PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
272 Innisfil Street, Barrie, Ontario

Prepared for:

Typhon Group Limited
5409 Eglinton Avenue West
Etobicoke, Ontario, M9C 5K6

Prepared by:

HLV2K ENGINEERING LIMITED

Project No. 1800064AE

April 26, 2021

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TYPHON GROUP LIMITED
5409 Eglinton Avenue West
Etobicoke, Ontario
M9C 5K6
Email: cmull@typhongroup.ca

Attention: Mr. Craig Mull

Dear Mr. Mull

Re: Phase Two Environmental Site Assessment
272 Innisfil Street, Barrie, Ontario

Please find enclosed a copy of the Updated Phase Two Environmental Site Assessment, in accordance with the Ontario Regulation 153/04 (as amended) related to the above-noted site.

We trust you will find this report to be complete within our terms of reference. Should you have any questions regarding the information contained in the report, or require further assistance please contact the undersigned at HLV2K's office.

For and on behalf of HLV2K Engineering Limited.

John (Gianni) Lametti, QP_{ESA}, P.Eng.
Principal & Environmental Manager

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1 EXECUTIVE SUMMARY

HLV2K Engineering Limited (HLV2K) was retained by Typhon Group Limited (hereinafter referred to as the Client) to update the Phase Two Environmental Site Assessment (ESA) report for the property located at 272 Innisfil Street, Barrie, Ontario (hereinafter referred to as the site and Phase Two Property). The location of the site is presented in **Drawing 1**.

The objectives of the Phase Two ESA were to address the presence or absence of one or more contaminants at the site as determined in the Phase One ESA (Report No. 1800064BE by HLV2K, dated April 20, 2021 and to assess the quality of the soil and groundwater. It is understood that a Record of Site Condition (RSC) is most likely not required at this time.

HLV2K has reviewed the previous work conducted by on August 23, 2018 (Report No. 1800064AE) and concurs that the work conducted previously can be relied upon. There has been no material change at the Phase Two Property and no changes in soil or groundwater quality are expected.

The Following is the Phase Two Environmental Site Assessment Update by HLV2K Engineering Limited:

HLV2K's executive summary is as follows:

Executive Summary	
Phase Two Property (the Site)	The Phase Two Property is irregularly shaped covers an area of 7027 m^2 or 0.7027 hectares with a PIN # 587550007LT located at 272 Innisfil Street Barrie covering Parts Lots 1 to 5 south side of Jacobs Terrace Lots 2 &3 west and south side of Baldwin Street Plan 30 as in R01357111, Barrie Ontario. The property is owned by 2337340 Ontario Inc and the site is to be redeveloped with 17 Storey condominium towers with one level of underground parking.
Phase Two Investigations	Phase II ESA was carried out in August of 2018 and Updated in April of 2021 from a CSA Standard to O.Reg 153/04 as amended document.
Geologic Conditions	The site is located is an area known as Simcoe Lowlands. These lowlands extend from Lake Couchiching, southward along the western edge of Lake Simcoe towards Bolton Ontario. The region is characterised by flat low-lying plains composed of silts, clays and to medium to fine grained sands deposited within glacial Lake Algonquin. Evidence of glacial Lake Algonquin and numerous shorelines, wave cut notches terraces and beach ridges located throughout the study area. According to Map 2556 of the Ontario Geological Survey, the site is located in an area of coarse textured glaciolacustrine deposits of sand gravel minor silt and clay foreshore and basinal deposits. The bedrock is composed of the Upper Ordovician limestone, dolostone, shale arkose and sandstone of the Trenton and Black River Groups. Bedrock lies approximately 50 to 85 meters below ground surface.
Hydrogeological Conditions	The over burden at the site consists primarily of Sand. The water table is located between 3 to 5 meters below ground surface (bgs) and the groundwater flow direction is towards the north east. Based upon the hydrogeological report only one aquifer exists on site and it is not confined. The hydraulic conductivity for the ranges from 1.39 $x10^{-5}$ m/s to 2.77 $x10^{-5}$ m/s and the hydraulic gradient is approximately 0.015 m/m in the direction of ground water flow.
Applicable Site	Ministry of the Environment, Conservation and Parks (MECP) "Table 1: Full Depth

Condition Standard	Generic Site Condition Standards in a Potable Groundwater Condition for coarse-grained soils in a Residential Parkland Institutional (RPI) property use.
Soil and Groundwater Quality Data	Soil and groundwater samples were collected and analyzed for Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs) metals, metal hydrides, Electrical Conductivity (EC), Sodium Adsorption Ratio (SAR) and pH. The results of the chemical analyses performed on soil and groundwater samples for the above parameters met the "Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition" (Table 1Standards) Residential Parkland Institutional site conditions standards for all parameters.
Conclusions	The soil and groundwater on the Phase Two Property met the MECP Table 2 Standard RPI in a potable groundwater condition.
Recommendations	The findings presented in this report may be used by the Client, for submission of a Record of Site Condition (RSC) subject to the conclusions and limitations mentioned in Section 8.
Limitations	The Client may use the findings in this report for these purposes subject to the *Statement of Limitations*, which forms an integral part of this document. No other third parties are entitled to rely upon this report without the express written consent of HLV2K Engineering Limited. Any use, which a third party makes of this report, is the sole responsibility of the said third party; HLV2K Engineering Limited accepts no responsibility for any damages.

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2 INTRODUCTION

HLV2K Engineering Limited (HLV2K) was retained by Typhon Group Limited (hereinafter referred to as the Client) to update the Phase Two Environmental Site Assessment (ESA) report for the property located at 272 Innisfil Street, Barrie, Ontario (hereinafter referred to as the site and Phase Two Property). The location of the site is presented in **Drawing 1**. A Phase Two ESA was completed by HLV2K in 2018. The purpose of the Phase Two ESA was to investigate Areas of Potential Environmental Concern (APECs) identified by a previous Phase One ESA (Terra aqua Investigations Limited, 1997 and HLV2K, 2021). This report is updating the findings of the report to include the current conditions on the Phase Two Property.

The Phase Two Property is currently in commercial land use as a multi-tenant building. The purpose of the Phase Two ESA is to support the demolition of the current building and future development of a new residential condominium consisting of at least ten (10) stories with one (1) level of underground parking on the Phase Two Property. An application for a Record of Site Condition (RSC) will be required to address the more sensitive use of the property as a residential use Phase Two Property.

2.1 Site Description

The Phase Two Property located at 272 Innisfil Street in Barrie Ontario, is situated in a commercial area between Anne Street and Essa Road, south of the downtown core of Barrie. The Phase Two Property is irregular polygon in shape and is occupied by several tenants including an upholstery shop, antique store, and storage units. The entire site covers 0.7027 hectares and is located on the northwest corner of Innisfil Street and Jacobs Terrace in the City of Barrie.

The site is bounded to the south and west by individual autobody shops; to the north by Jacobs Terrace and a CN Rail Line; to the east by Innisfil Street and various commercials operations. The land surrounding the Phase II Property is essentially flat with a gentle slope towards Kempenfelt Bay at the northwestern portion of Lake Simcoe.

The plan of the legal survey is attached as **Appendix A**, and a site location plan is attached as **Drawing 1**.

A summary of the site description is provided in **Table 1 – Section 2.1**.

Table 1 – Section 2.1: Summary of Site Description

Parameters	Information
Location/ Address	272 Innisfil Street, Barrie, Ontario **Drawing No. 1: Site Location, Physical Settings, PCAs**
Property Identification Numbers (PINs)	PIN #58755-0007(LT)
Legal Description	Part Lots 1 – 5 s/s Jacobs Terrace, Lots 2 & 3 w/s Baldwin Street, Plan 30, as in RO1357111. **Appendix A: Legal Survey**
Shape	The Phase Two Property is a irregular-shaped land.
Access to the Phase Two Property	Access to Phase Two Property is from Innisfil Street and Jacob's terrace.
Occupancy	Commercial
Current Land Use	Commercial

Parameters	Information
Proposed Future Land Use	Residential or Residential/Commercial

2.2 Property Ownership

The Qualified Person from HLV2K was retained by the Client to carry out this Phase Two ESA Update. The Phase Two Property ownership information is presented in **Table 2 – Section 2.2.**

Table 2 – Section 2.2: Phase Two Property Owner Contact Information

Company	Contact
Phase Two Property Owner	Mr. Craig Mull 5409 Eglinton Avenue west Etobicoke, Ontario M9C 5K6 T (416) 775-5382 cmull@typhongroup.ca
Phase Two Property Contact	Mr. Mark Bristoll 442 Woburn Avenue Toronto, Ontario M5M 1L7 T (416) 706-8300 mark.bristoll@ollieswitch.com

2.3 Current and Proposed Land Uses

The Phase Two Property is currently in use as a commercial property with a variety of stores and shops in one building. Future redevelopment of the land use is anticipated to change from commercial to residential land use or both. In any case, the any future use of the land as residential either entirely or both will require an RSC.

2.4 Applicable Site Condition Standard

The results of the soil and groundwater chemical analyses were evaluated using the Standards prescribed in the Ministry of the Environment, Conservation and Parks (MECP) Table 2 ICC Standards for coarse-grained soils in a potable groundwater condition. These Standards were used to evaluate soil and groundwater quality based on the samples collected and tested, to determine whether soil quality complied with MECP Standards, and to determine whether additional investigations are required or warranted.

The Phase Two Property was assessed using the Standards contained in MECP Table 2 of the above referenced Standards. The use of the Table 1Standards is considered appropriate by HLV2K based on the following considerations listed in **Table 3 – Section 2.4**.

Table 3 – Section 2.4: Phase Two Property Conditions

Parameters	Information
Proposed Land Use	Residential or Residential/Commercial
Potable or Non-Potable Ground Water	Potable Groundwater
Proximity to Surface Water	The closest water body is Kempenfelt Bay at the northwestern portion of Lake Simcoe which lies approximately 0.5 km from the Site. The Hotchkiss Creek exist approximately 293 m north and 312 m northwest of the site flowing into

Parameters	Information
	Kempenfelt Bay in westward direction.
Areas of Natural Significance	There are no Areas of Natural Scientific Interest (ANSI) in the study area, nor environmentally sensitive areas that encroach within 30 m of the Phase Two Property.
Nature and Depth of Bedrock Strata	According to the data obtained from EcoLog ERIS, Ontario wells, and Bedrock Oshawa available data for the depth of bedrock, the depth to bedrock can be assumed to be approximately 50 m below ground surface (bgs). The bedrock comprising mainly of Ottawa Group, Simcoe Group, Shadow Lake Formation dominantly limestone, dolostone, shale, arkose, and sandstone.
Direction of Groundwater Flow	The groundwater flow direction was determined to be in a north-easterly direction towards Kempenfelt Bay.
Grain Size Analysis	Coarse textured soil will be applied for the purpose of this report.
PH of Soil	Soil pH was between 5 and 9.

Based on the Phase Two Property conditions described in **Table 3 – Section 2.4**, the applicable criteria to be used in this Phase Two ESA is Ontario Regulation 153/04 "Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition" for Residential Parkland Institutional (Table 2 RPI Standards) as per the MECP document titled "*Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act"*, dated April 15, 2011, as amended.

3 BACKGROUND INFORMATION

3.1 Physical Setting

The site is located at approximately 229.8 m above sea level (ASL) and is generally flat land. According to EcoLog ERIS the land slopes to the northeast. The Hotchkiss Creek exist approximately 293 m north and 312 m northwest of the site. More streams may exist below the ground surface.

The ground surface of the property slopes towards the northeast with a gradient of 0.07 m/m. The land is steeper towards the north of the property.

The closest water body is Kempenfelt Bay at the northwestern portion of Lake Simcoe which lies approximately 0.5 km from the Site.

According to the Radon Potential Map of Ontario obtained from the website of Canada Radon, the Phase Two Study Area is located in the Relative Radon Hazard Zone 1 – High.

According to the Niagara Escarpment Plan obtained from the website of the Ontario Niagara Escarpment Commission, the Niagara Escarpment Plan does not affect or impact the Phase Two Study Area.

According to Oak Ridges Moraine Map obtained on the website of Ontario Municipal Affairs and Housing Corporation, there is no natural core area or natural linkage area that falls within the Phase Two Study Area.

According to the Municipal Official Plan, there are no areas of provincial park or conservation reserves, wetland, endangered species habitat, or wilderness areas in the Phase Two Study Area except for

Hotchkiss Creek located approximately 300 m north of the Phase Two Property. Hotchkiss Creek is a conservation authority regulated area under Lake Simcoe Conservation Authority Regulation Limits.

There are no areas of natural significance encroaching within 30 m of the site.

3.2 Past Investigations

As part of the Phase One Environmental Site Assessment ("1800064BE Phase One Environmental Site Assessment, 272 Innisfil Street, Barrie, Ontario"), prepared by HLV2K Engineering Limited for Typhon Group Limited, HLV2K reviewed the following environmental reports:

- *"Phase One Environmental Site Assessment, 272 Innisfil Street, Barrie, Ontario.", prepared by Terraqua Investigations Limited. for Copaco Space Rental (Report T677, dated August 8, 1997) (Author: Kim S. Hawkes, P.Eng.)*
- *"Phase II Environmental Site Assessment, 272 Innisfil Street, Barrie, Ontario.", prepared by HLV2K Engineering Limited. for Typhon Group Limited (Report 1800064AE, dated August 23, 2018) (Author: John (Gianni) Lametti, P.Eng.)*

3.3 Adequacy of Previous Data

The information collected from Terraqua's Phase One ESA was relied upon for information pertaining to conducting the Phase Two ESA in 2018.

HLV2K conducted a recent Phase One ESA (2021) defining PCAs and APECs that were similar to the ones determined in HLV2K's Phase Two ESA in 2018. The APECs 3a and 3b have changed and become APEC 3 and APEC 4.

The data obtained from the Phase Two ESA by HLV2K is considered to be valid and will be included as part of this Phase Two ESA. Although the investigation was obtained more than 18 months ago, no material change was identified through the updated HLV2K Phase One ESA, and the entire investigation met Ontario Regulation 153/04 (as amended) including quality control and quality assurance requirements under the supervision of the same QP for this Phase Two ESA.

4 SCOPE OF INVESTIGATION

4.1 Overview of Site Investigation

HLV2K's Phase Two ESA included analysis of previous field investigation carried out between August 1, 2018 to August 10, 2018. The field investigation was carried out to assess the quality of the soil and groundwater of the Phase Two Property in relation to the Areas of Potential Environmental Concern (APECs) identified by the Phase One Conceptual Site Model, represented in this report as **Drawing 3**.

The scope of the investigation included:

- Preparation of a Health and Safety Plan.
- Collection of the geodetic elevations for borehole locations.
- Advancement of total of four (4) boreholes, four (4) to a maximum depth of 6.7 m bgs.
- All boreholes were completed to monitoring wells designed to intercept the water table for the shallow

boreholes.

- Groundwater elevation measurements using a interphase probe for the potential measurements of free phase product either floating on the water table or base the base of any water column.
- Sample collection was carried out in accordance with the detailed sampling and analysis plan (attached as **Appendix B**).
- Field observations were made in accordance with the HLV2K's Standard of Operation (SOP) (attached as **Appendix E**).
- Samples collected were submitted and analyzed by ALS Environmental testing laboratories companies to the MECP Table 2 ICC Standards for coarse-textured soil.

4.2 Media Investigation

The Phase Two ESA was designed to investigate the potential for impact to soil and groundwater media on, in, and beneath the Phase Two Property. The sampling of sediment was not performed, as there were no surface bodies of water on the site during the Phase Two ESA investigation.

4.2.1 Soil Investigation

The soil investigation was designed to investigate the APECs identified by the Phase One ESA, and consisted of the following components:

- Four (4) boreholes were drilled on the Phase Two Property (MW101, MW102, MW103, and MW104), to a maximum depth of 6.0 m bgs or refusal (whichever came first).
- Sampling intervals for the boreholes were continuously taken with a 0.75 m in length split spoon sampler from the ground surface to 3.7 m bgs; and from 3.7 m bgs downward, samples were taken with a 0.75 m in length split spoon sampler with an interval of 0.7 m, to the bottom depth of the investigation.
- The split spoon sampler was cleaned with Alconox soap solution and rinsed with water between uses. The rinse water was collected and placed into a drum.
- Inspection and logging of the split-spoon samples in the field with observations noted pertaining to the soil type, composition, visual staining, decolourization, and olfactory clues for potential chemical impacts.
- Collection of soil samples from each soil layer.
- Prepared sub-samples for chemical laboratory analysis.
- Field screening of soil samples using an RKI Eagle 2 Photo Ionization Detector (PID) to measure headspace vapour concentrations and determine the potential existence of PHC F1 fractions and other VOCs.
- Collection of sub-samples of soil for chemical laboratory analysis was done using laboratory-prepared, pre-labelled jars and vials. Sub-samples were placed in previously ice-filled coolers. Based on the headspace vapour of analysis, the soil samples that exhibited the worst-case vapour readings were submitted to the analytical laboratory, along with a Chain of Custody Form for those samples.
- One (1) QA/QC was conducted on a duplicate sample, for every 10 sample parameters measured in the field. One (1) field duplicate soil sample was analyzed for PHCs, VOCs, PAHs, PCBs, Metals, and Inorganics.

- Soil cuttings were collected and remained on-site for future disposal.

4.2.2 Groundwater Investigation

The groundwater investigation was designed to intercept the groundwater table located approximately 3.0 m bgs. The following activities were completed to assess the groundwater:

- Four (4) monitoring wells (MW101, MW102, MW103, and MW104) were installed to assess the potential impact on the groundwater.
- The well screens were placed at the bottom 3.0 m of the monitoring well depth, with a maximum depth of approximately 6.0 m below the ground surface (bgs).
- Development of each well, prior to sampling by the removal (purge) of at least three (3) times the volume of water contained in each well.
- Collection of the bail water in drums for future offsite disposal.
- Determination of the presence of non-aqueous phase liquid-free product and the static groundwater elevation at each well.
- A sampling of groundwater using a low flow pump system (or equivalent) following the water quality test with a Hanna Pen water quality meter for determining the pH, conductivity, and temperature. Groundwater samples were collected once the three (3) parameters measured by the Hanna Pen meter showed the values to be constant.
- One (1) duplicate sample was collected for QA/QC analysis; one (1) for each ten (10) parameters measured in the field.
- The cooler also contained a trip blank for the measurement of VOC samples for groundwater.
- Groundwater samples were placed in laboratory-prepared and pre-labelled jars and placed in ice-filled cooler boxes for storage and transportation to the analytical laboratory, along with a Chain of Custody Form.
- Retention of a signed (by the Laboratory receiving agent) copy of the Chain of Custody Form once the samples were submitted for analysis.
- Ensured the temperature of the samples submitted was below 10°C.
- Chemical analysis of three (3) groundwater samples for contaminants of concern associated with specific APEC(s) identified by the Phase One ESA. Specifically, a groundwater sample and one (1) field duplicate groundwater sample were submitted for analysis PHCs, VOCs, PAHs, PCBs, OCs, metals, and inorganics. One (1) trip blank groundwater sample was submitted for VOCs.

4.3 Phase One Site Conceptual Model

The Phase One Conceptual Site Model is described as follows:

The PCAs on the Phase One Property and within Phase One Study Area identified through a records review, interview, and site reconnaissance are summarized as follows and includes the actual groundwater

flow direction as measured on-site during the investigation (**Drawing No. 3**):

Table 4 – Section 4.3: Phase One CSM – PCAS

No. On Map	PCA # (Table 2, Schedule D, Ontario Regulation 153/04)	Direction from Phase One Property	Approximate Distance from Phase One Property (m)	Relative to the groundwater flow direction
1	PCA#39: Paint Manufacturing, Processing and Bulk Storage	On Site	0 m	On site
1	PCA#55: Transformer Manufacturing Processing and Use	On site	0 m	On site
1	PCA#28: Gasoline and Associated Products Storage in Fixed Tanks	Offsite	5 m	Up Gradient
8	PCA#52: Storage, Maintenance, fueling and repair of equipment, vehicles, and materials used to maintain transportation system	S	15 m	Up-Gradient
6	PCA#10: Commercial Autobody Shops	W	23.4 m	Up Gradient and cross gradient

The potentially contaminating activities identified above have been evaluated by a qualified person to determine whether an area of potential environmental concern will transpose on the Phase One Property as a result of their presence within the Phase One Property or Phase One Study Area. The rationale for the exclusion of one or more PCAs may be the result of, but not limited to, the direction of site location in conjunction with proposed groundwater flow direction, distance from the site, results from previous environmental reports, etc.

The Areas of Potential Environmental Concern (APEC) identified in the Phase One ESA is as follows:

Table 5 – Section 4.3: Phase One CSM - APECs

Area of Potential Environmental Concern[1]	Location of Area of Potential Environmental Concern on Phase Two Property	Potentially Contaminating Activity[2]	Location of PCA (on-site or off-site)	Contaminants of Potential Concern[3]	Media Potentially Impacted (Groundwater, soil, and/or sediment)
APEC1	North	PCA#39: Paint Manufacturing, Processing and Bulk Storage	On Site	PHCs, VOCs, PCBs, PAHs, Metals, Metals Hydrides and ORPs	Soil and Groundwater
APEC2	South	PCA#10: Commercial Autobody Shops	Off Site	PHCs, VOCs, PCBs, PAHs, Metals, Metal forming	Groundwater and Soil

Area of Potential Environmental Concern[1]	Location of Area of Potential Environmental Concern on Phase Two Property	Potentially Contaminating Activity[2]	Location of PCA (on-site or off-site)	Contaminants of Potential Concern[3]	Media Potentially Impacted (Groundwater, soil, and/or sediment)
				hydrides and ORPs	
APEC3	South	PCA#28: Gasoline and Associated Products Storage in Fixed Tanks	On Site and Off site	PHCs, VOCs, PCBs, PAHs, Metals, Metal forming Hydrides and ORPs	Soil and Groundwater
APEC4	South	PCA#52: Storage, Maintenance, fuelling and repair of equipment, vehicles, and materials used to maintain transportation system	Off site	PHCs, VOCs, PCBs, PAHs, Metals, Metal forming Hydrides and ORPs	Groundwater and Soil
APEC5	North	PCA#55: Transformer Manufacturing, Processing, and Use	On Site	PHCs, VOCs, PCBs, PAHs, Metals, Metal Hydrides and ORPs	Soil and Groundwater

Notes:

1 - Area of Potential Environmental Concern (APEC) means the area on, in, or under a Phase One Property where one or more contaminants are potentially present, as determined through the Phase One ESA, including through:

(a) Identification of past or present uses on, in, or under the Phase One Property, and

(b) Identification of potentially contaminating activity.

2 - Potentially Contaminating Activity means a use or activity set out in Column A of Table 2 of Schedule D that is occurring or has occurred in a Phase One Study Area

3 - When completing this column, identify all contaminants of potential concern using the Method Groups as identified in the "Protocol for in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, March 9, 2004, amended as of July 1, 2011, as specified below:

4 - When submitting a record of site condition for filing, a copy of this table must be attached.

ABNs	PCB's	Metals	Electrical Conductivity/ SAR
CPs	PAH's	As, Sb, Se	Cr (VI)
1,4-Dioxane	THMs	Na	Hg
Dioxins/Furans, PCDDs/PCDFs	VOC's	B-HWS	Methyl Mercury
OCs	BTEX	Cl^-	high pH

PHC's	Ca, Mg	CN^-	low pH

Physical Settings

The entire Phase One Property was situated on stone-poor till textured glaciolacustrine deposits, which mainly consist of sandy silt to silty sand textured Till on Paleozoic terrain.

The bedrock comprising mainly of Ottawa Group, Simcoe Group, Shadow Lake Formation dominantly limestone, dolostone, shale, arkose, and sandstone.

Based on the aerial photographs, the Hotchkiss Creek exist approximately 293 m north and 312 m northwest of the site flowing into Kempenfelt Bay in westward direction. Kempenfelt Bay at the northwestern portion of Lake Simcoe lies approximately 0.5 km from the Site. Therefore, the inferred groundwater flow direction is towards northeast.

Water Bodies and Areas of Natural Significance

There are no Areas of Natural Significance within the Phase One Study Area. No water body is identified within 30 m of the site.

4.4 Deviations from Sampling and Analysis Plan

HLV2K did not deviate from the SOPs and forms outlined above. The location of the boreholes and monitoring wells in relation to the PCAs and APECs are presented in **Drawing 3**.

Monitoring wells were used to assess the groundwater flow direction and the groundwater quality at each screened interval.

The collection of groundwater samples could not be performed within 24 hours of purging as is required under the Ontario Regulation 153/04 (as amended).

No deviations occurred from the initial Sampling and Analysis Plan.

4.5 Impediments

There were no impediments encountered on site during the drilling of the boreholes and monitoring wells.

5 INVESTIGATION METHOD

The investigation method followed the analysis plan for soil shown in **Appendix B**.

5.1 General

The Phase Two ESA involved various field activities to investigate the quality of the soil and groundwater and was comprised of the following components:

- Retaining public and private utility locator companies;
- Retaining a certified (MECP licensed well drillers) contractor for drilling the boreholes and installing the monitoring wells;
- Supervision and documentation of borehole drilling and monitoring well installation field activities;

- Soil characterization and logging;
- Soil sample collection for chemical analysis;
- Well development;
- Determination of the presence of any non-aqueous phase free product and water elevation monitoring;
- Groundwater sample collection for chemical analysis;

HLV2K developed Standard Operating Procedures (SOPs) and field forms that follow Ontario Regulation 153/04 (as amended) to complete the Phase Two ESA. The following list of SOPs and forms were used:

- Phase Two ESA Field Protocols;
- Job Safety Analysis (JSA) field form;
- HLV2K Health and Safety Manual;
- Soil Sampling for VOCs using Methanol Vials;
- Soil Vapour Headspace Measurement for Soil Screening and Selection;
- HLV2K field logging forms;
- Residual Management Procedures for soil and groundwater;
- Ground Water Purging and Sampling Procedures; and
- Sample selection, packing, and transportation to the analytical laboratory.

HLV2K did not deviate from the SOPs and forms outlined above.

5.2 Drilling

Prior to subsurface activities on the Site, HLV2K contacted the Ontario One Call for the public locates. A private utility contractor was retained to verify all borehole positions were remote from buried utilities.

Four (4) boreholes were drilled to depths of 6.7 m below ground surface with a CME 55 truck mounted drill rig. All four boreholes were completed to monitoring wells with flush mounts cemented in place. The work was undertaken on August 1, 2018.

HLV2K did not deviate from the SOPs and forms outlined above.

5.2.1 Name of the Contractor

Drill Tech Drillers, licensed environmental and geotechnical drillers, were commissioned to drill the four (4) boreholes at the Phase Two Property and install the four (4) groundwater monitoring wells.

5.2.2 Description of the Equipment Used

The four (4) boreholes were drilled by Drill Tech Drillers, using a truck-mounted CME 55 drilling rig,

equipped with a 75 mm inside diameter rotary hollow stem augers. Samples were collected from dual-tube samplers with plastic sampling tubes.

5.2.3 Description of Measures taken to Minimize Cross-Contamination

Augers, down-hole tools, and hand tools used by the drillers to construct the borehole, collect soil samples, and install the groundwater monitoring wells were thoroughly decontaminated after each use, using Alconox solution and a pressure washer. The rinse water was in a large aluminum tub and later transferred into 205 L drums and stored on-site for subsequent disposal. New disposable gloves were used for handling each sample.

Sampling tools used to retrieve soil samples from the split spoon sampler were also cleaned with Alconox solution, rinsed with de-ionized water, and cloth dried prior to each re-use. The wash water was placed in a drum for subsequent disposal. The dedicated gloves were changed after each sample to prevent cross-contamination. The spent gloves were placed into garbage bags and removed from the property at end of the drilling program.

5.2.4 The Frequency of Sample Collection

Sampling intervals for the boreholes were continuously taken with a 0.6 m in length split spoon sampler from the ground surface to 6.7 m bgs.

5.3 Soil Sampling

5.3.1 Description of Equipment Used for Soil Collection

Samples of soil were obtained using a 50 mm diameter, 0.6 m dual-tube samplers with plastic sampling tubes.

Following field screening, samples were placed in appropriate laboratory-supplied, pre-labeled bottles and methanol-filled vials (for VOCs and PHC F1 analysis) and placed directly into ice-filled coolers for storage and transportation.

5.3.2 Geological Descriptions of Soil Samples

Geological descriptions of the soil samples based on the finalized field logs (**Appendix C**) for each borehole and monitoring well are provided in **Table 7 – Section 4.4** (below).

Table 6 – Section 4.4: Geological Descriptions of Soil Samples

Exploratory Location BH/MW	Type	Geological Description	Depth Range (m bgs)	Soil Sample
MW101	Asphalt	100mm	0.0 – 0.1	
	Fill	Silty Sand to Sand, black to brown, moist	0.1 – 0.6	SS1
	Native	Sand, brown, moist, loose	0.7 – 1.4	SS2
	Native	Silty Sand to Sandy Silt, some Clay, moist, loose	1.5 – 2.1	SS3
	Native	Silty Sand to Sandy Silt, brown, very moist	2.2 – 4.4	SS4
	Native	Silty Sand to Sandy Silt, brown to grey, very moist	4.5 – 6.7	SS5

Exploratory Location BH/MW	Type	Geological Description	Depth Range (m bgs)	Soil Sample
MW102	Asphalt	100mm	0.0 – 0.1	
	Fill	Silty Sand, some gravel, pieces of brick, black, moist	0.1 – 0.2	SS1
	Native	Sand, brown, moist, loose	0.2 – 0.6	SS2
	Native	Silty Sand to Sandy Silt, dark to light brown, oxidized, moist	0.7 – 2.9	SS3
	Native	Silty Sand to Sandy Silt, brown to grey, very moist	3.0 – 3.7	SS4
	Native	Silty Sand to Sandy Silt, grey, wet, some oxidization	3.8 – 6.7	SS5
MW103	Asphalt	100mm	0.0 – 0.1	
	Fill	Silty Sand, brown, moist	0.1 – 0.3	SS1
	Native	Silty Sand, black, moist	0.4 – 0.6	SS2
	Native	Silty Sand, black, pieces of gravel, moist	0.7 – 0.8	SS3
	Native	Silty Sand to Sandy Silt, brown, moist, some rootlets, some oxidization	0.9 – 2.1	SS4
	Native	Silty Sand to Sandy Silt, brown, moist	2.2 – 3.7	SS5
	Native	Silty Sand to Sandy Silt, greyish, very moist, some oxidization	3.8 – 6.7	SS6
MW104	Asphalt	100mm	0.0 – 0.1	
	Fill	Silty Sand, some gravel, some concrete	0.1 – 0.2	SS1
	Native	Silty Sand, brown, moist	0.2 – 0.6	SS2
	Native	Silty Sand to Sandy Silt, brown, some gravel, moist, some oxidization	0.7 – 2.1	SS3
	Native	Silty Sand to Sandy Silt, brown to greyish, moist to wet	2.2 – 5.2	SS4
	Native	Silty Sand to Sandy Silt, greyish, moist, oxidized	5.3 – 6.7	SS5

5.4 Field Screening Measurements

Field screening of the soil involved the use of a portable Photo-Ionization Detector (PID) to measure headspace concentrations of methane (as Hexane) and VOCs (as Isobutylene) in conjunction with visual and olfactory observations. This combination of field screening tools was used to determine the "worst-case" sample of the site and selection of the samples for submission of VOC analysis.

Soils were also field screened by visual inspection for staining and discolouration, and olfactory clues. Soil samples that were stained or odorous were also selected for analysis.

5.4.1 PID Screening

Soil samples collected were screened for vapours using the RKI Eagle II gas portable vapour monitor equipped with a PID sensor. The RKI Eagle II monitor was supplied and calibrated by Maxim Environmental

prior to use. Screening of VOC headspace concentrations was performed in accordance with HLV2K's SOP for Soil Vapour Headspace Measurement.

The VOC measurements were taken by collecting soil samples into dedicated sampling bags and allowing the sample to reach room temperature. The sampling probe of the RKI Eagle II was then inserted into the bag while maintaining a tight seal around the probe. The measurements taken represent the highest value detected within the first 30 seconds of the field screening. Measurements were then documented into the field notes. Soil samples with the highest combustible headspace vapours were then submitted to the laboratory for analysis, as are shown in **Table 15.**

5.4.2 Chemicals Detected and Associated Detection Limits

The monitoring program was performed using the RKI Eagle II gas meter equipped with a low range PID sensor and configured to detect VOCs calibrated to isobutylene (IBL), and combustible gas such as methane (CH4), Hydrogen Sulfide (H2S), Carbon Monoxide (CO), and Oxygen (O2). The RKI Eagle II provides sampling increments of one (1) part per million (ppm) for VOCs, H_2S, and CO measurements, 1% LEL for combustibles, and 0.1 % Vol for oxygen. The RKI Eagle II provides detection limit ranges between 0 – 50 ppm for VOCs, 0 – 100% LEL for combustibles, 0 – 100 ppm for H2S, 0 – 500 ppm for CO, and 0 – 40% Vol for oxygen.

5.4.3 Precision of the Measurements

Duplicate measurements were taken for one (1) in every ten (10) samples to assure the precision of the screening. Deviations greater than 30% of the initial reading indicated a non-reliable result due to random error. When a non-reliable result was encountered, the RKI Eagle II was calibrated to zero in the fresh air and the corresponding sample was re-screened.

5.4.4 Accuracy of the Measurements

According to the manufacturer's sheet, the accuracy of VOC is not applicable.

The accuracy of detected methane is ±5% of reading or ±2% LEL, whichever is greater.

The accuracy of H2S is ±5% of reading or ±2 ppm, whichever is greater.

The accuracy of CO is ±5% of reading or ±5 ppm, whichever is greater.

The accuracy of O2 is ±0.5% O2.

5.4.5 Procedure for Checking Calibration of Equipment

The RKI Eagle II Photo-Ionization Detector (PID) was rented and calibrated by Pine Environmental Services Inc. with isobutylene calibration gas and hexane prior to use.

The calibration of the RKI Eagle II PID is verified by operating the unit in a fresh air environment and ensuring zero readings for all measurable parameters. In the event that, the PID detects positive concentrations of any of the measurable parameters, the PID is re-calibrated using the auto-calibration function of the unit. In the event that, the unit continues to record positive concentrations in a fresh-air environment, the unit is replaced immediately.

The equipment accessories (i.e., filters, and hose connections) are checked prior to use for blockage and damage and are replaced frequently.

5.5 Groundwater: Monitoring Well Installation

The investigation method follows the analysis plan for groundwater was shown in **Table 5**.

Four (4) boreholes drilled at the site were installed with groundwater monitoring wells. The locations of the monitoring wells were selected to permit sampling of the groundwater in specific APEC locations to permit a more detailed evaluation of the groundwater regime beneath the Phase Two Property. Some of the monitoring well placements were selected to assess the direction of groundwater flow. The well screen was placed at the base of each monitoring with a three (3) m well screen. The screen was encompassed with the sand pack that extends 30 cm above the screen interval. Above the sand pack, the well was sealed with bentonite chips to approximately 7 cm below the ground surface. A flush mount casing with locking caps was added to the PVC pipe and cemented in place. The bottom of the well screen was sealed with a J-Plug.

5.5.1 Name of the Contractor

Drill Tech Drillers, licensed environmental and geotechnical drillers, were commissioned to drill the four (4) boreholes at the Phase Two Property and install the four (4) groundwater monitoring wells.

5.5.2 Description of the Equipment

The monitoring wells were drilled with a CME 55 truck-mounted drill rig using a 75 mm inside diameter (ID) auger and Geo-probe DT 6022 track mounted drill rig.

The monitoring wells were constructed using the following materials:

- Dedicated polyvinyl chloride (PVC) individually wrapped riser pipes and screens;
- 50 mm (2 inches) diameter Schedule 40 PVC pipe capped at the top;
- 50 mm (2 inches) diameter Schedule 40 No. 10-slot PVC screen with a screen length of 3.0 m and capped at the base with a J-Plug;
- Sand pack to approximately 0.3 m above the top of the well screen;
- Bentonite seal to at least 3 m above the sand pack; and,
- Flush mounts protective well covering, PVC cap for the well riser pipe, and locking caps on the flush mount casing cover.

5.5.3 Measures to Minimize Potential Cross-Contamination

There are dedicated Schedule 40 PVC pipe and screens encased in a plastic sleeve that is removed prior to installation. Once the monitoring wells were installed. Sterile dedicated tubing was placed in each monitoring for well development, which was subsequently removed, rinsed, placed in a plastic bag, and disposed of prior to groundwater sampling.

A dedicated sampling device consisting of a sampling tube and pump attached was used to collect groundwater samples. The groundwater was placed directly in the pre-labelled laboratory-supplied sample jars and vials and was tightly sealed and placed directly into a cooler for delivery to the laboratory. Sterile butyl nitrile gloves were changed for each well to ensure no cross-contamination during the sampling program.

Groundwater samples were placed directly into pre-labelled, laboratory-prepared sample containers and placed directly into a cooler.

5.5.4 Frequency of Sample Collection during Drilling

Groundwater samples were not collected during borehole drilling or monitoring well construction.

5.5.5 Monitoring Well Development

Prior to well development, the groundwater elevation at each monitoring well was established using a Heron H. Oil Oil/Water interface probe. The interface probe was used to assess the monitoring well for the presence of Light Non-Aqueous Phase Liquids (LNAPLs) and Dense Non-Aqueous Phase Liquids (DNAPLs). If a free product were present, the thickness of the free product would be measured and recorded, and the actual groundwater surface was corrected accordingly. The interface probe was thoroughly washed with de-ionized water and dried with a clean cloth prior to use at a subsequent well.

Subsequent to the groundwater elevation survey, each well was developed by the removal of at least three (3) times the volume of water (if possible) contained in each well using a pump system. The purged groundwater removed was collected in dedicated five (5) gallon pails (23 liters) to inspect the removed water for visible identifiers or sheen. The amount of water removed from each well was recorded and is summarized in **Table 8 – Section 5.5.5** below.

Table 7 – Section 5.5.5: Monitoring Well Development

Monitoring Well	Groundwater Level (m bgs)	Depth of water column (m)	Required Purge Volume (L)	Date of Development/Purging	The volume of Fluid Removed from Well (L)
MW101	3.43	3.36	20.43	August 9, 2018	20.58
MW102	4.22	2.48	14.88	August 9, 2018	25.32
MW103	3.33	3.37	20.22	August 9, 2018	19.98
MW104	4.07	2.63	15.78	August 9, 2018	24.42

5.6 Groundwater: Field Measurements of Water Quality Parameters

Prior to the collection of groundwater samples, measurements of the groundwater quality (temperature, PH, conductivity) were obtained from each monitoring well using Hanna Instrument HI98129. The Hanna Instrument measures water quality data including electrical conductivity (µS/cm), temperature (°C), and pH. Prior to sampling, the Hanna Instrument was calibrated and checked for accuracy in distilled water. For sampling, groundwater was first purged into the thoroughly cleaned and rinsed white pails. Then, the probe of the instrument was submerged into the water sample. When constant, the reading was noted. The procedure was repeated 2 to 3 times until the readings between each repeat were relatively consistent. When constant readings were reached or the variation in the reading was below 10%, the readings were deemed to be at a steady-state and the groundwater was collected for analysis. The midpoint value between the highest and lowest reading was recorded.

Table 9 Section 5.6 below summarizes the steady-state water quality parameters measured at each well, prior to the collection of groundwater samples.

Table 8 – Section 5.6: Hanna Instrument Readings at Steady-State Conditions

Date	Location	Temperature °C	Electrical Conductivity (µS/cm)	pH
August 9, 2018	MW101	14.53	0.61	7.16
August 9, 2018	MW102	13.66	0.97	7.0
August 9, 2018	MW103	14.53	0.61	7.36
August 9, 2018	MW104	12.93	1.20	6.96

Following each use and prior to the commencement of the subsequent groundwater sample, the Hanna Instrument probe was flushed with de-ionized water and dried prior to re-use.

5.7 Groundwater: Sampling

Groundwater samples were collected on August 09, 2018, following the field measurements of the water quality parameters, in accordance with HLV2K's SOP for Ground Water Purging and Sampling.

Groundwater samples were collected from the well as soon as there was sufficient groundwater in the well for sample collection. Hanna Instrument HI98129 was used to assess the water quality for temperature, conductivity, and PH. The wells were slow in recovery, however sufficient was recovered for sampling.

The jars and vials were prepared in advance by the laboratory. The pre-labeled jars were filled in the field sealed when full, packaged in bubble wrap, and placed into an ice-filled cool box to maintain temperatures below 10 ^{0}C for storage and transportation. The chain of custody form was completed in the field, placed in a protective wrap, and placed into the cooler box for delivery to the laboratory. A copy of the Chain of Custody was retained and is attached to the report in **Appendix D.**

5.8 Sediment: Sampling

The Phase Two Property did not contain a body of water as defined under Ontario Regulation 153/04 (as amended); therefore, sediment was not present in the investigation area and no sediment sampling was conducted.

5.9 Analytical Testing

The soil and groundwater samples were submitted to ALS Environmental, analytical laboratories accredited by the Canadian Association for Laboratory Accreditation (CALA). The analyses were performed in compliance with the MOE Laboratory Services Branch, "Protocol for Analytical Methods Used in the Assessment of Properties under Past XV.1 of the Environmental Protection Act of the Environmental Protection Act, July 1, 2011".

One (1) field duplicate sample was collected for every ten (10) samples, and one (1) trip blank for QA/QC purposes was placed in the cooler for the sampling of VOC parameters in groundwater. The duplicate(s) were labeled as Duplicate Sample 1 etc. However, the location and identity were not provided to the laboratory.

The required Reported Detection Limits (RDLs) for each parameter were met and there are no RDLs that exceed the applicable site condition standard.

5.10 Residue Management Procedures

5.10.1 Soil Cuttings - Drilling

Soil cuttings removed from the drill augers were stored on-site for future disposal. If the soil is to be disposed of in a licensed facility, a Toxicity Characteristic Leaching Procedure (TCLP) analysis will be required along with the bulk analysis.

5.10.2 Water from Well Development and Purging

Water generated from the well development and the purging of the wells was collected and stored onsite for future disposal. The groundwater encountered at the site did not exhibit any visual or olfactory evidence of chemical impact, sheen, or NAPLs and met the MECP Table 2 ICC Standard for coarse-grained soils.

