEPTH (MBGS)	PARAMETER	UNITS	MECP TABLE 3 SCS	ANALYTICAL RESULT
BH19-1-SS4	2.3 - 2.9	F1	ug/g	55	121
		F2		98	3040
		F3		300	2430
BH19-05-SS5	2.4 - 3.0	F2		98	297

mbgs – meters below ground surface

2020 Investigation (627 and 637 Kirkwood Avenue)

Five (5) soil samples, plus one (1) duplicate sample, were submitted for analysis of PHCs/BTEX. No exceedances of MECP Table 3 SCS for BTEX/PHCs were identified in the soil samples submitted for analysis.

5.5.3 VOLATILE ORGANIC COMPOUNDS (VOCS)

Results for VOCs in soil from the 2019 and 2020 investigations are summarized in **Table 1.**

2019 Investigation (627 Kirkwood Avenue)

Six (6) soil samples, plus one (1) duplicate sample, were submitted for analysis of volatile organic compounds. No exceedances of MECP Table 3 SCS for VOCs were identified in the soil samples submitted for analysis.

2020 Investigation (627 and 637 Kirkwood Avenue)

No soil samples were submitted for VOCs analysis.

5.5.4 POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

Results for PAHs in soil from the 2019 and 2020 investigations are summarized in **Table 1.**

2019 Investigation (627 Kirkwood Avenue)

Five (5) soil samples, plus one (1) duplicate sample, were submitted for analysis of polycyclic aromatic hydrocarbons. Laboratory analysis indicated parameter exceedances of MECP SCS for PAHs, noted in **Table 5-3** below. These exceedances are shown in **Figure 4.**

Table 5-3 Summary of PAH Exceedances in Soil (2019 Investigation)

SAMPLE ID	DEPTH (MBGS)	PARAMETER	UNITS	MECP TABLE 3 SCS	ANALYTICAL RESULT
BH19-05-SS5	2.3 - 2.9	2-Methylnaphthalene	ug/g	0.99	1.55
		Methylnaphthalene (1&2)		0.99	2.21

mbgs – meters below ground surface

2020 Investigation (627 and 637 Kirkwood Avenue)

Four (4) soil samples, plus one (1) duplicate sample, were submitted for analysis of polycyclic aromatic hydrocarbons. No exceedances of MECP Table 3 SCS for PAHs were identified in the soil samples submitted for analysis.

5.5.5 TCLP

One composite sample consisting of subsamples from BH20-1 and BH20-2, was submitted for TCLP analysis. Based on a comparison with Ontario Regulation 558, Schedule 4, the soil material is not considered to be hazardous waste.

5.6 GROUNDWATER QUALITY

The groundwater analysis results from the 2019 and 2020 investigations are presented in **Table 2** and are discussed below.

Groundwater samples, with corresponding number of QA/QC samples, collected from the monitoring wells were submitted to the laboratory and analyzed for the following CoCs: PHCs F1-F4, VOCs, and PAHs.

The Laboratory Certificates of Analysis for the groundwater analysis completed during the 2019 and 2020 investigations are provided in **Appendix B**.

5.6.1 PETROLEUM HYDROCARBONS (BTEX/PHCS F1-F4)

Results for BTEX/PHCs F1-F4 in groundwater from the 2019 and 2020 investigations are summarized in **Table 2.**

2019 Investigation (627 Kirkwood Avenue)

Five (5) groundwater samples, plus one (1) duplicate sample, were submitted for analysis of PHCs/BTEX. Laboratory analysis indicated a parameter exceedance of MECP SCS for PHCs F2, noted in Table 5-4 below. This exceedance is shown in **Figure 5**.

Table 5-4 Summary of PHC Exceedances in Groundwater (2019 Investigation)

SAMPLE ID	PARAMETER	UNITS	MECP TABLE 3 SCS	ANALYTICAL RESULT
BH19-1-GW1	F2	ug/L	150	608

2020 Investigation (627 and 637 Kirkwood Avenue)

Three (3) groundwater samples, plus one (1) duplicate sample, were submitted for analysis of PHCs/BTEX. No exceedances of MECP Table 3 SCS for BTEX/PHCs were identified in the groundwater samples submitted for analysis.

5.6.2 VOLATILE ORGANIC COMPOUNDS (VOCS)

Results for VOCs in groundwater from the 2019 and 2020 investigations are summarized in **Table 2.**

2019 Investigation (627 Kirkwood Avenue)

Three (3) groundwater samples, plus one (1) duplicate sample, were submitted for analysis of volatile organic compounds. No exceedances of MECP Table 3 SCS for VOCs were identified in the groundwater samples submitted for analysis.

2020 Investigation (627 and 637 Kirkwood Avenue)

No groundwater samples were submitted for VOCs analysis.

5.6.3 POLYCYLIC AROMATIC HYDROCARBONS (PAHS)

Results for PAHs in groundwater from the 2019 and 2020 investigations are summarized in **Table 2.**

2019 Investigation (627 Kirkwood Avenue)

Two (2) groundwater samples were submitted for analysis of polycyclic aromatic hydrocarbons. No exceedances of MECP Table 3 SCS for PAHs were identified in the groundwater samples submitted for analysis.

2020 Investigation (627 and 637 Kirkwood Avenue)

No groundwater samples were submitted for PAHs analysis.

5.7 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

Field duplicate samples were assessed as part of the QA/QC program during the 2019 and 2020 investigations. A minimum of one field duplicate sample was collected and analyzed for every ten samples. Field duplicate samples were evaluated based on the relative percent difference (RPD) in parameter concentrations. Where measured parameter concentrations were greater than five times the laboratory reportable detection limit (RDL), an RPD of less than 50% for soils and less than 30% for groundwater, except for certain parameters, was deemed acceptable; for concentrations less than five times the RDL, RPD cannot be reliably calculated and is not considered to affect the interpretation results.

A summary of the required performance standard for soil and groundwater sample homogeneity for QA/QC comparisons of the original to its duplicate sample is provided in **Table 5-5.**

Table 5-5 Required Performance Standards for Soil and Groundwater for QA/QC

REQUIRED QA/QC PARAMETER	REQUIRED PERFORMANCE STANDARD
Petroleum hydrocarbons	RPD should be ≤ 30% for water and ≤ 40% for soils
Polycyclic aromatic hydrocarbons	RPD should be ≤ 30% for water and ≤ 40% for soils
Volatile organic compounds	RPD should be ≤ 30% for water and ≤50% for soils
Hexavalent chromium	RPD should be ≤ 20% for water and ≤ 35% for soils
Metals, Hydrid metals, boron hot water soluble (BHWS)	RPD should be ≤ 20% for water and ≤ 30% for soils. BHWS ≤ 30% water and ≤40% soils

All 2019 and 2020 investigation soil and groundwater samples and their respective duplicates were within acceptable RPDs.

Paracel Laboratories carried out internal QA/QC measures including process recoveries, blanks, and replicate samples. The laboratory QA/QC results are provided on the Certificates of Analysis in **Appendix B**; the results were acceptable and, therefore, suitable for consideration of the results in the interpretation of site conditions.

6 SUMMARY OF FINDINGS

The following is a summary of the 2019 and 2020 investigations at the subject site.

2019

Between December 3 and December 19, 2019, five (5) environmental boreholes (three of which were completed as monitoring wells) were advanced to maximum depths ranging between 4.4 and 11.3 mbgs on 627 Kirkwood Avenue.

Representative soil samples from 5 boreholes and 5 groundwater samples (including two from existing wells on-site installed by GHD, a previous consultant) were submitted for chemical analysis to Paracel Laboratories Ltd.

2020

On December 3, 2020, two (2) environmental boreholes (each completed as monitoring wells) were advanced to maximum depths of 6.1 and 7.3 mbgs at the southern property line between 627 and 637 Kirkwood Avenue.

Representative soil samples from two (2) boreholes and three (3) groundwater samples (including a groundwater sample from BH19-1 on 627 Kirkwood) were submitted for chemical analysis to Paracel Laboratories Ltd.

Subject Site Geology

The soil stratigraphy beneath the subject site generally consisted of silty sand fill underlain by loose silty sand, soft silty clay or clay native material. Fill material was noted to extend to depths ranging between 0.0 m and 4.0 mgs.

Bedrock was not encountered at any borehole locations.

Subject Site Hydrogeology

The groundwater levels were measured in each of the eight (8) monitoring wells (including three from GHD, a previous consultant) on the subject site prior to groundwater purging and sampling activities.

The depth to groundwater in monitoring wells on 627 Kirkwood Avenue (BH19-1 to BH19-3 and GHD1 to GHD3) were approximately 2.9 to 5.5 mbgs, corresponding to elevations between 74.0 and 76.1 meters above sea level (masl).

The depth to groundwater in monitoring wells on 637 Kirkwood Avenue (BH20-1 and BH20-2) were approximately 2.21 to 2.27 mbgs, corresponding to elevations between 76.54 and 76.56 masl.

Based on groundwater elevations, the inferred groundwater flow direction at the subject site is in a north direction, towards the Ottawa River.

Soil and Groundwater Conditions

The reported analytical results which exceeded the MECP Table 3 SCS are summarized below:

<u>Soil Exceedances (2019)</u>

- PHCs (F1-F4)
  - F1: BH19-1-SS4 and BH19-05-SS5
  - F2: BH19-1-SS4
  - F3: BH19-1-SS4

- PAHs (2019)
  - 2-Methylnaphthalene: BH19-05-SS5
  - Methylnaphthalene (1&2): BH19-05-SS5

<u>Groundwater Exceedances (2019)</u>

- PHCs (F1-F4)
  - F2: BH19-1-GW1

All 2020 soil and groundwater samples met the applicable MECP Table 3 SCS.

7 CONCLUSIONS AND RECOMMENDATIONS

Based on the investigation findings, MECP Table 3 regulatory exceedances of PHCs and PAHs in soil and PHCs in groundwater were identified at the 627 Kirkwood portion of the subject site and no MECP Table 3 regulatory exceedances of PHCs/BTEX and PAHs in soil and groundwater were identified at the 637 Kirkwood portion of the subject site.

If the 627 Kirkwood portion of the subject site is to be re-developed, it is recommended that further investigations to delineate the extent of the soil and groundwater impacts and follow-up site remediation be completed to support the municipal site plan/building permit approval process and to minimize the environmental risk/liability associated with these impacts.

It is further recommended that any of the monitoring wells which will not be used in the future should be appropriately decommissioned as per Ontario Regulation 903.

8 QUALIFICATIONS OF ASSESSORS

8.1 WSP CANADA INC.

WSP is a leading, full-service engineering company that has seen successful growth in the past decade with a Canadian contingent of approximately 8,000 people making a significant contribution to our 34,000 global staff, based in more than 500 offices, across 40 countries. WSP employs about 450 environment staff in Ontario including Professional Engineers, Professional Geoscientists, Biologists and Certified Technicians. The firm provides services to transform the built environment and restore the natural environment, and its expertise ranges from environmental remediation to urban planning, from engineering iconic buildings to designing sustainable transport networks, and from developing the energy sources of the future to enabling new ways of extracting essential resources.

8.2 QUALIFIED PERSON AND ASSESSORS

Derek Stewart, M.Sc., P. Geo., QP_{ESA} is a Contaminant Specialist / Senior Project Manager with WSP's Environmental Management Department. Derek has more than 29 years' experience as a Contaminant Specialist/Senior Project Manager managing contaminant and groundwater investigations in support of transportation infrastructure and land redevelopment projects. Derek's work includes project technical support for both regional planning and local scale impact assessment studies supporting transportation route planning for municipal, provincial and federal Environmental Assessments (EAs); transportation infrastructure preliminary and detail designs; land redevelopment; and property acquisitions/dispositions. In addition, Derek provides contaminant and groundwater support for road, rail and transit infrastructure construction projects. Derek is certified under RAQ's for Contaminant/Waste Management and is a Qualified Person (QP_{ESA}) as defined under Ontario Regulation 153/04, as amended.

Mr. Steven Wheeler, B.Sc, is a Junior Geoscientist with WSP. He obtained a Bachelor of Science degree in Environmental Science, Concentration Earth Sciences from Carleton University. Steven has completed Phase One and Phase Two ESAs, under the supervision of a Qualified Person. Mr. Wheeler's work incorporates project management, as well as field tasks. Responsibilities include staff and subcontractor scheduling, cost control, performing/overseeing field work (drilling, test pits, well installation, groundwater, aquifer testing, surface water, soil and soil vapour sampling), interpretation of physical and chemical data, data validation and preparation of technical reports.

Mr. Lubo Saltchev, B.E.S, is an Environmental Scientist with WSP. He has 5 years' experience planning, co-ordinating and supervising a wide range of Phase I and Phase II Environmental Site Assessments (ESAs) and remediation programs in accordance with CSA Standards and O. Reg 153/04 Regulations. Lubo has led a wide variety of field sampling and inspection programs including soil drilling and groundwater well installations, test pitting, remedial excavations, underground storage tank removals, hoist decommissions, soil vapour sampling and ambient air sampling.

8.3 SIGNATURES

This Phase Two ESA report was conducted by the undersigned Qualified Person in general accordance with the requirements of O. Reg. 153/04.

Derek Stewart, M.Sc., P.Geo., QP_{ESA}

Senior Project Manager

Environmental Management

Steven Wheeler, B.Sc

Junior Geoscientist

Environment

Lubo Saltchev, B.E.S

Environmental Scientist

Environment

9 REFERENCES

- Chapman, L.J., and D.F. Putnam. 1984. The Physiography of Southern Ontario; Ontario Geological Survey. Special Volume 2. 270 p. Accompanied by Map P.2715 (coloured), scale 1:600 000.
- Environmental Protection Act, R.R.O 1990, Regulation 153/04, Records of Site Condition, as amended by Ontario Regulation 269/11.
- Ministry of the Environment (MOE). April 15, 2011. Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act.
- Ontario Ministry of Northern Development and Mines. 2016. Ontario Geological Society Maps
- Natural Resources Canada (n.d.). The Atlas of Canada: Topographic Maps. Approximate scale 1:17500. Accessed online in November 2019 at: http://atlas.gc.ca/toporama/en/index.html.
- Ontario Geological Survey. 2011. 1:250,000 Scale Bedrock Geology of Ontario; Ontario Geological Survey, Miscellaneous Release Data 126-Revision 1.

APPENDIX

A BOREHOLE LOGS

MONITORING WELL DRILLING RECORD : **BH19-1**

Prepared by: **Genevieve Rancourt** Date (Start): **03/12/2019**
Reviewed by: **Adrian Menyhart** Date (End): **17/07/2019**

Project Name: **Glenview Homes**
Site: **Glenview Homes - 627 Kirkwood**
Sector: **Ottawa**
Client: **Glenview Homes**

Project Number: **191-13873-00**
Geographic Coordinates: X = W
Y = N
Surface Elevation: Not measured
Plunge / Azimuth:

Drilling Company: Strata Soil
Drilling Equipment: Géoprobe 7822DT
Drilling Method: Automatic Drop Hammer / HQ Casing
Borehole Diameter: 50 mm
Drilling Fluid: N/A

WELL DETAILS
COPING Elevation :
SCREEN Bottom Depth :
Length :
Opening :
WATER Elevation:
WATER Date:
Water Level Free Phase

SAMPLE TYPE
DC - Diamond Core
SS - Split Spoon
PS - Piston Sample
TC - Hollow Tube
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TT - DT-32 Liner

ANALYSIS
AL - Atterberg Limits
GSA - Grain Size Analysis
PENTEST - Blow Counts/300mm
PL - Point Load Test
Sg - Specific Gravity
SPT - N Value (Blow Counts/300mm)
UCS - Uniaxial Compressive Strength
w - Moisture Content
wL - Liquidity Limit
wP - Plasticity Limit

SAMPLE STATE
Undisturbed
Remoulded
Lost
Cored

DEPTH ELEVATION (m)	STRATIGRAPHY	DESCRIPTION	NUMBER	LABORATORY TESTING	DUPLICATE	TYPE & NO.	STATE	% RECOVERY (RQD)	Blows Counts/6" (N Value = SPT)	GEOTECHNICAL (R □ Shear (kPa) I 30 60 90 120; SPT=N Value ▲ PENTEST △ RQD (%) ⊙; PLASTIC LIMIT w (%) LIQUID 20 40 60 80)	WELL DIAGRAM
		Ground surface.									
0.0		Silty sand, brown, loose, humid				SS-1		82	5 2 2 2 (4)		
						SS-2		28	0 1 1 1 (2)		
		black staining at 1.77 m , hydrocarbon odour				SS-3		77	1 0 0 0 (0)		
						SS-4		78	1 2 2 4 (4)		
3.05		Clay trace of silty sand, grey soft, humid				SS-5		100	0 0 0 0 (0)		
						SS-6		100	0 0 0 0 (0)		
4.57		Clay, grey, soft, wet				SS-7		100	0 0 0 0 (0)		
						SS-8		100	0 0 0 0 (0)		
						SS-9		100	0 0 0 0 (0)		
						SS-10		100	0 0 0 0 (0)		
						SS-11		100	0 0 0 0 (0)		
						SS-12		100	0 0 0 0 (0)		
						SS-13		100	0 0 0 0 (0)		
						SS-14		100	0 0 0 0 (0)		
10.50		Silty clay with trace of gravel, grey, loose, saturated				SS-15		100	0 0 0 0 (0)		
11.27		End of borehole at 11.30 m.									

MONITORING WELL DRILLING RECORD : **BH19-2**

Prepared by: **Genevieve Rancourt** Date (Start): **03/12/2019**
Reviewed by: **Adrian Menyhart** Date (End): **17/07/2019**

Project Name: **Glenview Homes**
Site: **Glenview Homes - 627 Kirkwood**
Sector: **Ottawa**
Client: **Glenview Homes**

Project Number: **191-13873-00**
Geographic Coordinates: X = W
Y = N
Surface Elevation: Not measured
Plunge / Azimuth:

Drilling Company: Strata Soil
Drilling Equipment: Géoprobe 7822DT
Drilling Method: Automatic Drop Hammer / HQ Casing
Borehole Diameter: 50 mm
Drilling Fluid: N/A

WELL DETAILS
COPING Elevation :
SCREEN Bottom Depth :
Length :
Opening :
WATER Elevation:
WATER Date:
Water Level Free Phase

SAMPLE TYPE
DC - Diamond Core
SS - Split Spoon
PS - Piston Sample
TC - Hollow Tube
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TT - DT-32 Liner

ANALYSIS
AL - Atterberg Limits
GSA - Grain Size Analysis
PENTEST - Blow Counts/300mm
PL - Point Load Test
Sg - Specific Gravity
SPT - N Value (Blow Counts/300mm)
UCS - Uniaxial Compressive Strength
w - Moisture Content
wL - Liquidity Limit
wP - Plasticity Limit

SAMPLE STATE
Undisturbed
Remoulded
Lost
Cored

DEPTH ELEVATION (m)	STRATIGRAPHY	DESCRIPTION	NUMBER	LABORATORY TESTING	DUPLICATE	TYPE & NO.	STATE	% RECOVERY (RQD)	Blows Counts/6" (N Value = SPT)	GEOTECHNICAL (R □ Shear (kPa) I; SPT=N Value ▲ PENTEST △; RQD (%) ⊙; PLASTIC LIMIT w (%) LIQUID)	WELL DIAGRAM
		Ground surface.									
0.76		Fill, sand and gravel with trace silt and organic matter, brown, loose, humid				SS-1		77	7 6 5 4 (11)		
2.28		Fill, sand with trace silty clay, brown, loose, humid				SS-2		87	2 2 3 4 (5)		
						SS-3		82	5 5 5 4 (10)		
3.04		Sand, brown, loose, humid becoming silty clay at 2.6 m				SS-4		100	2 3 1 1 (4)		
4.56		Clay with trace sane, grey, soft, humid				SS-5		100	1 0 0 0 (0)		
						SS-6		100	0 0 0 0 (0)		
5.32		Clay, grey, soft, humid				SS-7		100	0 0 0 0 (0)		
7.60		Clay, grey, soft, wet				SS-8		100	0 0 0 0 (0)		
						SS-9		100	0 0 0 0 (0)		
		End of borehole at 7.60 m.									