5.10.3 Equipment Cleaning Fluids

Fluids generated by the following tasks were placed into drums pending chemical evaluation and disposal offsite:

- Split-spoon sampler washing;
- Wash water for the cleaning of the augers remove soil;
- Hand tools used in the collection of soil samples;
- Cleaning of the Hanna Pen probe; and,
- Removal of the well tubing from the wells.

5.11 Elevation Surveying

An elevation survey was carried out using a handheld GPS for each borehole/monitoring well. The GPS used on the Phase Two Property was a Juniper Archer 2-2013 and a Hemisphere S - 32device with an accuracy +/- 2 mm in vertical elevation of the surface soil.

5.12 Quality Assurance and Quality Control Measures

For Quality Assurance and Quality Control Measures (QA/QC), one sample was collected as a duplicate sample for every 10 sample parameters collected in the field for soil and groundwater. In addition, a trip blank was carried in the cooler when sampling the groundwater for VOCs.

The analyses of QA/QC for both the soil and groundwater showed good agreement with the duplicates taken in the field.

No VOC concentrations were encountered in the trip blank above the various reportable detection limits (RDL), thus indicating that the collected groundwater sample was also unlikely to be influenced by ambient air during transport.

5.12.1 Laboratory Supplied Sample Containers and Shipment Procedures

Table 10 – Section 5.12.1 below provides a detailed description of the sample containers, preservation, labeling, handling, and custody for the samples submitted.

Table 9 – Section 5.12.1: Sampling Parameters and Containers

Parameter	Sample Container	Preservative	Handling & Custody Samples
Soil Samples			
Metals, PHCs (F2-F4), PAHs, PCB.	Amber glass Teflon lined lids	None	Soil samples were collected from the split-spoon sampler by hand or with the use of a clean steel trowel and transferred to a zip lock bag for field screening. Samples taken for laboratory analysis were placed in pre-prepared and labeled laboratory-supplied sample containers, observing the laboratory requirements for specific sample volumes according to the testing required. The soil samples collected for laboratory analysis were immediately placed into ice-filled cool boxes for storage and transportation to the laboratory. On arrival, all samples were removed from the ice-filled cool box and immediately refrigerated pending final chemical analysis sample selection. Selected samples for laboratory analysis were placed in ice-filled cool boxes and dispatched to the accredited chemical laboratory under Chain of Custody procedures.
VOCs, PHC (F1)	Vial	Methanol	
Groundwater Samples			
PHCs (F2-F4).	Amber Glass Bottle	HCL	Groundwater samples were collected using a low-flow waterra® pump and dispensed directly into the appropriate pre-labeled, laboratory-supplied groundwater sample containers. The collected groundwater samples were immediately placed into ice-filled cool boxes for storage and transportation to the laboratory. On arrival at the laboratory, all samples were removed from the ice-filled cool box and immediately refrigerated pending final chemical analysis sample selection. Selected samples for laboratory analysis were placed in ice-filled cool boxes and dispatched to the accredited chemical laboratory under Chain of Custody procedures.
VOCs, PHC (F1)	Vials	NaHSO4	
PCB/Pesticides-(OCP) surrogate, Cyanide, Mercury, Metals, PCBs, semi volatiles.	Amber Glass Bottle	No preservatives	

Soil samples were collected using dedicated prepared 250 ml jars, syringes, and vials provided by Eurofins. Soil samples that required VOC analysis involved placing approximately 5 g of soil into dedicated methanol-filled vials. This method was used to ensure no loss of VOCs during transportation. The vials were placed in the cooler containing the trip blank for VOC analysis. The cooler was placed in ice to ensure the temperature of samples was lower than 10 °C on arrival at the laboratory.

5.12.2 Description of Equipment Cleaning Procedures

The boreholes were drilled utilizing hollow stem augers to minimize the possibility for the cross-contamination between potentially impacted and non-impacted soil or groundwater layers and to facilitate appropriate groundwater monitoring well construction following completion of the borehole drilling.

Split spoon core samples of soil were obtained during the drilling was collected via a 0.6 m in length split-spoon sampler. The split-spoon samplers were washed and scrubbed with Alconox mixed in water, rinsed and hand dried (with a fresh towel) between each use to prevent cross-contamination on re-use. Spent towels were collected in a garbage bag and removed from the site. The rinse-water was placed into the drums for later offsite disposal.

Soil samples were collected from the split-spoon sampler by hand (using dedicated nitrile gloves that were disposed of after each sample), to mitigate cross-contamination. If necessary, soil samples contained in the split-spoon sampler were removed with the aid of a stainless-steel trowel. Subsequent to soil sample collection, each split-spoon sampler and any other hand-tool used for sample collection was immediately cleaned in accordance with HLV2K's SOP, as follows:

- Scrubbed with a wire brush in an Alconox solution (a powdered precision cleaner, that is biodegradable and has interfering-residue free and corrosion-inhibiting properties);
- Rinsed with distilled or de-ionized water;
- Toweled with dedicated disposable dry towels;
- Hanna instrument was flushed clean with de-ionized water; and,
- All fluids captured for offsite disposal in 205 L drums were clearly marked and labels.

The soil samples were placed directly into pre-labeled jars specific to the chemical analysis desired. The location of each sampling point is recorded, and the pre-labeled jars were placed in coolers and packed with ice. The remaining sample after classification were placed in a large zip lock bag for further field screening by means of PID for vapour headspace measurements.

The soil was retrieved from the teeth of the backhoe bucket and placed into the appropriate laboratory prepared jars and vials. The teeth of the backhoe bucket were cleaned with a wire brush and washed with ALOCONEX solution and water and dried off with a clean disposal cloth.

5.12.3 Description of Field Quality Control Measures

Soil samples including duplicates were placed into laboratory-provided bottles and vials that were clearly labeled with the sample location, date, and chemical analysis to be conducted on each sample jar. The same labeling was applied to the chain of custody forms. Dedicated nitrile gloves were used for each sample collected in the field and disposed of immediately after use.

VOC samples were collected in methanol vials filled by the laboratory and an exact amount of VOC impacted soil was added to the vials by means of a syringe that captures 5 ml of soil to be added to the vials. The vial caps are tightly sealed and placed directly in a bubble cap package and placed upright into a cooler packed with ice. Sample screening by means of a PID, olfactory clues, discoloration, soil characteristics, and texture were used to determine which samples were to be submitted for further analysis. Trip blanks were supplied in advance of sampling by the laboratory for placement into the sample coolers and were carried in the coolers until turn over to the laboratory.

Samples for analysis of metals parameters were placed into amber coloured jars prepared by the laboratory sealed with a Teflon lined cap. The jars were filled to the brim and capped tightly to minimize the vapour headspace in the jar. These jars were placed in bubble wrap containers and placed into a cooler packed

with ice. The selection of the samples for analysis was based on the field screening method outlined in HLV2K's SOPs.

Groundwater samples, including duplicates, were placed into laboratory prepared (with appropriate preservatives) and supplied bottles and vials. The vials and jars were filled to the brim to minimize VOC loss. Trip blanks for VOC analysis were provided by the laboratory in advance of sampling. The trip blank was placed in the cool box at the start of each day that groundwater samples were collected.

The following packaging and transportation procedures were followed:

- Correctly labeled samples were packed in ice-filled cool boxes to maintain temperatures below 10°C during sample collection and transportation from the Phase Two Property to the laboratory, and the chemical testing to ALS Environmental Laboratory.
- A copy of the chain of custody form was maintained.

5.12.4 Deviations from the Quality Assurance and Quality Control Program

No deviation for the procedure undertaken in the Phase Two ESA Investigation.

6 REVIEW AND EVALUATION

6.1 Geology

The surficial deposits, as indicated by the map of Surficial Geology of Ontario (obtained on the website of the Ministry of Northern Development and Mines and available for view in Google Earth), mainly comprised of stone poor, sandy silt to silty sand textured till and the site is situated in Paleozoic Terrain.

6.1.1 Geological Conditions Encountered

Four (4) boreholes were advanced across the Phase Two Property. The soils encountered onsite consisted mainly of brown sandy silts and silty sand that were very moist and became greyer with depth.

No sheen or evidence of Light Non-Aqueous Phase Liquid (LNAPL) and Dense Non- Aqueous Phase Liquid (DNAPL) as free product were observed in any of the monitoring wells. No hydrocarbon odours were detected in any of the monitoring wells.

The groundwater monitoring wells were positioned to identify potential groundwater impacts associated with the PCA's and APECs, as previously determined that are relative to the Phase Two Property. Groundwater contours and inferred groundwater flow direction are presented in **Drawing No. 4** along with the cross-section lines in the direction of groundwater flow and perpendicular to the flow.

A summary of the properties of each geologic unit is provided **Table 10**.**Error! Reference source not found.Table 11 – Section 6.1.2** below and cross-sections describing the spatial arrangement of the soils are presented as **Drawing No. 5** and **6**. A detailed account and description of the ground conditions encountered are provided in the Borehole and Monitoring Well Logs in **Appendix C**.

Table 10 – Section 6.1.1: Geological Conditions beneath the Phase Two Property

Exploratory Location BH/MW	Type	Geological Description	Depth Range (m bgs)	Soil Sample
MW101 228.93 m (asl)	Asphalt	100mm	228.9 – 228.8	
	Fill	Silty Sand to Sand, black to brown, moist	228.7 – 228.2	SSI
	Native	Sand, brown, moist, loose	228.1 – 227.4	SS2
	Native	Silty Sand to Sandy Silt, some Clay, moist, loose	227.3 – 226.7	SS3
	Native	Silty Sand to Sandy Silt, brown, very moist	226.6 – 224.4	SS4
	Native	Silty Sand to Sandy Silt, brown to grey, very moist	224.3 – 222.2	SS5
MW102 229.52 m (asl)	Asphalt	100mm	229.5 – 229.4	
	Fill	Silty Sand, some gravel, pieces of brick, black, moist	229.4 – 229.3	SS1
	Native	Sand, brown, moist, loose	229.2 – 228.8	SS2
	Native	Silty Sand to Sandy Silt, dark to light brown, oxidized, moist	228.7 – 226.5	SS3
	Native	Silty Sand to Sandy Silt, brown to grey, very moist	226.4 – 225.7	SS4
	Native	Silty Sand to Sandy Silt, grey, wet, some oxidization	225.6 – 222.8	SS5
MW103 230.13 m (asl)	Asphalt	100mm	230.1 – 230.0	
	Fill	Silty Sand, brown, moist	229.9 – 229.7	SS1
	Native	Silty Sand, black, moist	229.6 – 229.4	SS2
	Native	Silty Sand, black, pieces of gravel, moist	229.3 – 229.2	SS3
	Native	Silty Sand to Sandy Silt, brown, moist, some rootlets, some oxidization	229.1 – 227.9	SS4
	Native	Silty Sand to Sandy Silt, brown, moist	227.8 – 226.3	SS5
	Native	Silty Sand to Sandy Silt, greyish, very moist, some oxidization	226.2 – 223.4	SS6
MW104 230.45 m (asl)	Asphalt	100mm	230.5 – 230.4	
	Fill	Silty Sand, some gravel, some concrete	230.3 – 230.2	SS1
	Native	Silty Sand, brown, moist	230.1 – 229.8	SS2
	Native	Silty Sand to Sandy Silt, brown, some gravel, moist, some oxidization	229.7 – 228.3	SS3
	Native	Silty Sand to Sandy Silt, brown to greyish, moist to wet	228.2 – 225.2	SS4
	Native	Silty Sand to Sandy Silt, greyish, moist, oxidized	225.1 – 223.8	SS5

6.1.2 Elevations Geodetic Benchmark

A handheld GPS unit was used to determine the geodetic elevations for each borehole and monitoring well.

6.1.3 Aquifer / Aquitard Properties

The soil Stratigraphy indicated that the overburden was primarily comprised of coarse-grained sandy sediments, however lenses of fined grained (silt and clay) sediments were encountered on occasion. The deepest well was installed to a depth of 88.4 m bgs in gravel exhibited a static water level of 3.35 m bgs, similar to the water level encountered in the four (4) monitoring installed by HLV2K, therefore there is no confined aquifer on site and there appears to be one aquifer for the Phase Two Property.

6.1.4 Rationale for the Choice of Aquifer

Only one (1) aquifer was investigated as it lies directly below the site. Since none of the COC were encountered based on the offsite PCAs and onsite APECs in the aquitard that was above the SCS, further vertical delineation of the aquitard was not warranted. If any of the COC had been encountered above the SCS then deeper wells would have been required. Since no exceedances were encountered at the Phase Two Property, the QP determined the investigation to be complete.

6.1.5 Confirmatory Soil and Groundwater Monitoring Well Design and Rationale

Table 10B Confirmatory Groundwater Monitoring and Well Design Rationale

Monitoring Well	Target Aquitard or Aquifer	Screen interval Depth (m bgs)	APEC	PCA	Rational
MW101	Sand to Silty Sand	3.71 – 6.71	APEC 5	**PCA#55 Transformer Manufacturing, Processing and Use**	Soil and groundwater for PCBs, PAH, Metals, Metal, ORPs,Hydrides, EC, SAR, VOCs and PHCs
MW102	Sand to Silty Sand	3.71 – 6.71	APEC 1	**PCA#39 Paints Manufacturing, Processing, and bulk storage**	Soil and Groundwater for PCBs, PAH, Metals, Metal, ORPs,Hydrides, EC, SAR, VOCs and PHCs
MW103	Sand to Silty Sand	3.71 – 6.71		**PCA#28 Gasoline and Associated Products Storage in Fixed Tanks** **PCA#52 Storage, maintenance, fuelling**	Soil and Groundwater for PCBs, PAH, Metals, Metal, ORPs, Hydrides, EC,

Monitoring Well	Target Aquitard or Aquifer	Screen interval Depth (m bgs)	APEC	PCA	Rational
			APEC 3 and 4	**and repair of equipment, vehicles, and materials used to maintain transportation equipment**	SAR, VOCs and PHCs
MW104	Sand to Silty Sand	3.71 -6.71	APEC 2	**PCA#10 Commercial Autobody Shops**	Soil and Groundwater for PCBs, PAH, Metals, Metal, ORPs, Hydrides, EC, SAR, VOCs and PHCs

6.2 Ground Water Elevations

The direction of groundwater flow has been determined to be in the northeast direction. **Drawing 4** shows the groundwater flow direction which is to the north east. **Table 11** below shows the measured groundwater depth and elevation at each monitoring well.

Table 11 – Section 6.2: Groundwater, Elevation and Flow Direction

Monitoring Well	Groundwater Level (m asl)	Groundwater Table Below Ground Surface (m bgs)	Cartesian Coordinates (x, Y) m	Borehole Elevation (m)
MW101	220.5	3.43	(80, 85)	228.93
MW102	225.3	4.22	(20,65)	229.52
MW103	226.8	3.33	((40, 15)	230.13
MW104	226.38	4.07	(22,34)	230.45

6.2.1 Discussion and Rationale for Location and Screen Intervals

The wells were placed so that the triangulation of the groundwater elevations could be conducted to determine the groundwater flow direction. The three-meter-screen depth was used to straddle the groundwater table for the interception of LNAPLs and the potential of free phase and the dissolved fractions of DNAPLs.

6.2.2 Interphase Probe

No LNAPLs or DNAPLS were detected with the interphase Probe during the measuring of the water level measurements before well development and after. The wells were bailed via a low-flow submersible pump and no odours or a sheen was noted in the clean white pails that were used to collect the water.

6.2.3 Product Thickness

No free product was encountered. The depth of the water table was measured from ground level to water table using a multiphase groundwater level meter.

6.2.3.1 Record of Measured Groundwater Elevations

The following table shows the water level measurements collected from the Phase Two Property:

Table 12 – Section 6.2.3.1: Record of Measured Groundwater Elevations

Monitoring Well	Groundwater Level (m bgs)	Groundwater Level (m ASL)	Depth of water column (m)	Required Purge Volume (L)	Date of Development/Purging	Volume of Fluid Removed from Well (L)
MW101	3.43	220.5	3.36	20.43	August 9, 2018	20.58
MW102	4.22	225.3	2.48	14.88	August 9, 2018	25.32
MW103	3.33	226.8	3.37	20.22	August 9, 2018	19.98
MW104	4.07	226.38	2.63	15.78	August 9, 2018	24.42

6.2.3.2 Inferred Groundwater Flow Direction

Inferred groundwater flow direction is towards the northeast. The groundwater elevations collected on August 9, 2018 would also support the groundwater flow direction in the northeast direction.

6.2.3.3 Temporal Variations

As the Phase Two Property is underlain Sandy Silt and Silty Sand dominated materials, the site is likely subject to seasonal fluctuation of groundwater levels, which is higher after major precipitation of rainfall or spring thaw and lower during dry periods.

6.2.3.4 Presence of Utilities

The Phase Two Property is serviced by the municipality for water and wastewater. In addition, the site is fully operational at the time of this report, therefore, has active hydro and other utilities. These utilities may influence the groundwater flow direction and the potential spread of contaminants if present in the soil and groundwater.

6.3 Ground Water: Hydraulic Gradient

6.3.1 Horizontal Hydraulic Gradient

Hydraulic gradients were as follows:

Table 13 – Section 6.3.1: Hydraulic Gradient

Parameter	Hydraulic Gradient (m/m)	Remarks
Maximum	0.07	Between MW104 and MW102
Minimum	0.07	Between MW102 and MW103
Average	0.07	

6.3.2 Vertical Hydraulic Gradient

As no contaminants were present at a concentration greater than the MECP Table 2 ICC Standards, the

vertical gradient did not need to be determined.

6.4 Fine-Medium Soil Texture

Under Ontario Regulation 153/04 (as amended), "coarse-textured soil" is soil that contains more than 50 percent by mass of particles that are 75 micrometers (µm) or larger in mean diameter, and if at least one-third (⅓) of the soils at the Phase Two Property are found to be coarse-grained, then the more stringent coarse-textured soil standards are applicable. For this Phase Two ESA investigation, the more stringent coarse-grained soil analysis was applied.

6.4.1 Rationale for the Use of Fine – Medium Soil Texture

Not applicable.

6.4.2 Results of the Grain Size Analysis for Fine – Medium Soil Texture

Not applicable.

6.4.3 Rationale for the Number of Samples Collected and Analysed for Grain Size Analyses

Not applicable.

6.5 Soil: Field Screening

The samples were examined in the field for lithology as well as for aesthetic evidence of impacts (i.e., debris, staining, and odours). In addition, headspace readings were recorded using a photo-ionization detector (PID) calibrated to hexane (HEX) and isobutylene (IBL), (Section 5.4). This combination of field screening tools was used to determine the "worst-case" sample(s) collected from the subject site. **Table 15 – Section 6.5** below summarises the findings of the Field Screening measurements.

Table 14 – Section 6.5: Head Space Analyses on Soil Samples

Location and Date	Sample No.	Sample Depth (m)	Geologic Layer	Aesthetic Evidence of Potential Impact	Headspace Measurements	
					HEX (% LEL)	IBL (ppm)
MW101 August 9, 2018	1	0.0 – 0.1	Asphalt	None Detected	0	0
	2	0.1 – 0.6	Fill	None Detected	0	0
	3	0.7 – 1.4	Sand	None Detected	0	0
	4	1.5 – 2.1	Silty Sand to Sandy Silt	None Detected	0	0
	5	2.2 – 4.4	Silty Sand to Sandy Silt	None Detected	0	0
	6	4.5 – 6.7	Silty Sand to Sandy Silt	None Detected	0	0
MW102 August 9, 2018	1	0.0 – 0.1	Asphalt	None Detected	0	0
	2	0.1 – 0.2	Fill	None Detected	0	0
	3	0.2 – 0.6	Sand	None Detected	0	0
	4	0.7 – 2.9	Silty Sand to Sandy Silt	None Detected	0	0
	5	3.0 – 3.7	Silty Sand to Sandy Silt	None Detected	0	0
	6	3.8 – 6.7	Silty Sand to Sandy Silt	None Detected	0	0
MW103 August 9, 2018	1	0.0 – 0.1	Asphalt	None Detected	0	0
	2	0.1 – 0.3	Fill	None Detected	0	0
	3	0.4 – 0.6	Silty Sand	None Detected	0	0
	4	0.7 – 0.8	Silty Sand	None Detected	0	0

Location and Date	Sample No.	Sample Depth (m)	Geologic Layer	Aesthetic Evidence of Potential Impact	Headspace Measurements	
					HEX (% LEL)	IBL (ppm)
	5	0.9 – 2.1	Silty Sand to Sandy Silt	None Detected	0	0
	6	2.2 – 3.7	Silty Sand to Sandy Silt	None Detected	0	0
	7	3.8 – 6.7	Silty Sand to Sandy Silt	None Detected	0	0
MW104 August 9, 2018	1	0.0 – 0.1	Asphalt	None Detected	0	0
	2	0.1 – 0.2	Fill	None Detected	0	0
	3	0.2 – 0.6	Silty Sand	None Detected	0	0
	4	0.7 – 2.1	Silty Sand to Sandy Silt	None Detected	0	0
	5	2.2 – 5.2	Silty Sand to Sandy Silt	None Detected	0	0
	6	5.3 – 6.7	Silty Sand to Sandy Silt	None Detected	0	0

In the absence of any significant positive screening measurements (visual, olfactory, and headspace vapour measurements), the samples were collected at random.

6.6 Soil Quality

The Phase One ESA Conceptual Site Model identified the following Contaminants of Concern in the soil in relation to PCAs and five (5) APECs that may affect the Phase Two Property:

- Polycyclic Aromatic Hydrocarbons (PAHs);
- Metals and Organics (M&I);
- Polychlorinated Biphenyl (PCB)
- Volatile Organic Compounds; and,
- Petroleum Hydrocarbons – Fraction F1 to F4.

A total of six (6) soil samples were collected for thirty-four (34) sample parameters including two (2) duplicate samples, to evaluate the level of potential chemical impact to the soils beneath the Phase Two Property in the areas of the APECs:

- Five (5) samples for Metals and Inorganics
- Five (5) samples for PCBs
- Five (5) samples for PAHs
- Five (5) samples for VOCs
- Five (5) samples for PHCs/F1-F4.

All the soil samples met the MECP Table 2Standards RPI for coarse-grained soils in potable groundwater conditions.

6.6.1 Location, Depth of Sampling

The following table describes the location and depth of the specific samples submitted for chemical laboratory analysis, and the results of the analyses in comparison to MECP Table 2 RPI.

Table 15 – Section 6.6.1: Soil Chemical Laboratory Analysis

Borehole ID	Sample ID	Depth (m)	Date Sampled	Chemical Analysis						Standard Exceedance (Table 1 RPI for coarse sand)
				PHCs F2 – F4	VOCs/F1	PAHs	PCBs	OCPs	M & I	
MW101	BH1	0.1 to 0.6	Aug 2, 2018						✓	No Exceedances
MW101	BH1	0.7 - 1.4	Aug 2, 2018			✓	✓			No Exceedances
MW101	BH1	2.2 - 4.4	Aug 2, 2018	✓	✓					No Exceedances
MW102	BH2	0.1 – 0.6	Aug 2, 2018						✓	No Exceedances
MW102	BH2	0.7 – 2.9	Aug 2, 2018			✓	✓			No Exceedances
MW102	BH2	3.0 – 3.7	Aug 2, 2018	✓	✓					No Exceedances
MW103	BH3	0.1 – 0.6	Aug 2, 2018						✓	No Exceedances
MW103	BH3	0.7 – 2.1	Aug 2, 2018			✓	✓			No Exceedances
MW103	BH3	2.2 - 3.7	Aug 2, 2018	✓	✓					No Exceedances
MW104	BH4	0.1 – 0.6	Aug 2, 2018						✓	No Exceedances
MW104	BH4	0.7 – 2.1	Aug 2, 2018			✓	✓			No Exceedances
MW104	BH4	2.2 – 5.2	Aug 2, 2018	✓	✓					No Exceedances
	Dupe 1		Aug 2, 2018	✓						No Exceedances
	Dupe 2		Aug 2, 2018		✓	✓	✓		✓	No Exceedances

The Laboratory Certificates of Analysis are presented in **Appendix D** and detailed assessments of the soil analytical results are presented in **Table 4** (attachments).

The environmental quality of the soil at, in, and under the Phase Two Property was compared to the MECP Table 2 RPI/ICC Standards. All samples submitted for analysis met the MECP Table 2 RPI Standards for coarse-grained soils.

Given the presence of impacts to the soil from the COC parameters, the soil is considered a potential contaminant source.

6.6.2 Analytical Results

The Laboratory Certificate of Analysis is presented in **Appendix D**.

6.6.3 Contaminants of Concern (COC)

The contaminants of concern were as follows:

- Polycyclic Aromatic Hydrocarbons (PAHs);
- Metals, and Metal forming Hydrides, ORPs, EC, SAR and pH
- Polychlorinated Biphenyl (PCBs);

- Volatile Organic Compounds – Fraction 1 (VOCs/F1); and,
- Petroleum Hydrocarbons – Fraction F2 to F4 (PHCs/F2-F4).

6.6.4 Chemical and Biological Transformations

No chemical or biological transformations were noted in, on, or under the Phase Two Property.

6.6.5 Source of Contaminant Mass Contributing to the Groundwater

Groundwater was not impacted in this Phase Two ESA Investigation, therefore there was no potential for contaminant mass contributing to the groundwater.

6.7 Ground Water Quality

The Phase One ESA Conceptual Site Model identified the following Contaminants of Concern in relation to PCAs and APECs that may affect the Phase Two Property.

In total, six (6) groundwater samples including one (1) field duplicate groundwater sample for all sample parameters, and one (1) trip blank were analysed as followed, to appropriately evaluate the level of chemical impact to the groundwater beneath the Phase Two Property in the areas of the various APECs:

- Six (6) samples for VOCs,
- Five (5) samples PHC fractions F1 to F4
- Five (5) samples for PCBs
- Five (5) samples for PAHs
- Five (5) samples for metals and metal forming hydrides, Na, Cl, CN

6.7.1 Location and Sample Depth

Table 17 – Section 6.7.1 below describes the location and depth of the specific groundwater samples submitted for chemical laboratory analysis, and the results of the analyses in comparison to Table 1Standards for coarse-grained soils.

Table 16 – Section 6.7.1: Groundwater Chemical Laboratory Analysis

Well ID	Sample ID	Depth (m)	Date Sampled	Chemical Analysis						Standard Exceedance (Table 1 RPI/ICC for coarse sand)
				PHCs F2 – F4	VOCs/F1	PAHs	PCBs	OCPs	M & I	
MW101	MW101	225.0	Aug 9, 2018	✓	✓	✓	✓		✓	No Exceedances
MW102	MW102	225.3	Aug 9, 2018	✓	✓	✓	✓		✓	No Exceedances
MW103	MW103	226.8	Aug 9, 2018	✓	✓	✓	✓		✓	No Exceedances
MW104	MW104	226.4	Aug 9, 2018	✓	✓	✓	✓		✓	No Exceedances
	Duplicate 1			✓	✓	✓	✓		✓	No Exceedances

Well ID	Sample ID	Depth (m)	Date Sampled	Chemical Analysis						Standard Exceedance (Table 1 RPI/ICC for coarse sand)
				PHCs F2 – F4	VOCs/F1	PAHs	PCBs	OCPs	M & I	
	Trip Blank		Aug 9, 2018		✓					No Exceedances

The Laboratory Certificates of Analysis are presented in **Appendix D** and detailed assessments of the soil analytical results are presented in **Table 5** (attachments).

The environmental quality of the groundwater at the Phase Two Property was compared to the MECP Table 2 Standards for ICC. No exceedances were recorded.

6.7.2 Documentation of Field Filtering

Field Filtering was conducted for metals only. The Certificates of Analysis shows no lab filtering for the samples submitted for this site.

6.7.3 Analytical Results to SCS

The environmental quality of the groundwater at the Phase Two Property was compared to the MECP Table 2RPI/ ICC Standard. No exceedances were identified in the groundwater for the parameters analyzed at the time of sampling.

6.7.4 Contaminants of Concern

The contaminants of concern were as follows:

- Polycyclic Aromatic Hydrocarbons (PAHs);
- Metals and metal forming hydrides, ORPs
- Polychlorinated Biphenyl (PCBs);
- Volatile Organic Compounds including Benzene Ethyl Benzene Toluene Xylene (BTEX) and,
- Petroleum Hydrocarbons – Fraction F1 to F4

6.7.5 Chemical and Biological Transformation

There are no chemical or biological transformations noted in the groundwater for the COC.

6.7.6 Soil Serves as Source of Contamination to Groundwater

The soil is permeable and may contribute to the groundwater, but thus far, the groundwater meets SCS.

6.7.7 Presence of LNAPLs or DNAPLs

No free phase products were encountered in the groundwater.

6.8 Sediment Quality

The Phase Two Property did not include a surface body of water as defined under O. Reg. 153/04 (as amended); therefore, sediment was not sampled in this Phase Two ESA investigation.

6.9 Quality Assurance and Quality Control Results

Duplicate soil and groundwater samples were collected and submitted for chemical laboratory analyses for QA/QC purposes. In addition, for the groundwater sampling conducted on November 6, 2017, a Trip Blank VOC vial was placed in the cooler prior to sampling for the VOCs in the field. The samples collected in the field were placed in the cooler with the trip blank and subsequently submitted for analysis.

Table 18 – Section 6.9 below describes the duplicate samples collected and tested during the soil and groundwater sampling stages of the field investigation of the Phase Two Property.

Table 17 – Section 6.9: QA/QC Duplicate Sampling Strategy

Parameter	Soil		Groundwater		
	No. of Samples Tested	No. of Duplicates	No. of Samples Tested	No. of Duplicates	No. of Trip Blank
PHC (F1-F4)	4	1	4	1	-
VOC (incl. BTEX)	4	1	4	1	1
PAH	4	1	4	1	-
PCB	4	1	4	1	-
OCPs	0	0	0	0	-
Metals	4	1	4	1	-
TOTAL	**20**	**5**	**20**	**5**	**1**

Section 3. (3).5 of Schedule E of O. Reg. 153/04 (as amended) requires at least one (1) field duplicate be collected and analysed for every ten (10) sample parameters submitted for laboratory analysis.

Samples were transported in ice-filled coolers to ensure temperatures were maintained below 10°C, along with a Chain of Custody to ALS. ALS performed the chemical analysis in compliance with the MECP "Laboratory Services Branch, Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", as amended. No discrepancies were noted as samples were properly handled with regards to the following:

- Holding time
- Preservation method
- Storage requirement
- Container type

The Laboratory Certificates of Analysis for each sample were received and are presented in **Appendix D**. All certificates of analysis received pursuant to clause 47 (2) (b) of the regulation comply with subsection 47 (3) of O. Reg. 153/04 as amended.

The Qualified Person concluded that the data met the quality objective, and the decision-making was not

affected. The Qualified Person has also concluded that the overall objectives of the investigation and assessment were met.

Duplicate samples were taken for soil and Groundwater. The following formula was used to assess the various duplicates against their respective soil or groundwater sample.

Duplicate RPD = {([sample] – [sample duplicate])/([sample] + [sample duplicate])/2} x 100. The values calculated must fall in the Following Ranges shown on **Table 19.**

Most of the parameters met their respective RPD values with a few exceptions being for EC and pH units. The soil is not homogenous and values greater than the listed RPD values were expected. Re-sampling was not conducted because the exceedances for the RPD values were small relative to the number samples analysed.

Table 19 – Duplicate RPD Values in Less Than ≤

Parameter	Groundwater	Soil	Duplicate 1-S	Duplicate 2-S	Dupe 1 GW
PAH	**≤30%**	**≤40%**	≤40%		≤30%
1,4 Dioxane	**≤30%**	**≤50%**	Not Sampled		Not Sampled
OC Pesticides	**≤30%**	**≤40%**	Not Sampled		Not Sampled
PCB	**≤30%**	**≤40%**	≤40%		≤30%
VOC	**≤30%**	**≤40%**	≤40%		≤30%
PHC	**≤30%**	**≤40%**		≤39%	≤30%
Free CN	**≤20%**	**≤35%**	≤35%		≤20%
EC	**≤20%**	**≤10%**		19%	NA
Foc	**≤20%**	**≤35%**	NA	NA	NA
Cr VI	**≤20%**	**≤35%**		≤23%	≤20%
Hg	**≤20%**	**≤30%**		≤27%	≤20%
CH_4Hg	**≤30%**	**≤40%**	NA		NA

Metals, Metal Hydrides and Boron	**≤20%**	**≤30%**	≤20%		≤20%
Boron Hot water	**≤30%**	**≤40%**		≤17%	≤30%
pH	**0.3 units**	**0.3 unit**	>0.3		0.3

6.10 Phase Two Conceptual Site Model

The Phase Two Property is located at 272 Innisfil Street in Barrie on the northwest corner of Jacobs Terrace and Innisfil Street. The legal description of the property is Part Lot 1 SIS Jacobs Ter, 2 SIS Jacobs Ter, 3 SIS Jacobs Ter, 4SIS Jacobs Ter, 5 SIS Jacobs Ter, 2 WIS Baldwin ST., 3 WIS Baldwin ST., PL 30 Allandale as in RO1357111, Barrie being PIN NO. 58755-0007(LT). The property is irregularly shaped covering an area of 7027 m^2 or 0.7027 ha. The size and location is shown on **Drawing 1** the Registered Legal Survey of the Phase Two Property.

Historically, the site was farmland up to approximately 1931 when a hog slaughterhouse and food processing plant was built on the property. The food processing plant operated from 1931 to approximately 1969 when the building was converted to a multi tenant commercial business that included furniture stripping and repair, ceramic tile shop, antique stores, veterinary clinic etc. The property was much larger than currently that included a fuel storage for transport trucks and maintenance garage. That portion of the property was sold separately after the closure of the slaughterhouse in 1969.

The site is located is an area known as Simcoe Lowlands. These lowlands extend from Lake Couchiching, southward along the western edge of Lake Simcoe towards Bolton Ontario. The region is characterised by flat low-lying plains composed of silts, clays and to medium to fine grained sands deposited within glacial Lake Algonquin. Evidence of glacial Lake Algonquin and numerous shorelines, wave cut notches terraces and beach ridges located throughout the study area. According to **Map 2556 of the Ontario Geological Survey,** the site is located in an area of coarse textured glaciolacustrine deposits of sand gravel minor silt and clay foreshore and basinal deposits.

The bedrock is composed of the Upper Ordovician limestone, dolostone, shale arkose and sandstone of the Trenton and Black River Groups. Bedrock lies approximately 50 to 85 meters below ground surface.

The Conceptual Site Model shows seventeen (17) PCA surrounding that property of which relative to the groundwater flow direction only five (5) have and impact on the Phase Two Property. **Drawing 2** represents the PCAs surrounding the Phase 2 Property. The PCAs that effect the Phase Two Property include two (2) onsite PCAs namely **PCA 55** for electrical transformer and **PCA 39** Paint Manufacturing Process and Bulk Storage. The remaining PCAs are offsite and up gradient relative to the groundwater flow direction and they are as follows: **PCA 10** Commercial Auto Body Shops**, PCA 28** Gasoline and Associated Products Storage

in Fixed Tanks, and **PCA 52** Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation equipment systems. The five (5) PCAs generated five (5) onsite Areas of Potential Environmental Concern (APECs) namely **APEC1** for PCA 10, **APEC2** for PCA 39, **APEC3** for PCA 28, **APEC4** for PCA 52 and **APEC5** for PCA 55. The APECs are shown on **Drawing 3.** Note that **APEC3** and **APEC4** share the same area of influence.

The CSM is based on the soil and groundwater results from four (4) boreholes and four (4) monitoring wells. The parameters selected were to address the Contaminants of Concern (COCs) from the Potential Contaminating Activities (PCA) and the Areas of Potential Environmental Concern (APECs) identified in the Phase One ESA. The boreholes and monitoring wells are summarized on **Drawing 4.** The groundwater flow direction is towards the northeast and ground water table fluctuates between 3 to 4 m below ground surface. The groundwater flow direction is shown on Planview **Drawing 5** of the Site Plan.

The Ministry of the Environment, Conservation, and Parks (MECP) "Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition" for RPI property use was considered to be the applicable as the Site Condition Standard (SCS) for the Phase Two Property and have been used to assess the chemical quality of the soil and groundwater samples obtained from the Phase Two Property. The soil and groundwater were analyzed for PHCs F1 to F4 Fractions, Benzene, Toluene, Ethyl benzene, Xylene, VOCs, PAH, Metals and Metal forming hydrides, EC, SAR, and ORPs, and PCBs.

Cross sectional drawings based upon the Plan View **Drawing 6** of the Site Plan with one (1) cross-sectional line **A to A'** in the direction of ground water flow and cross-sectional line **B to B'** perpendicular to cross-sectional line A to A'. Cross-sections were drawn to scale vertical with geodetic elevations in m asl and horizontally in m to scale. In total eighteen (18) cross-section drawings were produced for each soil and groundwater parameter.

The precise location of each borehole and monitoring well are defined on **Drawing 6** via cartesian coordinates with valves for x-axis, y-axis, and the z-axis in meters.

The Phase Two CSM refers to the attached **Drawings 1 – 6** together with **Cross- Sectional Drawings 1A – 18a for A to A'** and **Cross-sectional Drawings 1B – 18B.**

Drawing 1: Legal Survey showing the site boundaries for the Phase One, Phase Two and RSC Property.

Drawing 2: Potential Contaminating Activities (PCAs) Identified for the Study Area and Onsite.

Drawing 3: Area of Potential Environmental Concern (APEC) identified in Phase One ESA

Drawing 4: Plan View Drawing showing the Borehole and Monitoring Well Locations.

Drawing 5: Inferred Groundwater Flow Direction Map and Groundwater Table Elevations

Drawing 6: Planview Drawing, Cartesian Coordinates of Cross-sectional Lines A to A' and B to B'

Drawing 7A: Cross-sectional Drawing A to A' for Metals and Hydride Forming Metals in Soil

Drawing 7B: Cross-sectional Drawing B to B' for Metals and Hydride Forming Metals in Soil

Drawing 8A: Cross-sectional Drawing A to A' for EC, SAR, and ORPs in Soil

Drawing 8B: Cross-sectional Drawing B to B' for EC, SAR, and ORPs in Soil

Drawing 9A: Cross-sectional Drawing A to A' VOCs and BTEX in Soil

Drawing 9B: Cross-sectional Drawing B to B' VOCs and BTEX in Soil

Drawing 10A: Cross-sectional Drawing A to A'PHCs F1 to F4 Fractions in Soil

Drawing 10B: Cross-sectional Drawing B to B'PHCs F1 to F4 Fractions in Soil

Drawing 11A: Cross-sectional Drawing A to A' PAHs in Soil

Drawing 11B: Cross-sectional Drawing B to B' PAH in Soil

Drawing 12A: Cross-sectional Drawing A to A' PCB in Soil

Drawing 12B: Cross-sectional Drawing B to B' PCB in Soil

Drawing 13A: Cross-sectional Drawing A to A' Metals and Hydride Forming Metals in Groundwater

Drawing 13B: Cross-sectional Drawing B to B' Metals and Hydride Forming Metals in Groundwater

Drawing 14A: Cross-sectional Drawing A to A' for ORPs in Groundwater

Drawing 14B: Cross-sectional Drawing B to B' for ORPs in Groundwater

Drawing 15A: Cross-sectional Drawing A to A' PHCs F1 to F4 Fractions in Groundwater

Drawing 15B: Cross-sectional Drawing B to B' PHCs F1 to F4 Fractions in Groundwater

Drawing 16A: Cross-sectional Drawing A to A' PAHs in Groundwater

Drawing 16B: Cross-sectional Drawing B to B' PAHs in Groundwater

Drawing 17A: Cross-sectional Drawing A to A' VOCs and BTEX in Groundwater

Drawing 17B: Cross-sectional Drawing B to B' VOCs and BTEX in Groundwater

Drawing 18A: Cross-sectional Drawing A to A' PCB in Groundwater

Drawing 18B: Cross-sectional Drawing A to A' PCB in Groundwater

Table 18 – Section 6.10: A Description and Assessment

6.10.1		**Description and Assessment**	
	A	**Areas where potentially contaminating activities (PCA) have occurred.**	**The following PCAs were identified within the Phase One Property**
	1	(On Site)	PCA#55 Transformer Manufacturing, Processing and Use
	2		PCA#39 Paints Manufacturing, Processing and Bulk Storage.
	3	(Off-Site)	**The following PCAs were identified within the Phase One Study Area.**
	4	West	PCA#10 Commercial Autobody Shop
	5	Southwest	PCA#28: Gasoline and Associated Products Storage in Fixed Tanks
	6	South west	PCA#52 Storage, maintenance, fueling and repair of equipment, vehicles and material used to maintain transportation systems
	7	West	PCA#39 Paints Manufacturing, Processing and Bulk Storage
	8	East	PCA#40 Pesticides Manufacturing, Processing, Bulk

			Storage and Large-Scale Application
	9	North East	PCA Other – Spill
	10	East	PCA#10: Commercial Autobody Shop
	11	East	PCA#28: Gasoline and Associated Products Storage in Fixed Tanks
	12	South East	PCA#10 Commercial Autobody Shop
	13	North West	PCA#10: Commercial Autobody Shop
	14	North	PCA#46: Rail Yards Track and Spurs
	15	North	PCA#28: Gasoline and Associated Products Storage in Fixed Tanks
	16	North	PCA#22 Fertilizer Manufacturing, Process and Bulk storage
	17	North East	PCA#42 Pharmaceutical Manufacturing and Processing
	18	North West	PCA#28: Gasoline and Associated Products Storage in Fixed Tanks
			Drawing 2 Outlines the PCA onsite and with in the Phase One Study Area.
	B	**Areas of Potential Environmental Concern**	**The following APECs were identified on the Phase One Property**
			APEC 1 – North west corner of the Property for PCA#39.
			APEC 2 – Northern half od West Property Boundary PCA#10
			APEC 3 –South Central portion of Phase Two Property for PCA#28:
			APEC 4 – South Central portion of the Phase Two Property for PCA#52
			APEC 5 – Northeast corner of the Phase Two Property for PCA#55
			Drawing 3 Outlines the location of the APECS for the Phase One Property.
			Drawing 4 Site Plan with the APECs and the location of the boreholes and monitoring wells on site and the location where the soil and groundwater was sampled.
	C	**Any subsurface structures and utilities on, in, or under the Phase Two Property that may affect the contaminant distribution and transport.**	Subsurface utilities are suspected to be concentrated on the eastern side of the property. Municipal sewers, municipal water supply, and natural gas appears to enter the property enters from Innisfil Road. Subsurface structures can act as pathways for potential impacts to the soil and groundwater.
6.10.2	**A description of and, as appropriate figures illustrating the physical setting of the Phase Two Property and any areas under it including:**		
	A	**Stratigraphy from the ground surface to the deepest aquifer or Aquitard**	The Phase Two Property has an asphalt layer that is approximately 100 mm in thickness followed by a layer of fill 0.1m 0.6 m below ground surface (bgs) followed native

		investigated.	coarse sand that varies in thickness from 0.6 m to 2.0 m bgs followed by the layer of silty sand to sandy silt that extends to depth of 11 m bgs. Bedrock at the4 site lies approximately 85 m bgs. The groundwater table varies at the site varies from 3 to 4 m below ground surface. **Drawing 5 Groundwater Contour Map** illustrates the groundwater flow direction for the Phase Two Property which is moving in north easterly direction with a hydraulic gradient of 0.07 m/m. **Drawing 6 Planview Drawing with Cross-section A to A' in the direction of groundwater flow and Cross-section B to B' perpendicular to groundwater flow.** **Drawing 7A and 7B to Drawing 12 A and 12B for soil.** The stratigraphy of soils from ground surface to deepest borehole along the cross-sectional lines **Refer to Cross Sectional Drawings 7A for the Stratigraphy for Soil in the inferred Groundwater Flow;** **Cross Section 7A is from the Southwest at A to Northeast at A'** ***Note: Elevations are geodetic in m above sea level (m asl). The horizontal scale is in meters as m.*** The cross-section covers property boundary to property boundary. **MW103** - The Stratigraphy of Phase Two Property consists for 100 mm of asphalt at Monitoring Well MW103 with a starting elevation of 230.1 m on the asphalt surface and is located approximately 10.5 m from the southwest property boundary. MW103 has cartesian coordinates of (40.5 m, 16.0 m). Beneath the asphalt layer shading of olive green on the drawing is a layer of fill comprising of silty sand, sand with trace silt, brown to dark brown, with gravel, and pieces of brick, trace asphalt fragments some concrete. This fill layer starts at 230 m that extends to 229.75 m, following this layer of fill is sand with trace gravel, trace silt, brown and brown mixed with black soil. This layer ends at 229.45 m on native sand to sandy silt that extends to bottom of the borehole at 223.5 m asl. The monitoring well screen was placed at 224.1 m so that the water table fall within the screen interval necessary for the capture of light non aqueous phase liquids known as LNAPS. The groundwater table was encountered at 226.80 m asl. The property boundary lies 10 m southwest of MW103.

			MW104 - lies approximately 19 m northeast of the southwest property boundary with a surface elevation of 230.5 m asl. Beneath the asphalt layer is fill material consisting of silty sand, sand with trace silt, gravel, bricks, black and brown coloured soil. The fill layer is thinner than in the previous borehole with a starting elevation of 230.4 m that extends to 230.3 m followed by the native soil consisting of sand to silty sand that extends to the bottom of the borehole at 223.3 m asl. The screen section of the monitoring starts at 224.5 m asl and extends to 227.5 m as to capture the groundwater table at mid screen. The groundwater elevation was measured at 226.4 m asl. **BH104-19** with coordinates of (73 m, 15.5m) and is located 24 m northeast of the south west property boundary. This borehole has a starting elevation of 230.2 m asl on the asphalt surface. Beneath the asphalt layer is the second fill layer denoted in the colour purple on the drawing that extends from 230.1 m asl to depth of 227.9 m asl. This fill layer consists of sand with trace gravel, trace silt brown and black soil. The native soil extends to 223.5 m asl at the bottom of the borehole. **BH102-19** with coordinates (51m,28m) and is located 26.5 m northeast of the southwest property boundary. The borehole was drilled to a depth of 34 m bgs. The starting elevation of 230.15 m asl on asphalt. The fill layer is immediately below asphalt surface consisting of sand with trace silt and a mix of brown to black soil. This fill layer extends from 230.05 m to 228 m where it ends at the native sand to silty sand layer. This layer extends to base of the borehole at 196.05 m asl. A bentonite plug was added from 196.05 m to 221.20 m and the borehole anulus was outfitted with a 3.0 m well screen that extends to 224.2 m asl. The groundwater table was found to lie at approximately 225.74 m asl. **BH103-19** with coordinates (82.5m, 32.5m) and is located approximately 43 m north east of the southwest property boundary. The elevation of this borehole is located at 230.0 m asl on asphalt. A fill layer starting at 229.9 m extends to 229.4 m asl and consists of material consisting of silty sand, sand with trace silt, gravel, bricks, black and brown coloured soil. A second fill layer exists starting at 229.4 m to 227.7 m asl consisting of sand with trace silt and brown to black to brown soil. The native sand to silty

			sand extends from 227.7 to bottom of the borehole at 223.35 m. **MW102** with coordinates of (21 m, 66m) and is located at 44 m northeast of the southwest property boundary. The starting elevation 229.5 m asl. The fill layer extends from 229.4 m to 229.25 m and is very thin at this location. The native soil extends from 229.25 m to 222.7 m asl. The screen was placed at 223.5 that extends to 226.5 m asl. The groundwater table was encountered at 225.30 m asl. **BH101-19** with coordinates of (59m, 75m) and is located 76.5 m northeast of the southwest property boundary. The starting elevation is 229.35 m on asphalt. The first fill layer extends from 229.25 m to 228.9 m followed by a second fill layer of sand to trace silt to 228.05 m to the top of the native sand to silty sand layer. This native layer extends to bottom of the borehole at 195.35 m asl. The borehole was instrumented with a well screen that was placed above a bentonite plug at 220.4 m to 223.4 m. The groundwater table was encountered at 225.91 m asl. **MW101** with coordinates (91m,85.5m) on asphalt with an elevation of 228.9 m. This monitoring well is located at 91 m to the northeast of the southwest property boundary. The first fill layer was not encountered, but the second fill layer consisting of sand to trace silt was at encountered at 228.8 m to depth of 228.25 m followed by native sand to silty sand to bottom of the monitoring wells at 222.3 m. The borehole was screened at 222.9 m to 225.9 m asl. The groundwater table was measured at 225.0 m asl. The cut line extends to the property boundary located at 98 m northeast of the southwest property boundary. **Cross-section 7B to B' from northwest to the southeast starting the northwest property boundary.** **MW102** lies 9.0 m southeast of the southwest property boundary. The starting elevation 229.5 m asl. The fill layer extends from 229.4 m to 229.25 m and is very thin at this location. The native soil extends from 229.25 m to 222.7 m asl. The screen was placed at 223.5 that extends to 226.5 m asl. The groundwater table was encountered at 225.30 m asl. **MW104** lies 22 m southeast of the northwest property

			boundary with a surface elevation of 230.5 m asl. Beneath the asphalt layer is fill material consisting of silty sand, sand with trace silt, gravel, bricks, black and brown coloured soil. The fill layer is thinner than in the previous borehole with a starting elevation of 230.4 m that extends to 230.3 m followed by the native soil consisting of sand to silty sand that extends to the bottom of the borehole at 223.3 m asl. The screen section of the monitoring starts at 224.5 m asl and extends to 227.5 m as to capture the groundwater table at mid screen. The groundwater elevation was measured at 226.4 m asl. **BH101-19** lies 40 m to the south east of the northwest property boundary. The starting elevation is 229.35 m on asphalt. The first fill layer extends from 229.25 m to 228.9 m followed by a second fill layer of sand to trace silt to 228.05 m to the top of the native sand to silty sand layer. This native layer extends to bottom of the borehole at 195.35 m asl. The borehole was instrumented with a well screen that was placed above a bentonite plug at 220.4 m to 223.4 m. The groundwater table was encountered at 225.91 m asl. **MW103** lies at 46.5 m south east of northwest property boundary with a starting elevation of 230.1 m on the asphalt surface and is located approximately 10.5 m from the southwest property boundary. Beneath the asphalt layer shading of olive green on the drawing is a layer of fill comprising of silty sand, sand with trace silt, brown to dark brown, with gravel, and pieces of brick, trace asphalt fragments some concrete. This fill layer starts at 230 m that extends to 229.75 m, following this layer of fill is sand with trace gravel, trace silt, brown and brown mixed with black soil. This layer ends at 229.45 m on native sand to sandy silt that extends to bottom of the borehole at 223.5 m asl. The monitoring well screen was placed at 224.1 m so that the water table falls within the screen interval necessary for the capture of light non aqueous phase liquids known as LNAPS. The groundwater table was encountered at 226.80 m asl. **BH102-19** lies approximately 51.5 southeast of the northwest property boundary. The borehole was drilled to a depth of 34 m bgs. The starting elevation of 230.15 m asl on asphalt. The fill layer is immediately below asphalt surface consisting of sand with trace silt and a mix of brown

			to black soil. This fill layer extends from 230.05 m to 228 m where it ends at the native sand to silty sand layer. This layer extends to base of the borehole at 196.05 m asl. A bentonite plug was added from 196.05 m to 221.20 m and the borehole anulus was outfitted with a 3.0 m well screen that extends to 224.2 m asl. The groundwater table was found to lie at approximately 225.74 m asl. **MW101** lies approximately 55 m southeast of the northwest property boundary with an elevation of 228.9 m. The first fill layer was not encountered, but the second fill layer consisting of sand to trace silt was at encountered at 228.8 m to depth of 228.25 m followed by native sand to silty sand to bottom of the monitoring wells at 222.3 m. The borehole was screened at 222.9 m to 225.9 m asl. The groundwater table was measured at 225.0 m asl. **BH104-19** lies approximately 77 m southeast of the northwest property boundary. This borehole has a starting elevation of 230.2 m asl on the asphalt surface. Beneath the asphalt layer is the second fill layer denoted in the colour purple on the drawing that extends from 230.1 m asl to depth of 227.9 m asl. This fill layer consists of sand with trace gravel, trace silt brown and black soil. The native soil extends to 223.5 m asl at the bottom of the borehole. **BH103-19** lies approximately 78 m southeast of the northwest property boundary. The boundary extends to southeast property boundary at 102 m from the northwest property boundary. The elevation of this borehole is located at 230.0 m asl on asphalt. A fill layer starting at 229.9 m extends to 229.4 m asl and consists of material consisting of silty sand, sand with trace silt, gravel, bricks, black and brown coloured soil. A second fill layer exists starting at 229.4 m to 227.7 m asl consisting of sand with trace silt and brown to black to brown soil. The native sand to silty sand extends from 227.7 to bottom of the borehole at 223.35 m.
6.10.2	**B**	**Hydrogeological characteristics including aquifers, aquitards, and in each the hydro-stratigraphic unit where one or more contaminants is present above the applicable site**	The hydrogeological characteristics are summarized below.
			The fill materials for the Phase Two Property consist of permeable material of sand to silty sand, gravel and pieces of brick which ranges in depth from 0.1 m bgs to 0.6 m bgs, followed by a second layer of fill ranging in depth from 0.1m to 2.0 m in thickness at its deepest point. The native soils

		conditions standards, lateral and vertical gradients.	on site consist of sand to silty sand to the explored depth of 195.00 m asl.
			The horizontal gradient for the aquifer was on average 0.07 m/m.
			The one hydro-stratigraphic was encountered onsite with the groundwater ranging from 3.0 to 4.0 m bgs. The measured hydraulic conductivity for the Phase Two Property single aquifer were in the range of $1.39x10^{-5}$m/s to $2.77x10^{-5}$m/s which falls within the range of the literature typically for sands (J. Power, 2007 and Fetter, 2001). No impacts to the groundwater table that exceeded the SCS for the Phase Two Property were encountered, thus, the vertical gradient was not determined in accordance with O.Reg. 153/04.
			No exceedances for soil or groundwater in comparison to the Table 2 RPI standards in a potable groundwater condition were encountered.
6.10.2	**C**	**Approximate depth to Bedrock.**	The approximate depth to bedrock is approximately 85 m bgs.
	D	**Approximate depth to the water table.**	The approximate depth of the water table is 3.0 to 4.0 m bgs.
	E	**Any respect in which Sections 41 or 43 of the regulation applies to the property.**	The Phase Two Property is not located adjacent to a Provincial Park or an area of Natural Significance or a wetland area and therefore is not anticipated to provide a habitat for endangered or threaten species identified by the Ministry of Natural Resources.
			The Phase two Property is not located within 30 m of a water body.
			Bedrock was not encountered within 2.0 m of the ground surface.
			The pH of the soils was within the acceptable range of 5 to 9 for surface soils and 5 to 11 for subsurface soils.
	F	**Areas where the soil has been brought from another property and placed on, in, or under the Phase Two Property.**	No fill was brought to the Phase Two Property.
	G	**Approximate location, if known, of any proposed buildings and other structures.**	The Phase Two Property is to be developed into a ten (10) storey condominium building with at least one level of underground parking covering approximately ½ of the property, with surface parking area on the other ½ of the property.
6.10.3	**Where a contaminate is present, on, in, or under a Phase Two Property at a concentration greater than the Applicable Site Condition Standard, identification of:**		
	A	**Each area where a**	No areas were found to have exceedances that were

		contaminant is present on, in, or under the Phase Two Property a concentration greater than the applicable SCS.	above the applicable SCS. Refer to Cross-sections A to A' and B to B' for Drawings 7A to 12A and 7B to 12B and 13 A and 13 B to 18A and 18B for groundwater for each parameter sampled in the soil and Groundwater. The parameters that were analyzed included metals and metal hydrides As, Se, Sb, (B, Cr (VI), Hg, EC, SAR, ORPs, PCB, pH, PHCs F1 to F4 fractions, VOCs and PAH in both soil and groundwater. **For soil stratigraphy refer to section 6.10.2 Section A.** **<u>SOIL ANALYSIS</u>** **Drawings Cross-section 7A and 7B for Metals and Metals Forming Hydrides** in soil were sampled at 229.3 m native sand to silty sand at MW103, native soil at MW104 sampled at 229.5 m asl, MW102 at 228.0 m asl native soil, and MW101 in the fill soils at 228.3 m asl. No exceedances for the SCS for metals and metal forming hydrides. **Drawing Cross-Sections 8A and 8B for EC, SAR, and ORPs:** Monitoring Well MW103 was sampled in the second fill layer sand to trace silt and brown to black soil at 229.5 m asl. MW104 was sampled in the native sand to silty sand ay 229.0 m asl. MW102 was sampled in the native sands located at depth of 228.9 m asl, and MW 101 was sampled in the native soils at 227.4 m asl. No exceedances to SCS (Table 2 RPI) were encountered. **Drawing Cross Sections 9A and 9B for BTEX and VOCs:** Soil was sampled in the water table at MW103 at depth of 225.9 m asl in native soils consisting of sand to silty sand. MW104 was sampled in the water table at 226.4 m asl in the native sand to silty sand. MW102 was sampled at 224.5 m asl in the native sand to silty sand. MW101 was sampled in the water table for Metals and Metal forming hydrides at 223.9 m asl. No exceedances to the SCS encountered. **Drawing Cross-Sections 10A and 10B for PHCs F1 to F4 fractions:** MW103 was sampled in the water able at 225.9 m asl. In the native sand to silty sand. MW104 was sampled in the water table at 226.4 m asl in the native sand to silty sand. MW 102 was sampled at a depth of 224.5 m

			in the native soil and MW101 was sampled at depth of 223.9 m asl. No exceedances to the SCS were encountered. **Drawing Cross-Section 11A and 11B for PAH in Soil** MW103 was sampled at a depth of 227.66 m asl in the native soils above the water table. MW104 was sampled in the native soils above the water table at 228 m asl. MW 102 was sampled above the water table in the native sand to silty sand at 227.7 m asl, and MW 101 was sampled at depth of 227.1 m asl above the water table in the native soils. No exceedances to the SCS were encountered. **Drawing Cross-section 12A and 12B for PCB in Soil** MW 228.6 m asl native soil above the water table was sampled for PCB. MW104 was sampled at 229 m asl above the water table in native sand to silty sand. MW 102 was sampled at 228.7 m asl above the water table and MW101 was sampled 228.1 just below the fill layer in the native sand to silty sand. **<u>GROUNDWATER ANALYSIS</u>** **Drawing Cross-Section 13A and 13B for Metals** MW101 – GW at 225.0 m asl MW102 - GW at 225.3 m asl MW103 – GW at 226.8 m asl MW104 - GW at 226.40 m asl Groundwater encountered at in the native sand to silty sand and there were no exceedances to the SCS for the Site. **Drawing Cross-Section 14A and 14B Groundwater ORPs and Metal Hydrides**. No Exceedances of the SCS encountered for Metals Hydrides and ORPs for MW 101, MW102, MW103 and MW104. **Drawing Cross-Section 15A and 15B Groundwater PHCs F1 to F4 Fractions.** The monitoring well screen for MW101,102,103, and 104 straddles the water table. No visible sheen or floating layer was encountered at the various monitoring wells. The groundwater met the SCS for PHCs F1 to F4 fractions in groundwater. **Drawing Cross-Section 16A and 16B Groundwater for PAH.** The groundwater met the SCS for PAH in groundwater. The groundwater table was screened in the native soil consisting of sand to sandy silt. **Drawing Cross-Section 17A and 17B Groundwater for VOC and BTEX.** The groundwater met the SCS for VOCs and BTEX. The groundwater contained no oily sheen or

			odour and there were no free products detected for floaters or sinkers. The groundwater was screened as to straddle the water table in the native soils consisting of sand to silty sand. **Drawing Cross-Section 18A and 18B Groundwater for PCBs**. No Dense non-Aqueous Phase Liquids (DNAPLs) were encountered at the base of the monitoring wells and the groundwater met the SCS for PCB in groundwater.
	B	**The contaminants associated with each of the areas referred to subparagraph A**	There were no contaminants encountered in each of the areas as referred to in subparagraph A.
	C	**Each medium in which a contaminant associated with an area referred to a subparagraph is present.**	No Exceedances were identified in the fill soils and the native soils for Metals, Metal forming hydrides, ORPs, EC, SAR, pH, BTEX, PHCs F1 to F4 fractions, VOCs, PAH and PCB at Monitoring Well Locations for Soil
6.10.3	**D**	**A description and assessment of what is known about each of the areas referred to in the subparagraph is present.**	The fill soils on site varies from 0.1 m to approximately 2.0 m below ground surface consisting of silty sand, gravel, brick fragments, black to brown soil. Following the fill soils native sand to silty sand was encountered that extends to the investigated depth of approximately 32.0 m below the fill soils. It is believed that the native sand to silty sand extends to the bed rock surface located 85 m bgs. One (1) aquifer exists on site and it is considered a potable groundwater source and was encountered at depths between three (3) to four and half (4.5) m below ground surface in the native sands and silty sand. The Hydraulic Conductivity of the groundwater was estimated to be in the $1.0x10^{-3}$cm/s flowing in a north easterly direction. The groundwater flow contours are shown on **Drawing No. 5.** The groundwater flow direction was determined to be in northeast direction.
6.10.3	**E**	**The distribution in each of the areas referred to in subparagraph A of each contaminant present in the areas at a concentration greater than the applicable site condition standard for each medium in which the contaminant present together with figures showing the distribution.**	No contamination was encountered in the fill and native soils or in the groundwater table at MW101, MW102, MW103 and MW104. The soil and groundwater analysed for Metals and Metal Forming Hydrides, EC, pH, SAR, Chloride, Sodium, PAH, PCB, BTEX, PHCs F1 to F4 fractions, and VOCs. **Plan View Drawing No. 6** shows the position of the monitoring wells and the cross-sectional lines A to A 'and B to B'. **Drawing Cross-sectionals 7A and 7B to 12A and 12B** provides the stratigraphy of the soil from ground surface to

			depth of the deepest borehole, in the direction of groundwater flow and perpendicular to the groundwater flow. **Drawing Cross 13A and 13B to 18A and 18B** are the groundwater cross-sections that depicts the elevation of the groundwater table at each monitoring well and the parameters that were analyzed at each Monitoring well location. The groundwater was analyzed for Metals and Metal Hydrides, Na, Cl, As, Se, Sb, (B, Cr (VI), Hg, CN, pH, BTEX, PHCs F1 to F4 fractions, VOCs, PAH and PCBs. The groundwater met the MECP Table 2 RPI/ICC Standards in potable groundwater condition.
	F	**Anything known about the reason for the discharge of contaminants present on, in, or under the Phase Two Property at concentrations greater than the applicable site condition standard into the natural environment.**	No exceedances were encountered that exceeded SCS in soil and groundwater.
6.10.3	**G**	**Anything known about the migration of contaminants in or under the Phase Two Property at a concentration greater than the applicable site condition standards away from any area of potential concern including the identification of any preferential pathways.**	No Contaminants were encountered that exceeded the SCS in soil and groundwater.
	H	**Climate or meteorological conditions that may influence the distribution and migration of contaminants such as temporal fluctuations in the groundwater levels and:**	Climate and meteorological conditions may influence the migration of contaminants that may cause the water table rise during temporal events. However, no contaminants were encountered on the Phase Two Property that exceeded the SCS for the property.
	I	**If applicable information concerning soil and vapour intrusion of the contaminants into the building including, 1. Relevant construction**	No soil vapor issues were identified as part of the Phase Two ESA Investigation. The soil and groundwater of the Phase Two Property meets the SCS, 1.The onsite building has a basement, but the soil and

		features of a building such as a basement or a crawl space; **2. Building heating and air conditioning design and operation; and,** **3. Subsurface utilities**	groundwater were free of impacts; thus, vapour intrusion into the basement envelope is unlikely. 2. The building is heated by Natural Gas forced air furnace in the basement and first floor. The building operates under positive pressure minimizing vapour intrusion through the concrete lined brick floor. 3. Although subsurface utilities exist beneath the building structure the soils surrounding these utilities is very permeable minimizing the conduit effect generally produced by these pipelines.
6.10.4	**Where contaminants on, in, or under the Phase Two Property are present at concentrations greater than the site condition standards.**		
6.10.4			The cross-sectional **Drawing 7A** and 7B show subsurface soils and the location of the groundwater table relative to the ground surface
	A	The lateral and vertical distribution of contaminants is present at concentrations greater than the applicable site condition standards,	No lateral and vertical distribution of contaminants is present at concentrations greater than the applicable site conditions standards. The SCS for the Phase Two Property have been met.
	B	Approximate depth to the water table in each area referred in subparagraph A.	**Refer to Drawing Cross-section 7A and 7B provides the groundwater table in each location of the site.** MW101 – GW at 225.0 m asl MW102 - GW at 225.3 m asl MW103 – GW at 226.8 m asl MW104 - GW at 226.40 m asl The groundwater varies from 3.0 m to 4.5 m below ground surface.
	C	Stratigraphy from the ground surface to the deepest aquifer or aquitard investigated.	**Refer to Drawing Cross-Section 7A and 7B the stratigraphy is provided in detailed.**
	D	Any Subsurface structures and utilities that may affect the contaminant distribution and transport in each area referred to in subparagraph A	There are subsurface structures underneath of the main building structures, however, because the surrounding soil comprise of sand to silty sand the soil is very permeable surrounding these structures, hence the preferential pathways are through this permeable soil. The subsurface utilities would have little impact in this location because of the very permeable soils.
6.10.5	**For each area where a contaminant is present on, in, or under the Phase Two Property at a concentration greater than the applicable site condition standard for the contaminant, a diagram identifying with a narrative explanatory noted. Provide a drawing showing the release mechanism, contaminant transport pathways, and the various receptors, in or on or under the Phase Two Property receptor exposure points and routes of exposure.**		
6.10.5	**A**		Refer to Drawing No. 19 for Human Health and Ecolog

		The release mechanism	Receptors. The release mechanisms soil, groundwater, vapor routes through soil, groundwater, plant uptake and release to atmosphere, discharge to surface water, dust ingestion and dermal contact with soil or groundwater. Excavation of the soils onsite may expose workers to contaminated soil via inhalation, ingestion and dermal contact with soil and groundwater**. Not applicable as no contamination found onsite.**
	B	**Contaminant Transport Pathway**	Soil and soil vapors, contact with groundwater, groundwater to surface water, impacted soil via plant uptake and groundwater uptake, inhalation on the surface and inside of the building of vapours, due to soil and groundwater impacts, ingestion of soil and plants on the potentially impacted soil and groundwater, dermal contact with soil and drinking water. **Not applicable no contamination found onsite.**
	C	**The human and ecological receptors located on or in the Phase Two Property**	Human and ecological receptors. The human receptors included a person inside a building or outside of building working the above ground or in a trench ingesting groundwater from a drinking water well. The ecological receptors include biota in surface water, mammals and birds foraging on the surface, plants and invertebrates. **Not applicable no contamination found onsite.**
	D	**Receptor Exposure Points**	Receptor exposure routes ingestion of potable groundwater, inhalation of indoor air containing soil vapor from soil or groundwater, groundwater to surface water, direct exposure to soil by dermal contact and soil ingestion, movement from soil to groundwater, dermal contact with groundwater, odour to surface soil, and then inhalation. Inhalation of dusts, dermal contact, during construction work above or below ground. Ingestion of plants, mammals, biota and birds that have come in contact soil and groundwater impacts. The soil vapour route to humans are not possible based upon the chemicals found in the soil and groundwater. **Not applicable no contamination found onsite.**
	E	**Routes of exposure**	Routes of exposure would be through water, air and soil. The soil and groundwater on the Phase Two Property met the SCS for Table 2 RPI Standards in a Potable groundwater condition for all parameters tested**. Not applicable.**

7 CONCLUSIONS

The Phase Two ESA for the RSC property has been conducted in accordance with the regulation by and

under the supervision of a QP which includes the evaluation of information gathered from planning and conducting a site investigation to write the report and any updates as required by the regulation.

The PCA and the APEC identified in the Phase One ESA were not encountered in the soil and groundwater that exceeded the SCS for the Phase Two Property. Soil was analyzed at analyzed at MW101, MW102, MW103 and MW104 met SCS for all parameters.

The groundwater at the Phase Two Property was sampled at MW101, MW102, MW103 and MW104 and was analyzed for metals As, Se, Sb, (B, Cr (VI), Hg, BHW, CN, BTEX, PHCs F1 to F4, PCB, PAH, VOCs, Cl, Na, and pH. The soil was analyzed for the same parameters except for Cl and Na. EC and SAR were analysed in the soil in the place of chloride and sodium. Both the soil and groundwater met the site condition standards for the MECP Table 2 RPI Standards in a potable groundwater condition.

The Site is located within the 5 to 10-year Capture Zone for Municipal Potable water wells as noted in the Groundwater Regulations in accordance with the Barrie-Caradoc Groundwater Management Study and the Barrie-Caradoc Official Plan.

On the basis that the Phase Two Property falls within the municipal drinking capture zone and the groundwater is near surface, the Site Condition Standard for the Site was determined to be MECP Table 2 Standard RPI coarse grained soils in a potable groundwater condition.

The site was found to meet the MECP Table 2 Standard RPI in potable groundwater condition for fine and coarse-grained soils.

The groundwater flow direction was determined through the groundwater table measurements taken prior to well development and based upon those measurements the groundwater is moving across the subject site in from a southwesterly to north-easterly direction. The groundwater table on the Phase Two Property ranged from 3.0 to 4.5 m below ground surface.

Based upon the results of the parameters tested across the four (4) monitoring well locations during the Phase Two ESA investigation, the soil and groundwater samples collected met the applicable MECP Table 2 RPI Standards suggests that the PCA's have not adversely impacted the Site at the locations sampled.

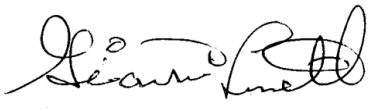
An RSC filing can be undertaken at this time as the Phase Two Property meets the Site Condition Standards. The last site work for the Phase Two ESA was concluded on August 10, 2018.

We trust you will find this report to be complete within our terms of reference. Should you have any questions regarding the information contained in the report, or require further assistance please contact the HLV2K office.

For and on behalf of HLV2K Engineering Limited

Mariam Mohammadi, BSc.
Environmental Scientist

I have reviewed the report and confirm that the Phase Two ESA, including findings and conclusions, have been carried out in accordance with the requirements of O.Reg. 153/04, as amended, in effect as of the date of this report.

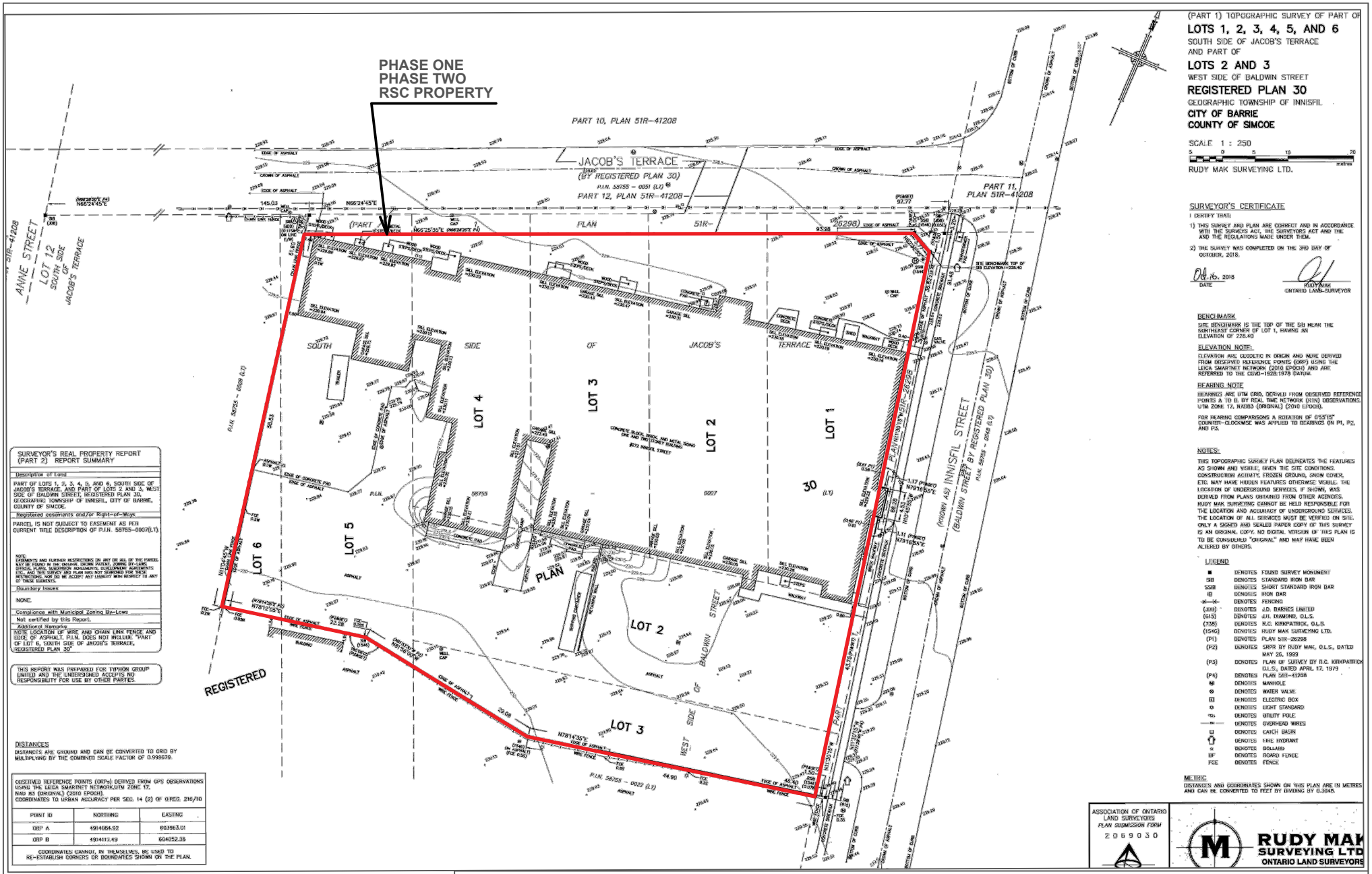


John (Gianni) Lametti, P. Eng. QP_{ESA}
Principal & Environmental Manager

REFERENCES

- Barnett, P.J., Cowan, W.R. and Henry, A.P. 1991. Quaternary Geology of Ontario, southern sheet; Ontario Geological Survey, Map 2556, Scale 1:1000 000.
- Chapman, L.J., and Putnam, D.F. 1984: Physiography of Southern Ontario; Ontario Geological Survey, Map P.2715. Scale 1:600 000.
- Terraqua Phase I Environmental Site Assessment, Report No. dated August, 1997.
- Barrie. 2018. Official Plan – Schedule G Drinking Water System Vulnerable Areas. Scale 1:20,000.

Drawings



(PART 1) TOPOGRAPHIC SURVEY OF PART OF
LOTS 1, 2, 3, 4, 5, AND 6
SOUTH SIDE OF JACOB'S TERRACE
AND PART OF
LOTS 2 AND 3
WEST SIDE OF BALDWIN STREET
REGISTERED PLAN 30
GEOGRAPHIC TOWNSHIP OF INNISFIL
CITY OF BARRIE
COUNTY OF SIMCOE

SCALE 1 : 250
5 0 5 10 20
metres

RUDY MAK SURVEYING LTD.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1) THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE AND THE REGULATIONS MADE UNDER THEM.

2) THE SURVEY WAS COMPLETED ON THE 3RD DAY OF OCTOBER, 2018.

Oct 16, 2018
DATE

RUDY MAK
ONTARIO LAND SURVEYOR

BENCHMARK

SITE BENCHMARK IS THE TOP OF THE SIB NEAR THE NORTHEAST CORNER OF LOT 1, HAVING AN ELEVATION OF 228.40

ELEVATION NOTE:

ELEVATION ARE GEODETIC IN ORIGIN AND WERE DERIVED FROM OBSERVED REFERENCE POINTS (ORP) USING THE LEICA SMARTNET NETWORK (2010 EPOCH) AND ARE REFERRED TO THE CGVD-1928:1978 DATUM.

BEARING NOTE

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A TO B, BY REAL TIME NETWORK (RTN) OBSERVATIONS. UTM ZONE 17, NAD83 (ORIGINAL) (2010 EPOCH).

FOR BEARING COMPARISONS A ROTATION OF 0°55'15" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P1, P2, AND P3.

NOTES:

THIS TOPOGRAPHIC SURVEY PLAN DELINEATES THE FEATURES AS SHOWN AND VISIBLE, GIVEN THE SITE CONDITIONS. CONSTRUCTION ACTIVITY, FROZEN GROUND, SNOW COVER, ETC. MAY HAVE HIDDEN FEATURES OTHERWISE VISIBLE. THE LOCATION OF UNDERGROUND SERVICES, IF SHOWN, WAS DERIVED FROM PLANS OBTAINED FROM OTHER AGENCIES. RUDY MAK SURVEYING CANNOT BE HELD RESPONSIBLE FOR THE LOCATION AND ACCURACY OF UNDERGROUND SERVICES. THE LOCATION OF ALL SERVICES MUST BE VERIFIED ON SITE. ONLY A SIGNED AND SEALED PAPER COPY OF THIS SURVEY IS AN ORIGINAL COPY. NO DIGITAL VERSION OF THIS PLAN IS TO BE CONSIDERED "ORIGINAL" AND MAY HAVE BEEN ALTERED BY OTHERS.

LEGEND

■	DENOTES FOUND SURVEY MONUMENT
SIB	DENOTES STANDARD IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
IB	DENOTES IRON BAR
-x-x-	DENOTES FENCING
(J.D.)	DENOTES J.D. BARNES LIMITED
(D.I.S.)	DENOTES J.H. DIAMOND, O.L.S.
(R.K.)	DENOTES R.C. KIRKPATRICK, O.L.S.
(RMS)	DENOTES RUDY MAK SURVEYING LTD.
(P1)	DENOTES PLAN 51R-26298
(P2)	DENOTES SRPR BY RUDY MAK, O.L.S., DATED MAY 26, 1999
(P3)	DENOTES PLAN OF SURVEY BY R.C. KIRKPATRICK O.L.S., DATED APRIL 17, 1979
(P4)	DENOTES PLAN 51R-41208
MH	DENOTES MANHOLE
WV	DENOTES WATER VALVE
EB	DENOTES ELECTRIC BOX
LS	DENOTES LIGHT STANDARD
UP	DENOTES UTILITY POLE
OH	DENOTES OVERHEAD WIRES
CB	DENOTES CATCH BASIN
FH	DENOTES FIRE HYDRANT
BF	DENOTES BOLLARD
BOF	DENOTES BOARD FENCE
FCE	DENOTES FENCE

METRIC

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SURVEYOR'S REAL PROPERTY REPORT (PART 2) REPORT SUMMARY

Description of Land
PART OF LOTS 1, 2, 3, 4, 5, AND 6, SOUTH SIDE OF JACOB'S TERRACE, AND PART OF LOTS 2 AND 3, WEST SIDE OF BALDWIN STREET, REGISTERED PLAN 30, GEOGRAPHIC TOWNSHIP OF INNISFIL, CITY OF BARRIE, COUNTY OF SIMCOE.
Registered easements and/or Right-of-Ways
PARCEL IS NOT SUBJECT TO EASEMENT AS PER CURRENT TITLE DESCRIPTION OF P.I.N. 58755-0007(LT).
NOTE: EASEMENTS AND FURTHER RESTRICTIONS ON ANY OR ALL OF THE PARCEL MAY BE FOUND IN THE ORIGINAL CROWN PATENT, ZONING BY-LAWS, TYPICAL PLANS, SUBDIVISION AGREEMENTS, DEVELOPMENT AGREEMENTS ETC., AND THIS SURVEY AND PLAN HAS NOT SEARCHED FOR THESE RESTRICTIONS, NOR DO WE ACCEPT ANY LIABILITY WITH RESPECT TO ANY OF THESE ELEMENTS.
Boundary Issues
NONE.
Compliance with Municipal Zoning By-Laws
Not certified by this Report.
Additional Remarks
NOTE LOCATION OF WIRE AND CHAIN LINK FENCE AND EDGE OF ASPHALT. P.I.N. DOES NOT INCLUDE "PART OF LOT 6, SOUTH SIDE OF JACOB'S TERRACE, REGISTERED PLAN 30"

THIS REPORT WAS PREPARED FOR TYPHON GROUP LIMITED AND THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

DISTANCES

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999679.