MONITORING WELL DRILLING RECORD : **BH19-3**

Prepared by: **Genevieve Rancourt** Date (Start): **03/12/2019**
Reviewed by: **Adrian Menyhart** Date (End): **17/07/2019**

Project Name: **Glenview Homes**
Site: **Glenview Homes - 627 Kirkwood**
Sector: **Ottawa**
Client: **Glenview Homes**

Project Number: **191-13873-00**
Geographic Coordinates: X = W
Y = N
Surface Elevation: Not measured
Plunge / Azimuth:

Drilling Company: Strata Soil
Drilling Equipment: Géoprobe 7822DT
Drilling Method: Automatic Drop Hammer / HQ Casing
Borehole Diameter: 50 mm
Drilling Fluid: N/A

WELL DETAILS
COPING Elevation :
SCREEN Bottom Depth :
Length :
Opening :
WATER Elevation:
WATER Date:
Water Level Free Phase

SAMPLE TYPE
DC - Diamond Core
SS - Split Spoon
PS - Piston Sample
TC - Hollow Tube
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TT - DT-32 Liner

ANALYSIS
AL - Atterberg Limits
GSA - Grain Size Analysis
PENTEST - Blow Counts/300mm
PL - Point Load Test
Sg - Specific Gravity
SPT - N Value (Blow Counts/300mm)
UCS - Uniaxial Compressive Strength
w - Moisture Content
wL - Liquidity Limit
wP - Plasticity Limit

SAMPLE STATE
Undisturbed
Remoulded
Lost
Cored

DEPTH ELEVATION (m)	STRATIGRAPHY	DESCRIPTION	NUMBER	LABORATORY TESTING	DUPLICATE	TYPE & NO.	STATE	% RECOVERY (RQD)	Blows Counts/6" (N Value = SPT)	GEOTECHNICAL (R □ Shear (kPa) I; SPT=N Value ▲ PENTEST △; RQD (%) ⊙; PLASTIC LIMIT w (%) LIQUID)	WELL DIAGRAM
		Ground surface.									
0.76		Fill, Gravel and sand, brown, dense, humid				SS-1		77	35 35 10 8 (45)		
1.50		Sand with trace silty gravel, brown, loose, humid				SS-2		93	3 3 4 5 (7)		
2.29		Sand with some silty sand, brown, loose, humid				SS-3		74	3 3 3 5 (6)		
3.02		Silty clay, brown-grey, soft, humid				SS-4		100	0 1 0 0 (1)		
						SS-5		100	0 0 0 0 (0)		
						SS-6		100	0 0 0 0 (0)		
		Clay, grey, soft, humid				SS-7		100	0 0 0 0 (0)		
						SS-8		100	0 0 0 0 (0)		
						SS-9		100	0 0 0 0 (0)		
7.60		End of borehole at 7.60 m.									

Projet : GLENVIEW - 191-13873-00_12112019.GPJ Type rapport : WSP_EN_WELL-GEOTECHNICAL ONLY Data Template : WSP_TEMPLATE_GEOTECH.GDT 11/12/2019

wsp | Identification bordereaux analyses | No: B19-04 | **RAPPORT DE FORAGE**

Nom du projet : Glenview Homes
Adesse du site : 627 Kirkwood
N° projet :

DATE : 18-12-2019
HEURE : 9h MÉTÉO : -5°C
TECHNICIEN : E. Sanborn

Diamètre du forage:
Profondeur du forage:
Quantité d'eau injectée:
Compagnie de forage: Marathon
Type de foreuse : Expo

État: Remanié; Intact; Perdu; Carottier

Type: CF Cuillère fendue; TS Tube shelby; CR Carottier diamanté; TT Tube Transparent; MA Manuel

Indices: Olfactif: A: Aucun, L: Léger, M: Moyen, F: Fort; Visuel: A: Aucun, D: Disséminé, I: Imbibé

Méthode	Coupe stratigraphique	État	Type et No	Récup. (%)	# coup	Indice N ou RQD	COV (PID)	Olfactif	Visuel	Profondeur Mètre / Pied	Description des échantillons
	Top soil 5"		SS1	30/61	7 8 23 15		HEX 0 / ISI 0			0.5 — 2'	Fill sand, brown humid, loose, trace gravel
			SS2	40/61	3 4 11 22		0 0			1.0 — 4'	fill - Silty sand, trace org. Mat, brown humid.
	DUP-1 (no COV)		SS3	47/61	18 26 27 29		15 0			1.5 — 6' / 2.0	Fill Silty Sand brown humid loose, trace silty clay
			SS4	40/61	4 7 11 12		5 0			2.5 — 8'	Fill - Sand, some silt, Brown, loose humid.
	from 0-20 cm Silty sand from 20-61 cm clay		SS5A	100%	H/18		0 0			3.0 — 10'	Silty Sand (SS-05A) Brown loose w/ transition
			SS05B		5		0 0			3.5 — 12'	gray clay Soft, wet
			SS-06	100%	H		0 0			4.0 — 14'	Clay some silt, grey-brown soft, wet
	End of borehole									4.5 — 16' / 5.0 — 5.5 — 18' / 6.0 — 20'	

REMARQUES :

Aide-Mémoire

wsp

FORAGE No: ~~BH-A-05~~

RAPPORT DE FORAGE

Nom du projet : ~~Pistc Cyclable~~ Glenview homes

Adesse du site : ~~Sentier de la rivière~~ 627 Kirkwood Ottawa

N° projet : ~~184-15780-00~~ PA-13873-00

DATE : 19-12-19

HEURE : _____ MÉTÉO : -33°C

TECHNICIEN : Eve Sabourin

Diamètre du forage:

Profondeur du forage:

Quantité d'eau injectée:

Compagnie de forage: Marathon

Type de foreuse : EXPO

État
- Remanié
- Intact
- Perdu
- Carottier

Type
- CF Cuillère fendue
- TS Tube shelby
- CR Carottier diamanté
- TT Tube Transparent
- MA Manuel

Indices

Olfactif: A: Aucun L: Léger M: Moyen F: Fort

Visuel: A: Aucun D: Disséminé I: Imbibé

Méthode	Coupe stratigraphique	État	Type et No	Récup. (%)	# coup	Indice N ou RQD	COV (PID) HEX	COV (PID) ISO	Olfactif	Visuel	Profondeur (Mètre / Pied)	Description des échantillons
	Top Soil 6"		SS1	25/61	3221		0	0			0.5 / 2'	Fill - Sand Brown, humid, loose some silt some org. mat
			SS2	39/61	2-2-3		0	6			1.0 / 4'	Fill Silty sand, some org. mat. Brown,
			SS3	30/61	5337		0	0			1.5 / 6'	Fill Sand, some silt, light Brown, loose.
			SS4	40/61	5667		0	0			2.0 / 8'	IDEM "
			SS5	50/61	4280 12		0	11	Strong Odour	Y E S	2.5 / 8'	Fill Sand, some silty clay brown. Loose, wet.
			SS6A	50/61	8457		0	1	"	"	3.0 / 10'	Sand, some silty clay brown - grey, wet Loose - transition to Clay - grey. soft, wet. Fill
			SS6B				0	0			3.5 / 12'	
			SS7	100%	3322		5	9	"	"	4.0 / 14'	Coarse Sand - gravel, grey, wet, Loose, some silty clay. Fill
			SS8	100%	2222						4.5 / 16'	"
			SS9A	100%	1111				Strong Odour		5.0 / 16'	Sand grey, wet, loose, strong Smell HC transition to Clay grey, soft, wet Fill
			SS9B								11.5 / 38'	
			SS10	47/61	1111						12.0 / 40'	" no transition

REMARQUES :

Aide-Mémoire

3% 5 % 10% 15 % 20 % 25 % 30 % 40 % 50 %

DRILLING RECORD : **BH20-1**

Project Number: **201-10687-00**

637 Kirkwood Avenue, Ottawa, Ontario
Supplemental Soil Sampling
Dolyn Developments Inc.

DRILLING DETAILS

Date (Start):	2020-12-03
Date (End):	2020-12-03
Drilling Company:	Strata Drilling Group
Drilling Equipment:	Géoprobe 420M
Drilling Method:	Hydraulic drill
Borehole Diameter:	57.2 mm
Drilling Fluid:	N/A

SURVEY DETAILS

Easting:	441978.98 m
Northing:	5026175.81 m
Surface Elevation:	78.915 masl
Top of Well Elevation:	78.805 masl

ODOUR
L - Light
M - Medium
S - Strong

VISUAL
D - Dispersed with Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
DT - Dual Tube
MC - Macro Core
NR - No Recovery

CHEMICAL ANALYSIS

Metals	Sb As Ba Be B Cd Cr Co Cu Pb Mo Ni Se Ag Tl U V Zn
Inorg.	Inorganic Compounds
PHC	Petroleum Hydrocarbons (F1-F4)
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
VOC	Volatile Organic Compounds
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
D/F	Dioxins & Furans
Phenol	Phenolic Compounds
GSA	Grain-size Analysis

(m) DEPTH *ELEVATION* (masl)	LITHOLOGY / GEOLOGY: STRATIGRAPHY	DESCRIPTION	OBSERVATIONS: PID *CGD* (ppm)	ODOUR (L M S)	VISUAL (D S)	SAMPLES: SAMPLE TYPE & No.	% RECOVERY	N (Blow/15cm)	CHEMICAL ANALYSIS	DUPLICATE	MONITORING WELL: DIAGRAM	DESCRIPTION	REMARKS
78.92 0.30		**TOPSOIL**: Approximately 0.15 meters of leaf litter over 0.15 m of Silty Sand some organics/roots, dark brown, damp (TOPSOIL)										FLUSH MOUNT	
78.61 0.5		**FILL**: Silty Sand, trace organics, dark brown to brown, dry to damp (FILL)	0 / *0*			MC1	36%						
1.0												BENTONITE RISER	
1.5			0 / *0*			MC2A	100%						
77.06 2.0			0 / *2*			MC2B	100%					SAND	
2.44 2.5		**FILL**: Silt and Sand, trace Clay, grey and brown, some orange staining, damp to moist (FILL)	10 / *0*			MC3	31%		PHC PAH				
76.48 3.0													
3.66 *75.26* 3.5		**FILL**: Sand some Silt, brown, moist to wet (FILL)	10 / *0*			MC4A	100%						
4.04 *74.88* 4.0		**SILT AND CLAY**: Silt and Clay, bluish grey, wet	0 / *0*			MC4B	73%		PHC PAH			SCREEN Length: 3.05 m Diam.: 25.4 mm Slot: #10	
4.5													
5.0			0 / *0*			MC5A	100%						
5.5												WATER MARKER Depth : 2.27 m Elev. : 76.645 m Date : 2020-12-04	
6.0			0 / *2*			MC5B	100%						
6.10		*END OF BOREHOLE* *Notes:* *1. Borehole terminated at approximately 6.1 meters in depth* *2. Borehole instrumented with monitoring well*											
6.5													
7.0													
7.5													
8.0													

Project : 637 KIRKWOOD AVE. DOLYN.GPJ Report : WSP_EN_WELL-ENVIRONMENTAL 2020-12-10

Prepared by: S. Wheeler
Reviewed by:

DRILLING RECORD : **BH20-2**

Project Number: **201-10687-00**

637 Kirkwood Avenue, Ottawa, Ontario
Supplemental Soil Sampling
Dolyn Developments Inc.

DRILLING DETAILS

Date (Start):	2020-12-03
Date (End):	2020-12-03
Drilling Company:	Strata Drilling Group
Drilling Equipment:	Géoprobe 420M
Drilling Method:	Hydraulic drill
Borehole Diameter:	57.2 mm
Drilling Fluid:	N/A

SURVEY DETAILS

Easting:	441983.54 m
Northing:	5026177.11 m
Surface Elevation:	78.87 masl
Top of Well Elevation:	78.77 masl

ODOUR
L - Light
M - Medium
S - Strong

VISUAL
D - Dispersed with Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
DT - Dual Tube
MC - Macro Core
NR - No Recovery

CHEMICAL ANALYSIS

Metals	Sb As Ba Be B Cd Cr Co Cu Pb Mo Ni Se Ag Tl U V Zn
Inorg.	Inorganic Compounds
PHC	Petroleum Hydrocarbons (F1-F4)
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
VOC	Volatile Organic Compounds
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
D/F	Dioxins & Furans
Phenol	Phenolic Compounds
GSA	Grain-size Analysis

(m) DEPTH *ELEVATION* (masl)	STRATIGRAPHY	DESCRIPTION	PID *CGD* (ppm)	ODOUR	VISUAL	SAMPLE TYPE & No.	% RECOVERY	N (Blow/15cm)	CHEMICAL ANALYSIS	DUPLICATE	MONITORING WELL DIAGRAM	MONITORING WELL DESCRIPTION	REMARKS
				L M S	D S								
78.87 / 0.30		**TOPSOIL**: Approximately 0.15 meters of leaf litter over 0.15 m of Silty Sand some organics/roots, dark brown, damp (TOPSOIL)										FLUSH MOUNT	
78.57		**FILL** : Sand some Silt, trace organics, brown, damp (FILL)	0 / 0			MC1	53%						
1.83			5 / 0			MC2A	71%					BENTONITE	
77.04		**SILTY SAND**: Silty Sand, brown, moist to wet	0 / 0			MC2B	71%					RISER	
76.64												SAND	
			220 / 0			MC3	29%		PHC BTEX PAH	BH20-DUP			
4.27			0 / 0			MC4	29%					SCREEN Length: 3.05 m Diam.: 38.1 mm Slot: #10	
74.60		**SILT AND SAND**: Silt and Sand some Clay, grey, wet											
4.88													
73.99		**SAND SOME SILT**: Sand some Silt, brown, wet	10 / 0			MC5	13%		PHC PAH				
			0 / 0			MC6A	67%					SLOUGH	
6.91													
71.96		**SILTY CLAY**: Silty Clay, grey, wet	0 / 0			MC6B	67%						
7.32		*END OF BOREHOLE*										WATER MARKER Depth : 2.21 m Elev. : 76.66 m Date : 2020-12-04	
		Notes: *1. Borehole terminated at approximately 7.3 meters in depth* *2. Borehole instrumented with monitoring well*											

Project : 637 KIRKWOOD AVE. DOLYN.GPJ Report : WSP_EN_WELL-ENVIRONMENTAL 2020-12-10

Prepared by: S. Wheeler
Reviewed by:

APPENDIX

B LABORATORY CERTIFICATES OF ANALYSIS

PARACEL LABORATORIES LTD.

TRUSTED.
RESPONSIVE.
RELIABLE.

351 Nash Road North, unit 9B
Hamilton, ON L8H 7P4
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

WSP Canada Inc. (Ottawa)

2611 Queensview Dr
Ottawa, ON K2B 8K2
Attn: Adrian Menyhart

Client PO:
Project: 191-13873-00
Custody: 122898

Report Date: 11-Dec-2019
Order Date: 5-Dec-2019

Order #: 1949466

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

Paracel ID	Client ID
1949466-01	BH19-1-SS6
1949466-02	BH19-2-SS2
1949466-03	BH19-3-SS3
1949466-04	DUP

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 5-Dec-2019
Project Description: 191-13873-00

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	9-Dec-19	10-Dec-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	5-Dec-19	9-Dec-19
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	6-Dec-19	6-Dec-19
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	5-Dec-19	11-Dec-19
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	9-Dec-19	10-Dec-19
Solids, %	Gravimetric, calculation	6-Dec-19	6-Dec-19

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 5-Dec-2019
Project Description: 191-13873-00

	Client ID:	BH19-1-SS6	BH19-2-SS2	BH19-3-SS3	DUP
	Sample Date:	04-Dec-19 09:00	04-Dec-19 09:00	04-Dec-19 09:00	04-Dec-19 09:00
	Sample ID:	1949466-01	1949466-02	1949466-03	1949466-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	51.4	92.2	88.3	87.5
Metals					
Antimony	1.0 ug/g dry	-	<1.0	-	-
Arsenic	1.0 ug/g dry	-	1.3	-	-
Barium	1.0 ug/g dry	-	19.9	-	-
Beryllium	0.5 ug/g dry	-	<0.5	-	-
Boron	5.0 ug/g dry	-	<5.0	-	-
Cadmium	0.5 ug/g dry	-	<0.5	-	-
Chromium	5.0 ug/g dry	-	13.7	-	-
Cobalt	1.0 ug/g dry	-	3.4	-	-
Copper	5.0 ug/g dry	-	5.0	-	-
Lead	1.0 ug/g dry	-	1.4	-	-
Molybdenum	1.0 ug/g dry	-	<1.0	-	-
Nickel	5.0 ug/g dry	-	7.2	-	-
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	-	22.4	-	-
Zinc	20.0 ug/g dry	-	<20.0	-	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromoform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromomethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chloroform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 5-Dec-2019
Project Description: 191-13873-00

	Client ID:	BH19-1-SS6	BH19-2-SS2	BH19-3-SS3	DUP
	Sample Date:	04-Dec-19 09:00	04-Dec-19 09:00	04-Dec-19 09:00	04-Dec-19 09:00
	Sample ID:	1949466-01	1949466-02	1949466-03	1949466-04
	MDL/Units	Soil	Soil	Soil	Soil
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylene dibromide (dibromoethan	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Hexane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Styrene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
4-Bromofluorobenzene	Surrogate	108%	108%	110%	109%
Dibromofluoromethane	Surrogate	105%	106%	104%	105%
Toluene-d8	Surrogate	100%	101%	103%	105%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	-

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 5-Dec-2019
Project Description: 191-13873-00