OBSERVED REFERENCE POINTS (ORPs) DERIVED FROM GPS OBSERVATIONS USING THE LEICA SMARTNET NETWORK (UTM ZONE 17, NAD 83 (ORIGINAL) (2010 EPOCH). COORDINATES TO URBAN ACCURACY PER SEC. 14 (2) OF O.REG. 216/10

POINT ID	NORTHING	EASTING
ORP A	4914084.92	603963.01
ORP B	4914117.49	604052.38

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THE PLAN.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2069030

RUDY MAK SURVEYING LTD
ONTARIO LAND SURVEYORS

Site Property Boundary

0 10 20 Meters

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Site Location Plan

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 1

LEGEND:

Site Property Boundary

Study Area

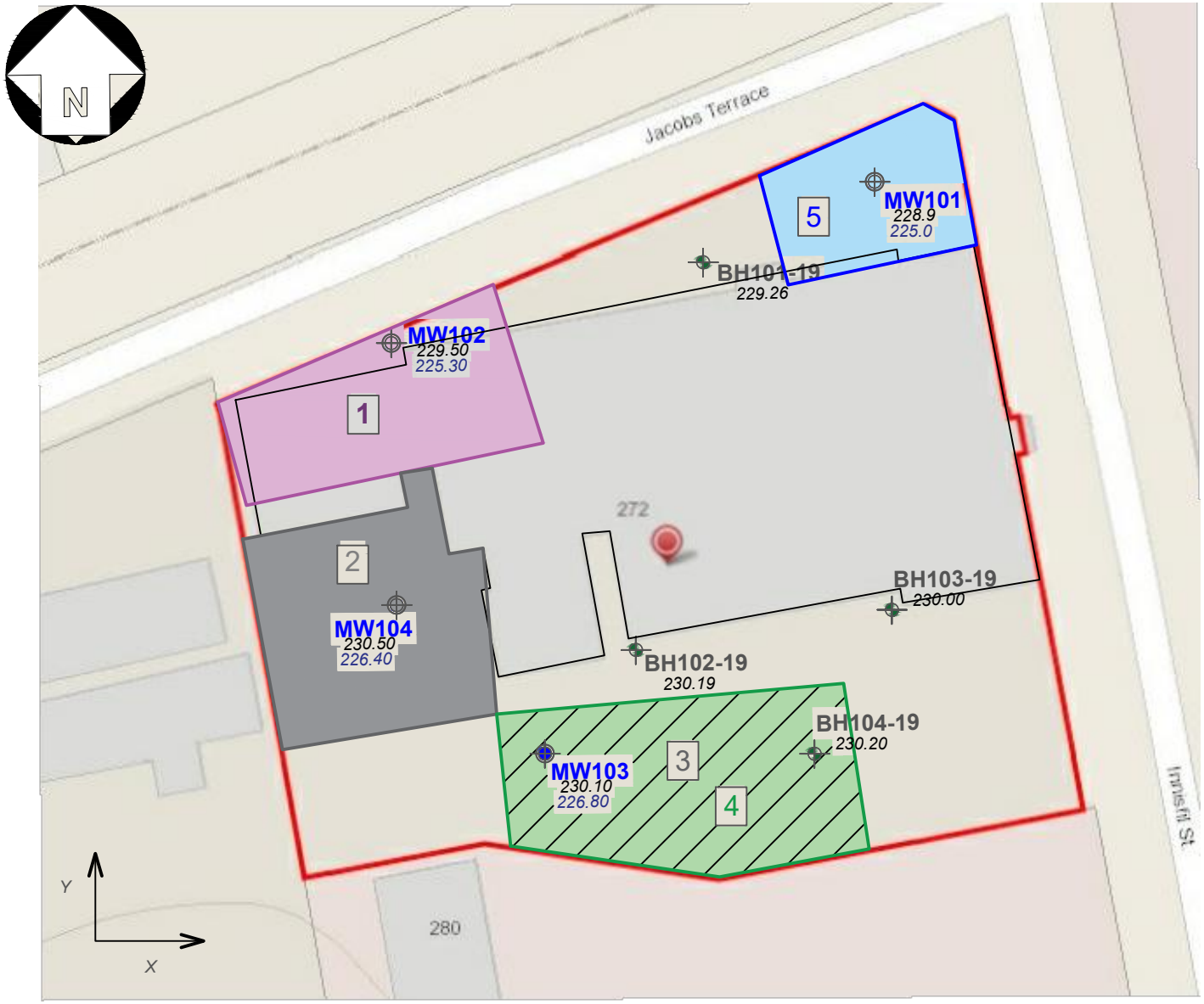
0 30 60 120 Meters

Drawn:	*KP*
Approved:	*JL*
HLV2K ENGINEERING LIMITED	*Project No: 1800064BE*

Title: Phase Two Property Potentially Contaminated Activities

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.	*Date: Apr-21*	*Drawing No: 2*



LEGEND

- Site Property Boundary
- MW 101 - Monitoring Wells by HLV2K (August 2018)
- BH101-19- Borehole by Cambium Inc. (August 2019)
- 228.90 Surface soil levations, m asl
- 225.00 Groundwater elevations, m asl

- 1 APEC 1
- 2 APEC 2
- 3 APEC 3
- 4 APEC 4
- 5 APEC 5

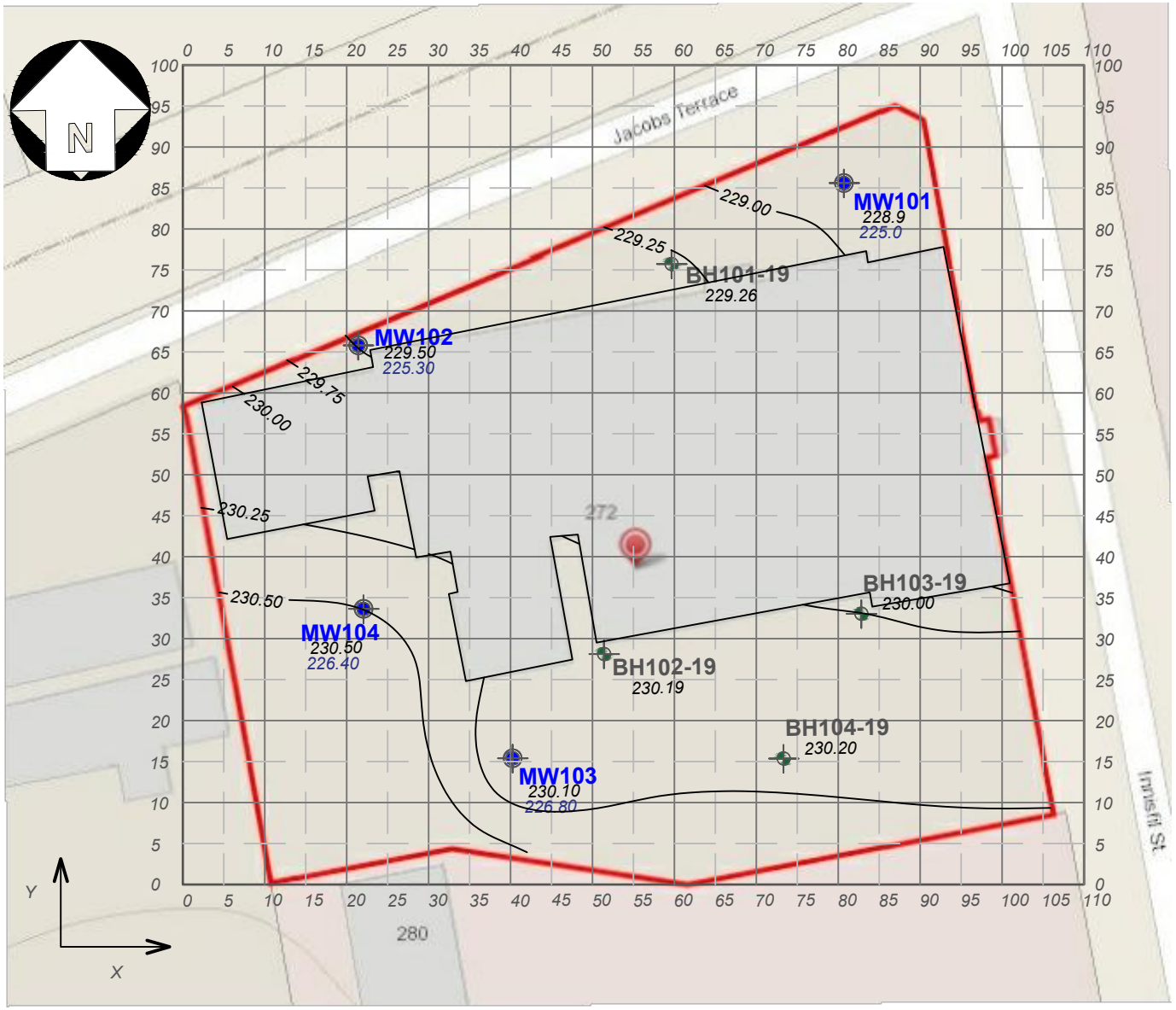
0 10 20 Meters

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Location of Phase Two Property APECs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd. | Date: Apr-21 | Drawing No: 3



LEGEND

- Site Property Boundary
- MW 101 - Monitoring Wells by HLV2K (August 2018)
- BH101-19- Borehole by Cambium Inc. (August 2019)
- 228.90 Surface soil levations, m asl
- 225.00 Groundwater elevations, m asl
- Surface contours

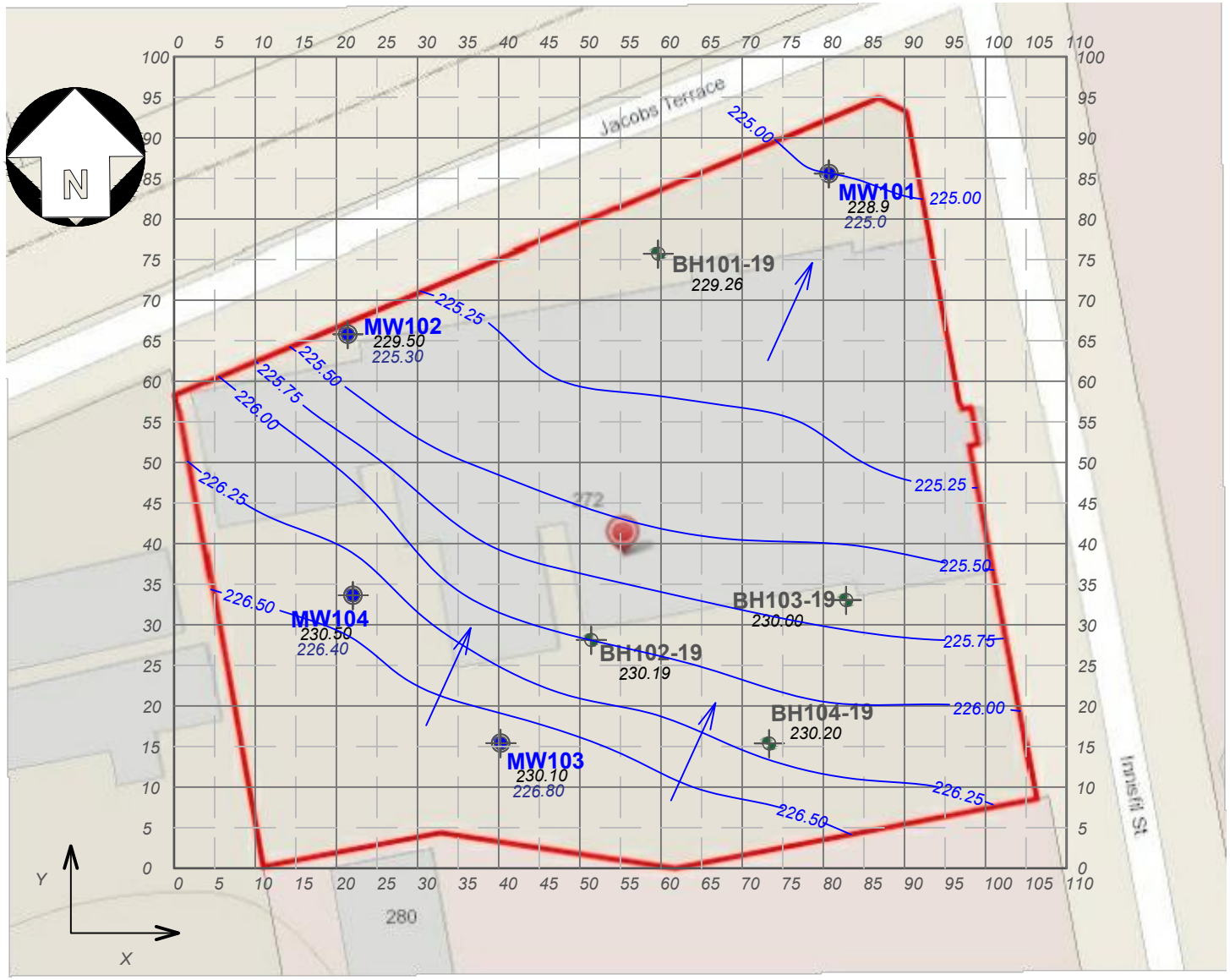
0 10 20 Meters

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Plan View of Boreholes and Monitoring Wells

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd. | Date: Apr-21 | Drawing No: 4



LEGEND

- Site Property Boundary
- Groundwater Flow Direction
- Groundwater contours
- MW 101 - Monitoring Wells by HLV2K (August 2018)
- BH101-19- Borehole by Cambium Inc. (August 2019)
- 228.90 — Surface soil levations, m asl
- 225.00 — Groundwater elevations, m asl

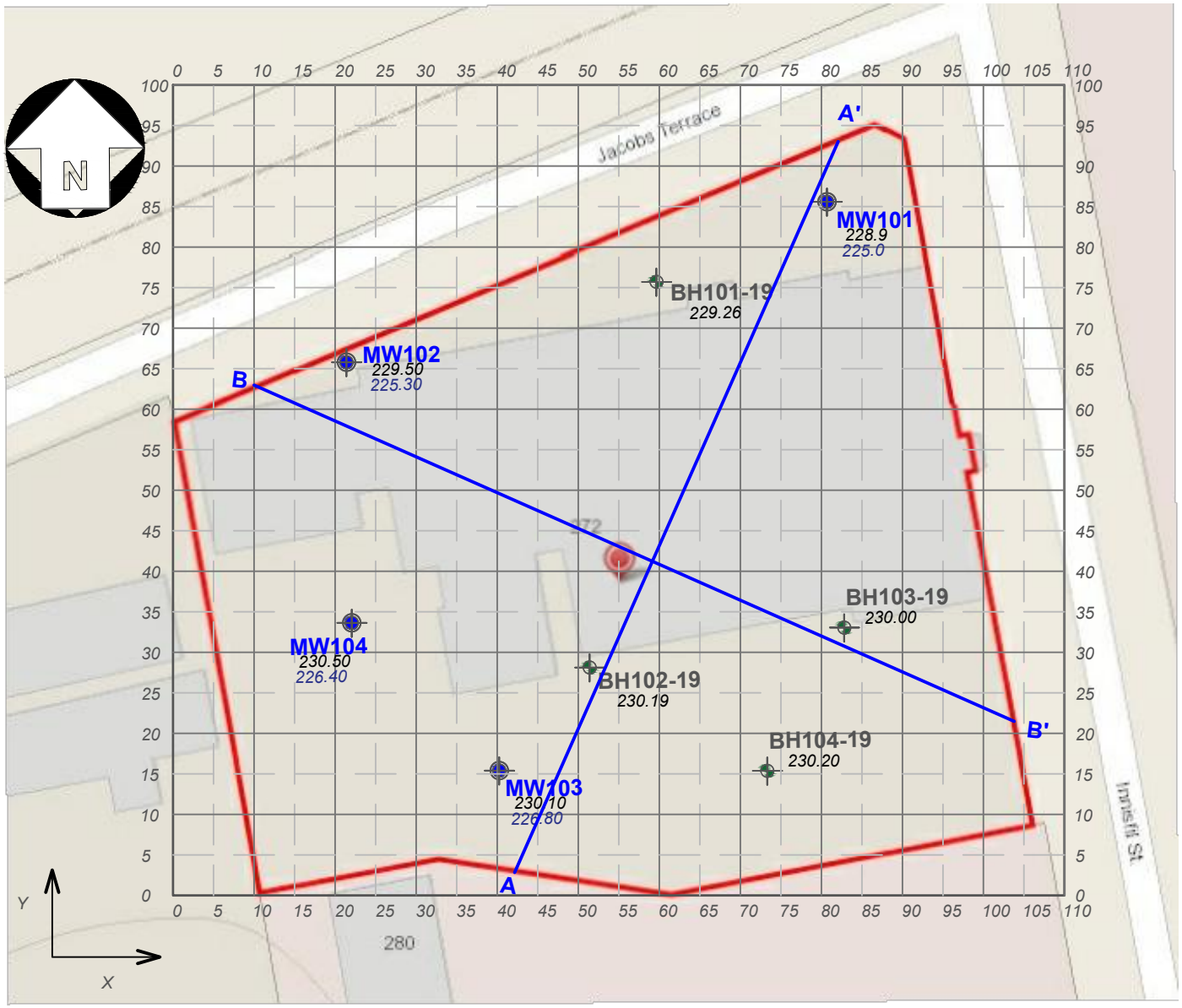
0 10 20 Meters

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Groundwater Flow Direction

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd. | Date: Apr-21 | Drawing No: 5



LEGEND

A —— A' Cross-Section Line

MW 101 - Monitoring Wells by HLV2K (August 2018)

BH101-19- Borehole by Cambium Inc. (August 2019)

228.90 Surface soil levations, m asl

225.00 Groundwater elevations, m asl

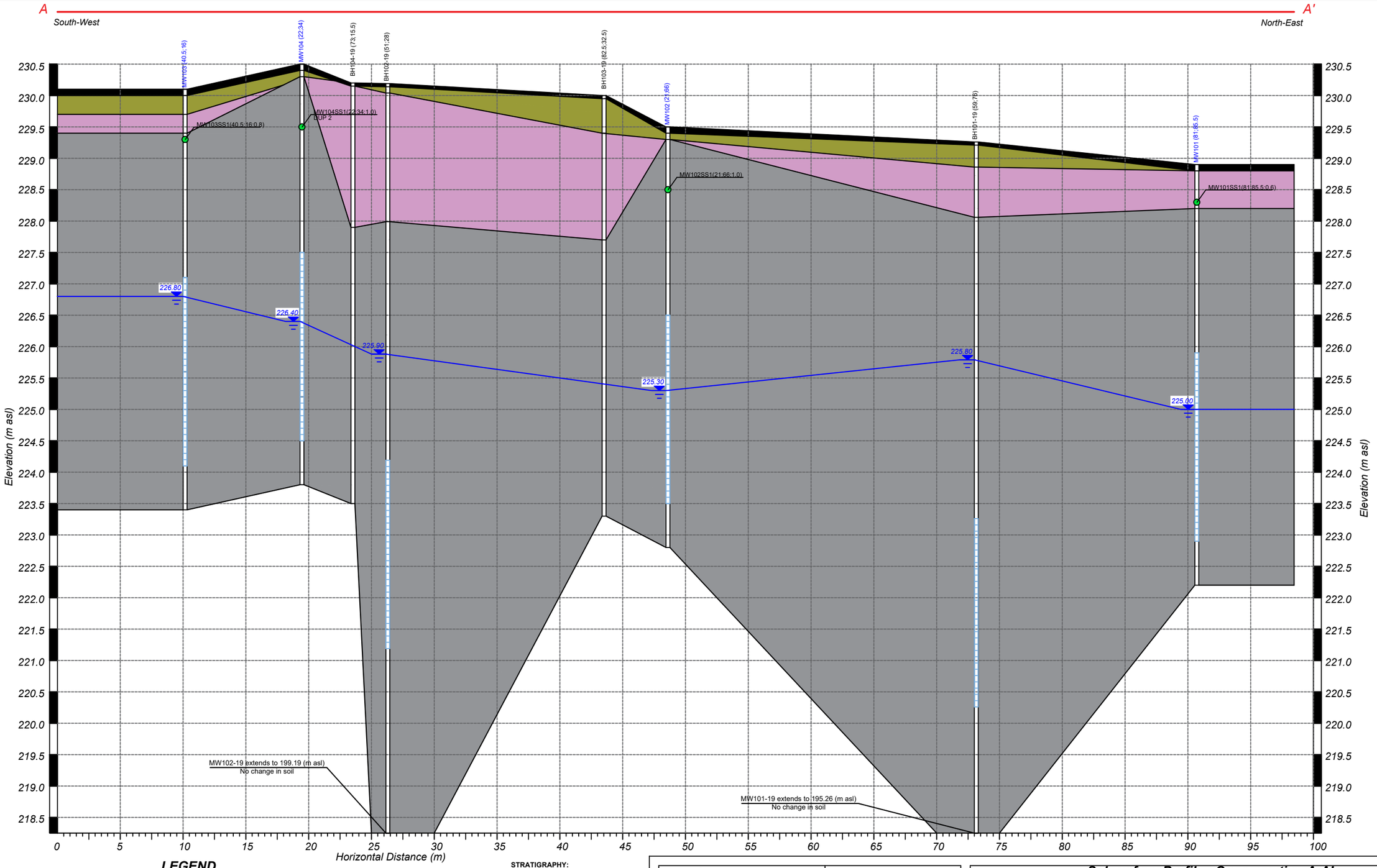
0 10 20 Meters

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Cross-Sections A-A', B-B' Plan View

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd. | Date: Apr-21 | Drawing No: 6



LEGEND

225.00	Water Level	BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)
	Interpreted Water Table	MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)
	Well Screen	Soil Sample meets Table 2RPI Site Condition Standard for Metals

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section A-A'
Soils Metals, Hydride-Forming Metals

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 7a

A — South-West — A' — North-East

MW103-19 (40.5;16)
MW104 (22;34)
BH104-19 (73;15.5)
BH102-19 (51;28)
BH103-19 (82.5;32.5)
MW102 (21;66)
BH101-19 (59;76)
MW101 (81;85.5)

MW103SS1(40.5;16;0.6)
MW104SS2(22;34;1.5)
DUP 2
MW102SS1(21;66;0.6)
MW101SS2(81;85.5;1.5)

226.80
226.40
225.90
225.30
225.80
225.00

MW102-19 extends to 199.19 (m asl)
No change in soil

MW101-19 extends to 195.26 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Soil Sample meets Table 2RPI Site Condition Standard for ORPs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

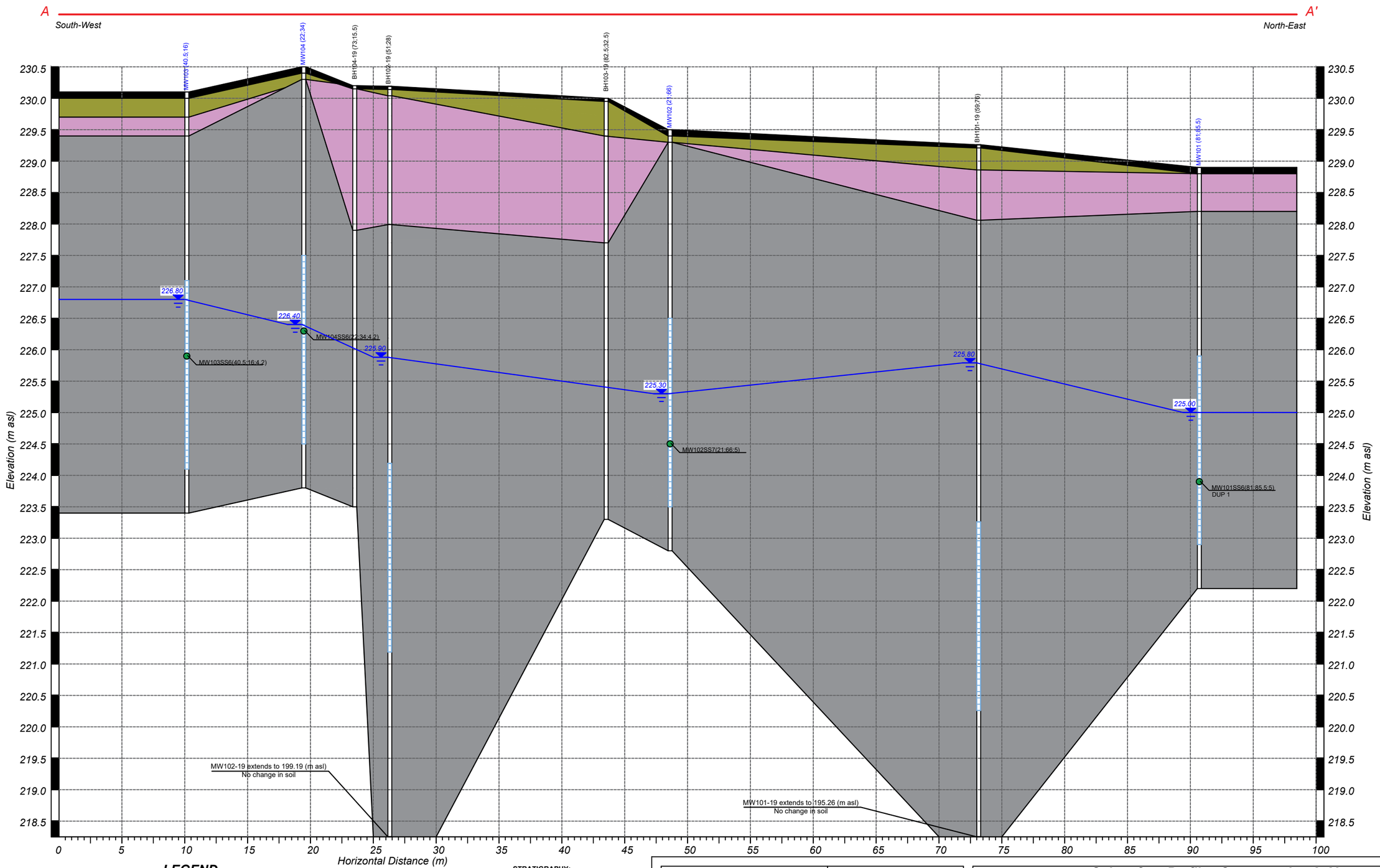
Title: Subsurface Profile - Cross-section A-A'
Soils EC , SAR and ORPs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 8A



LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Soil Sample meets Table 2RPI Site Condition Standard for VOCs and BTEX

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

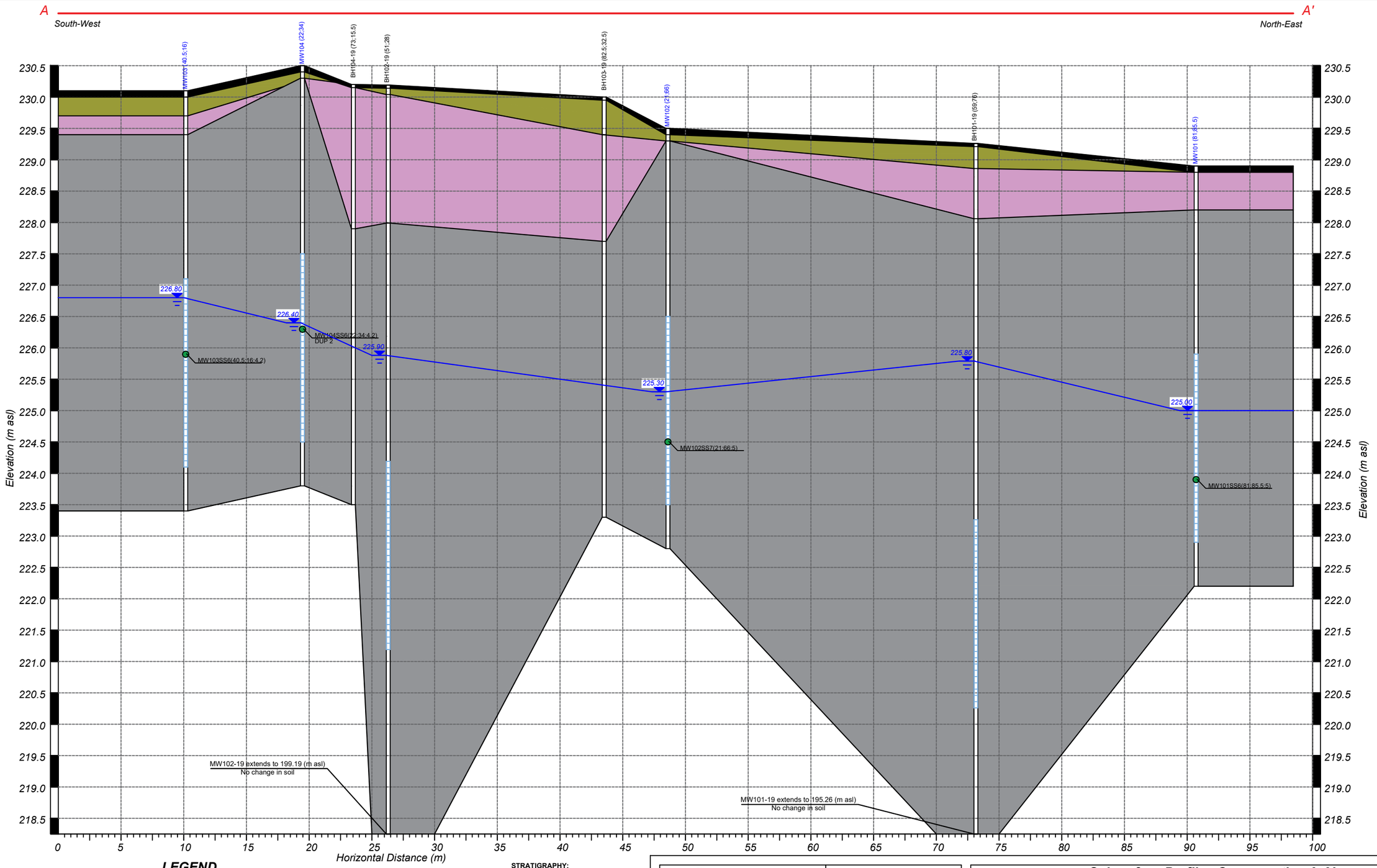
Title: Subsurface Profile - Cross-section A-A'
Soils VOCs and BTEX

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 9A



LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Soil Sample meets Table 2RPI Site Condition Standard for PHCs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section A-A'
Soils PHCs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 10A

A — South-West

A' — North-East

MW103-19 (40.5;16)
MW104 (22;34)
BH104-19 (73;15.5)
BH102-19 (51;28)
BH103-19 (82.5;32.5)
MW102 (21;66)
BH101-19 (59;76)
MW101 (81;85.5)

MW103SS4(40.5;16;2.5)
MW104SS4(22;34;4.5) DUP 2
MW102SS3(21;66;1.8)
MW101SS3(81;85.5;1.8)

226.80
226.40
225.90
225.30
225.80
225.00

MW102-19 extends to 199.19 (m asl)
No change in soil

MW101-19 extends to 195.26 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Soil Sample meets Table 2RPI Site Condition Standard for PAHs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section A-A'
Soils PAHs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 11A

A — South-West

A' — North-East

MW105(40.5;16)
MW104 (22;34)
BH104-19 (73;15.5)
BH102-19 (51;28)
BH103-19 (82.5;32.5)
MW102 (21;66)
BH101-19 (59;76)
MW101 (81;85.5)

MW103SS3(40.5;16-1.5)
MW104SS3(22;34-1.5) DUP 2
MW102SS2(21;66-0.8)
MW101SS2(81;85.5-0.8)

226.80
226.40
225.90
225.30
225.80
225.00

MW102-19 extends to 199.19 (m asl)
No change in soil

MW101-19 extends to 195.26 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Soil Sample meets Table 2RPI Site Condition Standard for PCBs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Subsurface Profile - Cross-section A-A'
Soils PCBs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 12A

B — North-West — B' — South-East

MW102 (21;66) | MW104 (22;34) | BH101-19 (59;76) | MW103 (40.5;16) | BH102-19 (51;28) | MW101 (81;85.5) | BH104-19 (73;15.5) | BH103-19 (82.5;32.5)

MW104SS1(22;34;1.0) DUP 2

MW103SS1(40.5;16;0.8)

MW102SS1(21;66;1.0)

MW101SS1(81;85.5;0.6)

226.80 | 226.40 | 225.80 | 225.90 | 225.30 | 225.00

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

230.5 230.0 229.5 229.0 228.5 228.0 227.5 227.0 226.5 226.0 225.5 225.0 224.5 224.0 223.5 223.0 222.5 222.0 221.5 221.0 220.5 220.0 219.5 219.0 218.5

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105

Horizontal Distance (m)

LEGEND

225.00 Water Level	BH101-19 (59;76)	Borehole installed by Cambium (cartesian coordinates of the borehole)
Interpreted Water Table	MW101 (81;85.5)	Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)
Well Screen	Soil Sample meets Table 2RPI Site Condition Standard for Metals	

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Soils Metals, Hydride-Forming Metals

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 7B

B — North-West — B' — South-East

MW102 (21;66)
MW104 (22;34)
BH101-19 (59;76)
MW103 (40.5;16)
BH102-19 (51;28)
MW101 (81;85.5)
BH104-19 (73;15.5)
BH103-19 (82.5;32.5)

MW102SS1(21;66:0.6)
MW104SS2(22;34:1.5) DUP 2
MW103SS1(40.5;16:0.6)
MW101SS2(81;85.5:1.5)

225.30
226.40
225.80
226.80
225.90
225.00

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

Water Level — 225.00

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Soil Sample meets Table 2RPI Site Condition Standard for ORPs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Soils EC, SAR and ORPs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 8B

B — North-West

B' — South-East

MW102 (21;66)
MW104 (22;34)
BH101-19 (59;76)
MW103 (40.5;16)
BH102-19 (51;28)
MW101 (81;85.5)
BH104-19 (73;15.5)
BH103-19 (82.5;32.5)

225.30
226.40
225.80
226.80
225.90
225.00

MW102SS7(21;66.5)
MW104SS6(22;34.1.2)
MW103SS6(40.5;16.4.2)
MW101SS6(81;85.5;5)
DUP 1

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

Water Level	BH101-19 (59;76)	Borehole installed by Cambium (cartesian coordinates of the borehole)
Interpreted Water Table	MW101 (81;85.5)	Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)
Well Screen		Soil Sample meets Table 2RPI Site Condition Standard for VOCs and BTEX

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Soils VOCs and BTEX

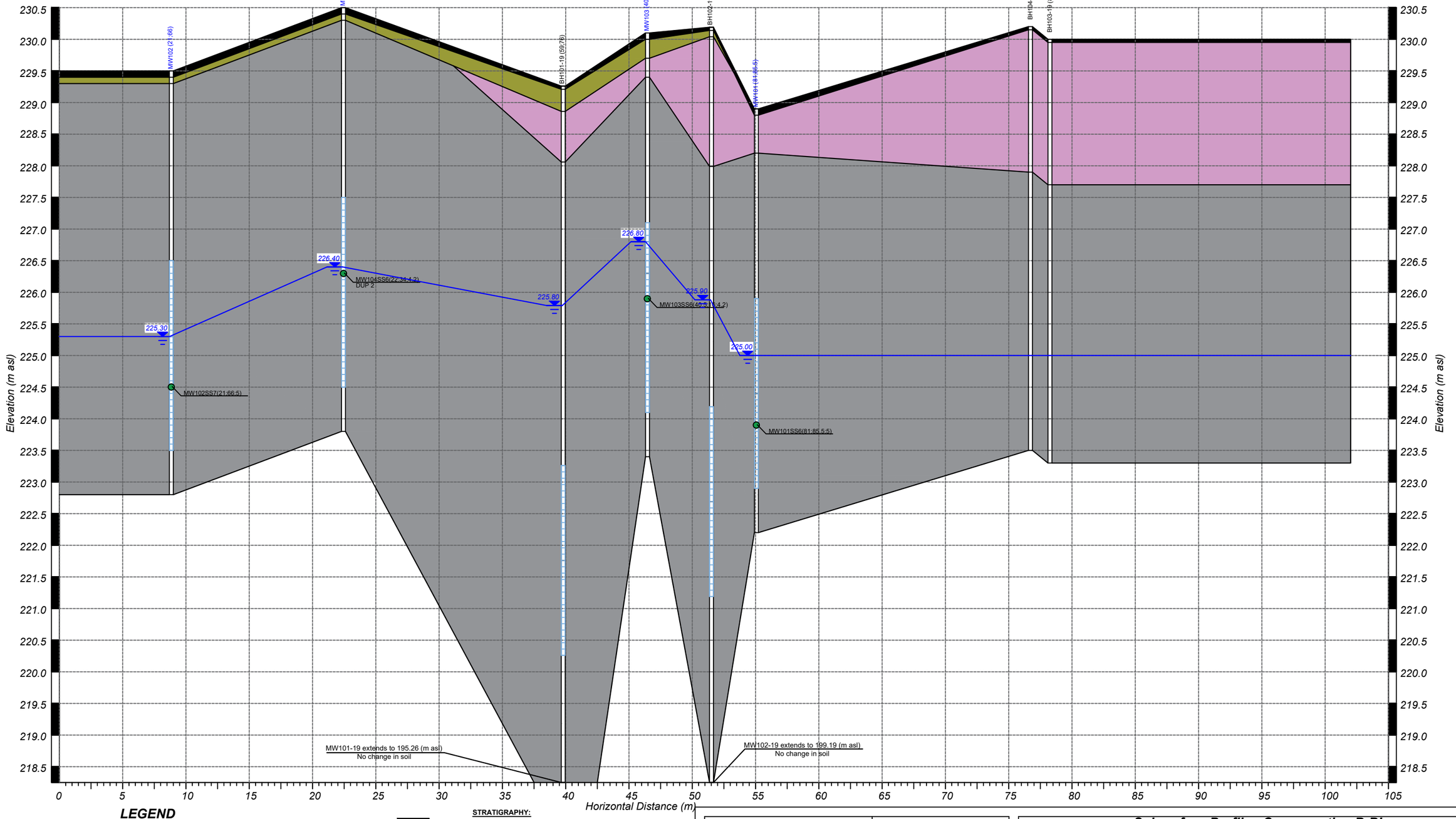
Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 9B

B — North-West — B' — South-East



LEGEND

225.00 — Water Level	BH101-19 (59;76)	Borehole installed by Cambium (cartesian coordinates of the borehole)
Interpreted Water Table	MW101 (81;85.5)	Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)
Well Screen	Soil Sample meets Table 2RPI Site Condition Standard for PHCs	

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Soils PHCs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 10B

B

North-West

B'

South-East

MW102 (21;66)

MW104 (22;34)

BH101-19 (59;76)

MW103 (40.5;16)

BH102-19 (51;28)

MW101 (81;85.5)

BH104-19 (73;15.5)

BH103-19 (82.5;32.5)

MW102SS3(21;66;1.8)

MW104SS4(22;34;2.5)
DUP 2

MW103SS4(40.5;16;2.5)

MW101SS3(81;85.5;1.8)

225.30

226.40

225.80

226.80

225.90

225.00

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 Water Level	BH101-19 (59;76)	Borehole installed by Cambium (cartesian coordinates of the borehole)
Interpreted Water Table	MW101 (81;85.5)	Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)
Well Screen		Soil Sample meets Table 2RPI Site Condition Standard for PAHs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Soils PAHs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 11B

B — North-West

B′ — South-East

MW102 (21;66)
MW104 (22;34)
BH101-19 (59;76)
MW103 (40.5;16)
BH102-19 (51;28)
MW101 (81;85.5)
BH104-19 (73;15.5)
BH103-19 (82.5;32.5)

MW102SS2(21;66;0.8)
MW104SS3(22;34;1.5) DUP 2
MW103SS3(40.5;16;1.5)
MW101SS2(81;85.5;0.8)

225.30
226.40
225.80
226.80
225.90
225.00

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 Water Level	BH101-19 (59;76)	Borehole installed by Cambium (cartesian coordinates of the borehole)
Interpreted Water Table	MW101 (81;85.5)	Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)
Well Screen		Soil Sample meets Table 2RPI Site Condition Standard for PCBs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Soils PCBs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 12B

A — South-West — A' — North-East

MW103(40.5;16.5) MW104 (22;34.5) BH104-19 (73;15.5) BH102-19 (51;28) BH103-19 (82.5;32.5) MW102 (21;66.5) BH101-19 (59;76) MW101 (81;85.5)

226.80 226.40 225.90 225.30 225.80 225.00

MW103(40.5;16.5) MW104(22;34.5) MW102(21;66.5) MW101(81;58.5;5)

MW102-19 extends to 199.19 (m asl)
No change in soil

MW101-19 extends to 195.26 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for Metals, Hydride-Forming Metals

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section A-A'
Groundwater Metals

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 13A

A South-West — A' North-East

MW103(40.5;16.5) MW104 (22;34.5) BH104-19 (73;15.5) BH102-19 (51;28) BH103-19 (82.5;32.5) MW102 (21;66.5) BH101-19 (59;76) MW101 (81;85.5)

226.80 226.40 225.90 225.30 225.80 225.00

MW103(40.5;16.5) MW104(22;34.5) MW102(21;66.5) MW101(81;58.5)

MW102-19 extends to 199.19 (m asl)
No change in soil

MW101-19 extends to 195.26 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for ORPs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section A-A'
Groundwater ORPs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 14A

A South-West — A' North-East

MW103 (40.5;16)
MW104 (22;34)
BH104-19 (73;15.5)
BH102-19 (51;28)
BH103-19 (82.5;32.5)
MW102 (21;66)
BH101-19 (59;76)
MW101 (81;85.5)

226.80
226.40
225.90
225.30
225.80
225.00

MW103(40.5;16.5)
MW104(22;34.5)
MW102(21;66.5)
MW101(81;58.5.5)

MW102-19 extends to 199.19 (m asl)
No change in soil

MW101-19 extends to 195.26 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for PHCs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Subsurface Profile - Cross-section A-A' Groundwater PHCs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 15A

A — South-West — A' — North-East

MW103(40.5;16.5) MW104 (22;34) BH104-19 (73;15.5) BH102-19 (51;28) BH103-19 (82.5;32.5) MW102 (21;66) BH101-19 (59;76) MW101 (81;85.5)

226.80 226.40 225.90 225.30 225.80 225.00

MW103(40.5;16.5) MW104(22;34.5) MW102(21;66.5) MW101(81;58.5;5)

MW102-19 extends to 199.19 (m asl)
No change in soil

MW101-19 extends to 195.26 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for PAHs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

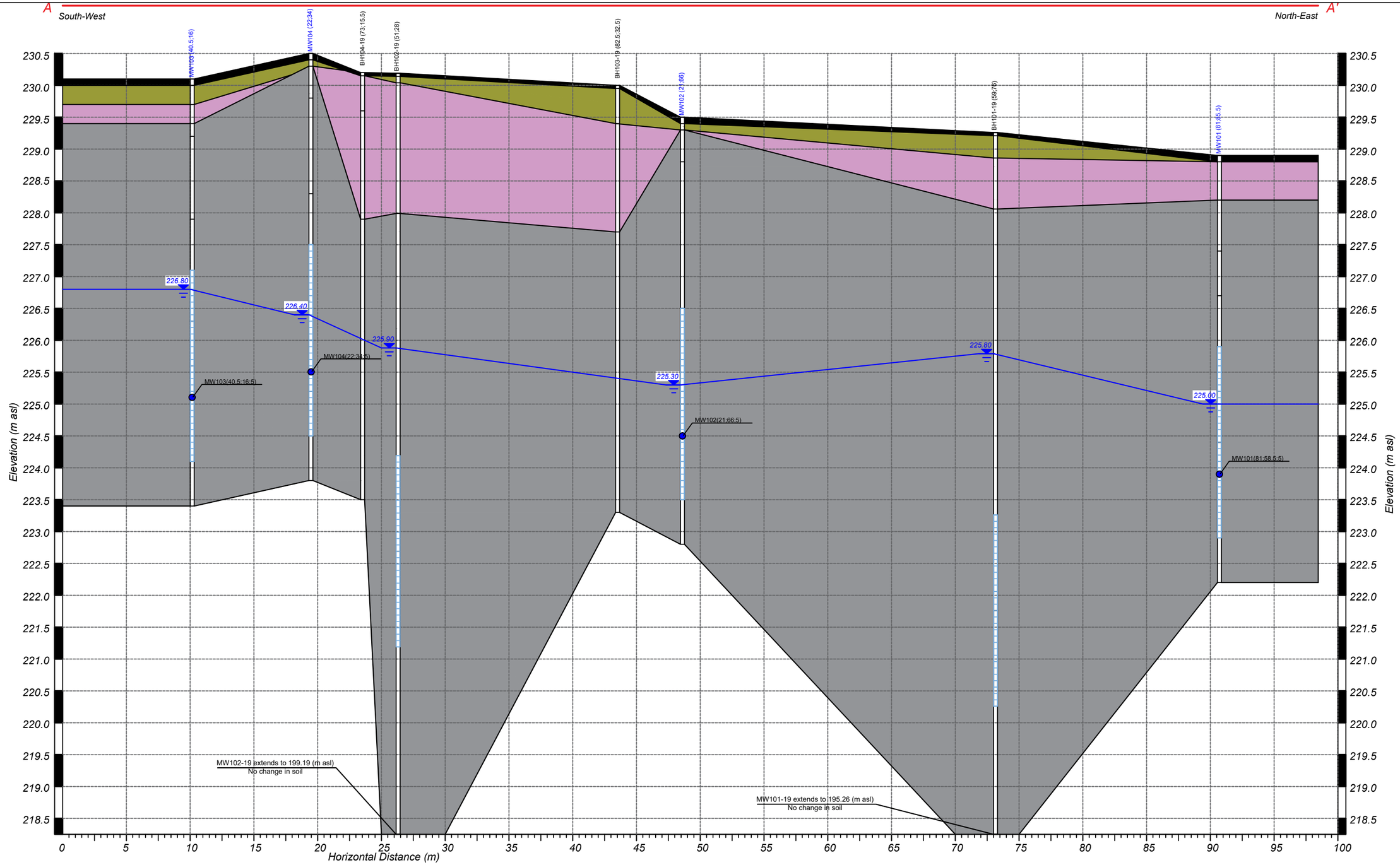
Title: Subsurface Profile - Cross-section A-A'
Groundwater PAHs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 16A



LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for VOCs and BTEX

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section A-A'
Groundwater VOCs and BTEX

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 17A

A — South-West — A'

North-East

MW103(40.5;16)
MW104 (22;34)
BH104-19 (73;15.5)
BH102-19 (51;28)
BH103-19 (82.5;32.5)
MW102 (21;66)
BH101-19 (59;76)
MW101 (81;85.5)

226.80
226.40
225.90
225.30
225.80
225.00

MW103(40.5;16.5)
MW104(22;34.5)
MW102(21;66.5)
MW101(81;58.5;5)

MW102-19 extends to 199.19 (m asl)
No change in soil

MW101-19 extends to 195.26 (m asl)
No change in soil

Elevation (m asl)

230.5 230.0 229.5 229.0 228.5 228.0 227.5 227.0 226.5 226.0 225.5 225.0 224.5 224.0 223.5 223.0 222.5 222.0 221.5 221.0 220.5 220.0 219.5 219.0 218.5

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for PCBs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section A-A'
Groundwater PCBs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 18A

B North-West

B' South-East

MW102 (21;66)
MW104 (22;34)
BH101-19 (59;76)
MW103 (40.5;16)
BH102-19 (51;28)
MW101 (81;85.5)
BH104-19 (73;15.5)
BH103-19 (82.5;32.5)

225.30
226.40
225.80
226.80
225.90
226.00

MW102(21;66;5)
MW104(22;34;5)
MW103(40.5;16;5)
MW101(81;58.5;5)

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

230.5 230.0 229.5 229.0 228.5 228.0 227.5 227.0 226.5 226.0 225.5 225.0 224.5 224.0 223.5 223.0 222.5 222.0 221.5 221.0 220.5 220.0 219.5 219.0 218.5

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for Metals, Hydride-Forming Metals

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Groundwater Metals

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 13B

B North-West — South-East B'

MW102 (21;66)
MW104 (22;34)
BH101-19 (59;76)
MW103 (40.5;16)
BH102-19 (51;28)
MW101 (81;85.5)
BH104-19 (73;15.5)
BH103-19 (82.5;32.5)

225.30
226.40
225.80
226.80
225.90
225.00

MW102(21;66:5)
MW104(22;34:5)
MW103(40.5;16:5)
MW101(81;58.5:5)

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for ORPs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Subsurface Profile - Cross-section B-B' Groundwater ORPs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 14B

B North-West — South-East B'

MW102 (21;66)
MW104 (22;34)
BH101-19 (59;76)
MW103 (40.5;16)
BH102-19 (51;28)
MW101 (81;85.5)
BH104-19 (73;15.5)
BH103-19 (82.5;32.5)

225.30
226.40
225.80
226.80
225.90
226.00

MW102(21;66.5)
MW104(22;34.5)
MW103(40.5;16.5)
MW101(81;58.5.5)

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

230.5 230.0 229.5 229.0 228.5 228.0 227.5 227.0 226.5 226.0 225.5 225.0 224.5 224.0 223.5 223.0 222.5 222.0 221.5 221.0 220.5 220.0 219.5 219.0 218.5

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for PHCs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Groundwater PHCs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 15B

B North-West — South-East B'

MW102 (21;66)
MW104 (22;34)
BH101-19 (59;76)
MW103 (40.5;16)
BH102-19 (51;28)
MW101 (81;85.5)
BH104-19 (73;15.5)
BH103-19 (82.5;32.5)

225.30
226.40
225.80
226.80
225.99
226.00

MW102(21;66;5)
MW104(22;34;5)
MW103(40.5;16;5)
MW101(81;58.5;5)

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for PAHs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Groundwater PAHs

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 16B

B North-West — South-East B'

MW102 (21;66)
MW104 (22;34)
BH101-19 (59;76)
MW103 (40.5;16)
BH102-19 (51;28)
MW101 (81;85.5)
BH104-19 (73;15.5)
BH103-19 (82.5;32.5)

225.30
226.40
225.86
226.80
225.90
225.00

MW102(21;66;5)
MW104(22;34;5)
MW103(40.5;16;5)
MW101(81;58.5;5)

MW101-19 extends to 195.26 (m asl)
No change in soil

MW102-19 extends to 199.19 (m asl)
No change in soil

Elevation (m asl)

230.5 230.0 229.5 229.0 228.5 228.0 227.5 227.0 226.5 226.0 225.5 225.0 224.5 224.0 223.5 223.0 222.5 222.0 221.5 221.0 220.5 220.0 219.5 219.0 218.5

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105

Horizontal Distance (m)

LEGEND

225.00 — Water Level

Interpreted Water Table

Well Screen

BH101-19 (59;76) — Borehole installed by Cambium (cartesian coordinates of the borehole)

MW101 (81;85.5) — Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)

Groundwater Sample meets Table 2RPI Site Condition Standard for VOCs and BTEX

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	Project No: 1800064BE

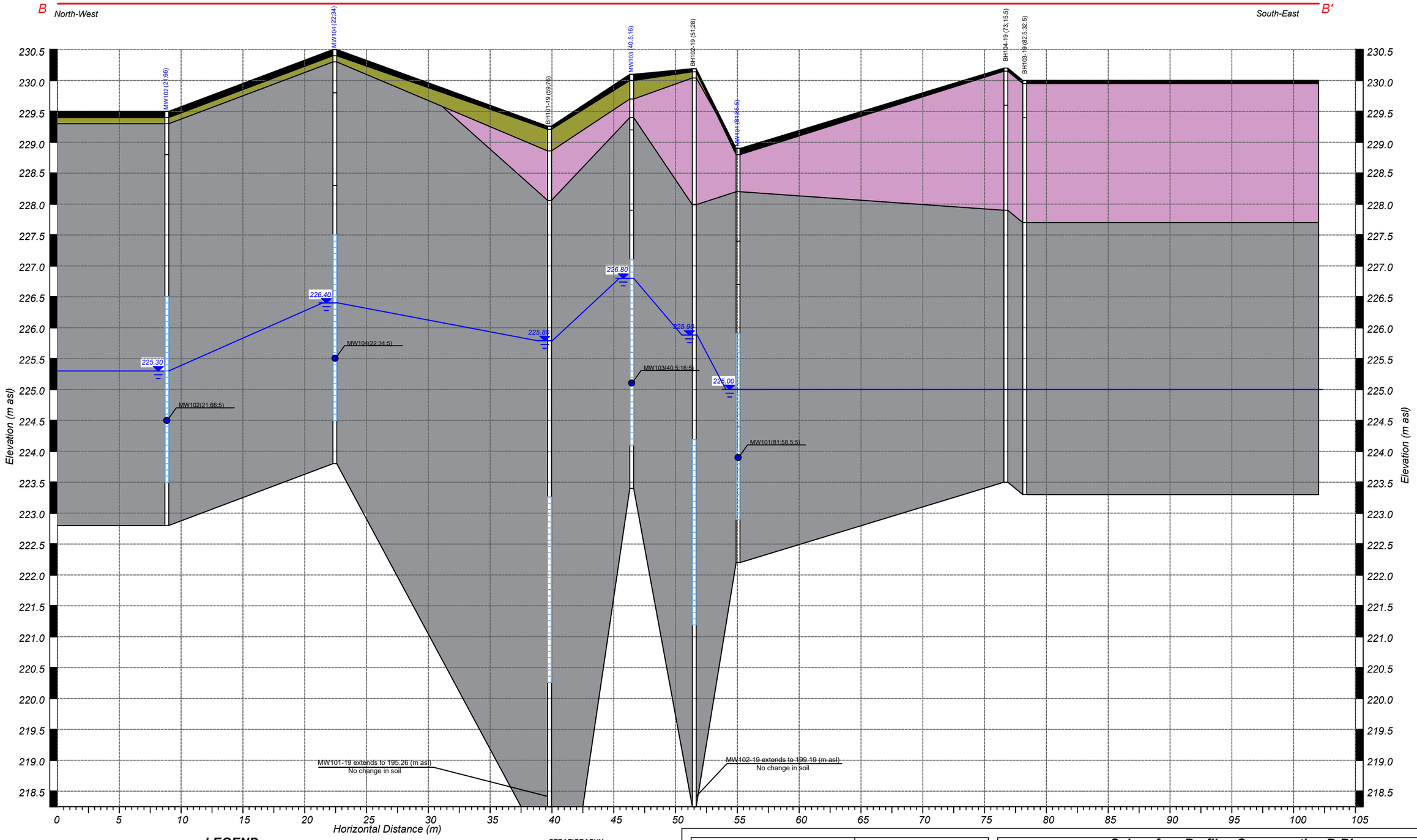
Title: Subsurface Profile - Cross-section B-B'
Groundwater VOCs and BTEX

Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 17B



LEGEND

Water Level	BH101-19 (59;76)	Borehole installed by Cambium (cartesian coordinates of the borehole)
Interpreted Water Table	MW101 (81;85.5)	Groundwater Monitoring Well installed by HLV2K (cartesian coordinates of the borehole)
Well Screen		Groundwater Sample meets Table 2RPI Site Condition Standard for PCBs

STRATIGRAPHY:

- Asphalt
- Fill: Silty Sand, Sand with trace of silt, brown, dark brown, black, with gravel and pieces of brick, trace asphalt fragments, some concrete, moist
- Fill: Sand, trace gravel, trace silt, brown,black to brown, moist
- Sand with trace of silt, Silty Sand, brown, grey, some oxidization, moist to wet

Drawn:	KP
Approved:	JL
HLV2K ENGINEERING LIMITED	**Project No:** 1800064BE

Title: Subsurface Profile - Cross-section B-B'
Groundwater PCBs

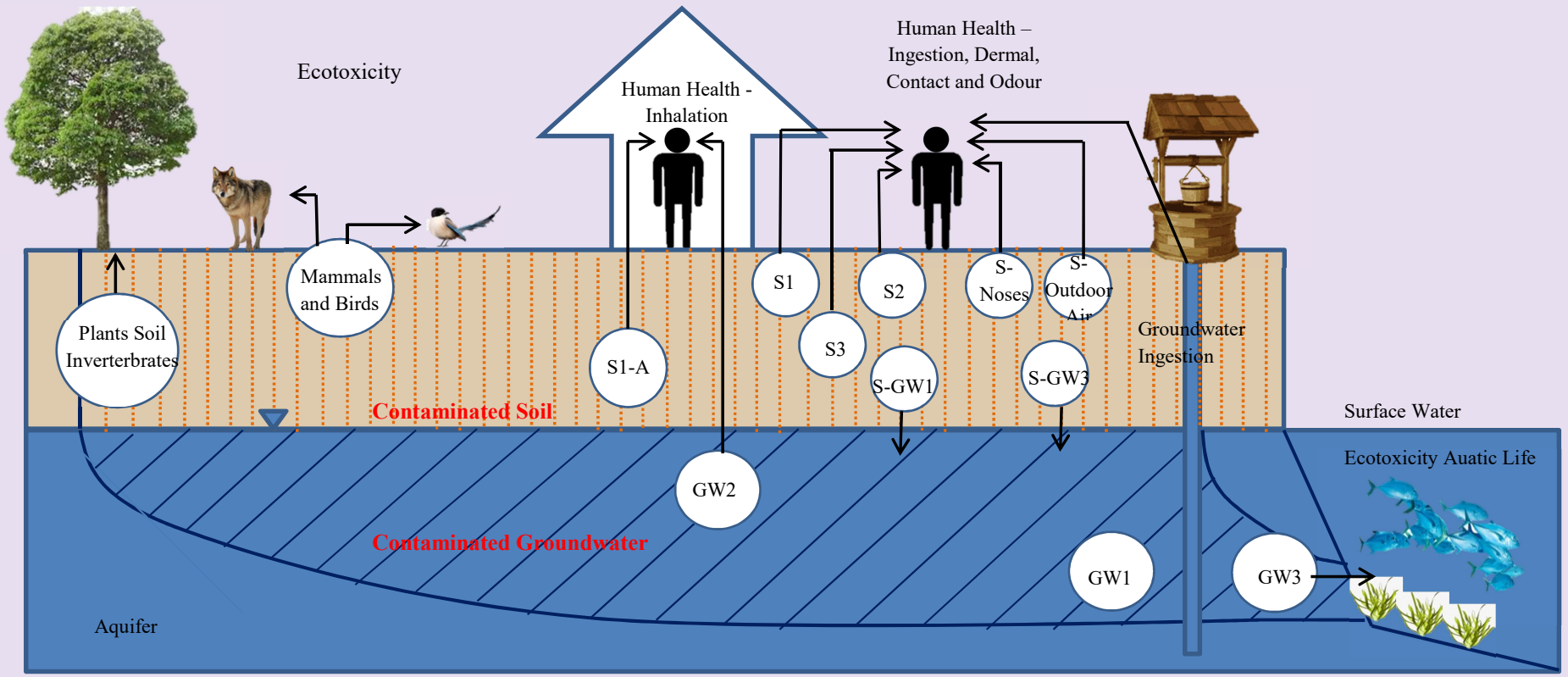
Project: Phase Two Environmental Assessment
272 Innisfil Street, Barrie, Ontario

Client: Typhon Group Ltd.

Date: Apr-21

Drawing No: 18B

Conceptual Model: Component Approach



Legend:

Soil

Groundwate

Contaminated Soil

Contaminated Groundwater

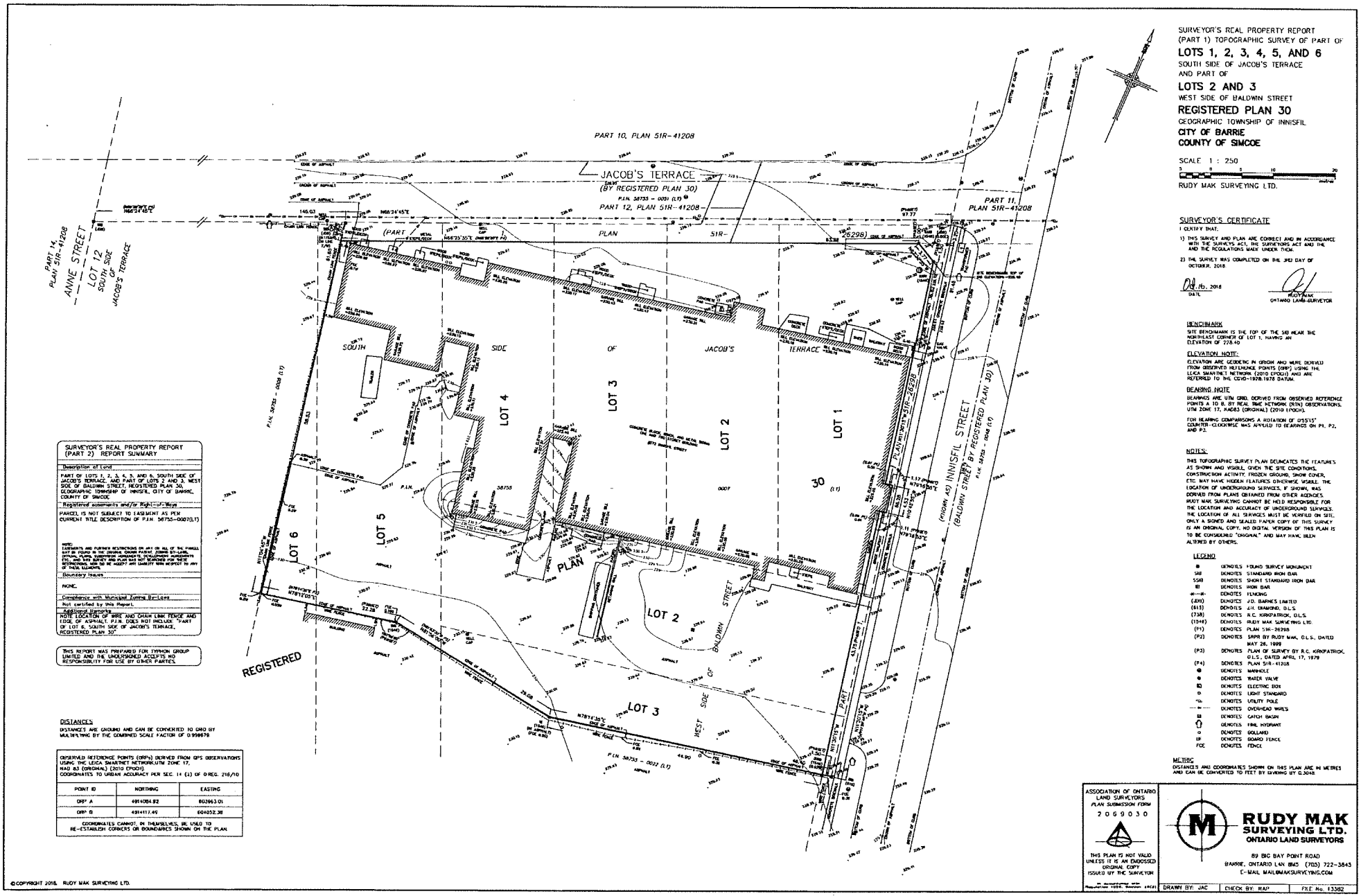
GW2 Component

Exposure Pathway

Appendix A: Legal Survey

Sampling and Analysis Plan

Area of Potential Environmental Concern[1]	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity[2]	Location of PCA (on-site or off-site)	Contaminants of Potential Concern[3]	Media Potentially Impacted (Groundwater, soil, and/or sediment)
APEC1	Northwest Corner	PCA#39: Paint Manufacturing, Processing and Bulk Storage	On Site	PHCs, VOCs, PCBs, PAHs, Metals, and Metal Hydrides, EC, SAR, pH, Cl, Na	Soil and Groundwater BH/MW102
APEC2	West side	PCA#10: Commercial Autobody Shops	Off Site	PHCs, VOCs, PCBs, PAHs, Metals, and Metal Hydrides, Na, Cl and pH	Groundwater BH/MW104
APEC3	South	PCA#28: Gasoline and Associated Products Storage in Fixed Tanks	Off site	PHCs, VOCs, PCBs, PAHs, Metals, and metal Hydrides EC, SAR, Na, Cl	Soil and Groundwater BH/MW103
APEC4	South	PCA#52: Storage, Maintenance, fuelling and repair of equipment, vehicles, and materials used to maintain transportation system	Off site	PHCs, VOCs, PCBs, PAHs, Metals, and Metal Hydrides, pH, Sodium and Chloride	Groundwater BH/MW103
APEC5	North east corner	PCA#55: Transformer Manufacturing, Processing, and Use	On Site	PHCs, VOCs, PCBs, PAHs, Metals, and metal hydrides, EC, SAR, Na and Cl.	Soil and Groundwater BH/MW101



SURVEYOR'S REAL PROPERTY REPORT
(PART 1) TOPOGRAPHIC SURVEY OF PART OF

LOTS 1, 2, 3, 4, 5, AND 6
SOUTH SIDE OF JACOB'S TERRACE
AND PART OF
LOTS 2 AND 3
WEST SIDE OF BALDWIN STREET
REGISTERED PLAN 30
GEOGRAPHIC TOWNSHIP OF INNISFIL
CITY OF BARRIE
COUNTY OF SIMCOE

SCALE 1 : 250
0 5 10 20 metres
RUDY MAK SURVEYING LTD.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1) THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE AND THE REGULATIONS MADE UNDER THEM.

2) THE SURVEY WAS COMPLETED ON THE 3RD DAY OF OCTOBER, 2018

04 Feb, 2018
DATE

RUDY MAK
ONTARIO LAND SURVEYOR

SURVEYOR'S REAL PROPERTY REPORT (PART 2) REPORT SUMMARY

Description of Land

PART OF LOTS 1, 2, 3, 4, 5, AND 6, SOUTH SIDE OF JACOB'S TERRACE AND PART OF LOTS 2 AND 3, WEST SIDE OF BALDWIN STREET, REGISTERED PLAN 30, GEOGRAPHIC TOWNSHIP OF INNISFIL, CITY OF BARRIE, COUNTY OF SIMCOE

Registered easements and/or Right-of-Ways

PARCEL IS NOT SUBJECT TO EASEMENT AS PER CURRENT TITLE DESCRIPTION OF P.I.N. 58755-0007(LT)

NOTE: EASEMENTS AND FURTHER RESTRICTIONS ON ANY OR ALL OF THE PARCEL MAY BE FOUND IN THE ZONING ORDER PARENT, ZONING BY-LAW, OFFICIAL PLANS, SUBDIVISION AGREEMENTS TO DEVELOPMENT AGREEMENTS ETC. AND THIS SURVEY AND PLAN WAS NOT SEARCHED FOR SUCH. THEREFORE THE SURVEYOR DOES NOT ACCEPT ANY LIABILITY WITH RESPECT TO ANY OF THESE MATTERS.

Boundary Issues

NONE.

Compliance with Municipal Zoning By-Laws

Not certified by this Report.

Additional Remarks

NOTE LOCATION OF WIRE AND CHAIN LINK FENCE AND EDGE OF ASPHALT. P.I.N. DOES NOT INCLUDE "PART OF LOT 6, SOUTH SIDE OF JACOB'S TERRACE, REGISTERED PLAN 30"

THIS REPORT WAS PREPARED FOR TYMMON GROUP LIMITED AND RUDY MAK SURVEYING LTD. ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

DISTANCES

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999879

OBSERVED REFERENCE POINTS (ORPs) DERIVED FROM GPS OBSERVATIONS USING THE LEICA SMARTNET NETWORK,UTM ZONE 17, NAD 83 (ORIGINAL) (2010 EPOCH)
COORDINATES TO URBAN ACCURACY PER SEC. 14 (2) OF O.REG. 216/10

POINT ID	NORTHING	EASTING
ORP A	4914084.82	603963.01
ORP B	4914117.49	604052.38

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THE PLAN.

LEGEND

●	DENOTES FOUND SURVEY MONUMENT
SIB	DENOTES STANDARD IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
IB	DENOTES IRON BAR
-x-x-	DENOTES FENCING
(JBL)	DENOTES J.D. BARNES LIMITED
(JLD)	DENOTES J.H. DRAWING, O.L.S.
(RJK)	DENOTES R.J.C. KIRKPATRICK, O.L.S.
(RMS)	DENOTES RUDY MAK SURVEYING LTD.
(P1)	DENOTES PLAN 51R-26298
(P2)	DENOTES SRPR BY RUDY MAK, O.L.S., DATED MAY 26, 1999
(P3)	DENOTES PLAN OF SURVEY BY R.C. KIRKPATRICK, O.L.S., DATED APRIL 17, 1979
(P4)	DENOTES PLAN 51R-41208
⊕	DENOTES MANHOLE
⊗	DENOTES WATER VALVE
EB	DENOTES ELECTRIC BOX
☼	DENOTES LIGHT STANDARD
⊸	DENOTES UTILITY POLE
-o-	DENOTES OVERHEAD WIRES
CB	DENOTES CATCH BASIN
	DENOTES FIRE HYDRANT
o	DENOTES BOLLARD
BF	DENOTES BOARD FENCE
FCE	DENOTES FENCE

METRIC

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
20690030

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR

RUDY MAK SURVEYING LTD.
ONTARIO LAND SURVEYORS
89 BIG BAY POINT ROAD
BARRIE, ONTARIO L4N 8M5 (705) 722-3645
E-MAIL MAIL@MAKSURVEYING.COM

DRAWN BY: JAC | CHECK BY: RAP | FILE No. 13382

Appendix B:
Sampling and Analysis Plan

Sampling and Analysis Plan

APEC	Monitoring Wells	Sampling Frequency	Parameters	Rational
APEC 1	**MW102**	1-GW	PHC F2 to F4	Paint stripping operation onsite and Autobody shop west of the Phase II Property offsite
		1-GW	VOC F1	
		1-GW	PAH	
		1-GW	M & I	
		1-GW	PCB	
		1-S	PHC F2 to F4	
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	PCB	
APEC 2	**MW104**	1-GW	PHC F2 to F4	Industrial shops including sign making shop and autobody shop
		1-GW	VOC F1	
		1-GW	PAH	
		1-GW	M & I	
		1-GW	PCB	
		1-S	PHC F2 to F4	
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	PCB	
APEC 3	**MW103**	1-GW	PHC F2 to F4	Garage for the maintenance of transportation devices. History of fuel tanks off site.
		1-GW	VOC F1	
		1-GW	PAH	
		1-GW	M & I	
		1-GW	PCB	
		1-S	PHC F2 to F4	
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	PCB	
APEC 4	**MW103**	1-GW	PHC F2 to F4	Former Underground Storage Tank (UST) located along south boundary of the Phase II Property Offsite.
		1-GW	VOC F1	
		1-GW	PAH	
		1-GW	M & I	
		1-GW	PCB	
		1-S	PHC F2 to F4	
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	PCB	
APEC 5	**MW101**	1-GW	PHC F2 to F4	History of transformers on
		1-GW	VOC F1	

APEC	Monitoring Wells	Sampling Frequency	Parameters	Rational
		1-GW	PAH	Phase II Property, and potential for offsite migration of PCBs from the current onsite building.
		1-GW	M & I	
		1-GW	PCB	
		1-S	PHC F2 to F4	
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	PCB	

Notes:

S - Soil media
GW - Ground water media
PHC - Petroleum Hydrocarbons F1 to F4 Fractions
PAH - Polycyclic Aromatic Hydrocarbons
M&I - Metals and Inorganics
PCB - Poly Chlorinated Biphenyls
VOC - Volatile Organic Compounds

Monitoring wells were installed at an approximate depth of 4.5 m below ground surface (bgs) in an attempt to intercept the shallow water table, and to meet the requirements of O. Reg. 903 requiring minimum bentonite seal of 1.5 m bgs.

Appendix C:
Borehole Logs

HLV2K ENGINEERING LIMITED

LOG OF BOREHOLE MW101

PROJECT:

CLIENT: The Typhon Group

PROJECT LOCATION: 272 Innisfil Street, Barrie

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Soild Stem Auger

Diameter: 0.15m

Date: Aug-01-2018

PROJECT NO.: 1800064AE

DRAWING NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors PID (ppm)	Soil Head Space Vapors CGD (% LEL)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (W_P w W_L) WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
228.9								2 4 6 8	2 4 6 8	10 20 30			
228.8 / 0.1	**Asphalt:** 100mm												
	Fill: silty sand to sand, black to brown, moist		1	SS	6								
228.2													
0.7	**Sand:** brown, moist, loose		2	SS	3		228						
227.4													
1.5	**Silty Sand to Sandy Silt:** some clay, brown, moist, loose		3	SS	4		227						
226.7													
2.2	**Silty Sand to Sandy Silt:** brown, very moist		4	SS	7		226						
			5	SS	14								
224.4							225						
4.5	**Silty Sand to Sandy Silt:** brown to grey, very moist		6	SS	14		224						
			7	SS	10		223						
222.2													
228.2 / 6.7	**End of Borehole:** Borehole terminated at 6.71 m.												

W. L. 225.0 m
Aug 10, 2018

Notes:
i) 50mm monitoring well installed at completion.
ii) Water Level at Completion-3.96m
iii) Water Level after 2 weeks-3.67m (July 5, 2018)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

HLV2K ENGINEERING LIMITED

LOG OF BOREHOLE MW102

PROJECT:

CLIENT: The Typhon Group

PROJECT LOCATION: 272 Innisfil Street, Barrie

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Soild Stem Auger

Diameter: 0.15m

Date: Jun-26-2018

PROJECT NO.: 1800064AE

DRAWING NO.: 5

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors: PID (ppm)	CGD (% LEL)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (W_P, W, W_L) WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
229.5													
229.4 / 0.0	**Asphalt:** 100mm												
229.3 / 0.1	**Fill:** silty sand, some gravel, pieces of brick, black, moist		1	SS	7		229						
0.2	**Sand:** brown, moist, loose												
228.8													
0.7	**Silty Sand to Sandy Silt:** dark to light brown, oxidized, moist		2	SS	5								
1													
			3	SS	5		228						
2													
			4	SS	10		227						
226.5													
3.0	**Silty Sand to Sandy Silt:** brown to grey, very moist		5	SS	11		226						
225.7													
3.8	**Silty Sand to Sandy Silt:** grey, wet, some oxidization		6	SS	16								
4							W. L. 225.3 m Aug 10, 2018						
			7	SS	16		225						
5													
			8	SS	16		224						
6													
			9	SS	27		223						
222.8													
222.8 / 6.7	**End of Borehole:** Borehole terminated at 6.71 m.												

Notes:
i) 50mm monitoring well installed at completion.
ii) Water Level at Completion-3.96m
iii) Water Level after 2 weeks-3.67m (July 5, 2018)

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity; ○ =3% Strain at Failure

HLV2K ENGINEERING LIMITED

LOG OF BOREHOLE MW103

PROJECT:

CLIENT: The Typhon Group

PROJECT LOCATION: 272 Innisfil Street, Barrie

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Soild Stem Auger

Diameter: 0.15m

Date: Jun-26-2018

PROJECT NO.: 1800064AE

DRAWING NO.: 1

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors PID (ppm)	CGD (% LEL)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT; WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
230.1													
230.0 / 0.0	**Asphalt:** 100mm												
0.1 / 229.7	**Fill:** silty sand, brown, moist		1	SS	4		230						
0.4 / 229.4	**Fill:** sand, black, moist												
0.7 / 229.2	**Silty Sand:** silty sand, black, pieces of gravel, moist		2	SS	3								
1 0.9	**Silty Sand:** silty sand to sandy silt, brown, moist, some rootlets, some oxidization						229						
			3	SS	3								
2 227.9													
2.2	**Silty Sand:** silty sand to sandy silt, brown, moist		4	SS	3		228						
3			5	SS	10	W. L. 226.8 m Aug 10, 2018	227						
226.3													
3.8	**Silty Sand:** silty sand to sandy silt, greyish, very moist, some oxdization		6	SS	10		226						
4													
5			7	SS	16		225						
6			8	SS	21								
223.4							224						
226.4 / 6.7	**End of Borehole:** Borehole terminated at 6.71 m.												
	Notes: i) 50mm monitoring well installed at completion. ii) Water Level at Completion-3.96m iii) Water Level after 2 weeks-3.67m (July 5, 2018)												

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

HLV2K ENGINEERING LIMITED

LOG OF BOREHOLE MW104

PROJECT:

CLIENT: The Typhon Group

PROJECT LOCATION: 272 Innisfil Street, Barrie

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Soild Stem Auger

Diameter: 0.15m

Date: Jun-26-2018

PROJECT NO.: 1800064AE

DRAWING NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors PID (ppm)	CGD (% LEL)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (w_P w w_L) WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
230.5 / 0.0	**Asphalt:** 100mm												
230.4 / 0.1	**Fill:** silty sand, some gravel, some concrete		1	SS	6		230						
230.3 / 0.2	**Silty Sand:** brown, moist												
229.8 / 0.7	**Silty Sand to Sandy Silt:** brown, some gravel, moist, some oxidization		2	SS	4		229						
1			3	SS	4								
228.3 / 2.2	**Silty Sand to Sandy Silt:** brown to greyish, moist to wet		4	SS	6		228						
3			5	SS	10		227						
4			6	SS	16	W. L. 226.4 m Aug 10, 2018	226						
5			7	SS	12								
225.2 / 5.3	**Silty Sand to Sandy Silt:** greyish, moist, oxidized		8	SS	22		225						
6			9	SS	23		224						
223.8 / 6.7	**End of Borehole:** Borehole terminated at 6.71 m.												

Notes:
i) 50mm monitoring well installed at completion.
ii) Water Level at Completion-3.96m
iii) Water Level after 2 weeks-3.67m (July 5, 2018)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Appendix D:
Certificate of Laboratory Analysis

HLV2K Engineering Limited (Brampton)
ATTN: John Lametti
2179 Dunwin Drive
Unit 4
Mississauga ON L5L 1X2

Date Received: 03-AUG-18
Report Date: 16-AUG-18 13:24 (MT)
Version: FINAL

Client Phone: 437-370-0317

Certificate of Analysis

Lab Work Order #: L2141637

Project P.O. #: NOT SUBMITTED
Job Reference: 1800064AE
C of C Numbers: 17-630438
Legal Site Desc:

Comments: ADDITIONAL 15-AUG-18 12:50

Amanda Fazekas
Account Manager

HLV2K Engineering Limited (Brampton)
ATTN: John Lametti
2179 Dunwin Drive
Unit 4
Mississauga ON L5L 1X2

Date Received: 10-AUG-18
Report Date: 15-AUG-18 14:43 (MT)
Version: FINAL

Client Phone: 437-370-0317

Certificate of Analysis

Lab Work Order #: L2145026

Project P.O. #: NOT SUBMITTED
Job Reference: 1800064AE
C of C Numbers: 17-630421
Legal Site Desc:

Amanda Fazekas
Account Manager

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Guideline						
Ontario Regulation 153/04 - April 15, 2011 Standards - T2-Ground Water (Coarse Soil)-All Types of Property Use						
(No parameter exceedances)						
Ontario Regulation 153/04 - April 15, 2011 Standards - T2-Ground Water (Fine Soil)-All Types of Property Use						
(No parameter exceedances)						

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Physical Tests - WATER

		Guide Limits						
				Lab ID	L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5
				Sample Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
				Sample ID	MW101	MW102	MW103	MW104	DUPLICATE 1
Analyte	Unit	#1	#2						
Conductivity	mS/cm	-	-		1.08	0.950	1.68	2.12	1.01
pH	pH units	-	-		7.74	7.73	7.34	7.56	7.85

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Anions and Nutrients - WATER

		Guide Limits									
				Lab ID	L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5
				Sample Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
				Sample ID	MW101	MW102	MW103	MW104	DUPLICATE 1
Analyte	Unit	#1	#2						
Chloride (Cl)	mg/L	790	790		169	117	368 DLHC	513 DLHC	125 DLHC

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Cyanides - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	Sample Date	Sample ID			
				L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5
				10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
				MW101	MW102	MW103	MW104	DUPLICATE 1
Cyanide, Weak Acid Diss	ug/L	66	66	<2.0	<2.0	<2.0	<2.0	<2.0

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Dissolved Metals - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5
				Sample Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
				Sample ID	MW101	MW102	MW103	MW104	DUPLICATE 1
Dissolved Mercury Filtration Location		-	-		FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location		-	-		FIELD	FIELD	FIELD	FIELD	FIELD
Antimony (Sb)-Dissolved	ug/L	6	6		<0.10	<0.10	0.11	0.29	0.11
Arsenic (As)-Dissolved	ug/L	25	25		<0.10	0.18	0.13	0.18	0.12
Barium (Ba)-Dissolved	ug/L	1000	1000		45.2	44.2	85.0	63.8	25.5
Beryllium (Be)-Dissolved	ug/L	4	4		<0.10	<0.10	<0.10	<0.10	<0.10
Boron (B)-Dissolved	ug/L	5000	5000		66	20	87	27	19
Cadmium (Cd)-Dissolved	ug/L	2.7	2.7		<0.010	<0.010	<0.010	0.010	<0.010
Chromium (Cr)-Dissolved	ug/L	50	50		0.54	0.72	0.55	0.74	<0.50
Cobalt (Co)-Dissolved	ug/L	3.8	3.8		0.11	<0.10	0.45	0.19	<0.10
Copper (Cu)-Dissolved	ug/L	87	87		0.80	0.73	2.34	2.56	0.51
Lead (Pb)-Dissolved	ug/L	10	10		<0.050	<0.050	<0.050	<0.050	<0.050
Mercury (Hg)-Dissolved	ug/L	0.29	1		<0.010	<0.010	<0.010	<0.010	<0.010
Molybdenum (Mo)-Dissolved	ug/L	70	70		0.571	0.748	0.912	0.653	0.621
Nickel (Ni)-Dissolved	ug/L	100	100		<0.50	<0.50	1.32	1.02	<0.50
Selenium (Se)-Dissolved	ug/L	10	10		2.32	2.43	1.36	2.04	2.08
Silver (Ag)-Dissolved	ug/L	1.5	1.5		<0.050	<0.050	<0.050	<0.050	<0.050
Sodium (Na)-Dissolved	ug/L	490000	490000		93500	87200	139000 DLHC	237000 DLHC	49000
Thallium (Tl)-Dissolved	ug/L	2	2		<0.010	<0.010	0.016	<0.010	<0.010
Uranium (U)-Dissolved	ug/L	20	20		0.441	0.399	0.440	0.568	0.385
Vanadium (V)-Dissolved	ug/L	6.2	6.2		<0.50	<0.50	<0.50	<0.50	<0.50
Zinc (Zn)-Dissolved	ug/L	1100	1100		<1.0	<1.0	11.4	5.8	<1.0

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Speciated Metals - WATER

		Guide Limits						
				Lab ID	L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5
				Sample Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
				Sample ID	MW101	MW102	MW103	MW104	DUPLICATE 1
Analyte	Unit	#1	#2						
Chromium, Hexavalent	ug/L	25	25		0.78	0.86	0.60	0.79	0.80

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Volatile Organic Compounds - WATER

				Lab ID	L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5	L2145026-6
				Sample Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
				Sample ID	MW101	MW102	MW103	MW104	DUPLICATE 1	TRIP BLANK
		Guide Limits								
Analyte	Unit	#1	#2							
Acetone	ug/L	2700	2700	<30	<30	<30	<30	<30	<30
Benzene	ug/L	5	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	ug/L	16	16	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bromoform	ug/L	25	25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	ug/L	0.89	0.89	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	ug/L	0.79	5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chlorobenzene	ug/L	30	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromochloromethane	ug/L	25	25	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Chloroform	ug/L	2.4	22	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dibromoethane	ug/L	0.2	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	ug/L	3	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	ug/L	59	59	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	ug/L	1	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	ug/L	590	590	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1-Dichloroethane	ug/L	5	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	ug/L	1.6	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/L	1.6	14	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethylene	ug/L	1.6	17	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	ug/L	1.6	17	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	ug/L	50	50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	ug/L	5	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	ug/L	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	ug/L	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,3-Dichloropropene (cis & trans)	ug/L	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	ug/L	2.4	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
n-Hexane	ug/L	51	520	<0.50	<0.50	<0.50	<0.50	<0.55 RRR	<0.50
Methyl Ethyl Ketone	ug/L	1800	1800	<20	<20	<20	<20	<20	<20
Methyl Isobutyl Ketone	ug/L	640	640	<20	<20	<20	<20	<20	<20
MTBE	ug/L	15	15	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Styrene	ug/L	5.4	5.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Volatile Organic Compounds - WATER

				Lab ID	L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5	L2145026-6
				Sample Date	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
				Sample ID	MW101	MW102	MW103	MW104	DUPLICATE 1	TRIP BLANK
Analyte	Unit	Guide Limits #1	#2							
1,1,1,2-Tetrachloroethane	ug/L	1.1	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	ug/L	1	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethylene	ug/L	1.6	17	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	ug/L	24	24	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	ug/L	200	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/L	4.7	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	ug/L	1.6	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	ug/L	150	150	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl chloride	ug/L	0.5	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	ug/L	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
m+p-Xylenes	ug/L	-	-	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Xylenes (Total)	ug/L	300	300	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Surrogate: 4-Bromofluorobenzene	%	-	-	99.4	98.7	100.0	97.5	99.9	97.8
Surrogate: 1,4-Difluorobenzene	%	-	-	100.8	100.7	101.0	100.9	100.9	100.0

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Hydrocarbons - WATER

		Guide Limits						
Lab ID				L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5
Sample Date				10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sample ID				MW101	MW102	MW103	MW104	DUPLICATE 1
Analyte	**Unit**	**#1**	**#2**					
F1 (C6-C10)	ug/L	750	750	<25	<25	<25	<25	<25
F1-BTEX	ug/L	750	750	<25	<25	<25	<25	<25
F2 (C10-C16)	ug/L	150	150	<100	<100	<100	<100	<100
F2-Naphth	ug/L	-	-	<100	<100	<100	<100	<100
F3 (C16-C34)	ug/L	500	500	<250	<250	<250	<250	<250
F3-PAH	ug/L	-	-	<250	<250	<250	<250	<250
F4 (C34-C50)	ug/L	500	500	<250	<250	<250	<250	<250
Total Hydrocarbons (C6-C50)	ug/L	-	-	<370	<370	<370	<370	<370
Chrom. to baseline at nC50		-	-	YES	YES	YES	YES	YES
Surrogate: 2-Bromobenzotrifluoride	%	-	-	90.6	93.6	88.3	91.0	86.1
Surrogate: 3,4-Dichlorotoluene	%	-	-	89.5	87.5	93.6	84.2	89.1

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Polycyclic Aromatic Hydrocarbons - WATER

		Guide Limits						
Lab ID				L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5
Sample Date				10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sample ID				MW101	MW102	MW103	MW104	DUPLICATE 1
Analyte	**Unit**	**#1**	**#2**					
Acenaphthene	ug/L	4.1	4.1	<0.020	<0.020	<0.020	<0.020	<0.020
Acenaphthylene	ug/L	1	1	<0.020	<0.020	<0.020	<0.020	<0.020
Anthracene	ug/L	2.4	2.4	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(a)anthracene	ug/L	1	1	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(a)pyrene	ug/L	0.01	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L	0.1	0.1	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	ug/L	0.2	0.2	<0.020	<0.020	<0.020	<0.020	<0.020
Benzo(k)fluoranthene	ug/L	0.1	0.1	<0.020	<0.020	<0.020	<0.020	<0.020
Chrysene	ug/L	0.1	0.1	<0.020	<0.020	<0.020	<0.020	<0.020
Dibenzo(ah)anthracene	ug/L	0.2	0.2	<0.020	<0.020	<0.020	<0.020	<0.020
Fluoranthene	ug/L	0.41	0.41	<0.020	<0.020	<0.020	<0.020	<0.020
Fluorene	ug/L	120	120	<0.020	<0.020	<0.020	<0.020	<0.020
Indeno(1,2,3-cd)pyrene	ug/L	0.2	0.2	<0.020	<0.020	<0.020	<0.020	<0.020
1+2-Methylnaphthalenes	ug/L	3.2	3.2	<0.028	<0.028	<0.028	<0.028	<0.028
1-Methylnaphthalene	ug/L	3.2	3.2	<0.020	<0.020	<0.020	<0.020	<0.020
2-Methylnaphthalene	ug/L	3.2	3.2	<0.020	<0.020	<0.020	<0.020	<0.020
Naphthalene	ug/L	11	11	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene	ug/L	1	1	<0.020	<0.020	<0.020	<0.020	<0.020
Pyrene	ug/L	4.1	4.1	<0.020	<0.020	<0.020	<0.020	<0.020
Surrogate: d10-Acenaphthene	%	-	-	105.9	95.8	96.5	98.5	96.4
Surrogate: d12-Chrysene	%	-	-	127.6	123.5	144.7 SURR-ND	121.0	120.5
Surrogate: d8-Naphthalene	%	-	-	91.7	85.7	82.3	100.9	100.9
Surrogate: d10-Phenanthrene	%	-	-	91.9	94.2	104.4	88.8	91.4

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Polychlorinated Biphenyls - WATER

		Guide Limits						
Lab ID				L2145026-1	L2145026-2	L2145026-3	L2145026-4	L2145026-5
Sample Date				10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18	10-AUG-18
Sample ID				MW101	MW102	MW103	MW104	DUPLICATE 1
Analyte	**Unit**	**#1**	**#2**					
Aroclor 1242	ug/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020
Aroclor 1248	ug/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020
Aroclor 1254	ug/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020
Aroclor 1260	ug/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020
Total PCBs	ug/L	3	3	<0.040	<0.040	<0.040	<0.040	<0.040
Surrogate: 2-fluorobiphenyl	%	-	-	64.3	65.7	58.0		

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments
L2145026-5	Water	Note: RL raised due to instrument sensitivity.	