	Client ID:	BH19-1-SS6	BH19-2-SS2	BH19-3-SS3	DUP
	Sample Date:	04-Dec-19 09:00	04-Dec-19 09:00	04-Dec-19 09:00	04-Dec-19 09:00
	Sample ID:	1949466-01	1949466-02	1949466-03	1949466-04
	MDL/Units	Soil	Soil	Soil	Soil
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	0.03	<0.02	-
Benzo [a] pyrene	0.02 ug/g dry	<0.02	0.03	<0.02	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	0.03	<0.02	-
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	0.02	<0.02	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	0.02	<0.02	-
Chrysene	0.02 ug/g dry	<0.02	0.03	<0.02	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Fluoranthene	0.02 ug/g dry	<0.02	0.07	<0.02	-
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	<0.04	-
Naphthalene	0.01 ug/g dry	<0.01	<0.01	<0.01	-
Phenanthrene	0.02 ug/g dry	<0.02	0.04	<0.02	-
Pyrene	0.02 ug/g dry	<0.02	0.05	<0.02	-
2-Fluorobiphenyl	Surrogate	97.8%	70.5%	120%	-
Terphenyl-d14	Surrogate	124%	80.4%	118%	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
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	*1.25*		*ug/g*		*93.6*	*50-140*			
Surrogate: Terphenyl-d14	*1.31*		*ug/g*		*98.3*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*9.19*		*ug/g*		*115*	*50-140*			
Surrogate: Dibromofluoromethane	*8.35*		*ug/g*		*104*	*50-140*			
Surrogate: Toluene-d8	*8.30*		*ug/g*		*104*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			0.0	30	
F3 PHCs (C16-C34)	29	8	ug/g dry	36			19.6	30	
F4 PHCs (C34-C50)	13	6	ug/g dry	28			71.6	30	QR-01
Metals									
Antimony	ND	1.0	ug/g dry	ND			0.0	30	
Arsenic	2.5	1.0	ug/g dry	2.6			0.5	30	
Barium	235	1.0	ug/g dry	248			5.1	30	
Beryllium	0.7	0.5	ug/g dry	0.7			0.5	30	
Boron	ND	5.0	ug/g dry	ND			0.0	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	53.3	5.0	ug/g dry	54.4			1.9	30	
Cobalt	11.2	1.0	ug/g dry	11.9			5.9	30	
Copper	23.3	5.0	ug/g dry	23.8			1.8	30	
Lead	4.3	1.0	ug/g dry	4.5			2.9	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	26.3	5.0	ug/g dry	26.3			0.1	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.3	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND			0.0	30	
Vanadium	67.1	10.0	ug/g dry	68.5			2.0	30	
Zinc	70.8	20.0	ug/g dry	73.2			3.4	30	
Physical Characteristics									
% Solids	67.6	0.1	% by Wt.	67.2			0.6	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	0.020			0.0	40	
Acenaphthylene	0.084	0.02	ug/g dry	0.154			59.2	40	QR-01
Anthracene	0.095	0.02	ug/g dry	0.140			38.0	40	
Benzo [a] anthracene	0.154	0.02	ug/g dry	0.256			49.4	40	QR-01
Benzo [a] pyrene	0.214	0.02	ug/g dry	0.289			29.8	40	
Benzo [b] fluoranthene	0.405	0.02	ug/g dry	0.492			19.2	40	
Benzo [g,h,i] perylene	0.186	0.02	ug/g dry	0.513			93.8	40	QR-01
Benzo [k] fluoranthene	0.196	0.02	ug/g dry	0.211			7.3	40	
Chrysene	0.349	0.02	ug/g dry	0.379			8.3	40	
Dibenzo [a,h] anthracene	0.022	0.02	ug/g dry	0.049			74.2	40	QR-01
Fluoranthene	0.401	0.02	ug/g dry	0.560			33.1	40	
Fluorene	ND	0.02	ug/g dry	ND			0.0	40	
Indeno [1,2,3-cd] pyrene	0.143	0.02	ug/g dry	0.400			94.7	40	QR-01
1-Methylnaphthalene	0.058	0.02	ug/g dry	0.065			10.5	40	
2-Methylnaphthalene	0.072	0.02	ug/g dry	0.075			3.5	40	
Naphthalene	0.217	0.01	ug/g dry	0.328			40.5	40	QR-01
Phenanthrene	0.202	0.02	ug/g dry	0.262			25.8	40	
Pyrene	0.399	0.02	ug/g dry	0.569			35.1	40	
Surrogate: 2-Fluorobiphenyl	*1.52*		*ug/g dry*		*87.0*	*50-140*			
Surrogate: Terphenyl-d14	*1.29*		*ug/g dry*		*73.5*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g dry	ND				50	
Benzene	ND	0.02	ug/g dry	ND				50	
Bromodichloromethane	ND	0.05	ug/g dry	ND				50	
Bromoform	ND	0.05	ug/g dry	ND				50	
Bromomethane	ND	0.05	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND				50	
Chlorobenzene	ND	0.05	ug/g dry	ND				50	
Chloroform	ND	0.05	ug/g dry	ND				50	
Dibromochloromethane	ND	0.05	ug/g dry	ND				50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Ethylene dibromide (dibromoethane	ND	0.05	ug/g dry	ND				50	
Hexane	ND	0.05	ug/g dry	ND				50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND				50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND				50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND				50	
Methylene Chloride	ND	0.05	ug/g dry	ND				50	
Styrene	ND	0.05	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND				50	
Trichloroethylene	ND	0.05	ug/g dry	ND				50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND				50	
Vinyl chloride	ND	0.02	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	*9.88*		*ug/g dry*		*107*	*50-140*			
Surrogate: Dibromofluoromethane	*9.67*		*ug/g dry*		*104*	*50-140*			
Surrogate: Toluene-d8	*9.57*		*ug/g dry*		*103*	*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)	177	7	ug/g		88.4	80-120			
F2 PHCs (C10-C16)	98	4	ug/g	ND	108	60-140			
F3 PHCs (C16-C34)	289	8	ug/g	36	114	60-140			
F4 PHCs (C34-C50)	175	6	ug/g	28	105	60-140			
Metals									
Antimony	45.6		ug/L		91.2	70-130			
Arsenic	54.8		ug/L		110	70-130			
Barium	52.7		ug/L		105	70-130			
Beryllium	58.7		ug/L		117	70-130			
Boron	51.5		ug/L		103	70-130			
Cadmium	54.4		ug/L		109	70-130			
Chromium	60.4		ug/L		121	70-130			
Cobalt	48.9		ug/L		97.8	70-130			
Copper	56.1		ug/L		112	70-130			
Lead	44.0		ug/L		87.9	70-130			
Molybdenum	51.9		ug/L		104	70-130			
Nickel	55.9		ug/L		112	70-130			
Selenium	55.4		ug/L		111	70-130			
Silver	49.7		ug/L		99.4	70-130			
Thallium	47.4		ug/L		94.9	70-130			
Uranium	47.8		ug/L		95.5	70-130			
Vanadium	59.0		ug/L		118	70-130			
Zinc	53.4		ug/L		107	70-130			
Semi-Volatiles									
Acenaphthene	0.175	0.02	ug/g	0.020	70.5	50-140			
Acenaphthylene	0.124	0.02	ug/g		74.5	50-140			
Anthracene	0.139	0.02	ug/g		83.4	50-140			
Benzo [a] anthracene	0.121	0.02	ug/g		72.8	50-140			
Benzo [a] pyrene	0.117	0.02	ug/g		70.4	50-140			
Benzo [b] fluoranthene	0.130	0.02	ug/g		77.9	50-140			
Benzo [g,h,i] perylene	0.209	0.02	ug/g		125	50-140			
Benzo [k] fluoranthene	0.134	0.02	ug/g		80.1	50-140			
Chrysene	0.163	0.02	ug/g		97.5	50-140			
Dibenzo [a,h] anthracene	0.204	0.02	ug/g		123	50-140			
Fluoranthene	0.127	0.02	ug/g		76.1	50-140			
Fluorene	0.134	0.02	ug/g		80.3	50-140			
Indeno [1,2,3-cd] pyrene	0.178	0.02	ug/g		107	50-140			
1-Methylnaphthalene	0.146	0.02	ug/g		87.8	50-140			
2-Methylnaphthalene	0.167	0.02	ug/g		100	50-140			
Naphthalene	0.172	0.01	ug/g		103	50-140			
Phenanthrene	0.133	0.02	ug/g		80.0	50-140			
Pyrene	0.129	0.02	ug/g		77.3	50-140			
Surrogate: 2-Fluorobiphenyl	*1.22*		*ug/g*		*69.5*	*50-140*			
Volatiles									
Acetone	7.17	0.50	ug/g		71.7	50-140			
Benzene	3.64	0.02	ug/g		90.9	60-130			
Bromodichloromethane	4.19	0.05	ug/g		105	60-130			
Bromoform	4.51	0.05	ug/g		113	60-130			
Bromomethane	4.28	0.05	ug/g		107	50-140			
Carbon Tetrachloride	4.09	0.05	ug/g		102	60-130			

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 5-Dec-2019
Project Description: 191-13873-00

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chlorobenzene	4.35	0.05	ug/g		109	60-130			
Chloroform	4.18	0.05	ug/g		104	60-130			
Dibromochloromethane	4.80	0.05	ug/g		120	60-130			
Dichlorodifluoromethane	4.32	0.05	ug/g		108	50-140			
1,2-Dichlorobenzene	4.46	0.05	ug/g		112	60-130			
1,3-Dichlorobenzene	4.17	0.05	ug/g		104	60-130			
1,4-Dichlorobenzene	4.44	0.05	ug/g		111	60-130			
1,1-Dichloroethane	4.20	0.05	ug/g		105	60-130			
1,2-Dichloroethane	3.86	0.05	ug/g		96.5	60-130			
1,1-Dichloroethylene	3.77	0.05	ug/g		94.3	60-130			
cis-1,2-Dichloroethylene	4.10	0.05	ug/g		102	60-130			
trans-1,2-Dichloroethylene	3.77	0.05	ug/g		94.2	60-130			
1,2-Dichloropropane	4.02	0.05	ug/g		101	60-130			
cis-1,3-Dichloropropylene	3.51	0.05	ug/g		87.7	60-130			
trans-1,3-Dichloropropylene	2.81	0.05	ug/g		70.2	60-130			
Ethylbenzene	4.50	0.05	ug/g		113	60-130			
Ethylene dibromide (dibromoethane	4.01	0.05	ug/g		100	60-130			
Hexane	3.60	0.05	ug/g		89.9	60-130			
Methyl Ethyl Ketone (2-Butanone)	10.6	0.50	ug/g		106	50-140			
Methyl Isobutyl Ketone	7.43	0.50	ug/g		74.3	50-140			
Methyl tert-butyl ether	7.15	0.05	ug/g		71.5	50-140			
Methylene Chloride	3.39	0.05	ug/g		84.6	60-130			
Styrene	4.28	0.05	ug/g		107	60-130			
1,1,1,2-Tetrachloroethane	4.92	0.05	ug/g		123	60-130			
1,1,2,2-Tetrachloroethane	3.76	0.05	ug/g		93.9	60-130			
Tetrachloroethylene	4.16	0.05	ug/g		104	60-130			
Toluene	4.00	0.05	ug/g		100	60-130			
1,1,1-Trichloroethane	3.77	0.05	ug/g		94.4	60-130			
1,1,2-Trichloroethane	3.14	0.05	ug/g		78.5	60-130			
Trichloroethylene	3.13	0.05	ug/g		78.4	60-130			
Trichlorofluoromethane	3.61	0.05	ug/g		90.2	50-140			
Vinyl chloride	4.19	0.02	ug/g		105	50-140			
m,p-Xylenes	8.55	0.05	ug/g		107	60-130			
o-Xylene	4.42	0.05	ug/g		110	60-130			

Qualifier Notes:

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 1949466

Head Office
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 122898

Page 1 of 1

Client Name: WSP CANADA INC	Project Reference: 191-3873-00	**Turnaround Time:**	
Contact Name: ADRIAN MENYHART	Quote # WSP 19-029	☐ 1 Day	☑ 3 Day
Address: QUEENSVIEW DRIVE OTTAWA	PO #	☐ 2 Day	☑ Regular
Telephone:	Email Address: adrian.menyhart@wsp.com	Date Required:	

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

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

Required Analyses

Paracel Order Number: 1949466

	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	BH19-1-SS6	S		3	DEC 4 2019		✓	✓	✓									RX 120mL+	DUP1	✓
2	BH19-2-SS2	|		|	|		✓	✓	✓	✓									✓
3	BH19-3-SS3	|		|	|		✓	✓	✓								↓		✓
4	DUP	|		|	|			✓											✓
5																				
6																				
7																				
8																				
9																				
10																				

Comments: NO.1 date read = DEC 03 2019.

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: T. Fearse	Received at Lab: Juneepoom Dokmai	Verified By:
Relinquished By (Print): ADRIAN MENYHART	Date/Time: 05/12/19 3:40 PM	Date/Time: DEC 05, 2019 04.45	Date/Time: 12-5-19 17:19
Date/Time: DEC 5 2019	Temperature: °C	Temperature: 16.3 °C	pH Verified [ ] By:

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Certificate of Analysis

WSP Canada Inc. (Ottawa)

2611 Queensview Dr
Ottawa, ON K2B 8K2
Attn: Adrian Menyhart

Client PO:
Project: 191-13873-00
Custody:

Report Date: 18-Dec-2019
Order Date: 13-Dec-2019

Order #: 1950609

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

Paracel ID	Client ID
1950609-01	BH19-1-SS4

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 18-Dec-2019
Order Date: 13-Dec-2019
Project Description: 191-13873-00

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	15-Dec-19	17-Dec-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	13-Dec-19	16-Dec-19
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	15-Dec-19	17-Dec-19
Solids, %	Gravimetric, calculation	16-Dec-19	16-Dec-19

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 18-Dec-2019
Order Date: 13-Dec-2019
Project Description: 191-13873-00

	Client ID:	BH19-1-SS4	-	-	-
	Sample Date:	03-Dec-19 09:00	-	-	-
	Sample ID:	1950609-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	84.7	-	-	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	-	-	-
Benzene	0.02 ug/g dry	<0.02	-	-	-
Bromodichloromethane	0.05 ug/g dry	<0.05	-	-	-
Bromoform	0.05 ug/g dry	<0.05	-	-	-
Bromomethane	0.05 ug/g dry	<0.05	-	-	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	-	-	-
Chlorobenzene	0.05 ug/g dry	<0.05	-	-	-
Chloroform	0.05 ug/g dry	<0.05	-	-	-
Dibromochloromethane	0.05 ug/g dry	<0.05	-	-	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	-	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	-	-	-
Ethylbenzene	0.05 ug/g dry	0.22	-	-	-
Ethylene dibromide (dibromoethan	0.05 ug/g dry	<0.05	-	-	-
Hexane	0.05 ug/g dry	0.09	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	-	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	-	-	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	-	-	-
Methylene Chloride	0.05 ug/g dry	<0.05	-	-	-
Styrene	0.05 ug/g dry	<0.05	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	-	-	-

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 18-Dec-2019
Order Date: 13-Dec-2019
Project Description: 191-13873-00

	Client ID:	BH19-1-SS4	-	-	-
	Sample Date:	03-Dec-19 09:00	-	-	-
	Sample ID:	1950609-01	-	-	-
	MDL/Units	Soil	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
Trichloroethylene	0.05 ug/g dry	<0.05	-	-	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	-	-	-
Vinyl chloride	0.02 ug/g dry	<0.02	-	-	-
m,p-Xylenes	0.05 ug/g dry	0.06	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	0.06	-	-	-
4-Bromofluorobenzene	Surrogate	94.4%	-	-	-
Dibromofluoromethane	Surrogate	106%	-	-	-
Toluene-d8	Surrogate	105%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	121	-	-	-
F2 PHCs (C10-C16)	4 ug/g dry	3040	-	-	-
F3 PHCs (C16-C34)	8 ug/g dry	2430	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*9.62*		*ug/g*		*120*	*50-140*			
Surrogate: Dibromofluoromethane	*8.63*		*ug/g*		*108*	*50-140*			
Surrogate: Toluene-d8	*7.71*		*ug/g*		*96.4*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	4280	4	ug/g dry	2750			43.7	30	QR-04
F3 PHCs (C16-C34)	1530	8	ug/g dry	952			46.5	30	QR-04
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Physical Characteristics									
% Solids	84.4	0.1	% by Wt.	84.1			0.4	25	
Volatiles									
Acetone	ND	0.50	ug/g dry	ND				50	
Benzene	ND	0.02	ug/g dry	ND				50	
Bromodichloromethane	ND	0.05	ug/g dry	ND				50	
Bromoform	ND	0.05	ug/g dry	ND				50	
Bromomethane	ND	0.05	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND				50	
Chlorobenzene	ND	0.05	ug/g dry	ND				50	
Chloroform	ND	0.05	ug/g dry	ND				50	
Dibromochloromethane	ND	0.05	ug/g dry	ND				50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Ethylene dibromide (dibromoethane	ND	0.05	ug/g dry	ND				50	
Hexane	ND	0.05	ug/g dry	ND				50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND				50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND				50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND				50	
Methylene Chloride	ND	0.05	ug/g dry	ND				50	
Styrene	ND	0.05	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND				50	
Trichloroethylene	ND	0.05	ug/g dry	ND				50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND				50	
Vinyl chloride	ND	0.02	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	*10.7*		*ug/g dry*		*107*	*50-140*			
Surrogate: Dibromofluoromethane	*10.7*		*ug/g dry*		*107*	*50-140*			
Surrogate: Toluene-d8	*10.5*		*ug/g dry*		*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)	175	7	ug/g		87.6	80-120			
F2 PHCs (C10-C16)	92	4	ug/g		115	80-120			
F3 PHCs (C16-C34)	227	8	ug/g		116	80-120			
F4 PHCs (C34-C50)	123	6	ug/g		99.2	80-120			
Volatiles									
Acetone	6.15	0.50	ug/g		61.5	50-140			
Benzene	4.17	0.02	ug/g		104	60-130			
Bromodichloromethane	4.31	0.05	ug/g		108	60-130			
Bromoform	3.44	0.05	ug/g		86.0	60-130			
Bromomethane	4.98	0.05	ug/g		124	50-140			
Carbon Tetrachloride	3.78	0.05	ug/g		94.5	60-130			
Chlorobenzene	4.29	0.05	ug/g		107	60-130			
Chloroform	4.29	0.05	ug/g		107	60-130			
Dibromochloromethane	4.18	0.05	ug/g		105	60-130			
Dichlorodifluoromethane	5.09	0.05	ug/g		127	50-140			
1,2-Dichlorobenzene	4.18	0.05	ug/g		105	60-130			
1,3-Dichlorobenzene	4.29	0.05	ug/g		107	60-130			
1,4-Dichlorobenzene	4.12	0.05	ug/g		103	60-130			
1,1-Dichloroethane	4.49	0.05	ug/g		112	60-130			
1,2-Dichloroethane	3.84	0.05	ug/g		96.1	60-130			
1,1-Dichloroethylene	4.73	0.05	ug/g		118	60-130			
cis-1,2-Dichloroethylene	4.49	0.05	ug/g		112	60-130			
trans-1,2-Dichloroethylene	4.34	0.05	ug/g		108	60-130			
1,2-Dichloropropane	4.25	0.05	ug/g		106	60-130			
cis-1,3-Dichloropropylene	3.77	0.05	ug/g		94.2	60-130			
trans-1,3-Dichloropropylene	2.60	0.05	ug/g		64.9	60-130			
Ethylbenzene	4.44	0.05	ug/g		111	60-130			
Ethylene dibromide (dibromoethane	3.92	0.05	ug/g		98.1	60-130			
Hexane	4.12	0.05	ug/g		103	60-130			
Methyl Ethyl Ketone (2-Butanone)	10.1	0.50	ug/g		101	50-140			
Methyl Isobutyl Ketone	6.64	0.50	ug/g		66.4	50-140			
Methyl tert-butyl ether	6.60	0.05	ug/g		66.0	50-140			
Methylene Chloride	3.67	0.05	ug/g		91.7	60-130			
Styrene	4.21	0.05	ug/g		105	60-130			
1,1,1,2-Tetrachloroethane	4.47	0.05	ug/g		112	60-130			
1,1,2,2-Tetrachloroethane	3.17	0.05	ug/g		79.2	60-130			
Tetrachloroethylene	4.12	0.05	ug/g		103	60-130			
Toluene	4.11	0.05	ug/g		103	60-130			
1,1,1-Trichloroethane	3.93	0.05	ug/g		98.4	60-130			
1,1,2-Trichloroethane	3.53	0.05	ug/g		88.3	60-130			
Trichloroethylene	4.19	0.05	ug/g		105	60-130			
Trichlorofluoromethane	4.05	0.05	ug/g		101	50-140			
Vinyl chloride	4.59	0.02	ug/g		115	50-140			
m,p-Xylenes	8.33	0.05	ug/g		104	60-130			
o-Xylene	4.31	0.05	ug/g		108	60-130			
Surrogate: 4-Bromofluorobenzene	*7.88*		*ug/g*		*98.5*	*50-140*			

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.

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.

13873.

PARACEL LABORATORIES

Paracel ID: 1950609

Head Office
300-2319 St. Laurent Blvd
Ottawa, Ontario K1G 4J8
1-800-749-1947
paracel@paracellabs.com
www.paracellabs.com

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
1950609	

Client Name: WSP	Project Ref: 191-13873-00	Page 1 of 1
Contact Name: ADRIAN MENYHART	Quote #: ~~P59~~ 19-029	**Turnaround Time**
Address: QUEENSVIEW DRIVE, OTTAWA	PO #:	☐ 1 day ☑ 3 day
Telephone: 343-961-1429	E-mail: adrian.menyhart@wsp.com	☑ 2 day ☐ Regular
		Date Required:

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)						
1	BH19-1-SS4	S		2	Dec 3 2019		✓	✓										250 + VOC	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received By Driver/Depot: T. LOUISE	Received at Lab:	Verified By:
Relinquished By (Print): ADRIAN MENYHART	Date/Time: 13/12/19 11 00	Date/Time: Dec 13/19 2:20	Date/Time: 13-12-19 14:37
Date/Time: Dec 13 2019	Temperature: °C AM	Temperature: 14.2 °C	pH Verified: ☐ By:

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Certificate of Analysis

WSP Canada Inc. (Ottawa)

2611 Queensview Dr
Ottawa, ON K2B 8K2
Attn: Adrian Menyhart

Client PO:
Project: 191-13873- 00:300:02
Custody:

Report Date: 30-Dec-2019
Order Date: 20-Dec-2019

Order #: 1951587

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

Paracel ID	Client ID
1951587-01	BH19-04-SS3
1951587-02	DUP1
1951587-03	BH19-05-SS5

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 30-Dec-2019
Order Date: 20-Dec-2019
Project Description: 191-13873- 00:300:02

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	27-Dec-19	27-Dec-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	21-Dec-19	23-Dec-19
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	21-Dec-19	23-Dec-19
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	27-Dec-19	27-Dec-19
Solids, %	Gravimetric, calculation	24-Dec-19	24-Dec-19

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 30-Dec-2019
Order Date: 20-Dec-2019
Project Description: 191-13873- 00:300:02

	Client ID:	BH19-04-SS3	DUP1	BH19-05-SS5	-
	Sample Date:	17-Dec-19 09:00	17-Dec-19 09:00	18-Dec-19 09:00	-
	Sample ID:	1951587-01	1951587-02	1951587-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	88.9	90.2	80.0	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	-	<0.50	-
Benzene	0.02 ug/g dry	<0.02	-	<0.02	-
Bromodichloromethane	0.05 ug/g dry	<0.05	-	<0.05	-
Bromoform	0.05 ug/g dry	<0.05	-	<0.05	-
Bromomethane	0.05 ug/g dry	<0.05	-	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	-	<0.05	-
Chlorobenzene	0.05 ug/g dry	<0.05	-	<0.05	-
Chloroform	0.05 ug/g dry	<0.05	-	<0.05	-
Dibromochloromethane	0.05 ug/g dry	<0.05	-	<0.05	-
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 (dibromoethan	0.05 ug/g dry	<0.05	-	<0.05	-
Hexane	0.05 ug/g dry	<0.05	-	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	-	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	-	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	-	<0.05	-
Methylene Chloride	0.05 ug/g dry	<0.05	-	<0.05	-
Styrene	0.05 ug/g dry	<0.05	-	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	-	<0.05	-

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 30-Dec-2019
Order Date: 20-Dec-2019
Project Description: 191-13873- 00:300:02