Qualifiers for Individual Parameters Listed:

Qualifier	Description
SURR-ND	Surrogate recovery marginally exceeded ALS DQO. Reported non-detect results for associated samples were deemed to be unaffected.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
RRR	Refer to Report Remarks for issues regarding this analysis

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Water	Cyanide (WAD)-O.Reg 153/04	APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-R511-WT	Water	Conductivity-O.Reg 153/04 (July 2011)	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-D-UG/L-CVAA-WT	Water	Diss. Mercury in Water by CVAAS (ug/L)	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270
PAH-511-WT	Water	PAH-O. Reg 153/04 (July 2011)	SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT	Water	PCB-O. Reg 153/04 (July 2011)	SW846 3510/8082

Aqueous samples are extracted, then concentrated, reconstituted, and analyzed by GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days			
VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260
Liquid samples are analyzed by headspace GC/MSD.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).			
XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION
Total xylenes represents the sum of o-xylene and m&p-xylene.			

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

17-630421

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2145026 Report Date: 15-AUG-18

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2

Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-WT	**Water**							
Batch R4169988								
WG2848880-14 DUP		**WG2848880-13**						
Chloride (Cl)		45.3	45.4		mg/L	0.1	20	14-AUG-18
WG2848880-9 DUP		**WG2848880-8**						
Chloride (Cl)		66.0	65.7		mg/L	0.3	20	14-AUG-18
WG2848880-12 LCS								
Chloride (Cl)			100.0		%		90-110	14-AUG-18
WG2848880-7 LCS								
Chloride (Cl)			100.1		%		90-110	14-AUG-18
WG2848880-11 MB								
Chloride (Cl)			<0.50		mg/L		0.5	14-AUG-18
WG2848880-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	14-AUG-18
WG2848880-10 MS		**WG2848880-8**						
Chloride (Cl)			107.3		%		75-125	14-AUG-18
WG2848880-15 MS		**WG2848880-13**						
Chloride (Cl)			100.8		%		75-125	14-AUG-18
CN-WAD-R511-WT	**Water**							
Batch R4168800								
WG2848698-3 DUP		**L2145026-1**						
Cyanide, Weak Acid Diss		<2.0	<2.0	RPD-NA	ug/L	N/A	20	14-AUG-18
WG2848698-2 LCS								
Cyanide, Weak Acid Diss			104.0		%		80-120	14-AUG-18
WG2848698-1 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	14-AUG-18
WG2848698-4 MS		**L2145026-1**						
Cyanide, Weak Acid Diss			101.9		%		75-125	14-AUG-18
CR-CR6-IC-R511-WT	**Water**							
Batch R4168892								
WG2847821-4 DUP		**WG2847821-3**						
Chromium, Hexavalent		0.78	0.71		ug/L	9.4	20	13-AUG-18
WG2847821-2 LCS								
Chromium, Hexavalent			100.7		%		80-120	13-AUG-18
WG2847821-1 MB								
Chromium, Hexavalent			<0.50		ug/L		0.5	13-AUG-18
WG2847821-5 MS		**WG2847821-3**						
Chromium, Hexavalent			96.6		%		70-130	13-AUG-18
EC-R511-WT	**Water**							

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-R511-WT	**Water**							
Batch R4165327								
WG2846723-8 DUP		**WG2846723-7**						
Conductivity		1.58	1.57		mS/cm	0.5	10	11-AUG-18
WG2846723-10 LCS								
Conductivity			97.1		%		90-110	11-AUG-18
WG2846723-6 LCS								
Conductivity			97.0		%		90-110	11-AUG-18
WG2846723-5 MB								
Conductivity			<0.0030		mS/cm		0.003	11-AUG-18
WG2846723-9 MB								
Conductivity			<0.0030		mS/cm		0.003	11-AUG-18
F1-HS-511-WT	**Water**							
Batch R4168470								
WG2843221-4 DUP		**WG2843221-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	14-AUG-18
WG2843221-1 LCS								
F1 (C6-C10)			100.6		%		80-120	14-AUG-18
WG2843221-2 MB								
F1 (C6-C10)			<25		ug/L		25	14-AUG-18
Surrogate: 3,4-Dichlorotoluene			89.4		%		60-140	14-AUG-18
WG2843221-5 MS		**WG2843221-3**						
F1 (C6-C10)			100.7		%		60-140	14-AUG-18
F2-F4-511-WT	**Water**							
Batch R4168284								
WG2847332-2 LCS								
F2 (C10-C16)			98.3		%		70-130	13-AUG-18
F3 (C16-C34)			104.0		%		70-130	13-AUG-18
F4 (C34-C50)			108.3		%		70-130	13-AUG-18
WG2847332-1 MB								
F2 (C10-C16)			<100		ug/L		100	13-AUG-18
F3 (C16-C34)			<250		ug/L		250	13-AUG-18
F4 (C34-C50)			<250		ug/L		250	13-AUG-18
Surrogate: 2-Bromobenzotrifluoride			97.9		%		60-140	13-AUG-18
HG-D-UG/L-CVAA-WT	**Water**							
Batch R4164409								
WG2846727-3 DUP		**L2145026-1**						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	11-AUG-18
WG2846727-2 LCS								

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-UG/L-CVAA-WT	**Water**							
Batch R4164409								
WG2846727-2 LCS								
Mercury (Hg)-Dissolved			99.3		%		80-120	11-AUG-18
WG2846727-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	11-AUG-18
WG2846727-4 MS		**L2145026-2**						
Mercury (Hg)-Dissolved			99.3		%		70-130	11-AUG-18
MET-D-UG/L-MS-WT	**Water**							
Batch R4166670								
WG2846820-4 DUP		**WG2846820-3**						
Antimony (Sb)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	11-AUG-18
Arsenic (As)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	11-AUG-18
Barium (Ba)-Dissolved		20.6	20.3		ug/L	1.7	20	11-AUG-18
Beryllium (Be)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	11-AUG-18
Boron (B)-Dissolved		<100	<100	RPD-NA	ug/L	N/A	20	11-AUG-18
Cadmium (Cd)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	11-AUG-18
Chromium (Cr)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	11-AUG-18
Cobalt (Co)-Dissolved		4.7	4.7		ug/L	0.1	20	11-AUG-18
Copper (Cu)-Dissolved		32.3	33.1		ug/L	2.2	20	11-AUG-18
Lead (Pb)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	11-AUG-18
Molybdenum (Mo)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	11-AUG-18
Nickel (Ni)-Dissolved		6.0	6.0		ug/L	0.6	20	11-AUG-18
Selenium (Se)-Dissolved		8.59	8.14		ug/L	5.4	20	11-AUG-18
Silver (Ag)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	11-AUG-18
Sodium (Na)-Dissolved		4740	4840		ug/L	1.9	20	11-AUG-18
Thallium (Tl)-Dissolved		0.16	0.18		ug/L	8.7	20	11-AUG-18
Uranium (U)-Dissolved		0.36	0.38		ug/L	5.9	20	11-AUG-18
Vanadium (V)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	11-AUG-18
Zinc (Zn)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	11-AUG-18
WG2846820-2 LCS								
Antimony (Sb)-Dissolved			95.0		%		80-120	11-AUG-18
Arsenic (As)-Dissolved			101.5		%		80-120	11-AUG-18
Barium (Ba)-Dissolved			102.7		%		80-120	11-AUG-18
Beryllium (Be)-Dissolved			103.1		%		80-120	11-AUG-18
Boron (B)-Dissolved			98.7		%		80-120	11-AUG-18
Cadmium (Cd)-Dissolved			102.5		%		80-120	11-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4166670								
WG2846820-2 LCS								
Chromium (Cr)-Dissolved			101.3		%		80-120	11-AUG-18
Cobalt (Co)-Dissolved			101.7		%		80-120	11-AUG-18
Copper (Cu)-Dissolved			102.1		%		80-120	11-AUG-18
Lead (Pb)-Dissolved			105.9		%		80-120	11-AUG-18
Molybdenum (Mo)-Dissolved			102.9		%		80-120	11-AUG-18
Nickel (Ni)-Dissolved			101.6		%		80-120	11-AUG-18
Selenium (Se)-Dissolved			100.6		%		80-120	11-AUG-18
Silver (Ag)-Dissolved			101.8		%		80-120	11-AUG-18
Sodium (Na)-Dissolved			103.9		%		80-120	11-AUG-18
Thallium (Tl)-Dissolved			106.8		%		80-120	11-AUG-18
Uranium (U)-Dissolved			107.5		%		80-120	11-AUG-18
Vanadium (V)-Dissolved			103.3		%		80-120	11-AUG-18
Zinc (Zn)-Dissolved			97.2		%		80-120	11-AUG-18
WG2846820-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	11-AUG-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	11-AUG-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	11-AUG-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	11-AUG-18
Boron (B)-Dissolved			<10		ug/L		10	11-AUG-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	11-AUG-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	11-AUG-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	11-AUG-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	11-AUG-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	11-AUG-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	11-AUG-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	11-AUG-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	11-AUG-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	11-AUG-18
Sodium (Na)-Dissolved			<50		ug/L		50	11-AUG-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	11-AUG-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	11-AUG-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	11-AUG-18
Zinc (Zn)-Dissolved			<1.0		ug/L		1	11-AUG-18
WG2846820-5 MS		**WG2846820-3**						

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4166670								
WG2846820-5 MS		**WG2846820-3**						
Antimony (Sb)-Dissolved			88.7		%		70-130	11-AUG-18
Arsenic (As)-Dissolved			93.4		%		70-130	11-AUG-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	11-AUG-18
Beryllium (Be)-Dissolved			90.3		%		70-130	11-AUG-18
Boron (B)-Dissolved			N/A	MS-B	%		-	11-AUG-18
Cadmium (Cd)-Dissolved			92.6		%		70-130	11-AUG-18
Chromium (Cr)-Dissolved			88.6		%		70-130	11-AUG-18
Copper (Cu)-Dissolved			N/A	MS-B	%		-	11-AUG-18
Lead (Pb)-Dissolved			93.0		%		70-130	11-AUG-18
Molybdenum (Mo)-Dissolved			98.3		%		70-130	11-AUG-18
Selenium (Se)-Dissolved			78.3		%		70-130	11-AUG-18
Silver (Ag)-Dissolved			92.2		%		70-130	11-AUG-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	11-AUG-18
Thallium (Tl)-Dissolved			92.8		%		70-130	11-AUG-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	11-AUG-18
Vanadium (V)-Dissolved			94.2		%		70-130	11-AUG-18
Zinc (Zn)-Dissolved			85.5		%		70-130	11-AUG-18
PAH-511-WT	**Water**							
Batch R4169481								
WG2847332-2 LCS								
1-Methylnaphthalene			84.5		%		50-140	15-AUG-18
2-Methylnaphthalene			86.4		%		50-140	15-AUG-18
Acenaphthene			88.7		%		50-140	15-AUG-18
Acenaphthylene			90.2		%		50-140	15-AUG-18
Anthracene			107.7		%		50-140	15-AUG-18
Benzo(a)anthracene			96.1		%		50-140	15-AUG-18
Benzo(a)pyrene			90.7		%		50-140	15-AUG-18
Benzo(b)fluoranthene			95.5		%		50-140	15-AUG-18
Benzo(g,h,i)perylene			89.2		%		50-140	15-AUG-18
Benzo(k)fluoranthene			112.6		%		50-140	15-AUG-18
Chrysene			110.7		%		50-140	15-AUG-18
Dibenzo(ah)anthracene			91.2		%		50-140	15-AUG-18
Fluoranthene			92.1		%		50-140	15-AUG-18
Fluorene			95.0		%		50-140	

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4169481								
WG2847332-2 LCS								
Fluorene			95.0		%		50-140	15-AUG-18
Indeno(1,2,3-cd)pyrene			101.0		%		50-140	15-AUG-18
Naphthalene			69.0		%		50-140	15-AUG-18
Phenanthrene			88.8		%		50-140	15-AUG-18
Pyrene			100.0		%		50-140	15-AUG-18
WG2847332-3 LCSD		**WG2847332-2**						
1-Methylnaphthalene		84.5	75.5		%	11	50	15-AUG-18
2-Methylnaphthalene		86.4	74.1		%	15	50	15-AUG-18
Acenaphthene		88.7	86.4		%	2.6	50	15-AUG-18
Acenaphthylene		90.2	87.5		%	3.1	50	15-AUG-18
Anthracene		107.7	113.2		%	5.0	50	15-AUG-18
Benzo(a)anthracene		96.1	103.0		%	6.9	50	15-AUG-18
Benzo(a)pyrene		90.7	93.4		%	2.9	50	15-AUG-18
Benzo(b)fluoranthene		95.5	100.9		%	5.5	50	15-AUG-18
Benzo(g,h,i)perylene		89.2	87.8		%	1.5	50	15-AUG-18
Benzo(k)fluoranthene		112.6	115.4		%	2.5	50	15-AUG-18
Chrysene		110.7	131.1		%	17	50	15-AUG-18
Dibenzo(ah)anthracene		91.2	87.4		%	4.3	50	15-AUG-18
Fluoranthene		92.1	89.1		%	3.3	50	15-AUG-18
Fluorene		95.0	88.3		%	7.2	50	15-AUG-18
Indeno(1,2,3-cd)pyrene		101.0	97.1		%	3.9	50	15-AUG-18
Naphthalene		69.0	63.9		%	7.6	50	15-AUG-18
Phenanthrene		88.8	96.3		%	8.1	50	15-AUG-18
Pyrene		100.0	85.6		%	16	50	15-AUG-18
WG2847332-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	15-AUG-18
2-Methylnaphthalene			<0.020		ug/L		0.02	15-AUG-18
Acenaphthene			<0.020		ug/L		0.02	15-AUG-18
Acenaphthylene			<0.020		ug/L		0.02	15-AUG-18
Anthracene			<0.020		ug/L		0.02	15-AUG-18
Benzo(a)anthracene			<0.020		ug/L		0.02	15-AUG-18
Benzo(a)pyrene			<0.010		ug/L		0.01	15-AUG-18
Benzo(b)fluoranthene			<0.020		ug/L		0.02	15-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4169481								
WG2847332-1 MB								
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	15-AUG-18
Benzo(k)fluoranthene			<0.020		ug/L		0.02	15-AUG-18
Chrysene			<0.020		ug/L		0.02	15-AUG-18
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	15-AUG-18
Fluoranthene			<0.020		ug/L		0.02	15-AUG-18
Fluorene			<0.020		ug/L		0.02	15-AUG-18
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	15-AUG-18
Naphthalene			<0.050		ug/L		0.05	15-AUG-18
Phenanthrene			<0.020		ug/L		0.02	15-AUG-18
Pyrene			<0.020		ug/L		0.02	15-AUG-18
Surrogate: d8-Naphthalene			85.6		%		60-140	15-AUG-18
Surrogate: d10-Phenanthrene			101.0		%		60-140	15-AUG-18
Surrogate: d12-Chrysene			136.9		%		60-140	15-AUG-18
Surrogate: d10-Acenaphthene			104.6		%		60-140	15-AUG-18
PCB-511-WT	**Water**							
Batch R4169556								
WG2847386-2 LCS								
Aroclor 1242			60.2		%		60-140	15-AUG-18
Aroclor 1248			71.1		%		60-140	15-AUG-18
Aroclor 1254			76.6		%		60-140	15-AUG-18
Aroclor 1260			102.6		%		60-140	15-AUG-18
WG2847386-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	15-AUG-18
Aroclor 1248			<0.020		ug/L		0.02	15-AUG-18
Aroclor 1254			<0.020		ug/L		0.02	15-AUG-18
Aroclor 1260			<0.020		ug/L		0.02	15-AUG-18
Surrogate: 2-fluorobiphenyl			62.6		%		50-150	15-AUG-18
PH-WT	**Water**							
Batch R4165327								
WG2846723-8 DUP		**WG2846723-7**						
pH		7.70	7.71	J	pH units	0.02	0.2	11-AUG-18
WG2846723-10 LCS								
pH			7.02		pH units		6.9-7.1	11-AUG-18
WG2846723-6 LCS								

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT	**Water**							
Batch R4165327								
WG2846723-6 LCS								
pH			7.02		pH units		6.9-7.1	11-AUG-18
VOC-511-HS-WT	**Water**							
Batch R4168470								
WG2843221-4 DUP		**WG2843221-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	14-AUG-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	14-AUG-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-AUG-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-AUG-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	14-AUG-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	14-AUG-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-AUG-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-AUG-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-AUG-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
n-Hexane		<0.55	<0.55	RPD-NA	ug/L	N/A	30	14-AUG-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	14-AUG-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	14-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4168470								
WG2843221-4 DUP		**WG2843221-3**						
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	14-AUG-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-AUG-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-AUG-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-AUG-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-AUG-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-AUG-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-AUG-18
WG2843221-1 LCS								
1,1,1,2-Tetrachloroethane			97.8		%		70-130	14-AUG-18
1,1,2,2-Tetrachloroethane			102.1		%		70-130	14-AUG-18
1,1,1-Trichloroethane			109.6		%		70-130	14-AUG-18
1,1,2-Trichloroethane			105.8		%		70-130	14-AUG-18
1,1-Dichloroethane			113.4		%		70-130	14-AUG-18
1,1-Dichloroethylene			101.0		%		70-130	14-AUG-18
1,2-Dibromoethane			103.3		%		70-130	14-AUG-18
1,2-Dichlorobenzene			104.9		%		70-130	14-AUG-18
1,2-Dichloroethane			112.3		%		70-130	14-AUG-18
1,2-Dichloropropane			106.3		%		70-130	14-AUG-18
1,3-Dichlorobenzene			104.3		%		70-130	14-AUG-18
1,4-Dichlorobenzene			104.6		%		70-130	14-AUG-18
Acetone			103.4		%		60-140	14-AUG-18
Benzene			105.7		%		70-130	14-AUG-18
Bromodichloromethane			108.7		%		70-130	14-AUG-18
Bromoform			101.8		%		70-130	14-AUG-18
Bromomethane			81.2		%		60-140	14-AUG-18
Carbon tetrachloride			102.5		%		70-130	14-AUG-18
Chlorobenzene			107.3		%		70-130	14-AUG-18
Chloroform			109.1		%		70-130	14-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4168470								
WG2843221-1 LCS								
cis-1,2-Dichloroethylene			106.6		%		70-130	14-AUG-18
cis-1,3-Dichloropropene			114.0		%		70-130	14-AUG-18
Dibromochloromethane			97.2		%		70-130	14-AUG-18
Dichlorodifluoromethane			72.8		%		50-140	14-AUG-18
Ethylbenzene			101.2		%		70-130	14-AUG-18
n-Hexane			120.8		%		70-130	14-AUG-18
m+p-Xylenes			103.1		%		70-130	14-AUG-18
Methyl Ethyl Ketone			103.0		%		60-140	14-AUG-18
Methyl Isobutyl Ketone			101.1		%		60-140	14-AUG-18
Methylene Chloride			108.9		%		70-130	14-AUG-18
MTBE			111.3		%		70-130	14-AUG-18
o-Xylene			99.97		%		70-130	14-AUG-18
Styrene			99.2		%		70-130	14-AUG-18
Tetrachloroethylene			102.8		%		70-130	14-AUG-18
Toluene			102.1		%		70-130	14-AUG-18
trans-1,2-Dichloroethylene			108.3		%		70-130	14-AUG-18
trans-1,3-Dichloropropene			108.8		%		70-130	14-AUG-18
Trichloroethylene			105.7		%		70-130	14-AUG-18
Trichlorofluoromethane			111.1		%		60-140	14-AUG-18
Vinyl chloride			89.7		%		60-140	14-AUG-18
WG2843221-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	14-AUG-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	14-AUG-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	14-AUG-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	14-AUG-18
1,1-Dichloroethane			<0.50		ug/L		0.5	14-AUG-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	14-AUG-18
1,2-Dibromoethane			<0.20		ug/L		0.2	14-AUG-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	14-AUG-18
1,2-Dichloroethane			<0.50		ug/L		0.5	14-AUG-18
1,2-Dichloropropane			<0.50		ug/L		0.5	14-AUG-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	14-AUG-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	14-AUG-18
Acetone			<30		ug/L		30	14-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4168470								
WG2843221-2 MB								
Benzene			<0.50		ug/L		0.5	14-AUG-18
Bromodichloromethane			<2.0		ug/L		2	14-AUG-18
Bromoform			<5.0		ug/L		5	14-AUG-18
Bromomethane			<0.50		ug/L		0.5	14-AUG-18
Carbon tetrachloride			<0.20		ug/L		0.2	14-AUG-18
Chlorobenzene			<0.50		ug/L		0.5	14-AUG-18
Chloroform			<1.0		ug/L		1	14-AUG-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	14-AUG-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	14-AUG-18
Dibromochloromethane			<2.0		ug/L		2	14-AUG-18
Dichlorodifluoromethane			<2.0		ug/L		2	14-AUG-18
Ethylbenzene			<0.50		ug/L		0.5	14-AUG-18
n-Hexane			<0.50		ug/L		0.5	14-AUG-18
m+p-Xylenes			<0.40		ug/L		0.4	14-AUG-18
Methyl Ethyl Ketone			<20		ug/L		20	14-AUG-18
Methyl Isobutyl Ketone			<20		ug/L		20	14-AUG-18
Methylene Chloride			<5.0		ug/L		5	14-AUG-18
MTBE			<2.0		ug/L		2	14-AUG-18
o-Xylene			<0.30		ug/L		0.3	14-AUG-18
Styrene			<0.50		ug/L		0.5	14-AUG-18
Tetrachloroethylene			<0.50		ug/L		0.5	14-AUG-18
Toluene			<0.50		ug/L		0.5	14-AUG-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	14-AUG-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	14-AUG-18
Trichloroethylene			<0.50		ug/L		0.5	14-AUG-18
Trichlorofluoromethane			<5.0		ug/L		5	14-AUG-18
Vinyl chloride			<0.50		ug/L		0.5	14-AUG-18
Surrogate: 1,4-Difluorobenzene			101.0		%		70-130	14-AUG-18
Surrogate: 4-Bromofluorobenzene			97.6		%		70-130	14-AUG-18
WG2843221-5 MS		**WG2843221-3**						
1,1,1,2-Tetrachloroethane			98.7		%		50-140	14-AUG-18
1,1,2,2-Tetrachloroethane			105.0		%		50-140	14-AUG-18
1,1,1-Trichloroethane			110.7		%		50-140	14-AUG-18
1,1,2-Trichloroethane			107.4		%		50-140	14-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4168470								
WG2843221-5 MS		**WG2843221-3**						
1,1-Dichloroethane			116.3		%		50-140	14-AUG-18
1,1-Dichloroethylene			100.3		%		50-140	14-AUG-18
1,2-Dibromoethane			104.5		%		50-140	14-AUG-18
1,2-Dichlorobenzene			105.5		%		50-140	14-AUG-18
1,2-Dichloroethane			114.0		%		50-140	14-AUG-18
1,2-Dichloropropane			107.1		%		50-140	14-AUG-18
1,3-Dichlorobenzene			103.4		%		50-140	14-AUG-18
1,4-Dichlorobenzene			104.9		%		50-140	14-AUG-18
Acetone			103.1		%		50-140	14-AUG-18
Benzene			106.2		%		50-140	14-AUG-18
Bromodichloromethane			111.2		%		50-140	14-AUG-18
Bromoform			102.2		%		50-140	14-AUG-18
Bromomethane			78.7		%		50-140	14-AUG-18
Carbon tetrachloride			103.5		%		50-140	14-AUG-18
Chlorobenzene			107.6		%		50-140	14-AUG-18
Chloroform			111.2		%		50-140	14-AUG-18
cis-1,2-Dichloroethylene			107.7		%		50-140	14-AUG-18
cis-1,3-Dichloropropene			111.4		%		50-140	14-AUG-18
Dibromochloromethane			97.1		%		50-140	14-AUG-18
Dichlorodifluoromethane			69.4		%		50-140	14-AUG-18
Ethylbenzene			99.6		%		50-140	14-AUG-18
n-Hexane			118.1		%		50-140	14-AUG-18
m+p-Xylenes			101.4		%		50-140	14-AUG-18
Methyl Ethyl Ketone			102.0		%		50-140	14-AUG-18
Methyl Isobutyl Ketone			103.3		%		50-140	14-AUG-18
Methylene Chloride			110.2		%		50-140	14-AUG-18
MTBE			111.2		%		50-140	14-AUG-18
o-Xylene			99.2		%		50-140	14-AUG-18
Styrene			98.5		%		50-140	14-AUG-18
Tetrachloroethylene			100.1		%		50-140	14-AUG-18
Toluene			101.0		%		50-140	14-AUG-18
trans-1,2-Dichloroethylene			107.3		%		50-140	14-AUG-18
trans-1,3-Dichloropropene			102.8		%		50-140	14-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4168470								
WG2843221-5 MS		**WG2843221-3**						
Trichloroethylene			106.3		%		50-140	14-AUG-18
Trichlorofluoromethane			111.1		%		50-140	14-AUG-18
Vinyl chloride			86.7		%		50-140	14-AUG-18
Batch R4169413								
WG2843224-4 DUP		**WG2843224-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	15-AUG-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	15-AUG-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	15-AUG-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	15-AUG-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	15-AUG-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	15-AUG-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	15-AUG-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	15-AUG-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	15-AUG-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	15-AUG-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	15-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4169413								
WG2843224-4 DUP		**WG2843224-3**						
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	15-AUG-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	15-AUG-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	15-AUG-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	15-AUG-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	15-AUG-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	15-AUG-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-AUG-18
WG2843224-1 LCS								
1,1,1,2-Tetrachloroethane			103.4		%		70-130	15-AUG-18
1,1,2,2-Tetrachloroethane			109.8		%		70-130	15-AUG-18
1,1,1-Trichloroethane			105.3		%		70-130	15-AUG-18
1,1,2-Trichloroethane			109.1		%		70-130	15-AUG-18
1,1-Dichloroethane			104.0		%		70-130	15-AUG-18
1,1-Dichloroethylene			102.7		%		70-130	15-AUG-18
1,2-Dibromoethane			106.5		%		70-130	15-AUG-18
1,2-Dichlorobenzene			108.0		%		70-130	15-AUG-18
1,2-Dichloroethane			111.8		%		70-130	15-AUG-18
1,2-Dichloropropane			108.0		%		70-130	15-AUG-18
1,3-Dichlorobenzene			108.3		%		70-130	15-AUG-18
1,4-Dichlorobenzene			106.7		%		70-130	15-AUG-18
Acetone			138.1		%		60-140	15-AUG-18
Benzene			107.1		%		70-130	15-AUG-18
Bromodichloromethane			108.8		%		70-130	15-AUG-18
Bromoform			104.8		%		70-130	15-AUG-18
Bromomethane			84.6		%		60-140	15-AUG-18
Carbon tetrachloride			105.8		%		70-130	15-AUG-18
Chlorobenzene			107.7		%		70-130	15-AUG-18
Chloroform			108.3		%		70-130	15-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4169413								
WG2843224-1 LCS								
cis-1,2-Dichloroethylene			104.3		%		70-130	15-AUG-18
cis-1,3-Dichloropropene			104.6		%		70-130	15-AUG-18
Dibromochloromethane			105.4		%		70-130	15-AUG-18
Dichlorodifluoromethane			132.5		%		50-140	15-AUG-18
Ethylbenzene			104.6		%		70-130	15-AUG-18
n-Hexane			129.8		%		70-130	15-AUG-18
m+p-Xylenes			100.6		%		70-130	15-AUG-18
Methyl Ethyl Ketone			102.4		%		60-140	15-AUG-18
Methyl Isobutyl Ketone			99.5		%		60-140	15-AUG-18
Methylene Chloride			103.1		%		70-130	15-AUG-18
MTBE			107.0		%		70-130	15-AUG-18
o-Xylene			103.9		%		70-130	15-AUG-18
Styrene			101.5		%		70-130	15-AUG-18
Tetrachloroethylene			105.3		%		70-130	15-AUG-18
Toluene			106.3		%		70-130	15-AUG-18
trans-1,2-Dichloroethylene			105.9		%		70-130	15-AUG-18
trans-1,3-Dichloropropene			103.5		%		70-130	15-AUG-18
Trichloroethylene			108.0		%		70-130	15-AUG-18
Trichlorofluoromethane			115.4		%		60-140	15-AUG-18
Vinyl chloride			106.1		%		60-140	15-AUG-18
WG2843224-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	15-AUG-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	15-AUG-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	15-AUG-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	15-AUG-18
1,1-Dichloroethane			<0.50		ug/L		0.5	15-AUG-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	15-AUG-18
1,2-Dibromoethane			<0.20		ug/L		0.2	15-AUG-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	15-AUG-18
1,2-Dichloroethane			<0.50		ug/L		0.5	15-AUG-18
1,2-Dichloropropane			<0.50		ug/L		0.5	15-AUG-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	15-AUG-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	15-AUG-18
Acetone			<30		ug/L		30	15-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4169413								
WG2843224-2 MB								
Benzene			<0.50		ug/L		0.5	15-AUG-18
Bromodichloromethane			<2.0		ug/L		2	15-AUG-18
Bromoform			<5.0		ug/L		5	15-AUG-18
Bromomethane			<0.50		ug/L		0.5	15-AUG-18
Carbon tetrachloride			<0.20		ug/L		0.2	15-AUG-18
Chlorobenzene			<0.50		ug/L		0.5	15-AUG-18
Chloroform			<1.0		ug/L		1	15-AUG-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	15-AUG-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	15-AUG-18
Dibromochloromethane			<2.0		ug/L		2	15-AUG-18
Dichlorodifluoromethane			<2.0		ug/L		2	15-AUG-18
Ethylbenzene			<0.50		ug/L		0.5	15-AUG-18
n-Hexane			<0.50		ug/L		0.5	15-AUG-18
m+p-Xylenes			<0.40		ug/L		0.4	15-AUG-18
Methyl Ethyl Ketone			<20		ug/L		20	15-AUG-18
Methyl Isobutyl Ketone			<20		ug/L		20	15-AUG-18
Methylene Chloride			<5.0		ug/L		5	15-AUG-18
MTBE			<2.0		ug/L		2	15-AUG-18
o-Xylene			<0.30		ug/L		0.3	15-AUG-18
Styrene			<0.50		ug/L		0.5	15-AUG-18
Tetrachloroethylene			<0.50		ug/L		0.5	15-AUG-18
Toluene			<0.50		ug/L		0.5	15-AUG-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	15-AUG-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	15-AUG-18
Trichloroethylene			<0.50		ug/L		0.5	15-AUG-18
Trichlorofluoromethane			<5.0		ug/L		5	15-AUG-18
Vinyl chloride			<0.50		ug/L		0.5	15-AUG-18
Surrogate: 1,4-Difluorobenzene			99.0		%		70-130	15-AUG-18
Surrogate: 4-Bromofluorobenzene			95.0		%		70-130	15-AUG-18
WG2843224-5 MS		**WG2843224-3**						
1,1,1,2-Tetrachloroethane			103.8		%		50-140	15-AUG-18
1,1,2,2-Tetrachloroethane			109.3		%		50-140	15-AUG-18
1,1,1-Trichloroethane			103.4		%		50-140	15-AUG-18
1,1,2-Trichloroethane			109.5		%		50-140	15-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4169413								
WG2843224-5 MS		**WG2843224-3**						
1,1-Dichloroethane			101.2		%		50-140	15-AUG-18
1,1-Dichloroethylene			94.0		%		50-140	15-AUG-18
1,2-Dibromoethane			107.6		%		50-140	15-AUG-18
1,2-Dichlorobenzene			107.2		%		50-140	15-AUG-18
1,2-Dichloroethane			113.0		%		50-140	15-AUG-18
1,2-Dichloropropane			109.1		%		50-140	15-AUG-18
1,3-Dichlorobenzene			106.8		%		50-140	15-AUG-18
1,4-Dichlorobenzene			106.4		%		50-140	15-AUG-18
Acetone			105.9		%		50-140	15-AUG-18
Benzene			106.2		%		50-140	15-AUG-18
Bromodichloromethane			110.5		%		50-140	15-AUG-18
Bromoform			105.1		%		50-140	15-AUG-18
Bromomethane			73.1		%		50-140	15-AUG-18
Carbon tetrachloride			101.7		%		50-140	15-AUG-18
Chlorobenzene			107.1		%		50-140	15-AUG-18
Chloroform			108.4		%		50-140	15-AUG-18
cis-1,2-Dichloroethylene			105.1		%		50-140	15-AUG-18
cis-1,3-Dichloropropene			111.5		%		50-140	15-AUG-18
Dibromochloromethane			106.9		%		50-140	15-AUG-18
Dichlorodifluoromethane			57.3		%		50-140	15-AUG-18
Ethylbenzene			102.5		%		50-140	15-AUG-18
n-Hexane			112.0		%		50-140	15-AUG-18
m+p-Xylenes			104.3		%		50-140	15-AUG-18
Methyl Ethyl Ketone			97.2		%		50-140	15-AUG-18
Methyl Isobutyl Ketone			97.7		%		50-140	15-AUG-18
Methylene Chloride			101.5		%		50-140	15-AUG-18
MTBE			106.2		%		50-140	15-AUG-18
o-Xylene			102.7		%		50-140	15-AUG-18
Styrene			102.5		%		50-140	15-AUG-18
Tetrachloroethylene			102.3		%		50-140	15-AUG-18
Toluene			103.5		%		50-140	15-AUG-18
trans-1,2-Dichloroethylene			103.0		%		50-140	15-AUG-18
trans-1,3-Dichloropropene			108.2		%		50-140	15-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4169413								
WG2843224-5 MS		**WG2843224-3**						
Trichloroethylene			107.5		%		50-140	15-AUG-18
Trichlorofluoromethane			99.3		%		50-140	15-AUG-18
Vinyl chloride			81.1		%		50-140	15-AUG-18

Quality Control Report

Workorder: L2145026 Report Date: 15-AUG-18

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

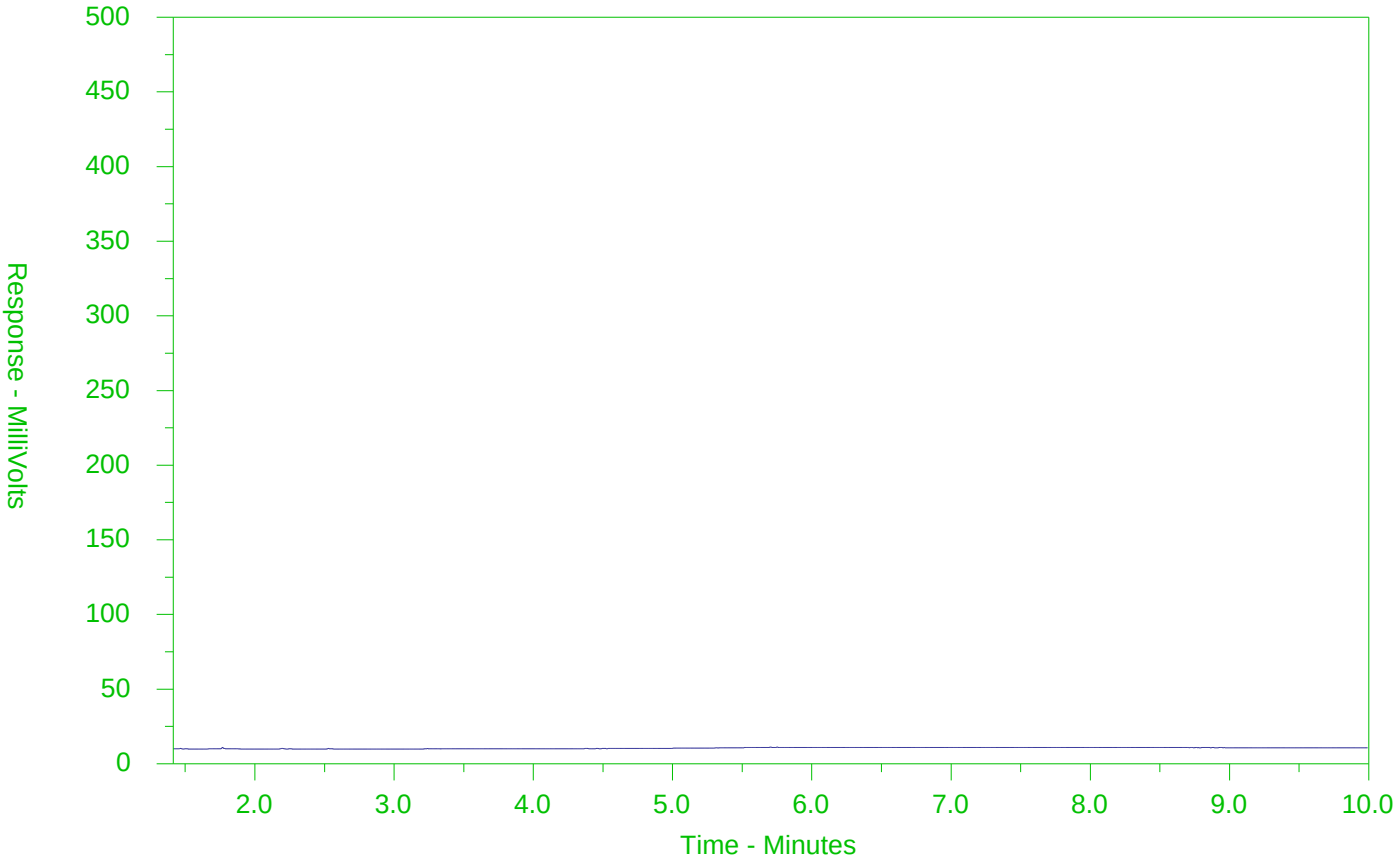
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2145026-1
Client Sample ID: MW101



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

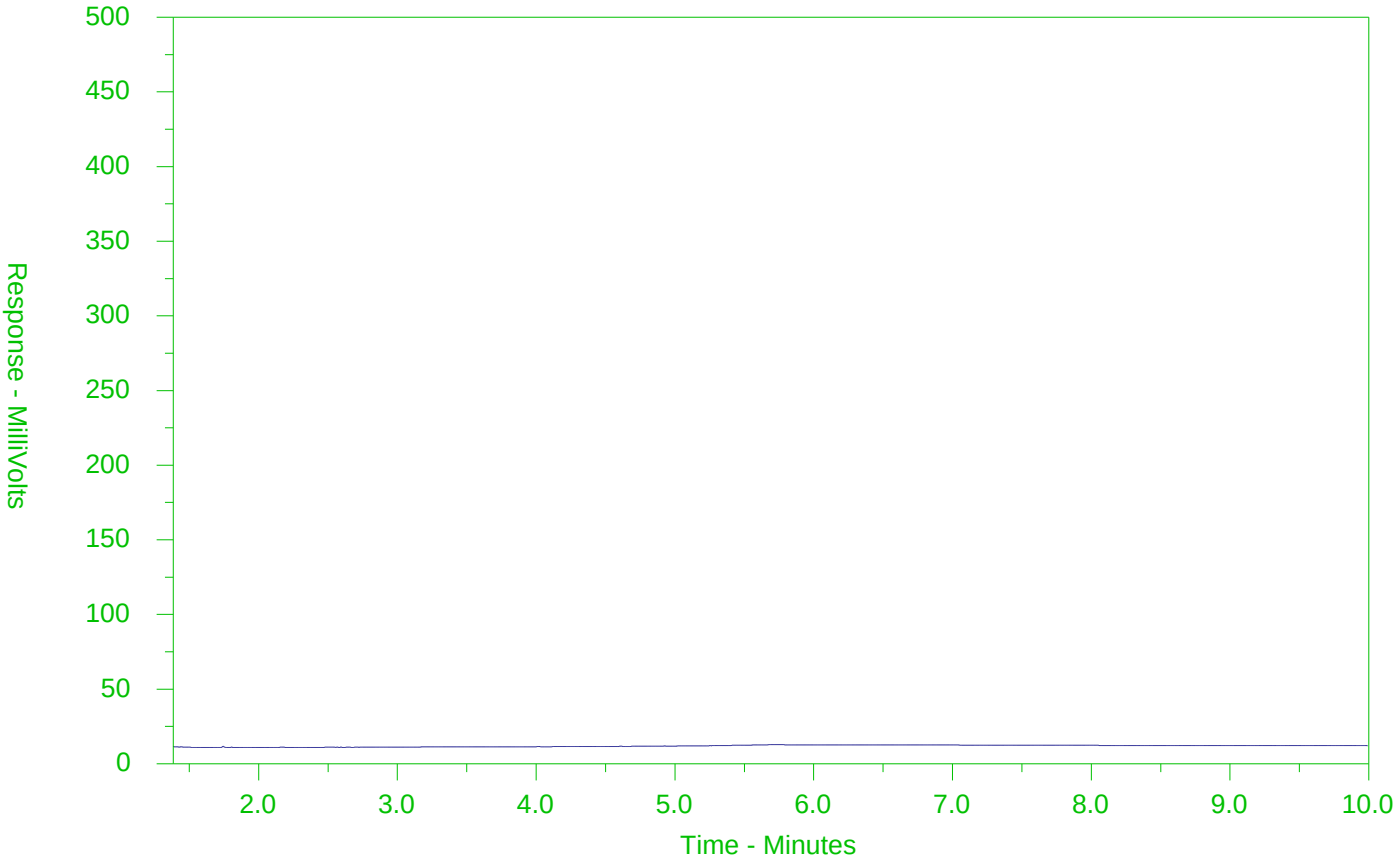
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2145026-2
Client Sample ID: MW102



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

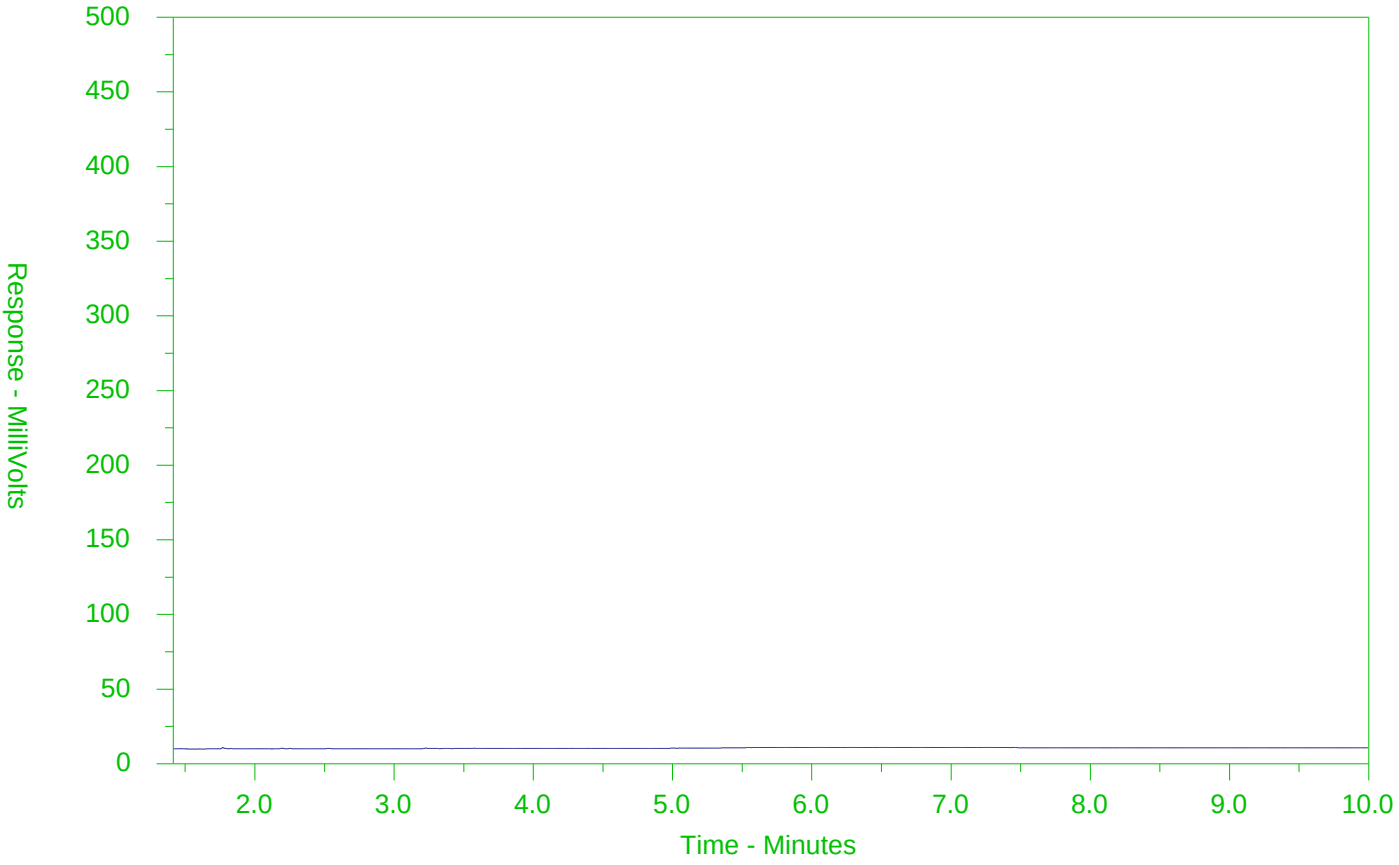
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2145026-3
Client Sample ID: MW103



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

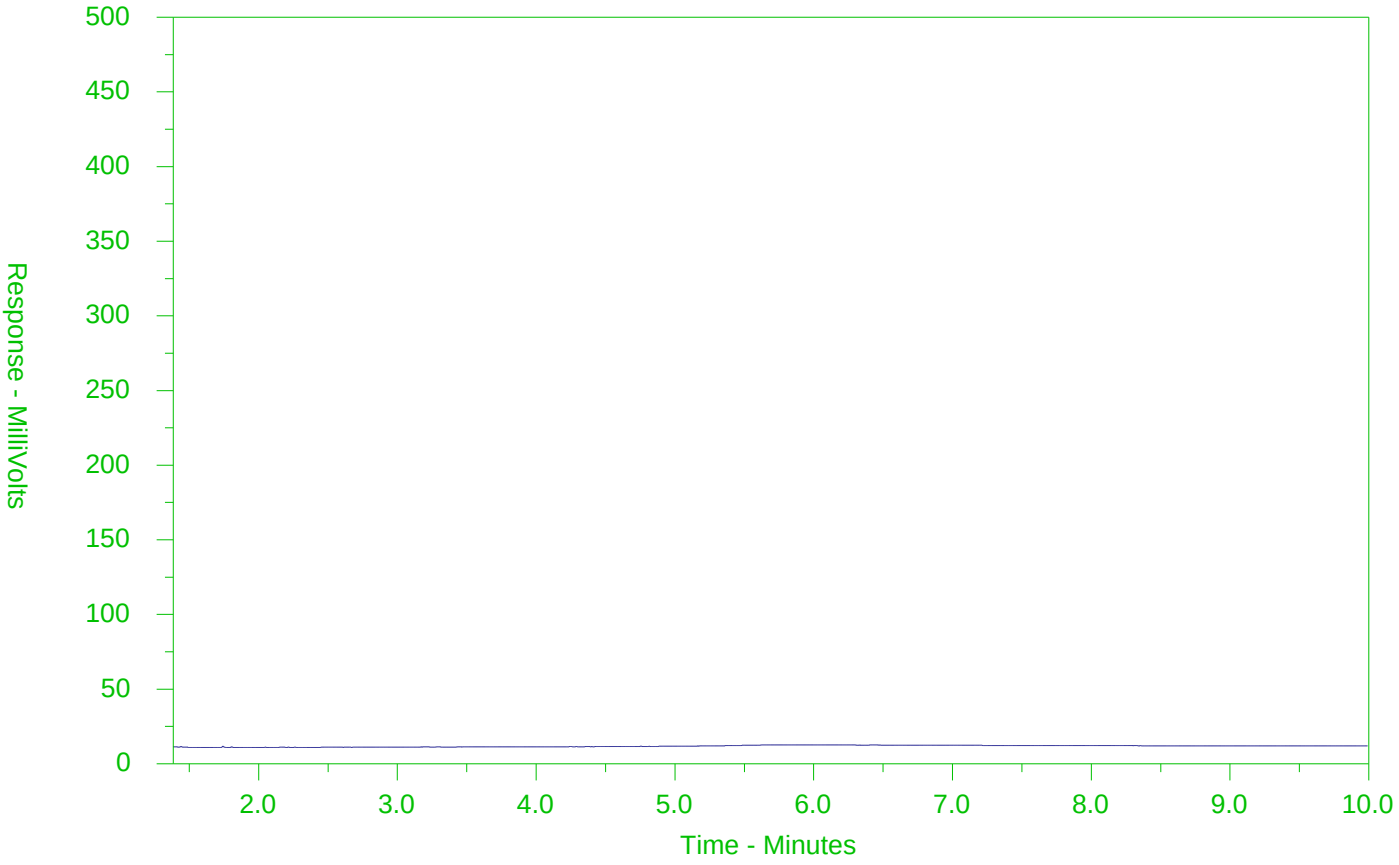
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2145026-4
Client Sample ID: MW104



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

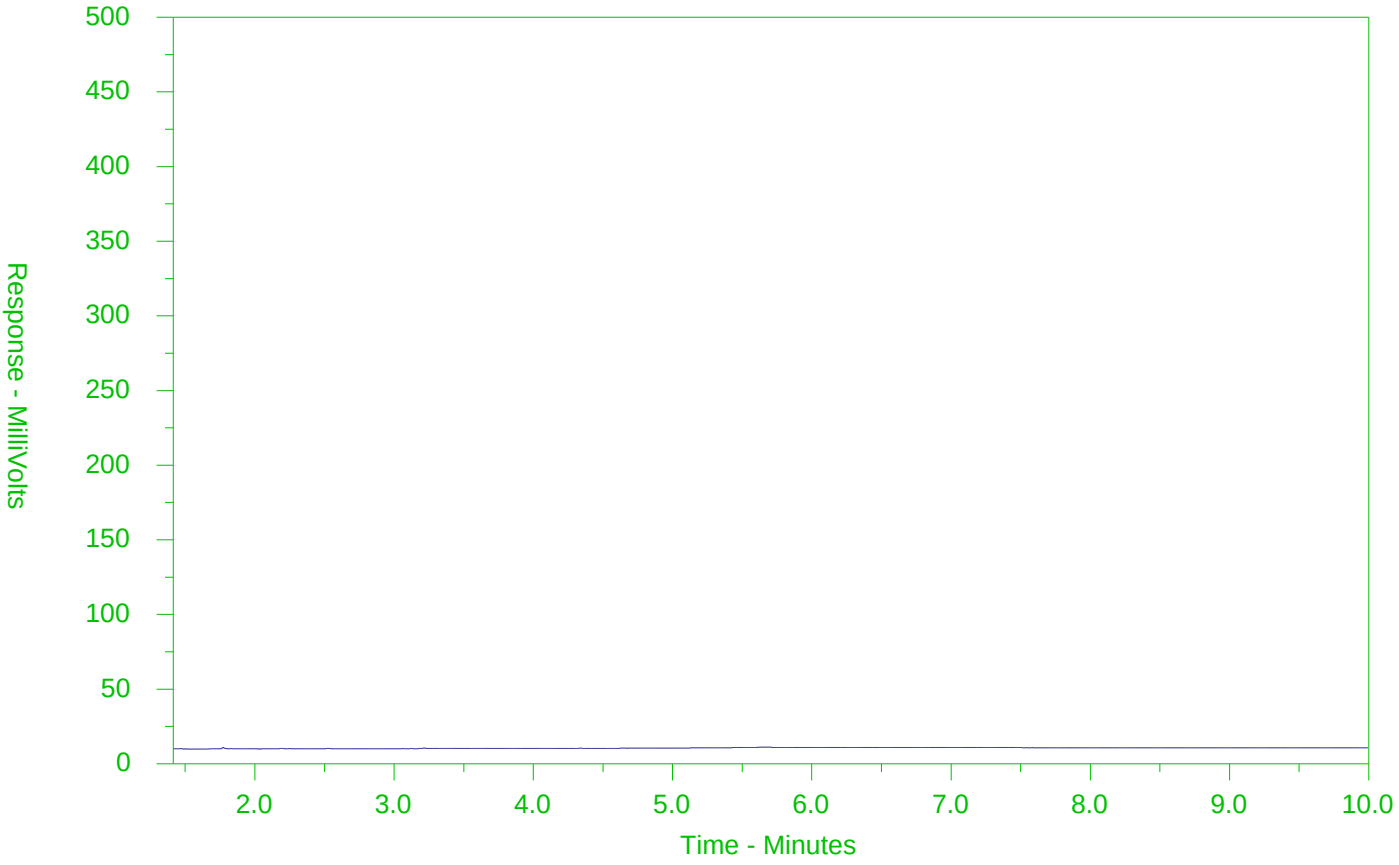
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2145026-5
Client Sample ID: DUPLICATE 1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2145026-COFC

COC Number: 17 - 630421

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	HLV2K ENGINEERING	Select Report Format: ☐ PDF ☐ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	JOHN LAMETTI	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☒ / 2 day [P2-50%] ☐
Phone:	647-926-8070	☐ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] ☐ / Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	2179 DUNWIN DRIVE	Email 1 or Fax john.lametti@hlv2k.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	MISSISSAUGA, ON	Email 2 alex.wood@hlv2k	
Postal Code:	L5L 1X2	Email 3	
Invoice To	Same as Report To ☒ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☒ YES ☐ NO	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	
Company:		Email 1 or Fax manny.virani@hlv2k.com	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q69753	AFE/Cost Center:	PO#
Job #:	800053AE	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2145026 COC	ALS Contact:	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals + Inorganics	PHC	VOC	PAH	PCB	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	MW101	10-AUG-18	12:00	WATER	X	X	X	X	X			
2	MW102	10-AUG-18	12:00	"	X	X	X	X	X			
3	MW103	10-AUG-18	12:00	"	X	X	X	X	X			
4	MW104	10-AUG-18	12:00	"	X	X	X	X	X			
5	DUPLICATE 1	10-AUG-18	12:00	"	X	X	X	X	X			
6	TRIP BLANK	"	"	"			X					

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☒ NO	Table 2 RPI
Are samples for human consumption/ use? ☐ YES ☒ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☐
Ice Packs ☐	Ice Cubes ☒	Custody seal intact	Yes ☐	No	☐
Cooling Initiated	☒				

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
7.7	10.3			8.6°			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
ALEX WOOD	09/AUG/18	4:00		Aug 10/18	17:00		Aug 10	18:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

SIF.

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Guideline						
Ontario Regulation 153/04 - April 15, 2011 Standards - T2-Soil-Res/Park/Inst. Property Use (Coarse)						
(No parameter exceedances)						
Ontario Regulation 153/04 - April 15, 2011 Standards - T2-Soil-Res/Park/Inst. Property Use (Fine)						
(No parameter exceedances)						

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Physical Tests - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	Sample Date	Sample ID				
				L2141637-1	L2141637-2	L2141637-3	L2141637-4	L2141637-5	L2141637-6
				02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18
				BH1	BH2	BH3	BH4	DUPE1	DUPE2
Conductivity	mS/cm	0.7	0.7	0.229	0.144	0.288	0.146		0.123
% Moisture	%	-	-	6.70	5.22	5.90	5.19	5.15	4.98
pH	pH units	-	-	7.64	7.70	7.47	8.61		8.19

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Cyanides - SOIL

		Guide Limits						
				Lab ID	L2141637-1	L2141637-2	L2141637-3	L2141637-4	L2141637-6
				Sample Date	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18
				Sample ID	BH1	BH2	BH3	BH4	DUPE2
Analyte	Unit	#1	#2						
Cyanide, Weak Acid Diss	ug/g	0.051	0.051		<0.050	<0.050	<0.050	<0.050	<0.050

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Saturated Paste Extractables - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	Sample Date	Sample ID
				L2141637-1	02-AUG-18	BH1
				L2141637-2	02-AUG-18	BH2
				L2141637-3	02-AUG-18	BH3
				L2141637-4	02-AUG-18	BH4
				L2141637-6	02-AUG-18	DUPE2
SAR	SAR	5	5	3.76 SAR:M	2.08 SAR:M	1.39 SAR:M	0.72 SAR:M	0.74 SAR:M
Calcium (Ca)	mg/L	-	-	3.6	3.1	12.5	6.4	4.9
Magnesium (Mg)	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0
Sodium (Na)	mg/L	-	-	25.8	13.3	17.9	6.6	6.0

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Metals - SOIL

				Lab ID	L2141637-1	L2141637-2	L2141637-3	L2141637-4	L2141637-6
				Sample Date	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18
				Sample ID	BH1	BH2	BH3	BH4	DUPE2
		Guide Limits							
Analyte	Unit	#1	#2						
Antimony (Sb)	ug/g	7.5	7.5	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic (As)	ug/g	18	18	<1.0	<1.0	1.1	<1.0	<1.0
Barium (Ba)	ug/g	390	390	18.0	10.4	10.9	11.5	11.4
Beryllium (Be)	ug/g	4	5	<0.50	<0.50	<0.50	<0.50	<0.50
Boron (B)	ug/g	120	120	<5.0	<5.0	<5.0	<5.0	<5.0
Boron (B), Hot Water Ext.	ug/g	1.5	1.5	0.19	0.12	0.54	0.22	0.16
Cadmium (Cd)	ug/g	1.2	1.2	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium (Cr)	ug/g	160	160	8.0	7.6	10.3	8.7	10.4
Cobalt (Co)	ug/g	22	22	2.0	2.0	2.2	2.1	2.2
Copper (Cu)	ug/g	140	180	2.2	2.2	1.8	1.9	1.9
Lead (Pb)	ug/g	120	120	1.9	2.5	2.6	1.3	1.3
Mercury (Hg)	ug/g	0.27	1.8	0.0088	<0.0050	0.0186	0.0076	0.0062
Molybdenum (Mo)	ug/g	6.9	6.9	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel (Ni)	ug/g	100	130	3.7	3.6	3.7	3.8	3.9
Selenium (Se)	ug/g	2.4	2.4	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)	ug/g	20	25	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)	ug/g	1	1	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	ug/g	23	23	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium (V)	ug/g	86	86	19.2	20.4	31.4	23.0	30.6
Zinc (Zn)	ug/g	340	340	10.1	9.7	19.9	8.4	7.8

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Speciated Metals - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	Sample Date	Sample ID			
				L2141637-1	L2141637-2	L2141637-3	L2141637-4	L2141637-6
				02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18
				BH1	BH2	BH3	BH4	DUPE2
Chromium, Hexavalent	ug/g	8	10	<0.20	<0.20	0.29	<0.20	0.40

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Volatile Organic Compounds - SOIL

				Lab ID	L2141637-1	L2141637-2	L2141637-3	L2141637-4	L2141637-5
				Sample Date	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18
				Sample ID	BH1	BH2	BH3	BH4	DUPE1
		Guide Limits							
Analyte	Unit	#1	#2						
Acetone	ug/g	16	28	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	ug/g	0.21	0.17	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068
Bromodichloromethane	ug/g	1.5	1.9	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	ug/g	0.27	0.26	<0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane	ug/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon tetrachloride	ug/g	0.05	0.12	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	ug/g	2.4	2.7	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	ug/g	2.3	2.9	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroform	ug/g	0.05	0.18	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dibromoethane	ug/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	ug/g	1.2	1.7	<0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	ug/g	4.8	6	<0.050	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	ug/g	0.083	0.097	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane	ug/g	16	25	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	ug/g	0.47	0.6	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	ug/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	ug/g	1.9	2.5	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	ug/g	0.084	0.75	<0.050	<0.050	<0.050	<0.050	<0.050
Methylene Chloride	ug/g	0.1	0.96	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	ug/g	0.05	0.085	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropene	ug/g	-	-	<0.030	<0.030	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	ug/g	-	-	<0.030	<0.030	<0.030	<0.030	<0.030
1,3-Dichloropropene (cis & trans)	ug/g	0.05	0.081	<0.042	<0.042	<0.042	<0.042	<0.042
Ethylbenzene	ug/g	1.1	1.6	<0.018	<0.018	<0.018	<0.018	<0.018
n-Hexane	ug/g	2.8	34	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	ug/g	16	44	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	ug/g	1.7	4.3	<0.50	<0.50	<0.50	<0.50	<0.50
MTBE	ug/g	0.75	1.4	<0.050	<0.050	<0.050	<0.050	<0.050
Styrene	ug/g	0.7	2.2	<0.050	<0.050	<0.050	<0.050	<0.050

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Volatile Organic Compounds - SOIL

			Lab ID	L2141637-1	L2141637-2	L2141637-3	L2141637-4	L2141637-5
			Sample Date	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18
			Sample ID	BH1	BH2	BH3	BH4	DUPE1
		Guide Limits						
Analyte	Unit	#1	#2					
1,1,1,2-Tetrachloroethane	ug/g	0.058	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	ug/g	0.28	2.3	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	ug/g	2.3	6	<0.080	<0.080	<0.080	<0.080	<0.080
1,1,1-Trichloroethane	ug/g	0.38	3.4	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	ug/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	ug/g	0.061	0.52	<0.010	<0.010	<0.010	<0.010	<0.010
Trichlorofluoromethane	ug/g	4	5.8	<0.050	<0.050	<0.050	<0.050	<0.050
Vinyl chloride	ug/g	0.02	0.022	<0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene	ug/g	-	-	<0.020	<0.020	<0.020	<0.020	<0.020
m+p-Xylenes	ug/g	-	-	<0.030	<0.030	<0.030	<0.030	<0.030
Xylenes (Total)	ug/g	3.1	25	<0.050	<0.050	<0.050	<0.050	<0.050
Surrogate: 4-Bromofluorobenzene	%	-	-	95.3	92.3	103.6	93.5	105.1
Surrogate: 1,4-Difluorobenzene	%	-	-	100.5	94.0	107.8	97.5	106.5

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Hydrocarbons - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	L2141637-1	L2141637-2	L2141637-3	L2141637-4	L2141637-5	L2141637-6
				Sample Date	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18
				Sample ID	BH1	BH2	BH3	BH4	DUPE1	DUPE2
F1 (C6-C10)	ug/g	55	65		<5.0	<5.0	<5.0	<5.0	<5.0	
F1-BTEX	ug/g	55	65		<5.0	<5.0	<5.0	<5.0		
F2 (C10-C16)	ug/g	98	150		<10	<10	<10	<10		<10
F2-Naphth	ug/g	-	-		<10	<10	<10	<10		<10
F3 (C16-C34)	ug/g	300	1300		<50	79	54	151		144
F3-PAH	ug/g	-	-		<50	79	54	151		144
F4 (C34-C50)	ug/g	2800	5600		<50	89	60	56		53
Total Hydrocarbons (C6-C50)	ug/g	-	-		<72	168	114	207		
Chrom. to baseline at nC50		-	-		YES	YES	YES	YES		YES
Surrogate: 2-Bromobenzotrifluoride	%	-	-		95.7	106.9	111.0	117.9		104.9
Surrogate: 3,4-Dichlorotoluene	%	-	-		73.4	85.9	88.1	86.1	88.7	

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Polycyclic Aromatic Hydrocarbons - SOIL

		Guide Limits						
Lab ID				L2141637-1	L2141637-2	L2141637-3	L2141637-4	L2141637-6
Sample Date				02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18
Sample ID				BH1	BH2	BH3	BH4	DUPE2
Analyte	**Unit**	**#1**	**#2**					
Acenaphthene	ug/g	7.9	29	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	ug/g	0.15	0.17	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	ug/g	0.67	0.74	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)anthracene	ug/g	0.5	0.63	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	ug/g	0.3	0.3	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b)fluoranthene	ug/g	0.78	0.78	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	ug/g	6.6	7.8	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	ug/g	0.78	0.78	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	ug/g	7	7.8	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenzo(ah)anthracene	ug/g	0.1	0.1	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	ug/g	0.69	0.69	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	ug/g	62	69	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	ug/g	0.38	0.48	<0.050	<0.050	<0.050	<0.050	<0.050
1+2-Methylnaphthalenes	ug/g	0.99	3.4	<0.042	<0.042	<0.042	<0.042	<0.042
1-Methylnaphthalene	ug/g	0.99	3.4	<0.030	<0.030	<0.030	<0.030	<0.030
2-Methylnaphthalene	ug/g	0.99	3.4	<0.030	<0.030	<0.030	<0.030	<0.030
Naphthalene	ug/g	0.6	0.75	<0.013	<0.013	<0.013	<0.013	<0.013
Phenanthrene	ug/g	6.2	7.8	<0.046	<0.046	<0.046	<0.046	<0.046
Pyrene	ug/g	78	78	<0.050	<0.050	<0.050	<0.050	<0.050
Surrogate: 2-Fluorobiphenyl	%	-	-	85.6	83.4	84.4	72.9	82.6
Surrogate: p-Terphenyl d14	%	-	-	92.1	83.4	85.7	75.4	85.1

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Polychlorinated Biphenyls - SOIL

			Lab ID	L2141637-1	L2141637-2	L2141637-3	L2141637-4	L2141637-6
			Sample Date	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18	02-AUG-18
			Sample ID	BH1	BH2	BH3	BH4	DUPE2
		Guide Limits						
Analyte	Unit	#1	#2					
Aroclor 1242	ug/g	-	-	<0.010	<0.010	<0.010	<0.010	<0.010
Aroclor 1248	ug/g	-	-	<0.010	<0.010	<0.010	<0.010	<0.010
Aroclor 1254	ug/g	-	-	<0.010	<0.010	<0.010	<0.010	<0.010
Aroclor 1260	ug/g	-	-	<0.010	<0.010	<0.010	<0.010	<0.010
Total PCBs	ug/g	0.35	0.35	<0.020	<0.020	<0.020	<0.020	<0.020
Surrogate: d14-Terphenyl	%	-	-	85.0	82.1	85.1	75.4	84.5

Guide Limit #1: T2-Soil-Res/Park/Inst. Property Use (Coarse)
Guide Limit #2: T2-Soil-Res/Park/Inst. Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
SAR:M	Reported SAR represents a maximum value. Actual SAR may be lower if both Ca and Mg were detectable.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-WT	Soil	Conductivity (EC)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Soil F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Soil F2-F4-O.Reg 153/04 (July 2011) CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-200.2-CVAA-WT Soil Mercury in Soil by CVAAS EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT Soil Metals in Soil by CRC ICPMS EPA 200.2/6020A (mod)

This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT Soil ABN-Calculated Parameters SW846 8270

MOISTURE-WT Soil % Moisture Gravimetric: Oven Dried

PAH-511-WT Soil PAH-O.Reg 153/04 (July 2011) SW846 3510/8270

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT	Soil	PCB-O.Reg 153/04 (July 2011)	SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

17-630438

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2141637 Report Date: 16-AUG-18

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R4161830								
WG2844468-4 DUP		**L2142435-3**						
Boron (B), Hot Water Ext.		<0.10	<0.10	RPD-NA	ug/g	N/A	30	09-AUG-18
WG2844468-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			84.6		%		70-130	09-AUG-18
WG2844468-3 LCS								
Boron (B), Hot Water Ext.			110.4		%		70-130	09-AUG-18
WG2844468-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	09-AUG-18
Batch R4162726								
WG2845084-4 DUP		**L2141635-2**						
Boron (B), Hot Water Ext.		0.22	0.20		ug/g	6.7	30	10-AUG-18
WG2845084-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			80.9		%		70-130	10-AUG-18
WG2845084-3 LCS								
Boron (B), Hot Water Ext.			110.7		%		70-130	10-AUG-18
WG2845084-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	10-AUG-18
CN-WAD-R511-WT	**Soil**							
Batch R4162900								
WG2844656-3 DUP		**L2141206-2**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	10-AUG-18
WG2844656-2 LCS								
Cyanide, Weak Acid Diss			89.4		%		80-120	10-AUG-18
WG2844656-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	10-AUG-18
WG2844656-4 MS		**L2141206-2**						
Cyanide, Weak Acid Diss			98.5		%		70-130	10-AUG-18
CR-CR6-IC-WT	**Soil**							
Batch R4162762								
WG2845225-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			95.0		%		70-130	10-AUG-18
WG2845225-3 DUP		**L2141637-1**						
Chromium, Hexavalent		<0.20	0.22	RPD-NA	ug/g	N/A	35	10-AUG-18
WG2845225-2 LCS								
Chromium, Hexavalent			95.7		%		80-120	10-AUG-18
WG2845225-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	10-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	**Soil**							
Batch R4162997								
WG2845605-4 DUP		**WG2845605-3**						
Conductivity		0.129	0.140		mS/cm	8.3	20	10-AUG-18
WG2845816-1 LCS								
Conductivity			100.6		%		90-110	10-AUG-18
WG2845605-1 MB								
Conductivity			<0.0040		mS/cm		0.004	10-AUG-18
Batch R4163294								
WG2845203-4 DUP		**WG2845203-3**						
Conductivity		0.427	0.432		mS/cm	1.2	20	10-AUG-18
WG2845817-1 LCS								
Conductivity			99.6		%		90-110	10-AUG-18
WG2845203-1 MB								
Conductivity			<0.0040		mS/cm		0.004	10-AUG-18
F1-HS-511-WT	**Soil**							
Batch R4161900								
WG2842810-4 DUP		**WG2842810-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	09-AUG-18
WG2842810-2 LCS								
F1 (C6-C10)			105.2		%		80-120	09-AUG-18
WG2842810-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	09-AUG-18
Surrogate: 3,4-Dichlorotoluene			97.3		%		60-140	09-AUG-18
WG2842810-6 MS		**L2140121-23**						
F1 (C6-C10)			105.4		%		60-140	09-AUG-18
Batch R4170988								
WG2850539-4 DUP		**WG2850539-3**						
F1 (C6-C10)		9.7	10.3		ug/g	5.4	30	16-AUG-18
WG2850539-2 LCS								
F1 (C6-C10)			106.5		%		80-120	16-AUG-18
WG2850539-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	16-AUG-18
Surrogate: 3,4-Dichlorotoluene			93.5		%		60-140	16-AUG-18
WG2850539-6 MS		**L2146712-9**						
F1 (C6-C10)			111.8		%		60-140	16-AUG-18
F2-F4-511-WT	**Soil**							

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Soil**							
Batch R4162601								
WG2844536-5 DUP		**WG2844536-1**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	10-AUG-18
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	10-AUG-18
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	10-AUG-18
WG2844536-3 LCS								
F2 (C10-C16)			103.2		%		80-120	10-AUG-18
F3 (C16-C34)			105.2		%		80-120	10-AUG-18
F4 (C34-C50)			103.0		%		80-120	10-AUG-18
WG2844536-2 MB								
F2 (C10-C16)			<10		ug/g		10	10-AUG-18
F3 (C16-C34)			<50		ug/g		50	10-AUG-18
F4 (C34-C50)			<50		ug/g		50	10-AUG-18
Surrogate: 2-Bromobenzotrifluoride			85.2		%		60-140	10-AUG-18
WG2844536-4 MS		**WG2844536-1**						
F2 (C10-C16)			100.2		%		60-140	10-AUG-18
F3 (C16-C34)			105.2		%		60-140	10-AUG-18
F4 (C34-C50)			101.2		%		60-140	10-AUG-18
Batch R4162642								
WG2844575-7 DUP		**WG2844575-6**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	13-AUG-18
F3 (C16-C34)		145	110		ug/g	27	30	13-AUG-18
F4 (C34-C50)		54	<50	RPD-NA	ug/g	N/A	30	13-AUG-18
WG2844575-3 LCS								
F2 (C10-C16)			101.3		%		80-120	10-AUG-18
F3 (C16-C34)			104.9		%		80-120	10-AUG-18
F4 (C34-C50)			100.6		%		80-120	10-AUG-18
WG2844575-2 MB								
F2 (C10-C16)			<10		ug/g		10	10-AUG-18
F3 (C16-C34)			<50		ug/g		50	10-AUG-18
F4 (C34-C50)			<50		ug/g		50	10-AUG-18
Surrogate: 2-Bromobenzotrifluoride			83.5		%		60-140	10-AUG-18
WG2844575-8 MS		**WG2844575-6**						
F2 (C10-C16)			102.6		%		60-140	13-AUG-18
F3 (C16-C34)			71.0		%		60-140	13-AUG-18
F4 (C34-C50)			87.4		%		60-140	13-AUG-18
HG-200.2-CVAA-WT	**Soil**							

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WT	**Soil**							
Batch R4161887								
WG2844445-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			107.9		%		70-130	09-AUG-18
WG2844445-6 DUP		**WG2844445-5**						
Mercury (Hg)		0.0186	0.0189		ug/g	1.6	40	09-AUG-18
WG2844445-3 LCS								
Mercury (Hg)			108.5		%		80-120	09-AUG-18
WG2844445-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	09-AUG-18
Batch R4162873								
WG2844794-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			107.5		%		70-130	10-AUG-18
WG2844794-6 DUP		**WG2844794-5**						
Mercury (Hg)		0.0196	0.0201		ug/g	2.6	40	10-AUG-18
WG2844794-4 LCS								
Mercury (Hg)			109.5		%		80-120	10-AUG-18
WG2844794-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	10-AUG-18
MET-200.2-CCMS-WT	**Soil**							
Batch R4163000								
WG2844445-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			104.8		%		70-130	10-AUG-18
Arsenic (As)			112.8		%		70-130	10-AUG-18
Barium (Ba)			114.3		%		70-130	10-AUG-18
Beryllium (Be)			119.2		%		70-130	10-AUG-18
Boron (B)			3.4		mg/kg		0-8.2	10-AUG-18
Cadmium (Cd)			119.0		%		70-130	10-AUG-18
Chromium (Cr)			111.4		%		70-130	10-AUG-18
Cobalt (Co)			110.4		%		70-130	10-AUG-18
Copper (Cu)			111.1		%		70-130	10-AUG-18
Lead (Pb)			110.9		%		70-130	10-AUG-18
Molybdenum (Mo)			114.6		%		70-130	10-AUG-18
Nickel (Ni)			108.4		%		70-130	10-AUG-18
Selenium (Se)			0.34		mg/kg		0.11-0.51	10-AUG-18
Silver (Ag)			0.24		mg/kg		0.13-0.33	10-AUG-18
Thallium (Tl)			0.123		mg/kg		0.077-0.18	10-AUG-18
Uranium (U)			104.4		%		70-130	10-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4163000								
WG2844445-2 CRM		**WT-CANMET-TILL1**						
Vanadium (V)			112.0		%		70-130	10-AUG-18
Zinc (Zn)			108.8		%		70-130	10-AUG-18
WG2844445-6 DUP		**WG2844445-5**						
Antimony (Sb)		<0.10	0.11	RPD-NA	ug/g	N/A	30	10-AUG-18
Arsenic (As)		1.08	1.19		ug/g	9.8	30	10-AUG-18
Barium (Ba)		10.9	12.4		ug/g	12	40	10-AUG-18
Beryllium (Be)		0.18	0.21		ug/g	16	30	10-AUG-18
Boron (B)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	10-AUG-18
Cadmium (Cd)		0.089	0.084		ug/g	5.5	30	10-AUG-18
Chromium (Cr)		10.3	11.4		ug/g	10	30	10-AUG-18
Cobalt (Co)		2.18	2.46		ug/g	12	30	10-AUG-18
Copper (Cu)		1.77	2.09		ug/g	17	30	10-AUG-18
Lead (Pb)		2.62	2.54		ug/g	3.1	40	10-AUG-18
Molybdenum (Mo)		0.24	0.22		ug/g	8.8	40	10-AUG-18
Nickel (Ni)		3.71	4.18		ug/g	12	30	10-AUG-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	10-AUG-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	10-AUG-18
Thallium (Tl)		<0.050	<0.050	RPD-NA	ug/g	N/A	30	10-AUG-18
Uranium (U)		0.333	0.289		ug/g	14	30	10-AUG-18
Vanadium (V)		31.4	32.7		ug/g	3.9	30	10-AUG-18
Zinc (Zn)		19.9	21.5		ug/g	7.7	30	10-AUG-18
WG2844445-4 LCS								
Antimony (Sb)			99.6		%		80-120	10-AUG-18
Arsenic (As)			96.7		%		80-120	10-AUG-18
Barium (Ba)			90.2		%		80-120	10-AUG-18
Beryllium (Be)			96.6		%		80-120	10-AUG-18
Boron (B)			90.4		%		80-120	10-AUG-18
Cadmium (Cd)			99.1		%		80-120	10-AUG-18
Chromium (Cr)			94.6		%		80-120	10-AUG-18
Cobalt (Co)			95.3		%		80-120	10-AUG-18
Copper (Cu)			93.1		%		80-120	10-AUG-18
Lead (Pb)			92.5		%		80-120	10-AUG-18
Molybdenum (Mo)			98.2		%		80-120	10-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4163000								
WG2844445-4 LCS								
Nickel (Ni)			94.9		%		80-120	10-AUG-18
Selenium (Se)			95.1		%		80-120	10-AUG-18
Silver (Ag)			95.1		%		80-120	10-AUG-18
Thallium (Tl)			92.3		%		80-120	10-AUG-18
Uranium (U)			90.4		%		80-120	10-AUG-18
Vanadium (V)			99.96		%		80-120	10-AUG-18
Zinc (Zn)			91.9		%		80-120	10-AUG-18
WG2844445-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	10-AUG-18
Arsenic (As)			<0.10		mg/kg		0.1	10-AUG-18
Barium (Ba)			<0.50		mg/kg		0.5	10-AUG-18
Beryllium (Be)			<0.10		mg/kg		0.1	10-AUG-18
Boron (B)			<5.0		mg/kg		5	10-AUG-18
Cadmium (Cd)			<0.020		mg/kg		0.02	10-AUG-18
Chromium (Cr)			<0.50		mg/kg		0.5	10-AUG-18
Cobalt (Co)			<0.10		mg/kg		0.1	10-AUG-18
Copper (Cu)			<0.50		mg/kg		0.5	10-AUG-18
Lead (Pb)			<0.50		mg/kg		0.5	10-AUG-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	10-AUG-18
Nickel (Ni)			<0.50		mg/kg		0.5	10-AUG-18
Selenium (Se)			<0.20		mg/kg		0.2	10-AUG-18
Silver (Ag)			<0.10		mg/kg		0.1	10-AUG-18
Thallium (Tl)			<0.050		mg/kg		0.05	10-AUG-18
Uranium (U)			<0.050		mg/kg		0.05	10-AUG-18
Vanadium (V)			<0.20		mg/kg		0.2	10-AUG-18
Zinc (Zn)			<2.0		mg/kg		2	10-AUG-18
Batch R4169123								
WG2848024-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			95.7		%		70-130	14-AUG-18
Arsenic (As)			99.3		%		70-130	14-AUG-18
Barium (Ba)			103.0		%		70-130	14-AUG-18
Beryllium (Be)			97.8		%		70-130	14-AUG-18
Boron (B)			3.0		mg/kg		0-8.2	14-AUG-18
Cadmium (Cd)			96.7		%		70-130	14-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4169123								
WG2848024-2 CRM		**WT-CANMET-TILL1**						
Chromium (Cr)			98.0		%		70-130	14-AUG-18
Cobalt (Co)			98.2		%		70-130	14-AUG-18
Copper (Cu)			98.7		%		70-130	14-AUG-18
Lead (Pb)			91.6		%		70-130	14-AUG-18
Molybdenum (Mo)			97.1		%		70-130	14-AUG-18
Nickel (Ni)			98.1		%		70-130	14-AUG-18
Selenium (Se)			0.31		mg/kg		0.11-0.51	14-AUG-18
Silver (Ag)			0.23		mg/kg		0.13-0.33	14-AUG-18
Thallium (Tl)			0.111		mg/kg		0.077-0.18	14-AUG-18
Uranium (U)			90.5		%		70-130	14-AUG-18
Vanadium (V)			97.5		%		70-130	14-AUG-18
Zinc (Zn)			94.2		%		70-130	14-AUG-18
WG2848024-6 DUP		**L2143405-4**						
Antimony (Sb)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	14-AUG-18
Arsenic (As)		8.3	9.0		ug/g	8.4	30	14-AUG-18
Barium (Ba)		51.6	55.8		ug/g	7.8	40	14-AUG-18
Beryllium (Be)		0.98	1.20		ug/g	20	30	14-AUG-18
Boron (B)		20.1	24.8		ug/g	21	30	14-AUG-18
Cadmium (Cd)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	14-AUG-18
Chromium (Cr)		30.8	34.4		ug/g	11	30	14-AUG-18
Cobalt (Co)		19.0	20.7		ug/g	8.8	30	14-AUG-18
Copper (Cu)		47.4	49.1		ug/g	3.5	30	14-AUG-18
Lead (Pb)		3.5	4.4		ug/g	24	40	14-AUG-18
Molybdenum (Mo)		<1.0	<1.0	RPD-NA	ug/g	N/A	40	14-AUG-18
Nickel (Ni)		38.3	42.1		ug/g	9.4	30	14-AUG-18
Selenium (Se)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	14-AUG-18
Silver (Ag)		<0.20	<0.20	RPD-NA	ug/g	N/A	40	14-AUG-18
Thallium (Tl)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	14-AUG-18
Uranium (U)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	14-AUG-18
Vanadium (V)		39.8	44.6		ug/g	11	30	14-AUG-18
Zinc (Zn)		71.5	76.9		ug/g	7.2	30	14-AUG-18
WG2848024-4 LCS								
Antimony (Sb)			100.6		%		80-120	14-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4169123								
WG2848024-4 LCS								
Arsenic (As)			105.3		%		80-120	14-AUG-18
Barium (Ba)			107.5		%		80-120	14-AUG-18
Beryllium (Be)			111.5		%		80-120	14-AUG-18
Boron (B)			104.4		%		80-120	14-AUG-18
Cadmium (Cd)			100.3		%		80-120	14-AUG-18
Chromium (Cr)			104.1		%		80-120	14-AUG-18
Cobalt (Co)			103.7		%		80-120	14-AUG-18
Copper (Cu)			101.1		%		80-120	14-AUG-18
Lead (Pb)			101.5		%		80-120	14-AUG-18
Molybdenum (Mo)			115.5		%		80-120	14-AUG-18
Nickel (Ni)			104.2		%		80-120	14-AUG-18
Selenium (Se)			104.0		%		80-120	14-AUG-18
Silver (Ag)			98.2		%		80-120	14-AUG-18
Thallium (Tl)			102.1		%		80-120	14-AUG-18
Uranium (U)			100.7		%		80-120	14-AUG-18
Vanadium (V)			107.4		%		80-120	14-AUG-18
Zinc (Zn)			97.3		%		80-120	14-AUG-18
WG2848024-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	14-AUG-18
Arsenic (As)			<0.10		mg/kg		0.1	14-AUG-18
Barium (Ba)			<0.50		mg/kg		0.5	14-AUG-18
Beryllium (Be)			<0.10		mg/kg		0.1	14-AUG-18
Boron (B)			<5.0		mg/kg		5	14-AUG-18
Cadmium (Cd)			<0.020		mg/kg		0.02	14-AUG-18
Chromium (Cr)			<0.50		mg/kg		0.5	14-AUG-18
Cobalt (Co)			<0.10		mg/kg		0.1	14-AUG-18
Copper (Cu)			<0.50		mg/kg		0.5	14-AUG-18
Lead (Pb)			<0.50		mg/kg		0.5	14-AUG-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	14-AUG-18
Nickel (Ni)			<0.50		mg/kg		0.5	14-AUG-18
Selenium (Se)			<0.20		mg/kg		0.2	14-AUG-18
Silver (Ag)			<0.10		mg/kg		0.1	14-AUG-18
Thallium (Tl)			<0.050		mg/kg		0.05	14-AUG-18
Uranium (U)			<0.050		mg/kg		0.05	14-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4169123								
WG2848024-1 MB								
Vanadium (V)			<0.20		mg/kg		0.2	14-AUG-18
Zinc (Zn)			<2.0		mg/kg		2	14-AUG-18
MOISTURE-WT	**Soil**							
Batch R4162559								
WG2844812-15 DUP		**L2141637-1**						
% Moisture		6.70	6.51		%	2.8	20	10-AUG-18
WG2844812-14 LCS								
% Moisture			100.1		%		90-110	10-AUG-18
WG2844812-13 MB								
% Moisture			<0.10		%		0.1	10-AUG-18
Batch R4170790								
WG2850289-3 DUP		**L2141637-5**						
% Moisture		5.15	5.14		%	0.2	20	16-AUG-18
WG2850289-2 LCS								
% Moisture			99.7		%		90-110	16-AUG-18
WG2850289-1 MB								
% Moisture			<0.10		%		0.1	16-AUG-18
PAH-511-WT	**Soil**							
Batch R4166289								
WG2842353-5 DUP		**WG2842353-1**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	13-AUG-18
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	13-AUG-18
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4166289								
WG2842353-5 DUP		**WG2842353-1**						
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
Naphthalene		<0.013	<0.013	RPD-NA	ug/g	N/A	40	13-AUG-18
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	13-AUG-18
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-AUG-18
WG2842353-3 LCS								
1-Methylnaphthalene			92.9		%		50-140	13-AUG-18
2-Methylnaphthalene			93.0		%		50-140	13-AUG-18
Acenaphthene			93.9		%		50-140	13-AUG-18
Acenaphthylene			88.4		%		50-140	13-AUG-18
Anthracene			85.9		%		50-140	13-AUG-18
Benzo(a)anthracene			85.7		%		50-140	13-AUG-18
Benzo(a)pyrene			88.9		%		50-140	13-AUG-18
Benzo(b)fluoranthene			84.8		%		50-140	13-AUG-18
Benzo(g,h,i)perylene			80.0		%		50-140	13-AUG-18
Benzo(k)fluoranthene			94.2		%		50-140	13-AUG-18
Chrysene			90.1		%		50-140	13-AUG-18
Dibenzo(ah)anthracene			82.0		%		50-140	13-AUG-18
Fluoranthene			86.4		%		50-140	13-AUG-18
Fluorene			89.4		%		50-140	13-AUG-18
Indeno(1,2,3-cd)pyrene			78.0		%		50-140	13-AUG-18
Naphthalene			91.2		%		50-140	13-AUG-18
Phenanthrene			89.9		%		50-140	13-AUG-18
Pyrene			86.6		%		50-140	13-AUG-18
WG2842353-2 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	13-AUG-18
2-Methylnaphthalene			<0.030		ug/g		0.03	13-AUG-18
Acenaphthene			<0.050		ug/g		0.05	13-AUG-18
Acenaphthylene			<0.050		ug/g		0.05	13-AUG-18
Anthracene			<0.050		ug/g		0.05	13-AUG-18
Benzo(a)anthracene			<0.050		ug/g		0.05	13-AUG-18
Benzo(a)pyrene			<0.050		ug/g		0.05	13-AUG-18
Benzo(b)fluoranthene			<0.050		ug/g		0.05	13-AUG-18
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	13-AUG-18
Benzo(k)fluoranthene			<0.050		ug/g		0.05	13-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4166289								
WG2842353-2 MB								
Chrysene			<0.050		ug/g		0.05	13-AUG-18
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	13-AUG-18
Fluoranthene			<0.050		ug/g		0.05	13-AUG-18
Fluorene			<0.050		ug/g		0.05	13-AUG-18
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	13-AUG-18
Naphthalene			<0.013		ug/g		0.013	13-AUG-18
Phenanthrene			<0.046		ug/g		0.046	13-AUG-18
Pyrene			<0.050		ug/g		0.05	13-AUG-18
Surrogate: 2-Fluorobiphenyl			88.9		%		50-140	13-AUG-18
Surrogate: p-Terphenyl d14			91.9		%		50-140	13-AUG-18
WG2842353-4 MS		**WG2842353-1**						
1-Methylnaphthalene			86.8		%		50-140	13-AUG-18
2-Methylnaphthalene			87.0		%		50-140	13-AUG-18
Acenaphthene			88.5		%		50-140	13-AUG-18
Acenaphthylene			84.1		%		50-140	13-AUG-18
Anthracene			82.9		%		50-140	13-AUG-18
Benzo(a)anthracene			83.2		%		50-140	13-AUG-18
Benzo(a)pyrene			85.1		%		50-140	13-AUG-18
Benzo(b)fluoranthene			83.0		%		50-140	13-AUG-18
Benzo(g,h,i)perylene			75.2		%		50-140	13-AUG-18
Benzo(k)fluoranthene			87.1		%		50-140	13-AUG-18
Chrysene			85.1		%		50-140	13-AUG-18
Dibenzo(ah)anthracene			80.9		%		50-140	13-AUG-18
Fluoranthene			84.5		%		50-140	13-AUG-18
Fluorene			84.5		%		50-140	13-AUG-18
Indeno(1,2,3-cd)pyrene			74.5		%		50-140	13-AUG-18
Naphthalene			85.3		%		50-140	13-AUG-18
Phenanthrene			84.3		%		50-140	13-AUG-18
Pyrene			84.9		%		50-140	13-AUG-18
PCB-511-WT	**Soil**							
Batch R4162722								
WG2842353-5 DUP		**WG2842353-1**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	10-AUG-18
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	10-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Soil**							
Batch R4162722								
WG2842353-5 DUP		**WG2842353-1**						
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	10-AUG-18
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	10-AUG-18
WG2842353-3 LCS								
Aroclor 1242			81.4		%		60-140	10-AUG-18
Aroclor 1248			82.5		%		60-140	10-AUG-18
Aroclor 1254			88.4		%		60-140	10-AUG-18
Aroclor 1260			102.2		%		60-140	10-AUG-18
WG2842353-2 MB								
Aroclor 1242			<0.010		ug/g		0.01	10-AUG-18
Aroclor 1248			<0.010		ug/g		0.01	10-AUG-18
Aroclor 1254			<0.010		ug/g		0.01	10-AUG-18
Aroclor 1260			<0.010		ug/g		0.01	10-AUG-18
Surrogate: d14-Terphenyl			82.1		%		60-140	10-AUG-18
WG2842353-4 MS		**WG2842353-1**						
Aroclor 1242			80.9		%		60-140	10-AUG-18
Aroclor 1254			87.3		%		60-140	10-AUG-18
Aroclor 1260			105.6		%		60-140	10-AUG-18
PH-WT	**Soil**							
Batch R4161942								
WG2844189-1 DUP		**L2141639-2**						
pH		7.33	7.28	J	pH units	0.05	0.3	09-AUG-18
WG2844713-1 LCS								
pH			6.96		pH units		6.9-7.1	09-AUG-18
SAR-R511-WT	**Soil**							
Batch R4163090								
WG2845203-4 DUP		**WG2845203-3**						
Calcium (Ca)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	10-AUG-18
Sodium (Na)		83.1	84.5		mg/L	1.6	30	10-AUG-18
Magnesium (Mg)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	10-AUG-18
WG2845203-2 IRM		**WT SAR2**						
Calcium (Ca)			100.6		%		70-130	10-AUG-18
Calcium (Ca)			100.6		%		70-130	10-AUG-18
Sodium (Na)			101.7		%		70-130	10-AUG-18
Magnesium (Mg)			96.6		%		70-130	10-AUG-18
WG2845203-1 MB								