	Client ID:	BH19-04-SS3	DUP1	BH19-05-SS5	-
	Sample Date:	17-Dec-19 09:00	17-Dec-19 09:00	18-Dec-19 09:00	-
	Sample ID:	1951587-01	1951587-02	1951587-03	-
	MDL/Units	Soil	Soil	Soil	-
Toluene	0.05 ug/g dry	<0.05	-	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	-	<0.05	-
Trichloroethylene	0.05 ug/g dry	<0.05	-	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	-	<0.05	-
Vinyl chloride	0.02 ug/g dry	<0.02	-	<0.02	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	<0.05	-
o-Xylene	0.05 ug/g dry	<0.05	-	<0.05	-
Xylenes, total	0.05 ug/g dry	<0.05	-	<0.05	-
4-Bromofluorobenzene	Surrogate	107%	-	99.6%	-
Dibromofluoromethane	Surrogate	84.7%	-	85.6%	-
Toluene-d8	Surrogate	107%	-	95.5%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	12	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	297	-
F3 PHCs (C16-C34)	8 ug/g dry	25	-	269	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	<6	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	0.10	-
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Chrysene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Fluorene	0.02 ug/g dry	<0.02	<0.02	0.11	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	0.66	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	1.55	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	2.21	-
Naphthalene	0.01 ug/g dry	<0.01	<0.01	0.20	-
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	0.33	-

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 30-Dec-2019
Order Date: 20-Dec-2019
Project Description: 191-13873- 00:300:02

	Client ID:	BH19-04-SS3	DUP1	BH19-05-SS5	-
	Sample Date:	17-Dec-19 09:00	17-Dec-19 09:00	18-Dec-19 09:00	-
	Sample ID:	1951587-01	1951587-02	1951587-03	-
	MDL/Units	Soil	Soil	Soil	-
Pyrene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
2-Fluorobiphenyl	Surrogate	75.8%	96.3%	127%	-
Terphenyl-d14	Surrogate	91.7%	103%	139%	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
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	*1.32*		*ug/g*		*99.1*	*50-140*			
Surrogate: Terphenyl-d14	*1.36*		*ug/g*		*102*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 30-Dec-2019
Order Date: 20-Dec-2019
Project Description: 191-13873- 00:300:02

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	*3.54*		*ug/g*		*111*	*50-140*			
Surrogate: Dibromofluoromethane	*2.95*		*ug/g*		*92.3*	*50-140*			
Surrogate: Toluene-d8	*3.33*		*ug/g*		*104*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	352	4	ug/g dry	113			103.0	30	QR-04
F3 PHCs (C16-C34)	349	8	ug/g dry	124			95.3	30	QR-04
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Physical Characteristics									
% Solids	70.3	0.1	% by Wt.	71.3			1.5	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND				40	
Anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND				40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND				40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND				40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND				40	
Chrysene	ND	0.02	ug/g dry	ND				40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	ND	0.02	ug/g dry	ND				40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND				40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
Naphthalene	ND	0.01	ug/g dry	ND				40	
Phenanthrene	ND	0.02	ug/g dry	ND				40	
Pyrene	ND	0.02	ug/g dry	ND				40	
Surrogate: 2-Fluorobiphenyl	*1.25*		*ug/g dry*		*87.8*	*50-140*			
Surrogate: Terphenyl-d14	*1.45*		*ug/g dry*		*102*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g dry	ND				50	
Benzene	ND	0.02	ug/g dry	ND				50	
Bromodichloromethane	ND	0.05	ug/g dry	ND				50	
Bromoform	ND	0.05	ug/g dry	ND				50	
Bromomethane	ND	0.05	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND				50	
Chlorobenzene	ND	0.05	ug/g dry	ND				50	
Chloroform	ND	0.05	ug/g dry	ND				50	
Dibromochloromethane	ND	0.05	ug/g dry	ND				50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Ethylene dibromide (dibromoethane	ND	0.05	ug/g dry	ND				50	
Hexane	ND	0.05	ug/g dry	ND				50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND				50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND				50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND				50	
Methylene Chloride	ND	0.05	ug/g dry	ND				50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Styrene	ND	0.05	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND				50	
Trichloroethylene	ND	0.05	ug/g dry	ND				50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND				50	
Vinyl chloride	ND	0.02	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	*3.58*		*ug/g dry*		*98.8*	*50-140*			
Surrogate: Dibromofluoromethane	*3.03*		*ug/g dry*		*83.5*	*50-140*			
Surrogate: Toluene-d8	*3.67*		*ug/g dry*		*101*	*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)	206	7	ug/g		103	80-120			
F2 PHCs (C10-C16)	329	4	ug/g	113	179	60-140			QM-06
F3 PHCs (C16-C34)	540	8	ug/g	124	141	60-140			QM-06
F4 PHCs (C34-C50)	174	6	ug/g	ND	92.7	60-140			
Semi-Volatiles									
Acenaphthene	0.174	0.02	ug/g	ND	97.6	50-140			
Acenaphthylene	0.147	0.02	ug/g	ND	82.7	50-140			
Anthracene	0.168	0.02	ug/g	ND	94.5	50-140			
Benzo [a] anthracene	0.149	0.02	ug/g	ND	83.5	50-140			
Benzo [a] pyrene	0.126	0.02	ug/g	ND	70.9	50-140			
Benzo [b] fluoranthene	0.207	0.02	ug/g	ND	116	50-140			
Benzo [g,h,i] perylene	0.143	0.02	ug/g	ND	80.0	50-140			
Benzo [k] fluoranthene	0.195	0.02	ug/g	ND	110	50-140			
Chrysene	0.193	0.02	ug/g	ND	108	50-140			
Dibenzo [a,h] anthracene	0.115	0.02	ug/g	ND	64.3	50-140			
Fluoranthene	0.160	0.02	ug/g	ND	90.0	50-140			
Fluorene	0.171	0.02	ug/g	ND	96.1	50-140			
Indeno [1,2,3-cd] pyrene	0.113	0.02	ug/g	ND	63.3	50-140			
1-Methylnaphthalene	0.130	0.02	ug/g	ND	73.2	50-140			
2-Methylnaphthalene	0.207	0.02	ug/g	ND	116	50-140			
Naphthalene	0.185	0.01	ug/g	ND	104	50-140			
Phenanthrene	0.170	0.02	ug/g	ND	95.2	50-140			
Pyrene	0.164	0.02	ug/g	ND	92.3	50-140			
Surrogate: 2-Fluorobiphenyl	*1.47*		*ug/g*		*103*	*50-140*			
Volatiles									
Acetone	9.74	0.50	ug/g		97.4	50-140			
Benzene	2.86	0.02	ug/g		71.4	60-130			
Bromodichloromethane	3.67	0.05	ug/g		91.8	60-130			
Bromoform	5.04	0.05	ug/g		126	60-130			
Bromomethane	3.11	0.05	ug/g		77.6	50-140			
Carbon Tetrachloride	4.45	0.05	ug/g		111	60-130			
Chlorobenzene	4.48	0.05	ug/g		112	60-130			
Chloroform	3.64	0.05	ug/g		90.9	60-130			
Dibromochloromethane	4.73	0.05	ug/g		118	60-130			
Dichlorodifluoromethane	3.61	0.05	ug/g		90.3	50-140			
1,2-Dichlorobenzene	4.00	0.05	ug/g		100	60-130			
1,3-Dichlorobenzene	4.02	0.05	ug/g		100	60-130			
1,4-Dichlorobenzene	4.29	0.05	ug/g		107	60-130			
1,1-Dichloroethane	3.40	0.05	ug/g		84.9	60-130			
1,2-Dichloroethane	3.73	0.05	ug/g		93.2	60-130			
1,1-Dichloroethylene	4.55	0.05	ug/g		114	60-130			
cis-1,2-Dichloroethylene	2.73	0.05	ug/g		68.3	60-130			
trans-1,2-Dichloroethylene	4.28	0.05	ug/g		107	60-130			
1,2-Dichloropropane	2.56	0.05	ug/g		63.9	60-130			
cis-1,3-Dichloropropylene	3.28	0.05	ug/g		81.9	60-130			
trans-1,3-Dichloropropylene	3.42	0.05	ug/g		85.4	60-130			
Ethylbenzene	4.84	0.05	ug/g		121	60-130			
Ethylene dibromide (dibromoethane	3.56	0.05	ug/g		89.0	60-130			
Hexane	2.80	0.05	ug/g		70.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	7.54	0.50	ug/g		75.4	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl Isobutyl Ketone	7.81	0.50	ug/g		78.1	50-140			
Methyl tert-butyl ether	11.1	0.05	ug/g		111	50-140			
Methylene Chloride	4.70	0.05	ug/g		117	60-130			
Styrene	4.70	0.05	ug/g		117	60-130			
1,1,1,2-Tetrachloroethane	5.11	0.05	ug/g		128	60-130			
1,1,2,2-Tetrachloroethane	4.57	0.05	ug/g		114	60-130			
Tetrachloroethylene	4.62	0.05	ug/g		115	60-130			
Toluene	4.63	0.05	ug/g		116	60-130			
1,1,1-Trichloroethane	3.85	0.05	ug/g		96.3	60-130			
1,1,2-Trichloroethane	2.65	0.05	ug/g		66.1	60-130			
Trichloroethylene	2.64	0.05	ug/g		66.0	60-130			
Trichlorofluoromethane	5.18	0.05	ug/g		129	50-140			
Vinyl chloride	3.28	0.02	ug/g		82.1	50-140			
m,p-Xylenes	10.2	0.05	ug/g		128	60-130			
o-Xylene	5.04	0.05	ug/g		126	60-130			

Qualifier Notes:

QC Qualifiers :

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

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.

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

Paracel ID: 1951587

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
1951587	

Client Name: WSP CANADA INC.
Contact Name: ADRIAN MENYHART
Address: 2611 QUEENSVIEW DRIVE, OTTAWA
Telephone: 613-690-3852

Project Ref: 191-13873-00, 300, 02
Quote #: 19-029
PO #:
E-mail: adrian.menyhart@wsp.com

Page 1 of 1

Turnaround Time

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

Regulation 153/04

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

Other Regulation

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

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

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	BH19-04-SS3	S		2	DEC 17		/	/	/										
2	BH19-04-SS4			2	DEC 17		/	/	/						HOLD				
3	DUP 1			1	DEC 17			.	/										
4	BH19-05-SS5			3	DEC 18		/	/	/						✓				
5	BH19-05-SS8			3	DEC 18		/	/	/						HOLD				
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Courier

Relinquished By (Sign):	Received By Driver/Depot: 1493 Dec 20	Received at Lab: Bam	Verified By: Bam
Relinquished By (Print): ADRIAN MENYHART	Date/Time:	Date/Time: 12/20/19 17:45	Date/Time: 12/21/19 11:47
Date/Time: Dec 20 2019.	Temperature: °C	Temperature: 17.8 °C	pH Verified: ☐ By:

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Certificate of Analysis

WSP Canada Inc. (Ottawa)

2611 Queensview Dr
Ottawa, ON K2B 8K2
Attn: Adrian Menyhart

Client PO:
Project: 191-13873-00
Custody: 124448

Report Date: 11-Dec-2019
Order Date: 6-Dec-2019

Order #: 1949573

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

Paracel ID	Client ID
1949573-01	BH19-1-GW1
1949573-02	BH19-2-GW1
1949573-03	BH19-3-GW1
1949573-04	BH19-GHD-1-GW1
1949573-05	BH19-GHD-3-GW1
1949573-06	DUP

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 6-Dec-2019
Project Description: 191-13873-00

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	11-Dec-19	11-Dec-19
PHC F1	CWS Tier 1 - P&T GC-FID	10-Dec-19	11-Dec-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	10-Dec-19	11-Dec-19
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	9-Dec-19	9-Dec-19
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	10-Dec-19	11-Dec-19

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 6-Dec-2019
Project Description: 191-13873-00

	Client ID:	BH19-1-GW1	BH19-2-GW1	BH19-3-GW1	BH19-GHD-1-GW1
	Sample Date:	06-Dec-19 12:00	06-Dec-19 12:00	06-Dec-19 12:00	06-Dec-19 12:00
	Sample ID:	1949573-01	1949573-02	1949573-03	1949573-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	8.2	-
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	8.2	<0.5	<0.5	-
Ethylene dibromide (dibromoethan	0.2 ug/L	<0.2	<0.2	<0.2	-
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 6-Dec-2019
Project Description: 191-13873-00

	Client ID:	BH19-1-GW1	BH19-2-GW1	BH19-3-GW1	BH19-GHD-1-GW1
	Sample Date:	06-Dec-19 12:00	06-Dec-19 12:00	06-Dec-19 12:00	06-Dec-19 12:00
	Sample ID:	1949573-01	1949573-02	1949573-03	1949573-04
	MDL/Units	Water	Water	Water	Water
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
4-Bromofluorobenzene	Surrogate	96.7%	118%	119%	-
Dibromofluoromethane	Surrogate	107%	92.0%	96.7%	-
Toluene-d8	Surrogate	97.5%	95.9%	97.5%	-
Benzene	0.5 ug/L	-	-	-	<0.5
Ethylbenzene	0.5 ug/L	-	-	-	<0.5
Toluene	0.5 ug/L	-	-	-	<0.5
m,p-Xylenes	0.5 ug/L	-	-	-	<0.5
o-Xylene	0.5 ug/L	-	-	-	<0.5
Xylenes, total	0.5 ug/L	-	-	-	<0.5
Toluene-d8	Surrogate	-	-	-	96.3%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	170	-	<25	<25
F2 PHCs (C10-C16)	100 ug/L	608	-	<100	<100
F3 PHCs (C16-C34)	100 ug/L	295	-	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	-	<100	<100
Semi-Volatiles					
Acenaphthene	0.05 ug/L	0.25	-	<0.05	-
Acenaphthylene	0.05 ug/L	<0.05	-	<0.05	-
Anthracene	0.01 ug/L	<0.01	-	<0.01	-
Benzo [a] anthracene	0.01 ug/L	<0.01	-	<0.01	-
Benzo [a] pyrene	0.01 ug/L	<0.01	-	<0.01	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	-	<0.05	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	-	<0.05	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	-	<0.05	-
Chrysene	0.05 ug/L	<0.05	-	<0.05	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	-	<0.05	-
Fluoranthene	0.01 ug/L	<0.01	-	<0.01	-
Fluorene	0.05 ug/L	0.30	-	<0.05	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	-	<0.05	-

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 11-Dec-2019

Order Date: 6-Dec-2019

Project Description: 191-13873-00

	Client ID:	BH19-1-GW1	BH19-2-GW1	BH19-3-GW1	BH19-GHD-1-GW1
	Sample Date:	06-Dec-19 12:00	06-Dec-19 12:00	06-Dec-19 12:00	06-Dec-19 12:00
	Sample ID:	1949573-01	1949573-02	1949573-03	1949573-04
	MDL/Units	Water	Water	Water	Water
1-Methylnaphthalene	0.05 ug/L	4.46	-	0.07	-
2-Methylnaphthalene	0.05 ug/L	8.27	-	0.11	-
Methylnaphthalene (1&2)	0.10 ug/L	12.7	-	0.18	-
Naphthalene	0.05 ug/L	5.12	-	<0.05	-
Phenanthrene	0.05 ug/L	0.33	-	<0.05	-
Pyrene	0.01 ug/L	<0.01	-	<0.01	-
2-Fluorobiphenyl	Surrogate	88.3%	-	92.0%	-
Terphenyl-d14	Surrogate	97.5%	-	117%	-

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 6-Dec-2019
Project Description: 191-13873-00

	Client ID:	BH19-GHD-3-GW1	DUP	-	-
	Sample Date:	06-Dec-19 12:00	06-Dec-19 12:00	-	-
	Sample ID:	1949573-05	1949573-06	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Acetone	5.0 ug/L	-	<5.0	-	-
Benzene	0.5 ug/L	-	<0.5	-	-
Bromodichloromethane	0.5 ug/L	-	<0.5	-	-
Bromoform	0.5 ug/L	-	<0.5	-	-
Bromomethane	0.5 ug/L	-	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	-	<0.2	-	-
Chlorobenzene	0.5 ug/L	-	<0.5	-	-
Chloroform	0.5 ug/L	-	<0.5	-	-
Dibromochloromethane	0.5 ug/L	-	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	-	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	-	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	-	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	-	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	-	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	-	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	-	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	-	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	-	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	-	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	-	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	-	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	-	<0.5	-	-
Ethylbenzene	0.5 ug/L	-	8.1	-	-
Ethylene dibromide (dibromoethar	0.2 ug/L	-	<0.2	-	-
Hexane	1.0 ug/L	-	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	-	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	-	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	-	<2.0	-	-
Methylene Chloride	5.0 ug/L	-	<5.0	-	-
Styrene	0.5 ug/L	-	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	-	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	-	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	-	<0.5	-	-
Toluene	0.5 ug/L	-	<0.5	-	-

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 11-Dec-2019
Order Date: 6-Dec-2019
Project Description: 191-13873-00

	Client ID:	BH19-GHD-3-GW1	DUP	-	-
	Sample Date:	06-Dec-19 12:00	06-Dec-19 12:00	-	-
	Sample ID:	1949573-05	1949573-06	-	-
	MDL/Units	Water	Water	-	-
1,1,1-Trichloroethane	0.5 ug/L	-	<0.5	-	-
1,1,2-Trichloroethane	0.5 ug/L	-	<0.5	-	-
Trichloroethylene	0.5 ug/L	-	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	-	<1.0	-	-
Vinyl chloride	0.5 ug/L	-	<0.5	-	-
m,p-Xylenes	0.5 ug/L	-	<0.5	-	-
o-Xylene	0.5 ug/L	-	<0.5	-	-
Xylenes, total	0.5 ug/L	-	<0.5	-	-
4-Bromofluorobenzene	Surrogate	-	96.8%	-	-
Dibromofluoromethane	Surrogate	-	101%	-	-
Toluene-d8	Surrogate	-	96.2%	-	-
Benzene	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
Toluene-d8	Surrogate	97.2%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	168	-	-	-
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						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						
Benzo [k] fluoranthene	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	*20.3*		*ug/L*		*102*	*50-140*			
Surrogate: Terphenyl-d14	*21.3*		*ug/L*		*107*	*50-140*			
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*97.8*		*ug/L*		*122*	*50-140*			
Surrogate: Dibromofluoromethane	*79.2*		*ug/L*		*99.0*	*50-140*			
Surrogate: Toluene-d8	*78.8*		*ug/L*		*98.4*	*50-140*			
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*78.8*		*ug/L*		*98.4*	*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				30	
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Ethylene dibromide (dibromoethane	ND	0.2	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*97.7*		*ug/L*		*122*	*50-140*			
Surrogate: Dibromofluoromethane	*82.9*		*ug/L*		*104*	*50-140*			
Surrogate: Toluene-d8	*77.0*		*ug/L*		*96.3*	*50-140*			
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	*77.0*		*ug/L*		*96.3*	*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)	1970	25	ug/L		98.3	68-117			
F2 PHCs (C10-C16)	1480	100	ug/L		92.5	60-140			
F3 PHCs (C16-C34)	3850	100	ug/L		98.3	60-140			
F4 PHCs (C34-C50)	2410	100	ug/L		97.1	60-140			
Semi-Volatiles									
Acenaphthene	4.49	0.05	ug/L		89.7	50-140			
Acenaphthylene	3.97	0.05	ug/L		79.4	50-140			
Anthracene	4.42	0.01	ug/L		88.3	50-140			
Benzo [a] anthracene	4.00	0.01	ug/L		79.9	50-140			
Benzo [a] pyrene	3.61	0.01	ug/L		72.3	50-140			
Benzo [b] fluoranthene	5.58	0.05	ug/L		112	50-140			
Benzo [g,h,i] perylene	4.36	0.05	ug/L		87.2	50-140			
Benzo [k] fluoranthene	5.59	0.05	ug/L		112	50-140			
Chrysene	5.29	0.05	ug/L		106	50-140			
Dibenzo [a,h] anthracene	4.51	0.05	ug/L		90.1	50-140			
Fluoranthene	4.40	0.01	ug/L		88.0	50-140			
Fluorene	3.95	0.05	ug/L		78.9	50-140			
Indeno [1,2,3-cd] pyrene	3.91	0.05	ug/L		78.2	50-140			
1-Methylnaphthalene	4.77	0.05	ug/L		95.4	50-140			
2-Methylnaphthalene	4.93	0.05	ug/L		98.6	50-140			
Naphthalene	4.74	0.05	ug/L		94.8	50-140			
Phenanthrene	3.91	0.05	ug/L		78.2	50-140			
Pyrene	4.49	0.01	ug/L		89.7	50-140			
Surrogate: 2-Fluorobiphenyl	*20.2*		*ug/L*		*101*	*50-140*			
Volatiles									
Acetone	63.0	5.0	ug/L		63.0	50-140			
Benzene	29.8	0.5	ug/L		74.4	60-130			
Bromodichloromethane	28.7	0.5	ug/L		71.8	60-130			
Bromoform	34.0	0.5	ug/L		85.0	60-130			
Bromomethane	43.2	0.5	ug/L		108	50-140			
Carbon Tetrachloride	32.0	0.2	ug/L		80.0	60-130			
Chlorobenzene	33.5	0.5	ug/L		83.8	60-130			
Chloroform	29.0	0.5	ug/L		72.5	60-130			
Dibromochloromethane	32.0	0.5	ug/L		79.9	60-130			
Dichlorodifluoromethane	29.3	1.0	ug/L		73.4	50-140			
1,2-Dichlorobenzene	33.8	0.5	ug/L		84.5	60-130			
1,3-Dichlorobenzene	33.8	0.5	ug/L		84.4	60-130			
1,4-Dichlorobenzene	33.6	0.5	ug/L		84.0	60-130			
1,1-Dichloroethane	29.1	0.5	ug/L		72.8	60-130			
1,2-Dichloroethane	27.0	0.5	ug/L		67.6	60-130			
1,1-Dichloroethylene	29.7	0.5	ug/L		74.4	60-130			
cis-1,2-Dichloroethylene	30.2	0.5	ug/L		75.6	60-130			
trans-1,2-Dichloroethylene	30.1	0.5	ug/L		75.2	60-130			
1,2-Dichloropropane	32.8	0.5	ug/L		82.0	60-130			
cis-1,3-Dichloropropylene	26.2	0.5	ug/L		65.4	60-130			
trans-1,3-Dichloropropylene	28.4	0.5	ug/L		71.0	60-130			
Ethylbenzene	30.2	0.5	ug/L		75.6	60-130			
Ethylene dibromide (dibromoethane	29.0	0.2	ug/L		72.6	60-130			
Hexane	30.3	1.0	ug/L		75.7	60-130			
Methyl Ethyl Ketone (2-Butanone)	77.5	5.0	ug/L		77.5	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl Isobutyl Ketone	65.6	5.0	ug/L		65.6	50-140			
Methyl tert-butyl ether	63.0	2.0	ug/L		63.0	50-140			
Methylene Chloride	31.5	5.0	ug/L		78.6	60-130			
Styrene	30.0	0.5	ug/L		75.0	60-130			
1,1,1,2-Tetrachloroethane	31.8	0.5	ug/L		79.6	60-130			
1,1,2,2-Tetrachloroethane	30.0	0.5	ug/L		74.9	60-130			
Tetrachloroethylene	37.0	0.5	ug/L		92.4	60-130			
Toluene	30.9	0.5	ug/L		77.2	60-130			
1,1,1-Trichloroethane	28.9	0.5	ug/L		72.2	60-130			
1,1,2-Trichloroethane	28.8	0.5	ug/L		71.9	60-130			
Trichloroethylene	36.0	0.5	ug/L		90.0	60-130			
Trichlorofluoromethane	34.0	1.0	ug/L		85.0	60-130			
Vinyl chloride	29.4	0.5	ug/L		73.5	50-140			
m,p-Xylenes	68.1	0.5	ug/L		85.2	60-130			
o-Xylene	32.6	0.5	ug/L		81.5	60-130			
Benzene	29.8	0.5	ug/L		74.4	60-130			
Ethylbenzene	30.2	0.5	ug/L		75.6	60-130			
Toluene	30.9	0.5	ug/L		77.2	60-130			
m,p-Xylenes	68.1	0.5	ug/L		85.2	60-130			
o-Xylene	32.6	0.5	ug/L		81.5	60-130			

Qualifier Notes:

Login Qualifiers :

Container(s) - Bottle and COC sample ID don't match - bottles read BH-GHD-1
Applies to samples: BH19-GHD-1-GW1

Container(s) - Bottle and COC sample ID don't match - bottles read BH-GHD-3
Applies to samples: BH19-GHD-3-GW1

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PARA LABORATORIES

Paracel ID: 1949573

ce
St. Laurent Blvd.
ntario K1G 4J8
49-1947
@paracellabs.com
cellabs.com

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
1949573	№ 124448

Page 1 of 1

Client Name: WSP CANADA INC.
Contact Name: ADRIAN MENYHART
Address: QUEENSVIEW DRIVE
Telephone: 613-363-3717

Project Ref: 191-13873-00
Quote #: 19-029
PO #: PO 19
E-mail: adrian.menyhart@wsp.com

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

Regulation 153/04
☐ Table 1 ☑ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☑ Coarse
☑ Table 3 ☐ Agri/Other
☐ Table ___
For RSC: ☐ Yes ☑ No

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

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

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	BH19-1-GW1	GW		4	Dec 6/19	PM	X	X	X					
2	BH19-2-GW1			2			X	X						
3	BH19-3-GW1			4			X	X	X					
4	BH19-GHD-1-GW1			3			X							add BH-GHD-1
5	BH19-GHD-3-GW1			3			X							" " -3
6	DUP			2				X						
7														
8														
9														
10														

Comments: Report ID's as per Coc as per Aidan.

Method of Delivery: walk in

Relinquished By (Sign): Claire McFaul	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Claire McFaul	Date/Time:	Date/Time: 12/06/19 4:08	Date/Time: 12-6-19 16:16
Date/Time: Dec 6/19 4:15	Temperature: °C	Temperature: 8.3 °C	pH Verified: ☐ By:

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Certificate of Analysis

WSP Canada Inc. (Ottawa)

2611 Queensview Dr, Suite 300
Ottawa, ON K2B 8K2
Attn: Steven Wheeler

Client PO:
Project: 201-10687-00
Custody: 57711

Report Date: 9-Dec-2020
Order Date: 3-Dec-2020

Order #: 2049472

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

Paracel ID	Client ID	Paracel ID	Client ID
2049472-01	BH20-1-ST3		
2049472-02	BH20-1-ST4B		
2049472-03	BH20-2-ST3		
2049472-04	BH20-2-ST5		
2049472-05	BH20-DUP		

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	7-Dec-20	7-Dec-20
PHC F1	CWS Tier 1 - P&T GC-FID	7-Dec-20	7-Dec-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	4-Dec-20	7-Dec-20
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	8-Dec-20	9-Dec-20
Solids, %	Gravimetric, calculation	7-Dec-20	7-Dec-20

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 09-Dec-2020
Order Date: 3-Dec-2020
Project Description: 201-10687-00

Summary of Exceedances

(If this page is blank then there are no exceedances)

Only those criteria that a sample exceeds will be highlighted in red

Regulatory Comparison:

Paracel Laboratories has provided regulatory guidelines on this report for informational purposes only and makes no representations or warranties that the data is accurate or reflects the current regulatory values. The user is advised to consult with the appropriate official regulations to evaluate compliance. Sample results that are highlighted have exceeded the selected regulatory limit. Calculated uncertainty estimations have not been applied for determining regulatory exceedances. Regulatory limts displayed in brackets, (), applies to medium and fine textured soils.

Criteria:

Client ID	Analyte	MDL / Units	Result	Reg 153/04 (2011)-Table 3 Residential

PARACEL LABORATORIES LTD.

Order #: 2049472

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

	Client ID:	BH20-1-ST3	BH20-1-ST4B	BH20-2-ST3	BH20-2-ST5	Criteria:	
	Sample Date:	03-Dec-2020	03-Dec-2020	03-Dec-2020	03-Dec-2020		
	Sample ID:	2049472-01	2049472-02	2049472-03	2049472-04	Reg 153/04 (2011)-Table 3 Residential	
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	82.4	56.7	77.2	78.4		
Volatiles							
Benzene	0.02 ug/g	-	-	<0.02	-	0.21	ug/g
Ethylbenzene	0.05 ug/g	-	-	<0.05	-	2	ug/g
Toluene	0.05 ug/g	-	-	<0.05	-	2.3	ug/g
m,p-Xylenes	0.05 ug/g	-	-	<0.05	-		
o-Xylene	0.05 ug/g	-	-	<0.05	-		
Xylenes, total	0.05 ug/g	-	-	<0.05	-	3.1	ug/g
Toluene-d8	Surrogate	-	-	109%	-		
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	55	ug/g
F2 PHCs (C10-C16)	4 ug/g	<4	<4	<4	<4	98	ug/g
F3 PHCs (C16-C34)	8 ug/g	<8	<8	<8	<8	300	ug/g
F4 PHCs (C34-C50)	6 ug/g	<6	<6	<6	<6	2,800	ug/g
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	7.9	ug/g
Acenaphthylene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.15	ug/g
Anthracene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.67	ug/g
Benzo [a] anthracene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.5	ug/g
Benzo [a] pyrene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.3	ug/g
Benzo [b] fluoranthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.78	ug/g
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	6.6	ug/g
Benzo [k] fluoranthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.78	ug/g
Chrysene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	7	ug/g

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

	Client ID:	BH20-1-ST3	BH20-1-ST4B	BH20-2-ST3	BH20-2-ST5	Criteria:	
	Sample Date:	03-Dec-2020	03-Dec-2020	03-Dec-2020	03-Dec-2020		
	Sample ID:	2049472-01	2049472-02	2049472-03	2049472-04	Reg 153/04 (2011)-Table 3 Residential	
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.1	ug/g
Fluoranthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.69	ug/g
Fluorene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	62	ug/g
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.38	ug/g
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.99	ug/g
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	0.99	ug/g
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.04	<0.04	<0.04	0.99	ug/g
Naphthalene	0.01 ug/g	<0.01	<0.01	<0.01	<0.01	0.6	ug/g
Phenanthrene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	6.2	ug/g
Pyrene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	78	ug/g
2-Fluorobiphenyl	Surrogate	99.0%	105%	95.8%	91.1%		
Terphenyl-d14	Surrogate	95.6%	111%	115%	90.4%		

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

	Client ID:	BH20-DUP	-	-	-	Criteria:	
	Sample Date:	03-Dec-2020	-	-	-	Reg 153/04 (2011)-Table 3 Residential	
	Sample ID:	2049472-05	-	-	-		
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	78.3	-	-	-		
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	-	-	-	55	ug/g
F2 PHCs (C10-C16)	4 ug/g	<4	-	-	-	98	ug/g
F3 PHCs (C16-C34)	8 ug/g	<8	-	-	-	300	ug/g
F4 PHCs (C34-C50)	6 ug/g	<6	-	-	-	2,800	ug/g
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	-	-	-	7.9	ug/g
Acenaphthylene	0.02 ug/g	<0.02	-	-	-	0.15	ug/g
Anthracene	0.02 ug/g	<0.02	-	-	-	0.67	ug/g
Benzo [a] anthracene	0.02 ug/g	<0.02	-	-	-	0.5	ug/g
Benzo [a] pyrene	0.02 ug/g	<0.02	-	-	-	0.3	ug/g
Benzo [b] fluoranthene	0.02 ug/g	<0.02	-	-	-	0.78	ug/g
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	-	-	-	6.6	ug/g
Benzo [k] fluoranthene	0.02 ug/g	<0.02	-	-	-	0.78	ug/g
Chrysene	0.02 ug/g	<0.02	-	-	-	7	ug/g
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	-	-	-	0.1	ug/g
Fluoranthene	0.02 ug/g	<0.02	-	-	-	0.69	ug/g
Fluorene	0.02 ug/g	<0.02	-	-	-	62	ug/g
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	-	-	-	0.38	ug/g
1-Methylnaphthalene	0.02 ug/g	<0.02	-	-	-	0.99	ug/g
2-Methylnaphthalene	0.02 ug/g	<0.02	-	-	-	0.99	ug/g
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	-	-	-	0.99	ug/g

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

	Client ID:	BH20-DUP	-	-	-	**Criteria:**		
	Sample Date:	03-Dec-2020	-	-	-			
	Sample ID:	2049472-05	-	-	-	**Reg 153/04 (2011)-Table 3 Residential**		
	Matrix:	Soil	-	-	-			
	MDL/Units							
Naphthalene	0.01 ug/g	<0.01	-	-	-	0.6	ug/g	
Phenanthrene	0.02 ug/g	<0.02	-	-	-	6.2	ug/g	
Pyrene	0.02 ug/g	<0.02	-	-	-	78	ug/g	
2-Fluorobiphenyl	Surrogate	85.6%	-	-	-			
Terphenyl-d14	Surrogate	89.8%	-	-	-			

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
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	*1.60*		*ug/g*		*120*	*50-140*			
Surrogate: Terphenyl-d14	*1.24*		*ug/g*		*92.9*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.48*		*ug/g*		*106*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Physical Characteristics									
% Solids	90.9	0.1	% by Wt.	91.1			0.2	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g				NC	40	
Acenaphthylene	ND	0.02	ug/g				NC	40	
Anthracene	ND	0.02	ug/g				NC	40	
Benzo [a] anthracene	0.026	0.02	ug/g				200.0	40	
Benzo [a] pyrene	0.034	0.02	ug/g				200.0	40	
Benzo [b] fluoranthene	0.037	0.02	ug/g				200.0	40	
Benzo [g,h,i] perylene	0.031	0.02	ug/g				200.0	40	
Benzo [k] fluoranthene	ND	0.02	ug/g				NC	40	
Chrysene	0.031	0.02	ug/g				200.0	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g				NC	40	
Fluoranthene	0.063	0.02	ug/g				200.0	40	
Fluorene	ND	0.02	ug/g				NC	40	
Indeno [1,2,3-cd] pyrene	0.026	0.02	ug/g				200.0	40	
1-Methylnaphthalene	ND	0.02	ug/g				NC	40	
2-Methylnaphthalene	ND	0.02	ug/g				NC	40	
Naphthalene	ND	0.01	ug/g				NC	40	
Phenanthrene	0.056	0.02	ug/g				200.0	40	
Pyrene	0.051	0.02	ug/g				200.0	40	
Surrogate: 2-Fluorobiphenyl	*1.55*		ug/g		*107*	*50-140*			
Surrogate: Terphenyl-d14	*1.66*		ug/g		*115*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*9.92*		ug/g		*109*	*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)	181	7	ug/g	ND	90.7	80-120			
F2 PHCs (C10-C16)	77	4	ug/g	ND	87.6	60-140			
F3 PHCs (C16-C34)	209	8	ug/g	ND	96.6	60-140			
F4 PHCs (C34-C50)	127	6	ug/g	ND	93.0	60-140			
Semi-Volatiles									
Acenaphthene	0.106	0.02	ug/g	ND	63.8	50-140			
Acenaphthylene	0.085	0.02	ug/g	ND	51.1	50-140			
Anthracene	0.114	0.02	ug/g	ND	68.4	50-140			
Benzo [a] anthracene	0.102	0.02	ug/g	ND	61.2	50-140			
Benzo [a] pyrene	0.109	0.02	ug/g	ND	65.3	50-140			
Benzo [b] fluoranthene	0.151	0.02	ug/g	ND	90.7	50-140			
Benzo [g,h,i] perylene	0.101	0.02	ug/g	ND	60.4	50-140			
Benzo [k] fluoranthene	0.134	0.02	ug/g	ND	80.6	50-140			
Chrysene	0.112	0.02	ug/g	ND	67.2	50-140			
Dibenzo [a,h] anthracene	0.132	0.02	ug/g	ND	79.4	50-140			
Fluoranthene	0.117	0.02	ug/g	ND	70.2	50-140			
Fluorene	0.118	0.02	ug/g	ND	70.6	50-140			
Indeno [1,2,3-cd] pyrene	0.131	0.02	ug/g	ND	78.9	50-140			
1-Methylnaphthalene	0.169	0.02	ug/g	ND	101	50-140			
2-Methylnaphthalene	0.171	0.02	ug/g	ND	102	50-140			
Naphthalene	0.132	0.01	ug/g	ND	79.0	50-140			
Phenanthrene	0.130	0.02	ug/g	ND	77.8	50-140			
Pyrene	0.119	0.02	ug/g	ND	71.5	50-140			
Surrogate: 2-Fluorobiphenyl	*1.48*		*ug/g*		*111*	*50-140*			
Surrogate: Terphenyl-d14	*1.76*		*ug/g*		*132*	*50-140*			
Volatiles									
Benzene	4.24	0.02	ug/g	ND	106	60-130			
Ethylbenzene	4.10	0.05	ug/g	ND	103	60-130			
Toluene	4.15	0.05	ug/g	ND	104	60-130			
m,p-Xylenes	7.83	0.05	ug/g	ND	97.8	60-130			
o-Xylene	3.90	0.05	ug/g	ND	97.6	60-130			
Surrogate: Toluene-d8	*8.24*		*ug/g*		*103*	*50-140*			

PARACEL LABORATORIES LTD.

Order #: 2049472

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

Qualifier Notes:

Login Qualifiers :

Container and COC sample IDs don't match - Vial labelled as ST2B

Applies to samples: BH20-1-ST4B

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/Solid results are reported on a dry weight basis unless otherwise indicated
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.

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Paracel ID: 2049472

Chain Of Custody
(Lab Use Only)
№ 57711

Client Name: WSP Canada Inc	Project Ref: 201-10657-00	Page 1 of 1
Contact Name: Steven Wheeler	Quote #: WSP Standing Quote	**Turnaround Time**
Address: 3611 Queensview Dr. Ottawa ON	PO #:	☐ 1 day ☐ 3 day
	E-mail: Steven.Wheeler@wsp.com	☐ 2 day ☒ Regular
Telephone: 343-961-3251	Derek.Stewart@wsp.com	Date Required:

Regulation 153/04: ☐ Table 1 ☒ Res/Park ☐ Med/Fine ☐ Table 2 ☐ Ind/Comm ☒ Coarse ☒ Table 3 ☐ Agri/Other ☐ Table ___ For RSC: ☒ Yes ☐ No

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analysis: PHC(F1-F4)	PAH	BTEX	TCLP
1	BH20-1-ST3	S		2	Dec. 3		1	1		
2	BH20-1-ST4B	S		2			1	1		
3	BH20-2-ST3	S		2			1	1	1	
4	BH20-2-ST5	S		2			1	1		
5	BH20-DUP	S		2			1	1		
6	TCLP	S		3						1
7										
8										
9										
10										

Comments: TCLP Analysis for 558 VOC, PAH, Metals, Flashpoint

Method of Delivery: D/B

Relinquished By (Sign): Steven Wheeler	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Steven Wheeler	Date/Time:	Date/Time: 12-3-20 16:55	Date/Time: Dec 4/20 11:10a
Date/Time: Dec. 3, 2020 / 4:35pm	Temperature: °C	Temperature: 2.5 °C	pH Verified: ☐ By: NIA

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Certificate of Analysis

WSP Canada Inc. (Ottawa)

2611 Queensview Dr, Suite 300
Ottawa, ON K2B 8K2
Attn: Steven Wheeler

Client PO: 201-10687-00
Project: 201-10687-00
Custody: 130745

Report Date: 10-Dec-2020
Order Date: 4-Dec-2020

Order #: 2049557

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

Paracel ID	Client ID
2049557-01	BH20-1-GW1
2049557-02	BH20-2-GW1
2049557-03	BH19-1-GW1
2049557-04	DUP-GW1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO: 201-10687-00

Report Date: 10-Dec-2020

Order Date: 4-Dec-2020

Project Description: 201-10687-00

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	8-Dec-20	8-Dec-20
PHC F1	CWS Tier 1 - P&T GC-FID	7-Dec-20	8-Dec-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	9-Dec-20	9-Dec-20

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO: 201-10687-00

Report Date: 10-Dec-2020

Order Date: 4-Dec-2020

Project Description: 201-10687-00

	Client ID:	BH20-1-GW1	BH20-2-GW1	BH19-1-GW1	DUP-GW1
	Sample Date:	04-Dec-20 12:00	04-Dec-20 13:00	04-Dec-20 14:30	04-Dec-20 00:00
	Sample ID:	2049557-01	2049557-02	2049557-03	2049557-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Benzene	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
Toluene	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
Toluene-d8	Surrogate	94.3%	95.2%	94.2%	96.1%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*78.8*		*ug/L*		*98.5*	*50-140*			

Certificate of Analysis

Report Date: 10-Dec-2020

Client: WSP Canada Inc. (Ottawa)

Order Date: 4-Dec-2020

Client PO: 201-10687-00

Project Description: 201-10687-00

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	387	25	ug/L	192			67.4	30	QR-07
Volatiles									
Benzene	8.36	0.5	ug/L	7.44			11.6	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	0.86	0.5	ug/L	0.53			47.5	30	QR-07
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*73.8*		*ug/L*		*92.3*	*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)	1910	25	ug/L	ND	95.3	68-117			
F2 PHCs (C10-C16)	1340	100	ug/L	ND	83.5	60-140			
F3 PHCs (C16-C34)	3290	100	ug/L	ND	83.9	60-140			
F4 PHCs (C34-C50)	1930	100	ug/L	ND	78.0	60-140			
Volatiles									
Benzene	38.9	0.5	ug/L	ND	97.2	60-130			
Ethylbenzene	36.0	0.5	ug/L	ND	90.0	60-130			
Toluene	38.2	0.5	ug/L	ND	95.6	60-130			
m,p-Xylenes	70.8	0.5	ug/L	ND	88.5	60-130			
o-Xylene	35.0	0.5	ug/L	ND	87.4	60-130			
Surrogate: Toluene-d8	*64.4*		*ug/L*		*80.4*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QR-07 : Duplicate result exceeds RPD limits due to non-homogeneity between multiple sample vials. Remainder of QA/QC is acceptable.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

PARACEL LABORATORIES

Paracel ID: 2049557

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2049557	№ 130745

Client Name: WSP Canada Inc
Contact Name: Steven Wheeler
Address: 3611 Queensview Dr. Ottawa ON
Telephone: 343-961-3251

Project Ref: 201-10687-00
Quote #: WSP Standing Quote
PO #: 201-10687-00
E-mail: Steven.Wheeler@wsp.com
Derek.Stewart@wsp.com

Page 1 of 1

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

Regulation 153/04
☐ Table 1 ☒ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table ___
For RSC: ☒ Yes ☐ No

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH20-1-GW1	GW		3	Dec. 4, 2020	12:00	1						
2	BH20-2-GW1	GW		3	"	13:00	1						
3	BH19-1-GW1	GW		3	"	14:30	1						
4	DUP-GW1	GW		3	"		1						
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: DOP Bot

Relinquished By (Sign): Steven Wheeler
Relinquished By (Print): Steven Wheeler
Date/Time: Dec. 4, 2020 / 3:40pm

Received By Driver/Depot:
Date/Time:
Temperature: °C

Received at Lab:
Date/Time: Dec 4 2020 15:55
Temperature: 6.8 °C

Verified By:
Date/Time: Dec 4 2020 16:19
pH Verified: ☐ By:

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Certificate of Analysis

WSP Canada Inc. (Ottawa)

2611 Queensview Dr, Suite 300
Ottawa, ON K2B 8K2
Attn: Steven Wheeler

Client PO:
Project: 201-10687-00
Custody: 57711

Report Date: 9-Dec-2020
Order Date: 3-Dec-2020

Order #: 2049475

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

Paracel ID	Client ID	Paracel ID	Client ID
2049475-01	TCLP		

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Flashpoint	ASTM D93 - Pensky-Martens Closed Cup	7-Dec-20	7-Dec-20
Metals, ICP-MS	TCLP EPA 6020 - Digestion - ICP-MS	8-Dec-20	8-Dec-20
REG 558 - Mercury by CVAA	EPA 7470A - Cold Vapour AA	7-Dec-20	7-Dec-20
REG 558 - PAHs	EPA 625 - GC-MS	7-Dec-20	7-Dec-20
REG 558 - VOCs	EPA 624 - P&T GC-MS	8-Dec-20	9-Dec-20
Solids, %	Gravimetric, calculation	9-Dec-20	9-Dec-20

Certificate of Analysis
Client: WSP Canada Inc. (Ottawa)
Client PO:

Report Date: 09-Dec-2020
Order Date: 3-Dec-2020
Project Description: 201-10687-00

Summary of Exceedances

(If this page is blank then there are no exceedances)

Only those criteria that a sample exceeds will be highlighted in red

Regulatory Comparison:

Paracel Laboratories has provided regulatory guidelines on this report for informational purposes only and makes no representations or warranties that the data is accurate or reflects the current regulatory values. The user is advised to consult with the appropriate official regulations to evaluate compliance. Sample results that are highlighted have exceeded the selected regulatory limit. Calculated uncertainty estimations have not been applied for determining regulatory exceedances. Regulatory limts displayed in brackets, (), applies to medium and fine textured soils.

Criteria:

Client ID	Analyte	MDL / Units	Result	Reg 558 Schedule 4

Certificate of Analysis

Client: **WSP Canada Inc. (Ottawa)**

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

	Client ID:	TCLP	-	-	-		
	Sample Date:	03-Dec-2020	-	-	-	**Criteria:**	
	Sample ID:	2049475-01	-	-	-	**Reg 558 Schedule 4**	
	Matrix:	Soil	-	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	59.1	-	-	-		
Flashpoint	°C	>70	-	-	-		
EPA 1311 - TCLP Leachate Metals							
Arsenic	0.05 mg/L	<0.05	-	-	-	2.5	mg/L
Barium	0.05 mg/L	0.31	-	-	-	100	mg/L
Boron	0.05 mg/L	0.08	-	-	-	500	mg/L
Cadmium	0.01 mg/L	<0.01	-	-	-	0.5	mg/L
Chromium	0.05 mg/L	<0.05	-	-	-	5	mg/L
Lead	0.05 mg/L	0.15	-	-	-	5	mg/L
Mercury	0.005 mg/L	<0.005	-	-	-	0.1	mg/L
Selenium	0.05 mg/L	<0.05	-	-	-	1	mg/L
Silver	0.05 mg/L	<0.05	-	-	-	5	mg/L
Uranium	0.05 mg/L	<0.05	-	-	-	10	mg/L
EPA 1311 - TCLP Leachate Volatiles							
Benzene	0.005 mg/L	<0.005	-	-	-	0.5	mg/L
Carbon Tetrachloride	0.005 mg/L	<0.005	-	-	-	0.5	mg/L
Chlorobenzene	0.004 mg/L	<0.004	-	-	-	8	mg/L
Chloroform	0.006 mg/L	<0.006	-	-	-	10	mg/L
1,2-Dichlorobenzene	0.004 mg/L	<0.004	-	-	-	20	mg/L
1,4-Dichlorobenzene	0.004 mg/L	<0.004	-	-	-	0.5	mg/L
1,2-Dichloroethane	0.005 mg/L	<0.005	-	-	-	0.5	mg/L
1,1-Dichloroethylene	0.006 mg/L	<0.006	-	-	-	1.4	mg/L
Methyl Ethyl Ketone (2-Butanone)	0.30 mg/L	<0.30	-	-	-	200	mg/L

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

	Client ID:	TCLP	-	-	-		
	Sample Date:	03-Dec-2020	-	-	-	**Criteria:**	
	Sample ID:	2049475-01	-	-	-	**Reg 558 Schedule 4**	
	Matrix:	Soil	-	-	-		
	MDL/Units						
Methylene Chloride	0.04 mg/L	<0.04	-	-	-	5	mg/L
Tetrachloroethylene	0.005 mg/L	<0.005	-	-	-	3	mg/L
Trichloroethylene	0.004 mg/L	<0.004	-	-	-	5	mg/L
Vinyl chloride	0.005 mg/L	<0.005	-	-	-	0.2	mg/L
4-Bromofluorobenzene	Surrogate	119%	-	-	-		
Dibromofluoromethane	Surrogate	102%	-	-	-		
Toluene-d8	Surrogate	94.4%	-	-	-		
EPA 1311 - TCLP Leachate Organics							
Benzo [a] pyrene	0.0001 mg/L	<0.0001	-	-	-	0.001	mg/L
Terphenyl-d14	Surrogate	114%	-	-	-		

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Metals									
Arsenic	ND	0.05	mg/L						
Barium	ND	0.05	mg/L						
Boron	ND	0.05	mg/L						
Cadmium	ND	0.01	mg/L						
Chromium	ND	0.05	mg/L						
Lead	ND	0.05	mg/L						
Mercury	ND	0.005	mg/L						
Selenium	ND	0.05	mg/L						
Silver	ND	0.05	mg/L						
Uranium	ND	0.05	mg/L						
EPA 1311 - TCLP Leachate Organics									
Benzo [a] pyrene	ND	0.0001	mg/L						
Surrogate: Terphenyl-d14	*0.24*		*mg/L*		*119*	*37.1-155.6*			
EPA 1311 - TCLP Leachate Volatiles									
Benzene	ND	0.005	mg/L						
Carbon Tetrachloride	ND	0.005	mg/L						
Chlorobenzene	ND	0.004	mg/L						
Chloroform	ND	0.006	mg/L						
1,2-Dichlorobenzene	ND	0.004	mg/L						
1,4-Dichlorobenzene	ND	0.004	mg/L						
1,2-Dichloroethane	ND	0.005	mg/L						
1,1-Dichloroethylene	ND	0.006	mg/L						
Methyl Ethyl Ketone (2-Butanone)	ND	0.30	mg/L						
Methylene Chloride	ND	0.04	mg/L						
Tetrachloroethylene	ND	0.005	mg/L						
Trichloroethylene	ND	0.004	mg/L						
Vinyl chloride	ND	0.005	mg/L						
Surrogate: 4-Bromofluorobenzene	*0.786*		*mg/L*		*114*	*83-134*			
Surrogate: Dibromofluoromethane	*0.692*		*mg/L*		*101*	*78-124*			
Surrogate: Toluene-d8	*0.670*		*mg/L*		*97.4*	*76-118*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Metals									
Arsenic	ND	0.05	mg/L	ND			NC	29	
Barium	ND	0.05	mg/L	0.267			NC	34	
Boron	0.160	0.05	mg/L	ND			NC	33	
Cadmium	ND	0.01	mg/L	ND			NC	33	
Chromium	ND	0.05	mg/L	ND			NC	32	
Lead	0.057	0.05	mg/L	0.115			NC	32	
Mercury	ND	0.005	mg/L	ND			NC	30	
Selenium	ND	0.05	mg/L	ND			NC	28	
Silver	ND	0.05	mg/L	ND			NC	28	
Uranium	ND	0.05	mg/L	ND			NC	27	
EPA 1311 - TCLP Leachate Organics									
Benzo [a] pyrene	ND	0.0001	mg/L	ND			NC	50	
Surrogate: Terphenyl-d14	*0.24*		mg/L		*118*	*37.1-155.6*			
EPA 1311 - TCLP Leachate Volatiles									
Benzene	ND	0.005	mg/L	ND			NC	25	
Carbon Tetrachloride	ND	0.005	mg/L	ND			NC	25	
Chlorobenzene	ND	0.004	mg/L	ND			NC	25	
Chloroform	ND	0.006	mg/L	ND			NC	25	
1,2-Dichlorobenzene	ND	0.004	mg/L	ND			NC	25	
1,4-Dichlorobenzene	ND	0.004	mg/L	ND			NC	25	
1,2-Dichloroethane	ND	0.005	mg/L	ND			NC	25	
1,1-Dichloroethylene	ND	0.006	mg/L	ND			NC	25	
Methyl Ethyl Ketone (2-Butanone)	ND	0.30	mg/L	ND			NC	25	
Methylene Chloride	ND	0.04	mg/L	ND			NC	25	
Tetrachloroethylene	ND	0.005	mg/L	ND			NC	25	
Trichloroethylene	ND	0.004	mg/L	ND			NC	25	
Vinyl chloride	ND	0.005	mg/L	ND			NC	25	
Surrogate: 4-Bromofluorobenzene	*0.764*		mg/L		*111*	*83-134*			
Surrogate: Dibromofluoromethane	*0.676*		mg/L		*98.2*	*78-124*			
Surrogate: Toluene-d8	*0.658*		mg/L		*95.6*	*76-118*			
Physical Characteristics									
% Solids	83.2	0.1	% by Wt.	83.0			0.2	25	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Metals									
Arsenic	47.9	0.05	mg/L	ND	95.8	83-119			
Barium	46.1	0.05	mg/L	ND	92.2	83-116			
Boron	57.8	0.05	mg/L	3.03	109	71-128			
Cadmium	40.2	0.01	mg/L	0.016	80.4	78-119			
Chromium	48.9	0.05	mg/L	0.121	97.6	80-124			
Lead	47.6	0.05	mg/L	11.5	72.2	77-126			QM-07
Mercury	0.0330	0.005	mg/L	ND	110	70-130			
Selenium	41.7	0.05	mg/L	0.053	83.3	75-125			
Silver	41.0	0.05	mg/L	ND	81.9	70-128			
Uranium	45.3	0.05	mg/L	0.073	90.4	70-131			
EPA 1311 - TCLP Leachate Organics									
Benzo [a] pyrene	0.0348	0.0001	mg/L	ND	69.5	39-123			
Surrogate: Terphenyl-d14	*0.24*		*mg/L*		*118*	*37.1-155.6*			
EPA 1311 - TCLP Leachate Volatiles									
Benzene	0.308	0.005	mg/L	ND	89.5	55-141			
Carbon Tetrachloride	0.314	0.005	mg/L	ND	91.2	49-149			
Chlorobenzene	0.340	0.004	mg/L	ND	98.8	64-137			
Chloroform	0.302	0.006	mg/L	ND	87.8	58-138			
1,2-Dichlorobenzene	0.332	0.004	mg/L	ND	96.6	60-150			
1,4-Dichlorobenzene	0.332	0.004	mg/L	ND	96.6	63-132			
1,2-Dichloroethane	0.306	0.005	mg/L	ND	89.0	50-140			
1,1-Dichloroethylene	0.324	0.006	mg/L	ND	94.2	43-153			
Methyl Ethyl Ketone (2-Butanone)	0.752	0.30	mg/L	ND	87.5	26-153			
Methylene Chloride	0.295	0.04	mg/L	ND	85.6	58-149			
Tetrachloroethylene	0.362	0.005	mg/L	ND	105	51-145			
Trichloroethylene	0.345	0.004	mg/L	ND	100	52-135			
Vinyl chloride	0.235	0.005	mg/L	ND	68.4	31-159			
Surrogate: 4-Bromofluorobenzene	*0.700*		*mg/L*		*102*	*83-134*			
Surrogate: Dibromofluoromethane	*0.667*		*mg/L*		*97.0*	*78-124*			
Surrogate: Toluene-d8	*0.560*		*mg/L*		*81.4*	*76-118*			

PARACEL LABORATORIES LTD.

Order #: 2049475

Certificate of Analysis

Client: WSP Canada Inc. (Ottawa)

Client PO:

Report Date: 09-Dec-2020

Order Date: 3-Dec-2020

Project Description: 201-10687-00

Qualifier Notes:

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

Soil/Solid results are reported on a dry weight basis unless otherwise indicated

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

PARACEL LABORATORIES LTD. | TRUSTED. RESPONSIVE. RELIABLE.

Paracel ID: 2049475

Chain Of Custody
(Lab Use Only)
№ 57711

Client Name: WSP Canada Inc	Project Ref: 201-10657-00
Contact Name: Steven Wheeler	Quote #: WSP Standing Quote
Address: 3611 Queensview Dr. Ottawa. On	PO #:
Telephone: 343-961-3251	E-mail: Steven.wheeler@wsp.com; Derek.Stewart@wsp.com

Page 1 of 1

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

Regulation 153/04
☐ Table 1 ☒ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☒ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table
For RSC: ☒ Yes ☐ No

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

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analysis: PHC(F1-F4)	PAH	BTEX	TCLP
1	BH20-1-ST3	S		2	Dec. 3		1	1		
2	BH20-1-ST4B	S		2			1	1		
3	BH20-2-ST3	S		2			1	1	1	
4	BH20-2-ST5	S		2			1	1		
5	BH20-Dup	S		2			1	1		
6	TCLP	S		3						1
7										
8										
9										
10										

Comments: TCLP Analysis for 558 VOC, PAH, Metals, Flashpoint

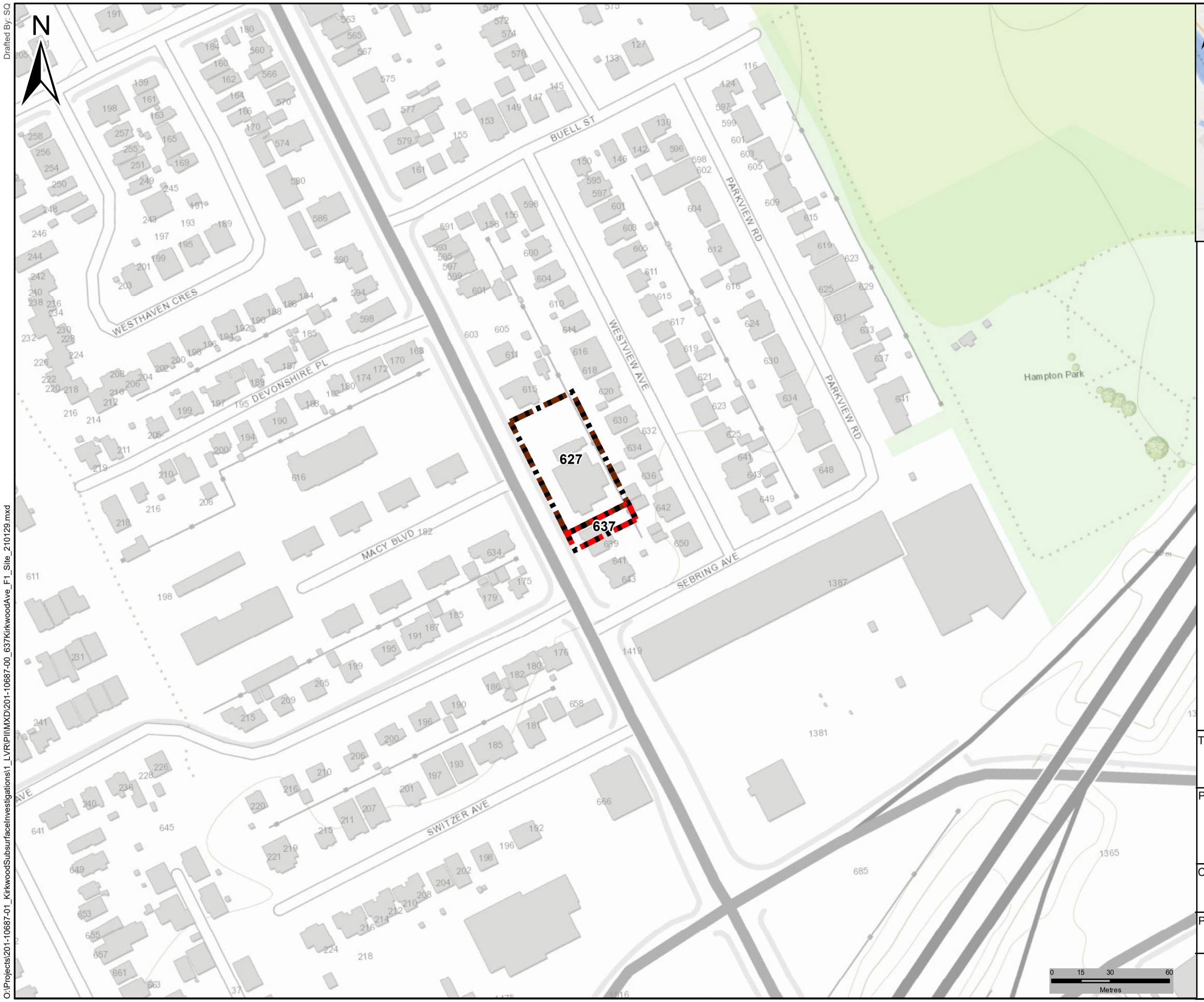
Method of Delivery: P/B

Relinquished By (Sign): Steven Wheeler	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Steven Wheeler	Date/Time:	Date/Time: 12-3-20 16:55	Date/Time: Dec 4/20 11:10a
Date/Time: Dec. 3, 2020 / 4:35 pm	Temperature: °C	Temperature: 2.5 °C	pH Verified: ☐ By: N/A

APPENDIX

C FIGURES AND TABLES

Drafted By: SQ



LEGEND

637 Kirkwood Ave.

627 Kirkwood Ave.

TITLE

SITE LOCATION

PROJECT

2019 AND 2020 SUBSURFACE INVESTIGATIONS
627 AND 637 KIRKWOOD AVE,
OTTAWA, ONTARIO

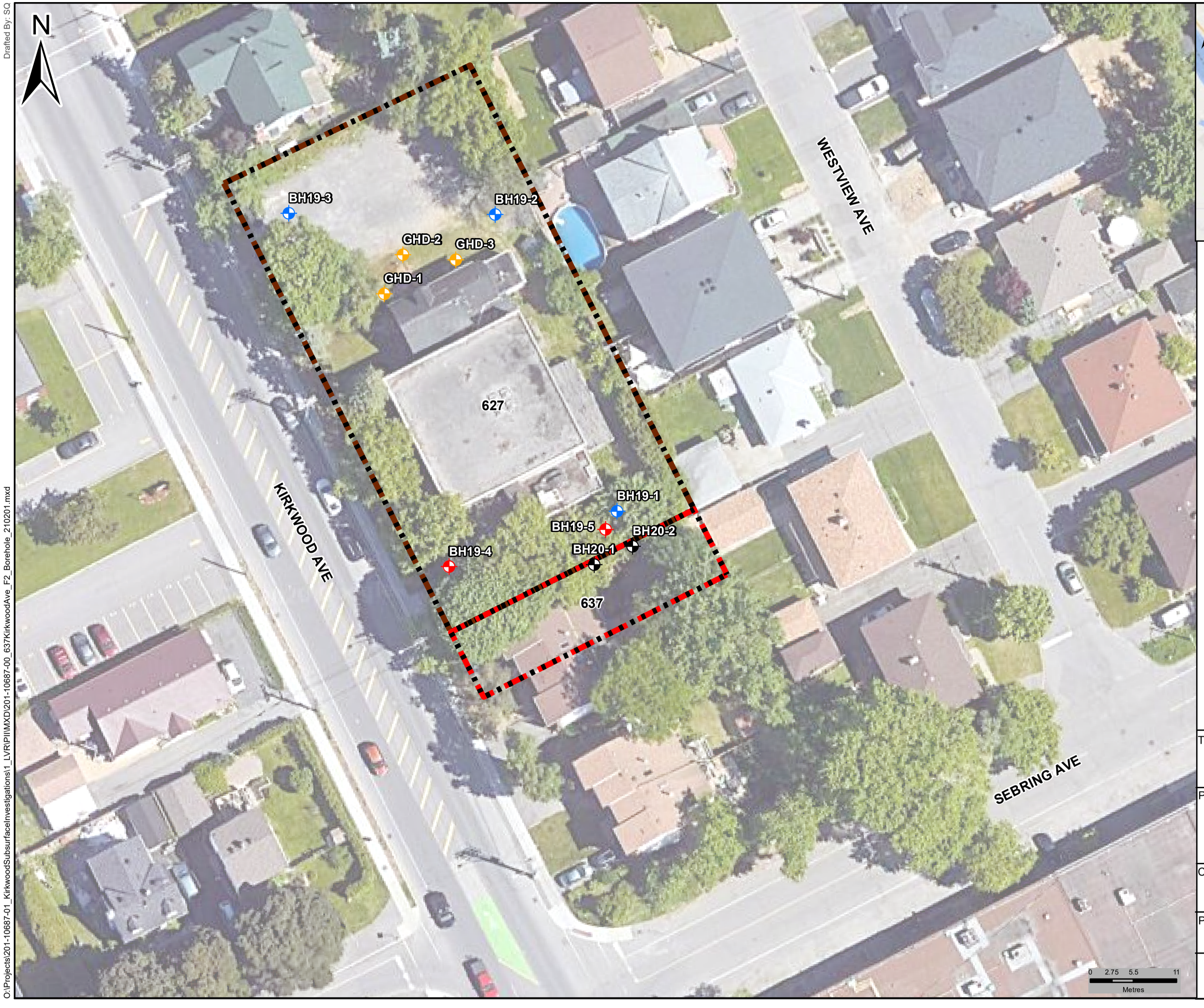
CLIENT

DOLYN CONSTRUCTION LTD.

PROJECT NO	SOURCE	REVIEWED BY
201-10687-01	**BING / Google, ESRI World Topographic**	**LS**
	DATE **FEBRUARY 1st 2021**	FIGURE **1**

O:\Projects\201-10687-01_KirkwoodSubsurfaceInvestigations\1_LVR\PII\MXD\201-10687-00_637KirkwoodAve_F1_Site_210129.mxd

Drafted By: SQ



LEGEND

- 637 Kirkwood Ave.
- 627 Kirkwood Ave.
- Monitoring Well (WSP, 2020)
- Monitoring Well (WSP, 2019)
- Monitoring Well (GHD)
- Borehole (WSP, 2019)

TITLE
2019 AND 2020 INVESTIGATIONS BOREHOLE LOCATION PLAN

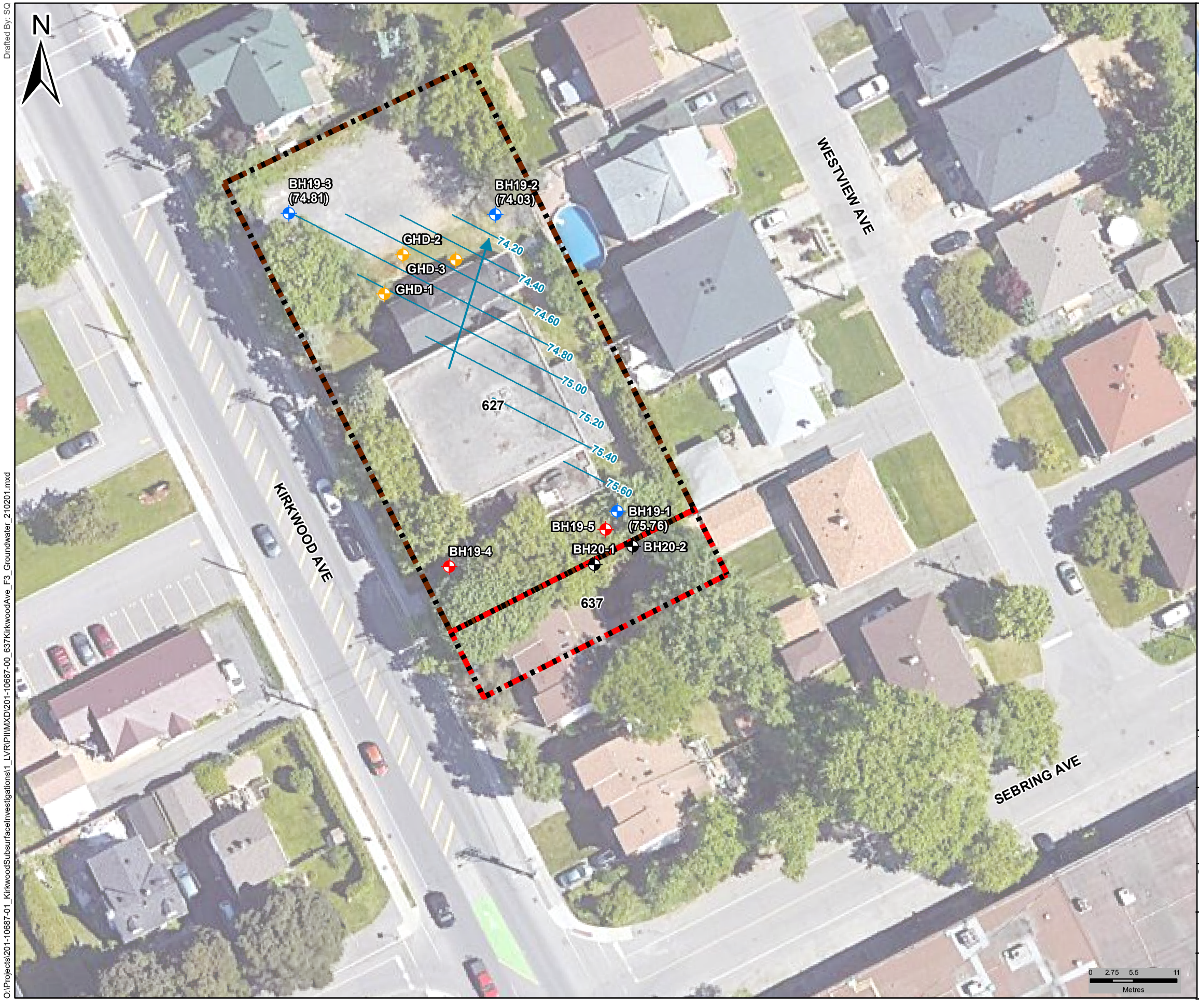
PROJECT
2019 AND 2020 SUBSURFACE INVESTIGATIONS 627 AND 637 KIRKWOOD AVE, OTTAWA, ONTARIO

CLIENT
DOLYN CONSTRUCTION LTD.

PROJECT NO	SOURCE	REVIEWED BY
201-10687-01	**BING / Google, LIO, MNRF, GeoOttawa**	**LS**
	DATE **FEBRUARY 1st 2021**	FIGURE **2**

O:\Projects\201-10687-01_KirkwoodSubsurfaceInvestigations\1_LVR\PII\MXD\201-10687-00_637KirkwoodAve_F2_Borehole_210201.mxd

Drafted By: SQ



LEGEND

- 637 Kirkwood Ave.
- 627 Kirkwood Ave.
- Monitoring Well (WSP, 2020)
- Monitoring Well (WSP, 2019)
- Monitoring Well (GHD)
- Borehole (WSP, 2019)
- Groundwater contours
- Groundwater flow direction
- (75.76) Groundwater elevation

TITLE: **GROUNDWATER CONTOURS AND FLOW DIRECTION (BASED ON 2019 INVESTIGATION)**		
PROJECT: **2019 AND 2020 SUBSURFACE INVESTIGATIONS 627 AND 637 KIRKWOOD AVE, OTTAWA, ONTARIO**		
CLIENT: **DOLYN CONSTRUCTION LTD.**		
PROJECT NO: **201-10687-01**	SOURCE: **BING / Google, LIO, MNRF, GeoOttawa**	REVIEWED BY: **LS**
wsp	DATE: **FEBRUARY 1st 2021**	FIGURE: **3**

O:\Projects\201-10687-01_KirkwoodSubsurfaceInvestigations\1_LVR\PIII\MXD\201-10687-00_637KirkwoodAve_F3_Groundwater_210201.mxd

Drafted By: SQ

BH19-1-SS4	
2.3m – 2.9m	2019-03-12
	ug/g
PHC F1	121
PHC F2	3040
PHC F3	2430

BH19-05-SS5	
2.4m – 3.0m	2019-12-19
	ug/g
PHC F2	297
2-Methylnaphthalene	1.55
Methylnaphthalene (1&2)	2.21

LEGEND

- 637 Kirkwood Ave.
- 627 Kirkwood Ave.
- Monitoring Well (WSP, 2020)
- Monitoring Well (WSP, 2019)
- Monitoring Well (GHD)
- Borehole (WSP, 2019)

MECP Table 3 SCS	
	ug/g
PHC F1	55
PHC F2	98
PHCS F3	300
2-Methylnaphthalene	0.99
Methylnaphthalene (1&2)	0.99

0.2 - exceeds MECP SCS

TITLE

SOIL EXCEEDANCES (2019 AND 2020 INVESTIGATIONS)

PROJECT

2019 AND 2020 SUBSURFACE INVESTIGATIONS 627 AND 637 KIRKWOOD AVE, OTTAWA, ONTARIO

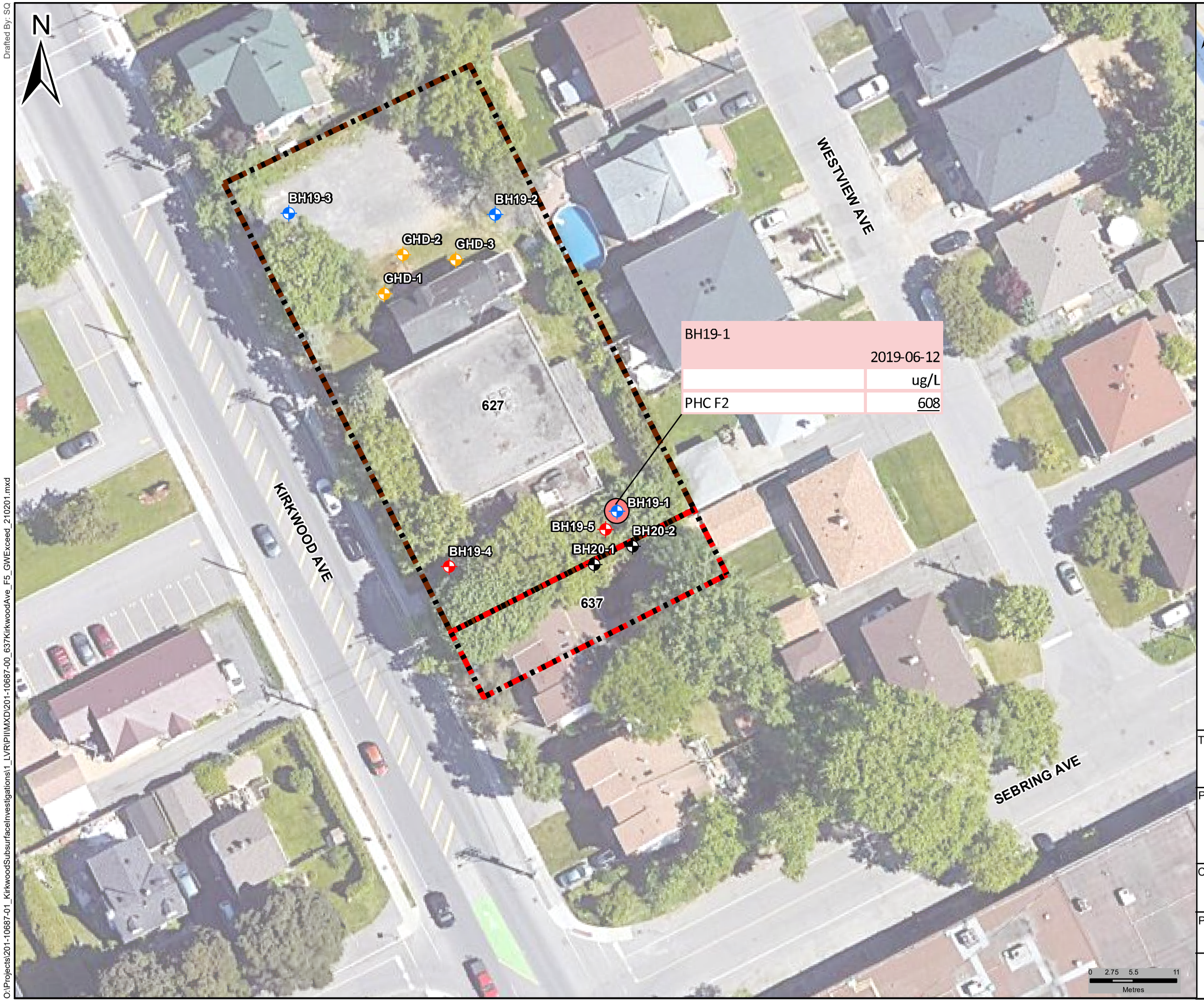
CLIENT

DOLYN CONSTRUCTION LTD.

PROJECT NO	SOURCE	REVIEWED BY
201-10687-01	BING / Google, LIO, MNRF, GeoOttawa	LS
	DATE: FEBRUARY 1st 2021	FIGURE: 4

O:\Projects\201-10687-01_KirkwoodSubsurfaceInvestigations\1_LVR\PIII\MXD\201-10687-00_637KirkwoodAve_F4_SoilExceed_210201.mxd

Drafted By: SQ



LEGEND

- 637 Kirkwood Ave.
- 627 Kirkwood Ave.
- Monitoring Well (WSP, 2020)
- Monitoring Well (WSP, 2019)
- Monitoring Well (GHD)
- Borehole (WSP, 2019)

MECP Table 3 SCS	
	ug/L
PHC F2	150

0.2 - exceeds MECP SCS

TITLE
GROUNDWATER EXCEEDANCES (2019 AND 2020 INVESTIGATIONS)

PROJECT
2019 AND 2020 SUBSURFACE INVESTIGATIONS
627 AND 637 KIRKWOOD AVE,
OTTAWA, ONTARIO

CLIENT
DOLYN CONSTRUCTION LTD.

PROJECT NO	SOURCE	REVIEWED BY
201-10687-01	**BING / Google, LIO, MNRF, GeoOttawa**	**LS**
	DATE **FEBRUARY 1st 2021**	FIGURE **5**

O:\Projects\201-10687-01_KirkwoodSubsurfaceInvestigations\1_LVR\PIII\MXD\201-10687-00_637KirkwoodAve_F5_GWExceed_210201.mxd

Table 1: Soil Analytical Results (ug/g)

Date (dd/mm/yyyy)			03/12/2019	04/12/2019	04/12/2019	04/12/2019	04/12/2019	18/12/2019	18/12/2019	19/12/2019	03/12/2020	03/12/2020
Borehole			BH19-1	BH19-1	BH19-2	BH19-3	BH19-3	BH19-4	BH19-4	BH19-5	BH20-1	BH20-1
Sample ID	MECP Table 3 SCS[1]		BH19-1-SS4	BH19-1-SS6	BH19-2-SS2	BH19-3-SS3	DUP	BH19-4-SS3	DUP1	BH19-5-SS5	BH20-1-ST3	BH20-1-ST4B
Sample depth (m)			2.3 - 2.9	3.8 - 4.4	0.7 - 1.4	1.5 - 2.1	1.5 - 2.1	1.5 - 2.1	1.5 - 2.1	2.4 - 3.0	2.4 - 3.7	4.0 - 4.8
RKI Eagle HEX/PID (ppm)		RDL	170/184	10/0	0/0	0/0	0/0	15/0	15/0	0/11	10/0	0/0
BTEX and Petroleum Hydrocarbons (PHCs)												
Benzene	0.21	0.02	ND	ND	ND	ND	ND	ND	-	ND	-	-
Toluene	2.3	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Ethylbenzene	2	0.05	0.22	ND	ND	ND	ND	ND	-	ND	-	-
p+m-Xylene	NV	0.05	0.06	ND	ND	ND	ND	ND	-	ND	-	-
o-Xylene	NV	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Xylene	3.1											
F1[1]	55	7	**121**	ND	ND	ND	-	ND	-	12	ND	ND
F2[1]	98	4	**3040**	ND	ND	ND	-	ND	-	**297**	ND	ND
F3[1]	300	8	**2430**	ND	ND	ND	-	25	-	269	ND	ND
F4[1]	2800	6	ND	ND	ND	ND	-	ND	-	ND	ND	ND
Metals												
Antimony	7.5	1.0	-	-	ND	-	-	-	-	-	-	-
Arsenic	18	1.0	-	-	1.3	-	-	-	-	-	-	-
Barium	390	1.0	-	-	19.9	-	-	-	-	-	-	-
Beryllium	4	0.5	-	-	ND	-	-	-	-	-	-	-
Boron	120	5.0	-	-	ND	-	-	-	-	-	-	-
Cadmium	1.2	0.5	-	-	ND	-	-	-	-	-	-	-
Chromium	160	5.0	-	-	13.7	-	-	-	-	-	-	-
Cobalt	22	1.0	-	-	3.4	-	-	-	-	-	-	-
Copper	140	5.0	-	-	5.0	-	-	-	-	-	-	-
Lead	120	1.0	-	-	1.4	-	-	-	-	-	-	-
Molybdenum	6.9	1.0	-	-	ND	-	-	-	-	-	-	-
Nickel	100	5.0	-	-	7.2	-	-	-	-	-	-	-
Selenium	2.4	1.0	-	-	ND	-	-	-	-	-	-	-
Silver	20	0.3	-	-	ND	-	-	-	-	-	-	-
Thallium	1	1.0	-	-	ND	-	-	-	-	-	-	-
Uranium	23	1.0	-	-	ND	-	-	-	-	-	-	-
Vanadium	86	10.0	-	-	22.4	-	-	-	-	-	-	-
Zinc	340	20.0	-	-	ND	-	-	-	-	-	-	-
Polycyclic aromatic hydrocarbon (PAHs)												
Acenaphthene	7.9	0.02	-	ND	ND	ND	-	ND	ND	0.10	ND	ND
Acenaphthylene	0.15	0.02	-	ND	ND	ND	-	ND	ND	ND	ND	ND
Anthracene	0.67	0.02	-	ND	ND	ND	-	ND	ND	ND	ND	ND
Benzo[a]anthracene	0.5	0.02	-	ND	0.03	ND	-	ND	ND	ND	ND	ND
Benzo[a]pyrene	0.3	0.02	-	ND	0.03	ND	-	ND	ND	ND	ND	ND
Benzo[b]fluoranthene	0.78	0.02	-	ND	0.03	ND	-	ND	ND	ND	ND	ND
Benzo[g,h,i]perylene	6.6	0.02	-	ND	0.02	ND	-	ND	ND	ND	ND	ND
Benzo[k]fluoranthene	0.78	0.02	-	ND	0.02	ND	-	ND	ND	ND	ND	ND
Chrysene	7	0.02	-	ND	0.03	ND	-	ND	ND	ND	ND	ND
Dibenzo[a,h]anthracene	0.1	0.02	-	ND	ND	ND	-	ND	ND	ND	ND	ND
Fluoranthene	0.69	0.02	-	ND	0.07	ND	-	ND	ND	ND	ND	ND
Fluorene	62	0.02	-	ND	ND	ND	-	ND	ND	0.11	ND	ND
Indeno[1,2,3-cd]pyrene	0.38	0.02	-	ND	ND	ND	-	ND	ND	ND	ND	ND
1-Methylnaphthalene	0.99	0.02	-	ND	ND	ND	-	ND	ND	0.66	ND	ND
2-Methylnaphthalene	0.99	0.02	-	ND	ND	ND	-	ND	ND	**1.55**	ND	ND
Methylnaphthalene (1&2)	0.99	0.04	-	ND	ND	ND	-	ND	ND	**2.21**	ND	ND
Naphthalene	0.6	0.01	-	ND	ND	ND	-	ND	ND	0.20	ND	ND
Phenanthrene	6.2	0.02	-	ND	0.04	ND	-	ND	ND	0.33	ND	ND
Pyrene	78	0.02	-	ND	0.05	ND	-	ND	ND	ND	ND	ND
Volatile Organic Compounds (VOCs)												
Acetone	16	0.50	ND	ND	ND	ND	ND	ND	-	ND	-	-
Benzene	0.21	0.02	ND	ND	ND	ND	ND	ND	-	ND	-	-
Bromodichloromethane	13	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Bromoform	0.27	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Bromomethane	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Carbon Tetrachloride	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Chlorobenzene	2.4	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Chloroform	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Dibromochloromethane	9.4	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Dichlorodifluoromethane	16	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,2-Dichlorobenzene	3.4	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,3-Dichlorobenzene	4.8	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,4-Dichlorobenzene	0.08	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,1-Dichloroethane	3.5	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,2-Dichloroethane	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,1-Dichloroethylene	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
cis-1,2-Dichloroethylene	3.4	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
trans-1,2-Dichloroethylene	0.08	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,2-Dichloropropane	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
cis-1,3-Dichloropropylene	NV	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
trans-1,3-Dichloropropylene	NV	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,3-Dichloropropene, total	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Ethylbenzene	2	0.05	0.22	ND	ND	ND	ND	ND	-	ND	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Hexane	2.8	0.05	0.09	ND	ND	ND	ND	ND	-	ND	-	-
Methyl Ethyl Ketone (2-Butanone)	16	0.50	ND	ND	ND	ND	ND	ND	-	ND	-	-
Methyl Isobutyl Ketone	1.7	0.50	ND	ND	ND	ND	ND	ND	-	ND	-	-
Methyl tert-butyl ether	0.75	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Methylene Chloride	0.1	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Styrene	0.7	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,1,1,2-Tetrachloroethane	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,1,2,2-Tetrachloroethane	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Tetrachloroethylene	0.28	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Toluene	2.3	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,1,1-Trichloroethane	0.38	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
1,1,2-Trichloroethane	0.05	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Trichloroethylene	0.06	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Trichlorofluoromethane	4	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Vinyl Chloride	0.02	0.02	ND	ND	ND	ND	ND	ND	-	ND	-	-
m/p-Xylene	NV	0.05	0.06	ND	ND	ND	ND	ND	-	ND	-	-
o-Xylene	NV	0.05	ND	ND	ND	ND	ND	ND	-	ND	-	-
Xylenes, total	3.1	0.05	0.06	ND	ND	ND	ND	ND	-	ND	-	-

1. Ministry of the Environment, Conservation and Parks (MECP) Table 3: Full Depth Generic Site Condition Standards (SCS) for Non-Potable Ground Water and Residential land use and coarse-textured soils

ND: Non-Detect, result was below method detection limit

- : Non Analyzed

RDL : Reportable Detection Limit

NV: No prescribed SCS value applies

2: Exceeds MECP SCS

Table 1: Soil Analytical Results (ug/g)

Date (dd/mm/yyyy)			03/12/2020	03/12/2020	03/12/2020
Borehole			BH20-2	BH20-2	BH20-2
Sample ID	MECP Table 3 SCS[1]		BH20-2-ST3	DUP1	BH20-2-ST5
Sample depth (m)			2.5 - 3.6	2.5 - 3.6	4.9 - 6.1
RKI Eagle HEX/PID (ppm)		RDL	220/0	220/0	10/0
BTEX and Petroleum Hydrocarbons (PHCs)					
Benzene	0.21	0.02	ND	-	-
Toluene	2.3	0.05	ND	-	-
Ethylbenzene	2	0.05	ND	-	-
p+m-Xylene	NV	0.05	ND	-	-
o-Xylene	NV	0.05	ND	-	-
Xylene	3.1				
F1[1]	55	7	ND	ND	ND
F2[1]	98	4	ND	ND	ND
F3[1]	300	8	ND	ND	ND
F4[1]	2800	6	ND	ND	ND
Metals					
Antimony	7.5	1.0	-	-	-
Arsenic	18	1.0	-	-	-
Barium	390	1.0	-	-	-
Beryllium	4	0.5	-	-	-
Boron	120	5.0	-	-	-
Cadmium	1.2	0.5	-	-	-
Chromium	160	5.0	-	-	-
Cobalt	22	1.0	-	-	-
Copper	140	5.0	-	-	-
Lead	120	1.0	-	-	-
Molybdenum	6.9	1.0	-	-	-
Nickel	100	5.0	-	-	-
Selenium	2.4	1.0	-	-	-
Silver	20	0.3	-	-	-
Thallium	1	1.0	-	-	-
Uranium	23	1.0	-	-	-
Vanadium	86	10.0	-	-	-
Zinc	340	20.0	-	-	-
Polycyclic aromatic hydrocarbon (PAHs)					
Acenaphthene	7.9	0.02	ND	ND	ND
Acenaphthylene	0.15	0.02	ND	ND	ND
Anthracene	0.67	0.02	ND	ND	ND
Benzo[a]anthracene	0.5	0.02	ND	ND	ND
Benzo[a]pyrene	0.3	0.02	ND	ND	ND
Benzo[b]fluoranthene	0.78	0.02	ND	ND	ND
Benzo[g,h,i]perylene	6.6	0.02	ND	ND	ND
Benzo[k]fluoranthene	0.78	0.02	ND	ND	ND
Chrysene	7	0.02	ND	ND	ND
Dibenzo[a,h]anthracene	0.1	0.02	ND	ND	ND
Fluoranthene	0.69	0.02	ND	ND	ND
Fluorene	62	0.02	ND	ND	ND
Indeno[1,2,3-cd]pyrene	0.38	0.02	ND	ND	ND
1-Methylnaphthalene	0.99	0.02	ND	ND	ND
2-Methylnaphthalene	0.99	0.02	ND	ND	ND
Methylnaphthalene (1&2)	0.99	0.04	ND	ND	ND
Naphthalene	0.6	0.01	ND	ND	ND
Phenanthrene	6.2	0.02	ND	ND	ND
Pyrene	78	0.02	ND	ND	ND
Volatile Organic Compounds (VOCs)					
Acetone	16	0.50	-	-	-
Benzene	0.21	0.02	-	-	-
Bromodichloromethane	13	0.05	-	-	-
Bromoform	0.27	0.05	-	-	-
Bromomethane	0.05	0.05	-	-	-
Carbon Tetrachloride	0.05	0.05	-	-	-
Chlorobenzene	2.4	0.05	-	-	-
Chloroform	0.05	0.05	-	-	-
Dibromochloromethane	9.4	0.05	-	-	-
Dichlorodifluoromethane	16	0.05	-	-	-
1,2-Dichlorobenzene	3.4	0.05	-	-	-
1,3-Dichlorobenzene	4.8	0.05	-	-	-
1,4-Dichlorobenzene	0.08	0.05	-	-	-
1,1-Dichloroethane	3.5	0.05	-	-	-
1,2-Dichloroethane	0.05	0.05	-	-	-
1,1-Dichloroethylene	0.05	0.05	-	-	-
1,2-Dichloroethane	0.05	0.05	-	-	-
1,1-Dichloroethylene	0.05	0.05	-	-	-
cis-1,2-Dichloroethylene	3.4	0.05	-	-	-
trans-1,2-Dichloroethylene	0.08	0.05	-	-	-
1,2-Dichloropropane	0.05	0.05	-	-	-
cis-1,3-Dichloropropylene	NV	0.05	-	-	-
trans-1,3-Dichloropropylene	NV	0.05	-	-	-
1,3-Dichloropropene, total	0.05	0.05	-	-	-
Ethylbenzene	2	0.05	-	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.05	0.05	-	-	-
Hexane	2.8	0.05	-	-	-
Methyl Ethyl Ketone (2-Butanone)	16	0.50	-	-	-
Methyl Isobutyl Ketone	1.7	0.50	-	-	-
Methyl tert-butyl ether	0.75	0.05	-	-	-
Methylene Chloride	0.1	0.05	-	-	-
Styrene	0.7	0.05	-	-	-
1,1,1,2-Tetrachloroethane	0.05	0.05	-	-	-
1,1,2,2-Tetrachloroethane	0.05	0.05	-	-	-
Tetrachloroethylene	0.28	0.05	-	-	-
Toluene	2.3	0.05	-	-	-
1,1,1-Trichloroethane	0.38	0.05	-	-	-
1,1,2-Trichloroethane	0.05	0.05	-	-	-
Trichloroethylene	0.06	0.05	-	-	-
Trichlorofluoromethane	4	0.05	-	-	-
Vinyl Chloride	0.02	0.02	-	-	-
m/p-Xylene	NV	0.05	-	-	-
o-Xylene	NV	0.05	-	-	-
Xylenes, total	3.1	0.05	-	-	-

1. Ministry of the Environment, Conservation and Parks (MECP) Table 3: Full

ND: Non-Detect, result was below method detection limit

- : Non Analyzed

RDL : Reportable Detection Limit

NV: No prescribed SCS value applies

2: Exceeds MECP SCS

Table 2: Groundwater Analytical Results (ug/L)

Date (dd/mm/yyyy)			06/12/2019	06/12/2019	06/12/2019	06/12/2019	06/12/2019	06/12/2019	04/12/2020
Borehole/Well ID			BH19-1	BH19-2	BH19-3	GHD-1	GHD-3	BH19-1	BH20-1
Sample ID	MECP Table 3 SCS[1]	MDL	BH19-1-GW1	BH19-2-GW1	BH19-3-GW1	BH19-GHD-1-GW1	BH19-GHD-3-GW1	DUP	BH20-1-GW1
BTEX and Petroleum Hydrocarbons (PHCs)									
Benzene	44	0.5	ND	ND	ND	ND	ND	ND	ND
Toluene	18000	0.5	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	2300	0.5	8.2	ND	ND	ND	ND	8.1	ND
p+m-Xylene	NV	0.5	ND	ND	ND	ND	ND	ND	ND
o-Xylene	NV	0.5	ND	ND	ND	ND	ND	ND	ND
Xylene	4200	0.5	ND	ND	ND	ND	ND	ND	ND
F1[1]	750	25	170	-	ND	ND	168	-	ND
F2[1]	150	100	**608**	-	ND	ND	ND	-	ND
F3[1]	500	100	295	-	ND	ND	ND	-	ND
F4[1]	500	100	ND	-	ND	ND	ND	-	ND
Polycyclic aromatic hydrocarbon (PAHs)									
Acenaphthene	600	0.05	0.25	-	ND	-	-	-	-
Acenaphthylene	1.8	0.05	ND	-	ND	-	-	-	-
Anthracene	2.4	0.01	ND	-	ND	-	-	-	-
Benzo[a]anthracene	4.7	0.01	ND	-	ND	-	-	-	-
Benzo[a]pyrene	0.81	0.01	ND	-	ND	-	-	-	-
Benzo[b]fluoranthene	0.75	0.05	ND	-	ND	-	-	-	-
Benzo[g,h,i]perylene	0.2	0.05	ND	-	ND	-	-	-	-
Benzo[k]fluoranthene	0.4	0.05	ND	-	ND	-	-	-	-
Chrysene	1	0.05	ND	-	ND	-	-	-	-
Dibenzo[a,h]anthracene	0.52	0.05	ND	-	ND	-	-	-	-
Fluoranthene	130	0.01	ND	-	ND	-	-	-	-
Fluorene	400	0.05	0.30	-	ND	-	-	-	-
Indeno[1,2,3-cd]pyrene	0.2	0.05	ND	-	ND	-	-	-	-
1-Methylnaphthalene	1800	0.05	4.46	-	0.07	-	-	-	-
2-Methylnaphthalene	1800	0.05	8.27	-	0.11	-	-	-	-
Methylnaphthalene (1&2)	1800	0.10	12.7	-	0.18	-	-	-	-
Naphthalene	1400	0.05	5.12	-	ND	-	-	-	-
Phenanthrene	580	0.05	0.33	-	ND	-	-	-	-
Pyrene	68	0.01	ND	-	ND	-	-	-	-
Volatile Organic Compounds (VOCs)									
Acetone	130000	5.0	ND	ND	8.2	-	-	ND	-
Benzene	44	0.5	ND	ND	ND	ND	ND	ND	-
Bromodichloromethane	85000	0.5	ND	ND	ND	-	-	ND	-
Bromoform	380	0.5	ND	ND	ND	-	-	ND	-
Bromomethane	5.6	0.5	ND	ND	ND	-	-	ND	-
Carbon Tetrachloride	0.79	0.2	ND	ND	ND	-	-	ND	-
Chlorobenzene	630	0.5	ND	ND	ND	-	-	ND	-
Chloroform	2.4	0.5	ND	ND	ND	-	-	ND	-
Dibromochloromethane	82000	0.5	ND	ND	ND	-	-	ND	-
Dichlorodifluoromethane	4400	1.0	ND	ND	ND	-	-	ND	-
1,2-Dichlorobenzene	4600	0.5	ND	ND	ND	-	-	ND	-
1,3-Dichlorobenzene	9600	0.5	ND	ND	ND	-	-	ND	-
1,4-Dichlorobenzene	8	0.5	ND	ND	ND	-	-	ND	-
1,1-Dichloroethane	320	0.5	ND	ND	ND	-	-	ND	-
1,2-Dichloroethane	1.6	0.5	ND	ND	ND	-	-	ND	-
1,1-Dichloroethylene	1.6	0.5	ND	ND	ND	-	-	ND	-
cis-1,2-Dichloroethylene	1.6	0.5	ND	ND	ND	-	-	ND	-
trans-1,2-Dichloroethylene	1.6	0.5	ND	ND	ND	-	-	ND	-
1,2-Dichloropropane	16	0.5	ND	ND	ND	-	-	ND	-
cis-1,3-Dichloropropylene	NV	0.5	ND	ND	ND	-	-	ND	-
trans-1,3-Dichloropropylene	NV	0.5	ND	ND	ND	-	-	ND	-
1,3-Dichloropropene, total	5.2	0.5	ND	ND	ND	-	-	ND	-
Ethylbenzene	2300	0.5	8.2	ND	ND	ND	ND	8.1	-
Ethylene dibromide (dibromoethane, 1,2-)	0.25	0.2	ND	ND	ND	-	-	ND	-
Hexane	51	1.0	ND	ND	ND	-	-	ND	-
Methyl Ethyl Ketone (2-Butanone)	470000	5.0	ND	ND	ND	-	-	ND	-
Methyl Isobutyl Ketone	140000	5.0	ND	ND	ND	-	-	ND	-
Methyl tert-butyl ether	190	2.0	ND	ND	ND	-	-	ND	-
Methylene Chloride	610	5.0	ND	ND	ND	-	-	ND	-
Styrene	1300	0.5	ND	ND	ND	-	-	ND	-
1,1,1,2-Tetrachloroethane	3.3	0.5	ND	ND	ND	-	-	ND	-
1,1,2,2-Tetrachloroethane	3.2	0.5	ND	ND	ND	-	-	ND	-
Tetrachloroethylene	1.6	0.5	ND	ND	ND	-	-	ND	-
Toluene	18000	0.5	ND	ND	ND	ND	ND	ND	-
1,1,1-Trichloroethane	640	0.5	ND	ND	ND	-	-	ND	-
1,1,2-Trichloroethane	4.7	0.5	ND	ND	ND	-	-	ND	-
Trichloroethylene	1.6	0.5	ND	ND	ND	-	-	ND	-
Trichlorofluoromethane	2500	1.0	ND	ND	ND	-	-	ND	-
Vinyl Chloride	0.5	0.5	ND	ND	ND	-	-	ND	-
m/p-Xylene	NV	0.5	ND	ND	ND	ND	ND	ND	-
o-Xylene	NV	0.5	ND	ND	ND	ND	ND	ND	-
Xylenes, total	4200	0.5	ND	ND	ND	ND	ND	ND	-

1. Ministry of the Environment, Conservation and Parks (MECP) Table 3: Full Depth Generic Site Condition Standards (SCS) for Non-Potable Ground Water and Residential land use and coarse-textured soils

ND: Non-Detect, result was below method detection limit

- : Non Analyzed

MDL : Method Detection Limit

NV: No prescribed SCS value applies

2: Exceeds MECP SCS

Table 2: Groundwater Analytical Results (ug/L)					
Date (dd/mm/yyyy)			04/12/2020	04/12/2020	04/12/2020
Borehole/Well ID			BH20-2	BH19-1	BH20-1
Sample ID	MECP Table 3 SCS[1]	MDL	BH20-2-GW1	BH19-1-GW1	DUP-GW1
BTEX and Petroleum Hydrocarbons (PHCs)					
Benzene	44	0.5	ND	ND	ND
Toluene	18000	0.5	ND	ND	ND
Ethylbenzene	2300	0.5	ND	ND	ND
p+m-Xylene	NV	0.5	ND	ND	ND
o-Xylene	NV	0.5	ND	ND	ND
Xylene	4200	0.5	ND	ND	ND
F1[1]	750	25	ND	ND	ND
F2[1]	150	100	ND	ND	ND
F3[1]	500	100	ND	ND	ND
F4[1]	500	100	ND	ND	ND
Polycyclic aromatic hydrocarbon (PAHs)					
Acenaphthene	600	0.05	-	-	-
Acenaphthylene	1.8	0.05	-	-	-
Anthracene	2.4	0.01	-	-	-
Benzo[a]anthracene	4.7	0.01	-	-	-
Benzo[a]pyrene	0.81	0.01	-	-	-
Benzo[b]fluoranthene	0.75	0.05	-	-	-
Benzo[g,h,i]perylene	0.2	0.05	-	-	-
Benzo[k]fluoranthene	0.4	0.05	-	-	-
Chrysene	1	0.05	-	-	-
Dibenzo[a,h]anthracene	0.52	0.05	-	-	-
Fluoranthene	130	0.01	-	-	-
Fluorene	400	0.05	-	-	-
Indeno[1,2,3-cd]pyrene	0.2	0.05	-	-	-
1-Methylnaphthalene	1800	0.05	-	-	-
2-Methylnaphthalene	1800	0.05	-	-	-
Methylnaphthalene (1&2)	1800	0.10	-	-	-
Naphthalene	1400	0.05	-	-	-
Phenanthrene	580	0.05	-	-	-
Pyrene	68	0.01	-	-	-
Volatile Organic Compounds (VOCs)					
Acetone	130000	5.0	-	-	-
Benzene	44	0.5	-	-	-
Bromodichloromethane	85000	0.5	-	-	-
Bromoform	380	0.5	-	-	-
Bromomethane	5.6	0.5	-	-	-
Carbon Tetrachloride	0.79	0.2	-	-	-
Chlorobenzene	630	0.5	-	-	-
Chloroform	2.4	0.5	-	-	-
Dibromochloromethane	82000	0.5	-	-	-
Dichlorodifluoromethane	4400	1.0	-	-	-
1,2-Dichlorobenzene	4600	0.5	-	-	-
1,3-Dichlorobenzene	9600	0.5	-	-	-
1,4-Dichlorobenzene	8	0.5	-	-	-
1,1-Dichloroethane	320	0.5	-	-	-
1,2-Dichloroethane	1.6	0.5	-	-	-
1,1-Dichloroethylene	1.6	0.5	-	-	-
cis-1,2-Dichloroethylene	1.6	0.5	-	-	-
trans-1,2-Dichloroethylene	1.6	0.5	-	-	-
1,2-Dichloropropane	16	0.5	-	-	-
cis-1,3-Dichloropropylene	NV	0.5	-	-	-
trans-1,3-Dichloropropylene	NV	0.5	-	-	-
1,3-Dichloropropene, total	5.2	0.5	-	-	-
Ethylbenzene	2300	0.5	-	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.25	0.2	-	-	-
Hexane	51	1.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	470000	5.0	-	-	-
Methyl Isobutyl Ketone	140000	5.0	-	-	-
Methyl tert-butyl ether	190	2.0	-	-	-
Methylene Chloride	610	5.0	-	-	-
Styrene	1300	0.5	-	-	-
1,1,1,2-Tetrachloroethane	3.3	0.5	-	-	-
1,1,2,2-Tetrachloroethane	3.2	0.5	-	-	-
Tetrachloroethylene	1.6	0.5	-	-	-
Toluene	18000	0.5	-	-	-
1,1,1-Trichloroethane	640	0.5	-	-	-
1,1,2-Trichloroethane	4.7	0.5	-	-	-
Trichloroethylene	1.6	0.5	-	-	-
Trichlorofluoromethane	2500	1.0	-	-	-
Vinyl Chloride	0.5	0.5	-	-	-
m/p-Xylene	NV	0.5	-	-	-
o-Xylene	NV	0.5	-	-	-
Xylenes, total	4200	0.5	-	-	-

1. Ministry of the Environment, Conservation and Parks (MECP) Table 3: Full Dep

ND: Non-Detect, result was below method detection limit

- : Non Analyzed

MDL : Method Detection Limit

NV: No prescribed SCS value applies

2: Exceeds MECP SCS