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R4163090								
WG2845203-1 MB								
Calcium (Ca)			<1.0		mg/L		1	10-AUG-18
Sodium (Na)			<1.0		mg/L		1	10-AUG-18
Magnesium (Mg)			<1.0		mg/L		1	10-AUG-18
Batch R4166748								
WG2845605-4 DUP		**WG2845605-3**						
Calcium (Ca)		6.7	6.1		mg/L	9.0	30	10-AUG-18
Sodium (Na)		2.8	2.4		mg/L	15	30	10-AUG-18
Magnesium (Mg)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	10-AUG-18
WG2845605-2 IRM		**WT SAR2**						
Calcium (Ca)			101.3		%		70-130	10-AUG-18
Sodium (Na)			100.7		%		70-130	10-AUG-18
Magnesium (Mg)			95.8		%		70-130	10-AUG-18
WG2845605-1 MB								
Calcium (Ca)			<1.0		mg/L		1	10-AUG-18
Sodium (Na)			<1.0		mg/L		1	10-AUG-18
Magnesium (Mg)			<1.0		mg/L		1	10-AUG-18
VOC-511-HS-WT	**Soil**							
Batch R4161900								
WG2842810-4 DUP		**WG2842810-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	09-AUG-18
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	09-AUG-18
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4161900								
WG2842810-4 DUP		**WG2842810-3**						
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	09-AUG-18
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	09-AUG-18
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	09-AUG-18
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	09-AUG-18
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	09-AUG-18
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	09-AUG-18
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	09-AUG-18
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	09-AUG-18
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	09-AUG-18
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	09-AUG-18
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	09-AUG-18
WG2842810-2 LCS								
1,1,1,2-Tetrachloroethane			103.3		%		60-130	09-AUG-18
1,1,2,2-Tetrachloroethane			105.5		%		60-130	09-AUG-18
1,1,1-Trichloroethane			96.1		%		60-130	09-AUG-18
1,1,2-Trichloroethane			108.2		%		60-130	09-AUG-18
1,1-Dichloroethane			100.6		%		60-130	09-AUG-18
1,1-Dichloroethylene			85.2		%		60-130	09-AUG-18
1,2-Dibromoethane			108.2		%		70-130	09-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4161900								
WG2842810-2 LCS								
1,2-Dichlorobenzene			108.6		%		70-130	09-AUG-18
1,2-Dichloroethane			96.4		%		60-130	09-AUG-18
1,2-Dichloropropane			108.9		%		70-130	09-AUG-18
1,3-Dichlorobenzene			105.1		%		70-130	09-AUG-18
1,4-Dichlorobenzene			106.2		%		70-130	09-AUG-18
Acetone			99.7		%		60-140	09-AUG-18
Benzene			109.5		%		70-130	09-AUG-18
Bromodichloromethane			105.9		%		50-140	09-AUG-18
Bromoform			106.5		%		70-130	09-AUG-18
Bromomethane			90.6		%		50-140	09-AUG-18
Carbon tetrachloride			96.6		%		70-130	09-AUG-18
Chlorobenzene			104.7		%		70-130	09-AUG-18
Chloroform			103.7		%		70-130	09-AUG-18
cis-1,2-Dichloroethylene			107.2		%		70-130	09-AUG-18
cis-1,3-Dichloropropene			116.0		%		70-130	09-AUG-18
Dibromochloromethane			103.5		%		60-130	09-AUG-18
Dichlorodifluoromethane			107.0		%		50-140	09-AUG-18
Ethylbenzene			92.7		%		70-130	09-AUG-18
n-Hexane			104.5		%		70-130	09-AUG-18
Methylene Chloride			109.4		%		70-130	09-AUG-18
MTBE			107.9		%		70-130	09-AUG-18
m+p-Xylenes			96.3		%		70-130	09-AUG-18
Methyl Ethyl Ketone			119.9		%		60-140	09-AUG-18
Methyl Isobutyl Ketone			102.6		%		60-140	09-AUG-18
o-Xylene			92.3		%		70-130	09-AUG-18
Styrene			96.0		%		70-130	09-AUG-18
Tetrachloroethylene			100.9		%		60-130	09-AUG-18
Toluene			97.4		%		70-130	09-AUG-18
trans-1,2-Dichloroethylene			96.4		%		60-130	09-AUG-18
trans-1,3-Dichloropropene			102.3		%		70-130	09-AUG-18
Trichloroethylene			110.7		%		60-130	09-AUG-18
Trichlorofluoromethane			99.6		%		50-140	09-AUG-18
Vinyl chloride			99.6		%		60-140	09-AUG-18
WG2842810-1 MB								

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4161900								
WG2842810-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	09-AUG-18
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	09-AUG-18
1,1,1-Trichloroethane			<0.050		ug/g		0.05	09-AUG-18
1,1,2-Trichloroethane			<0.050		ug/g		0.05	09-AUG-18
1,1-Dichloroethane			<0.050		ug/g		0.05	09-AUG-18
1,1-Dichloroethylene			<0.050		ug/g		0.05	09-AUG-18
1,2-Dibromoethane			<0.050		ug/g		0.05	09-AUG-18
1,2-Dichlorobenzene			<0.050		ug/g		0.05	09-AUG-18
1,2-Dichloroethane			<0.050		ug/g		0.05	09-AUG-18
1,2-Dichloropropane			<0.050		ug/g		0.05	09-AUG-18
1,3-Dichlorobenzene			<0.050		ug/g		0.05	09-AUG-18
1,4-Dichlorobenzene			<0.050		ug/g		0.05	09-AUG-18
Acetone			<0.50		ug/g		0.5	09-AUG-18
Benzene			<0.0068		ug/g		0.0068	09-AUG-18
Bromodichloromethane			<0.050		ug/g		0.05	09-AUG-18
Bromoform			<0.050		ug/g		0.05	09-AUG-18
Bromomethane			<0.050		ug/g		0.05	09-AUG-18
Carbon tetrachloride			<0.050		ug/g		0.05	09-AUG-18
Chlorobenzene			<0.050		ug/g		0.05	09-AUG-18
Chloroform			<0.050		ug/g		0.05	09-AUG-18
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	09-AUG-18
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	09-AUG-18
Dibromochloromethane			<0.050		ug/g		0.05	09-AUG-18
Dichlorodifluoromethane			<0.050		ug/g		0.05	09-AUG-18
Ethylbenzene			<0.018		ug/g		0.018	09-AUG-18
n-Hexane			<0.050		ug/g		0.05	09-AUG-18
Methylene Chloride			<0.050		ug/g		0.05	09-AUG-18
MTBE			<0.050		ug/g		0.05	09-AUG-18
m+p-Xylenes			<0.030		ug/g		0.03	09-AUG-18
Methyl Ethyl Ketone			<0.50		ug/g		0.5	09-AUG-18
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	09-AUG-18
o-Xylene			<0.020		ug/g		0.02	09-AUG-18
Styrene			<0.050		ug/g		0.05	09-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4161900								
WG2842810-1 MB								
Tetrachloroethylene			<0.050		ug/g		0.05	09-AUG-18
Toluene			<0.080		ug/g		0.08	09-AUG-18
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	09-AUG-18
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	09-AUG-18
Trichloroethylene			<0.010		ug/g		0.01	09-AUG-18
Trichlorofluoromethane			<0.050		ug/g		0.05	09-AUG-18
Vinyl chloride			<0.020		ug/g		0.02	09-AUG-18
Surrogate: 1,4-Difluorobenzene			104.3		%		50-140	09-AUG-18
Surrogate: 4-Bromofluorobenzene			101.3		%		50-140	09-AUG-18
WG2842810-5 MS		**L2140121-22**						
1,1,1,2-Tetrachloroethane			102.0		%		50-140	09-AUG-18
1,1,2,2-Tetrachloroethane			91.8		%		50-140	09-AUG-18
1,1,1-Trichloroethane			98.3		%		50-140	09-AUG-18
1,1,2-Trichloroethane			98.7		%		50-140	09-AUG-18
1,1-Dichloroethane			99.0		%		50-140	09-AUG-18
1,1-Dichloroethylene			88.5		%		50-140	09-AUG-18
1,2-Dibromoethane			96.0		%		50-140	09-AUG-18
1,2-Dichlorobenzene			106.4		%		50-140	09-AUG-18
1,2-Dichloroethane			84.6		%		50-140	09-AUG-18
1,2-Dichloropropane			102.2		%		50-140	09-AUG-18
1,3-Dichlorobenzene			106.7		%		50-140	09-AUG-18
1,4-Dichlorobenzene			107.1		%		50-140	09-AUG-18
Acetone			85.2		%		50-140	09-AUG-18
Benzene			107.3		%		50-140	09-AUG-18
Bromodichloromethane			98.3		%		50-140	09-AUG-18
Bromoform			94.9		%		50-140	09-AUG-18
Bromomethane			86.9		%		50-140	09-AUG-18
Carbon tetrachloride			100.4		%		50-140	09-AUG-18
Chlorobenzene			103.6		%		50-140	09-AUG-18
Chloroform			100.3		%		50-140	09-AUG-18
cis-1,2-Dichloroethylene			103.1		%		50-140	09-AUG-18
cis-1,3-Dichloropropene			102.5		%		50-140	09-AUG-18
Dibromochloromethane			96.1		%		50-140	09-AUG-18
Dichlorodifluoromethane			110.9		%		50-140	09-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4161900								
WG2842810-5 MS		**L2140121-22**						
Ethylbenzene			97.0		%		50-140	09-AUG-18
n-Hexane			112.1		%		50-140	09-AUG-18
Methylene Chloride			101.9		%		50-140	09-AUG-18
MTBE			107.0		%		50-140	09-AUG-18
m+p-Xylenes			99.4		%		50-140	09-AUG-18
Methyl Ethyl Ketone			93.3		%		50-140	09-AUG-18
Methyl Isobutyl Ketone			80.5		%		50-140	09-AUG-18
o-Xylene			93.8		%		50-140	09-AUG-18
Styrene			93.7		%		50-140	09-AUG-18
Tetrachloroethylene			106.9		%		50-140	09-AUG-18
Toluene			101.0		%		50-140	09-AUG-18
trans-1,2-Dichloroethylene			96.7		%		50-140	09-AUG-18
trans-1,3-Dichloropropene			90.9		%		50-140	09-AUG-18
Trichloroethylene			111.5		%		50-140	09-AUG-18
Trichlorofluoromethane			105.9		%		50-140	09-AUG-18
Vinyl chloride			103.5		%		50-140	09-AUG-18
Batch R4170988								
WG2850539-4 DUP		**WG2850539-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
1,1,2,2-Tetrachloroethane		<0.20	<0.20	RPD-NA	ug/g	N/A	40	16-AUG-18
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
1,2-Dichlorobenzene		0.074	0.081		ug/g	8.8	40	16-AUG-18
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	16-AUG-18
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	16-AUG-18
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4170988								
WG2850539-4 DUP		**WG2850539-3**						
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	16-AUG-18
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	16-AUG-18
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
m+p-Xylenes		0.087	0.088		ug/g	1.1	40	16-AUG-18
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	16-AUG-18
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	16-AUG-18
o-Xylene		0.047	0.047		ug/g	0.7	40	16-AUG-18
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	16-AUG-18
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	16-AUG-18
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	16-AUG-18
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-AUG-18
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	16-AUG-18
WG2850539-2 LCS								
1,1,1,2-Tetrachloroethane			102.1		%		60-130	16-AUG-18
1,1,2,2-Tetrachloroethane			97.5		%		60-130	16-AUG-18
1,1,1-Trichloroethane			103.6		%		60-130	16-AUG-18
1,1,2-Trichloroethane			100.9		%		60-130	16-AUG-18
1,1-Dichloroethane			92.5		%		60-130	16-AUG-18
1,1-Dichloroethylene			92.7		%		60-130	16-AUG-18
1,2-Dibromoethane			98.5		%		70-130	16-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4170988								
WG2850539-2 LCS								
1,2-Dichlorobenzene			110.2		%		70-130	16-AUG-18
1,2-Dichloroethane			96.4		%		60-130	16-AUG-18
1,2-Dichloropropane			97.6		%		70-130	16-AUG-18
1,3-Dichlorobenzene			109.9		%		70-130	16-AUG-18
1,4-Dichlorobenzene			111.5		%		70-130	16-AUG-18
Acetone			80.6		%		60-140	16-AUG-18
Benzene			106.2		%		70-130	16-AUG-18
Bromodichloromethane			104.5		%		50-140	16-AUG-18
Bromoform			99.4		%		70-130	16-AUG-18
Bromomethane			85.2		%		50-140	16-AUG-18
Carbon tetrachloride			107.3		%		70-130	16-AUG-18
Chlorobenzene			109.2		%		70-130	16-AUG-18
Chloroform			106.3		%		70-130	16-AUG-18
cis-1,2-Dichloroethylene			112.4		%		70-130	16-AUG-18
cis-1,3-Dichloropropene			100.0		%		70-130	16-AUG-18
Dibromochloromethane			100.5		%		60-130	16-AUG-18
Dichlorodifluoromethane			90.6		%		50-140	16-AUG-18
Ethylbenzene			102.5		%		70-130	16-AUG-18
n-Hexane			105.8		%		70-130	16-AUG-18
Methylene Chloride			102.4		%		70-130	16-AUG-18
MTBE			111.9		%		70-130	16-AUG-18
m+p-Xylenes			104.0		%		70-130	16-AUG-18
Methyl Ethyl Ketone			89.0		%		60-140	16-AUG-18
Methyl Isobutyl Ketone			76.8		%		60-140	16-AUG-18
o-Xylene			99.9		%		70-130	16-AUG-18
Styrene			102.3		%		70-130	16-AUG-18
Tetrachloroethylene			116.0		%		60-130	16-AUG-18
Toluene			103.9		%		70-130	16-AUG-18
trans-1,2-Dichloroethylene			98.1		%		60-130	16-AUG-18
trans-1,3-Dichloropropene			86.9		%		70-130	16-AUG-18
Trichloroethylene			120.9		%		60-130	16-AUG-18
Trichlorofluoromethane			111.9		%		50-140	16-AUG-18
Vinyl chloride			90.2		%		60-140	16-AUG-18
WG2850539-1 MB								

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4170988								
WG2850539-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	16-AUG-18
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	16-AUG-18
1,1,1-Trichloroethane			<0.050		ug/g		0.05	16-AUG-18
1,1,2-Trichloroethane			<0.050		ug/g		0.05	16-AUG-18
1,1-Dichloroethane			<0.050		ug/g		0.05	16-AUG-18
1,1-Dichloroethylene			<0.050		ug/g		0.05	16-AUG-18
1,2-Dibromoethane			<0.050		ug/g		0.05	16-AUG-18
1,2-Dichlorobenzene			<0.050		ug/g		0.05	16-AUG-18
1,2-Dichloroethane			<0.050		ug/g		0.05	16-AUG-18
1,2-Dichloropropane			<0.050		ug/g		0.05	16-AUG-18
1,3-Dichlorobenzene			<0.050		ug/g		0.05	16-AUG-18
1,4-Dichlorobenzene			<0.050		ug/g		0.05	16-AUG-18
Acetone			<0.50		ug/g		0.5	16-AUG-18
Benzene			<0.0068		ug/g		0.0068	16-AUG-18
Bromodichloromethane			<0.050		ug/g		0.05	16-AUG-18
Bromoform			<0.050		ug/g		0.05	16-AUG-18
Bromomethane			<0.050		ug/g		0.05	16-AUG-18
Carbon tetrachloride			<0.050		ug/g		0.05	16-AUG-18
Chlorobenzene			<0.050		ug/g		0.05	16-AUG-18
Chloroform			<0.050		ug/g		0.05	16-AUG-18
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	16-AUG-18
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	16-AUG-18
Dibromochloromethane			<0.050		ug/g		0.05	16-AUG-18
Dichlorodifluoromethane			<0.050		ug/g		0.05	16-AUG-18
Ethylbenzene			<0.018		ug/g		0.018	16-AUG-18
n-Hexane			<0.050		ug/g		0.05	16-AUG-18
Methylene Chloride			<0.050		ug/g		0.05	16-AUG-18
MTBE			<0.050		ug/g		0.05	16-AUG-18
m+p-Xylenes			<0.030		ug/g		0.03	16-AUG-18
Methyl Ethyl Ketone			<0.50		ug/g		0.5	16-AUG-18
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	16-AUG-18
o-Xylene			<0.020		ug/g		0.02	16-AUG-18
Styrene			<0.050		ug/g		0.05	16-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4170988								
WG2850539-1 MB								
Tetrachloroethylene			<0.050		ug/g		0.05	16-AUG-18
Toluene			<0.080		ug/g		0.08	16-AUG-18
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	16-AUG-18
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	16-AUG-18
Trichloroethylene			<0.010		ug/g		0.01	16-AUG-18
Trichlorofluoromethane			<0.050		ug/g		0.05	16-AUG-18
Vinyl chloride			<0.020		ug/g		0.02	16-AUG-18
Surrogate: 1,4-Difluorobenzene			105.2		%		50-140	16-AUG-18
Surrogate: 4-Bromofluorobenzene			104.1		%		50-140	16-AUG-18
WG2850539-5 MS		**L2146663-10**						
1,1,1,2-Tetrachloroethane			104.8		%		50-140	16-AUG-18
1,1,2,2-Tetrachloroethane			95.8		%		50-140	16-AUG-18
1,1,1-Trichloroethane			104.9		%		50-140	16-AUG-18
1,1,2-Trichloroethane			107.0		%		50-140	16-AUG-18
1,1-Dichloroethane			94.6		%		50-140	16-AUG-18
1,1-Dichloroethylene			93.0		%		50-140	16-AUG-18
1,2-Dibromoethane			103.5		%		50-140	16-AUG-18
1,2-Dichlorobenzene			102.1		%		50-140	16-AUG-18
1,2-Dichloroethane			100.9		%		50-140	16-AUG-18
1,2-Dichloropropane			100.8		%		50-140	16-AUG-18
1,3-Dichlorobenzene			102.3		%		50-140	16-AUG-18
1,4-Dichlorobenzene			103.2		%		50-140	16-AUG-18
Acetone			76.2		%		50-140	16-AUG-18
Benzene			107.6		%		50-140	16-AUG-18
Bromodichloromethane			107.9		%		50-140	16-AUG-18
Bromoform			105.2		%		50-140	16-AUG-18
Bromomethane			86.6		%		50-140	16-AUG-18
Carbon tetrachloride			107.3		%		50-140	16-AUG-18
Chlorobenzene			110.1		%		50-140	16-AUG-18
Chloroform			109.3		%		50-140	16-AUG-18
cis-1,2-Dichloroethylene			115.3		%		50-140	16-AUG-18
cis-1,3-Dichloropropene			98.2		%		50-140	16-AUG-18
Dibromochloromethane			105.7		%		50-140	16-AUG-18
Dichlorodifluoromethane			91.2		%		50-140	16-AUG-18

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4170988								
WG2850539-5 MS		**L2146663-10**						
Ethylbenzene			101.8		%		50-140	16-AUG-18
n-Hexane			99.6		%		50-140	16-AUG-18
Methylene Chloride			105.7		%		50-140	16-AUG-18
MTBE			115.7		%		50-140	16-AUG-18
m+p-Xylenes			101.6		%		50-140	16-AUG-18
Methyl Ethyl Ketone			94.8		%		50-140	16-AUG-18
Methyl Isobutyl Ketone			83.6		%		50-140	16-AUG-18
o-Xylene			98.2		%		50-140	16-AUG-18
Styrene			101.6		%		50-140	16-AUG-18
Tetrachloroethylene			112.2		%		50-140	16-AUG-18
Toluene			104.0		%		50-140	16-AUG-18
trans-1,2-Dichloroethylene			98.4		%		50-140	16-AUG-18
trans-1,3-Dichloropropene			89.4		%		50-140	16-AUG-18
Trichloroethylene			121.5		%		50-140	16-AUG-18
Trichlorofluoromethane			112.9		%		50-140	16-AUG-18
Vinyl chloride			91.0		%		50-140	16-AUG-18

Quality Control Report

Workorder: L2141637 Report Date: 16-AUG-18

Client: HLV2K Engineering Limited (Brampton)
2179 Dunwin Drive Unit 4
Mississauga ON L5L 1X2
Contact: John Lametti

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

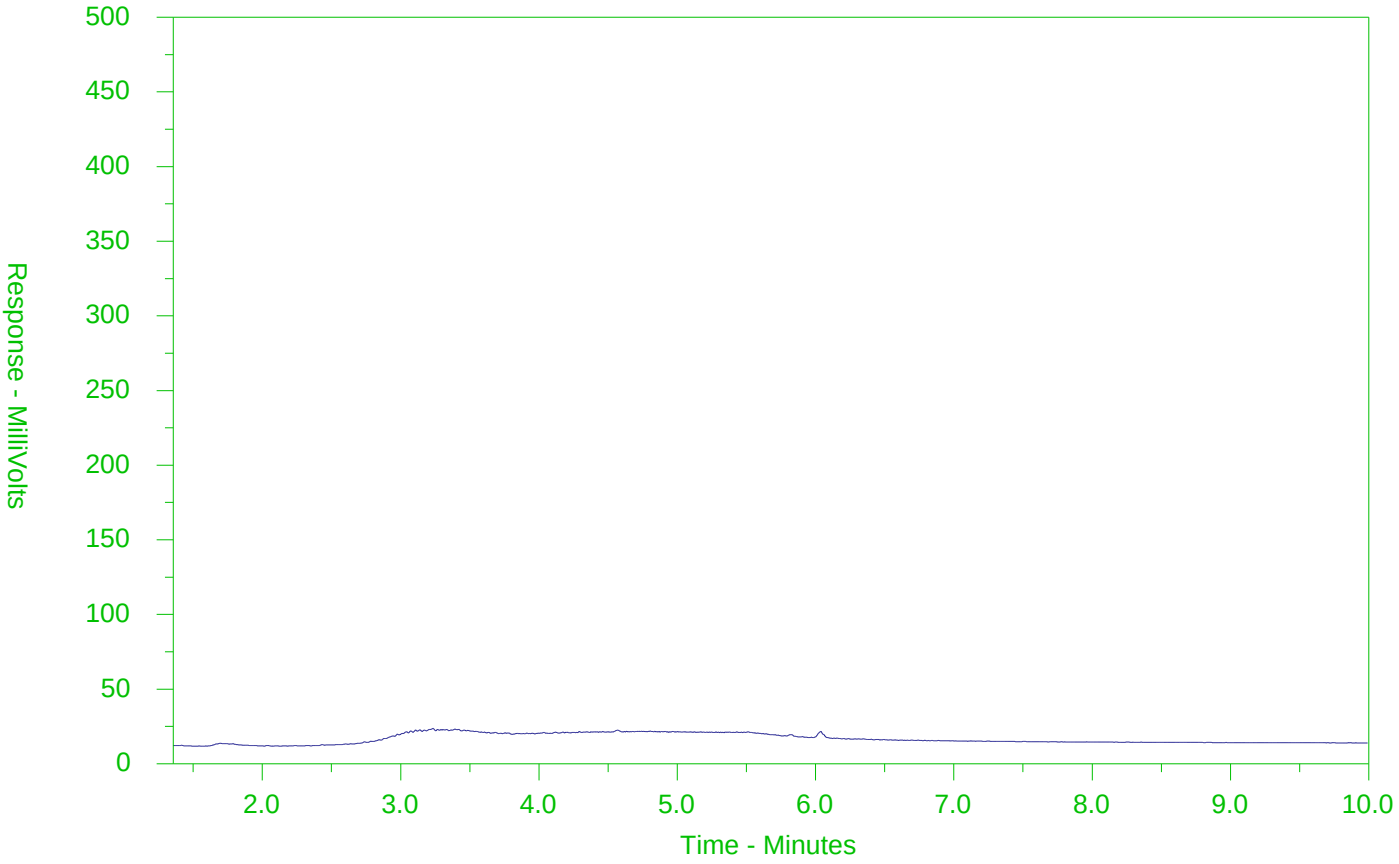
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141637-1
Client Sample ID: BH1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

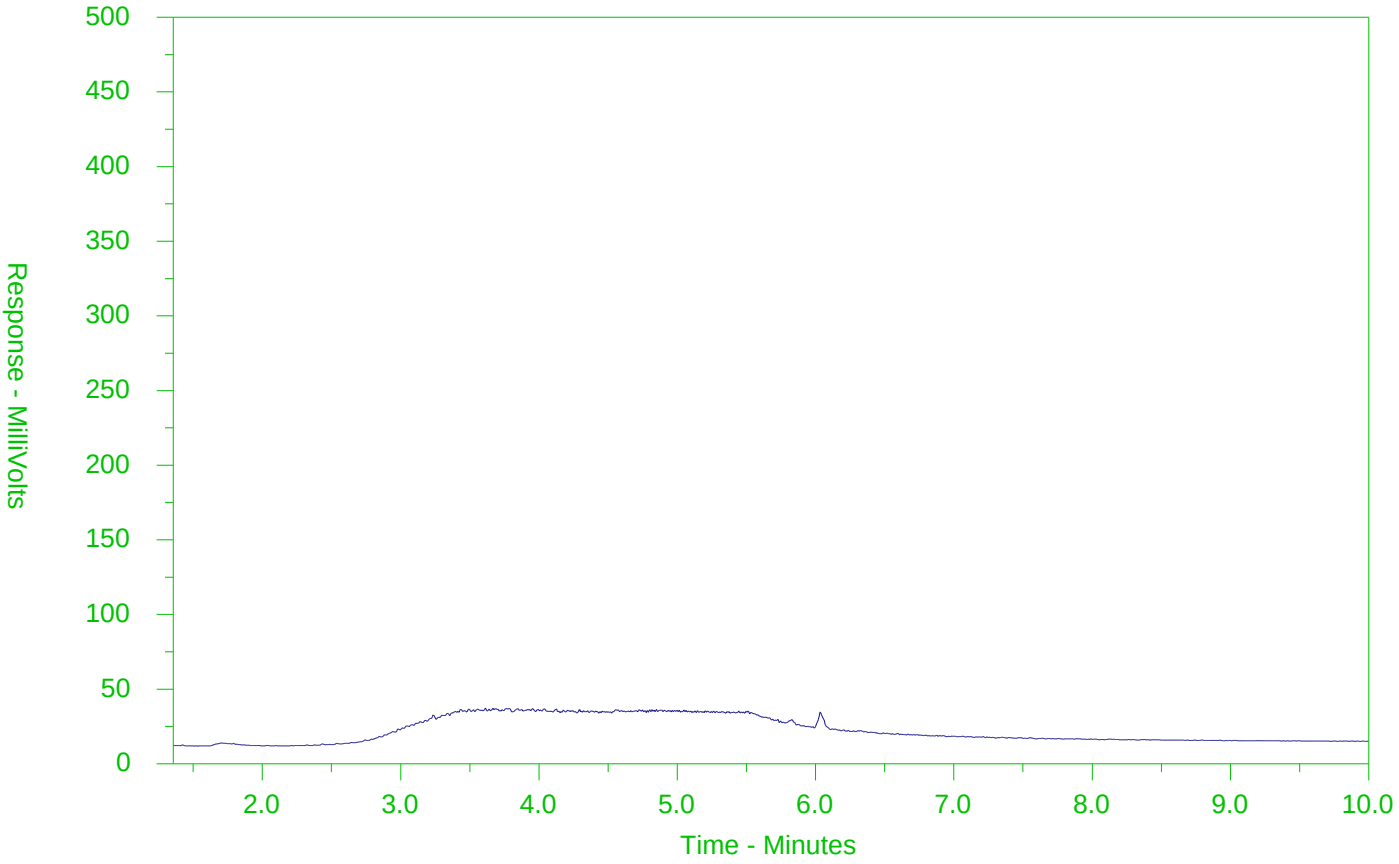
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141637-2
Client Sample ID: BH2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

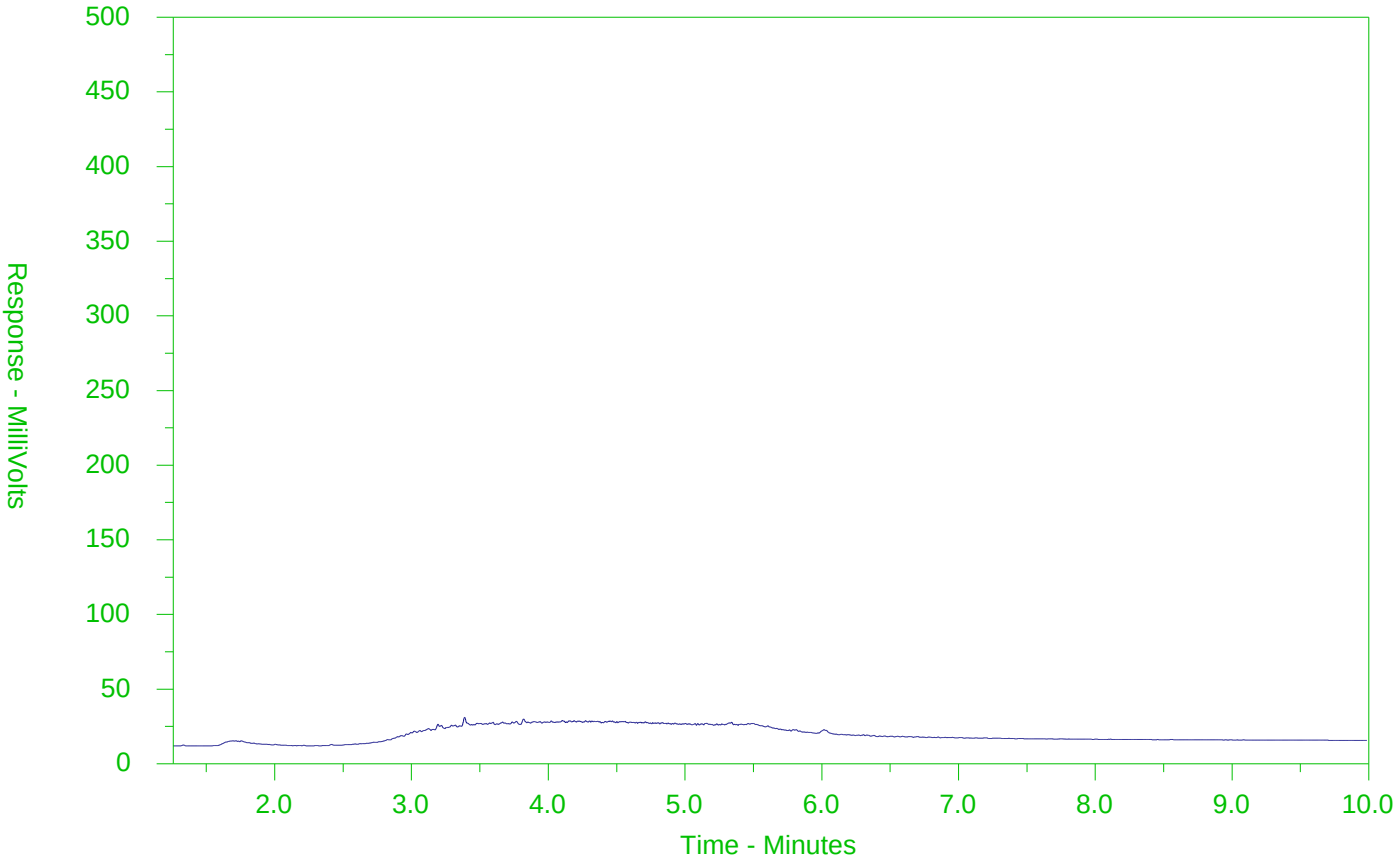
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141637-3
Client Sample ID: BH3



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

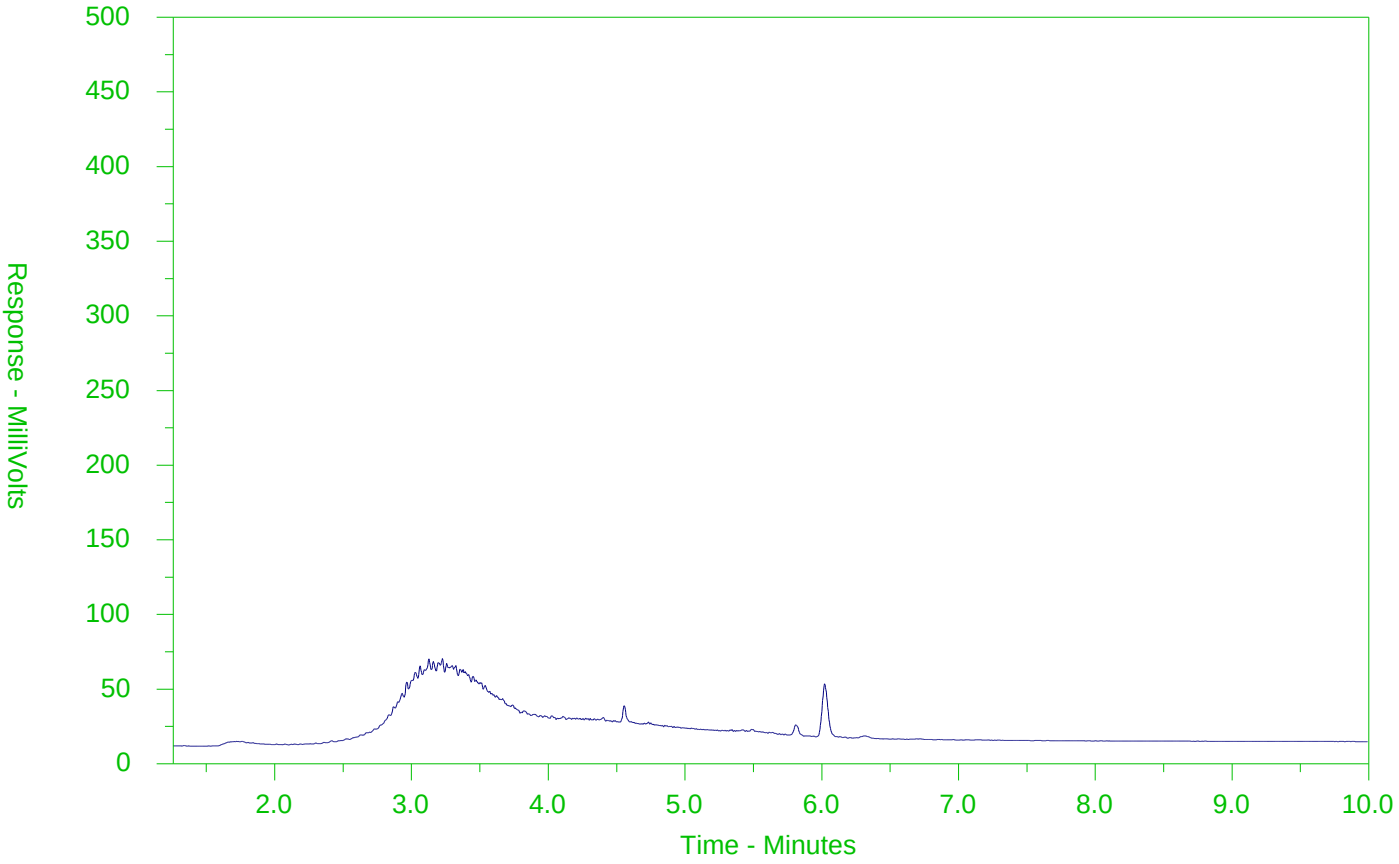
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141637-4
Client Sample ID: BH4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

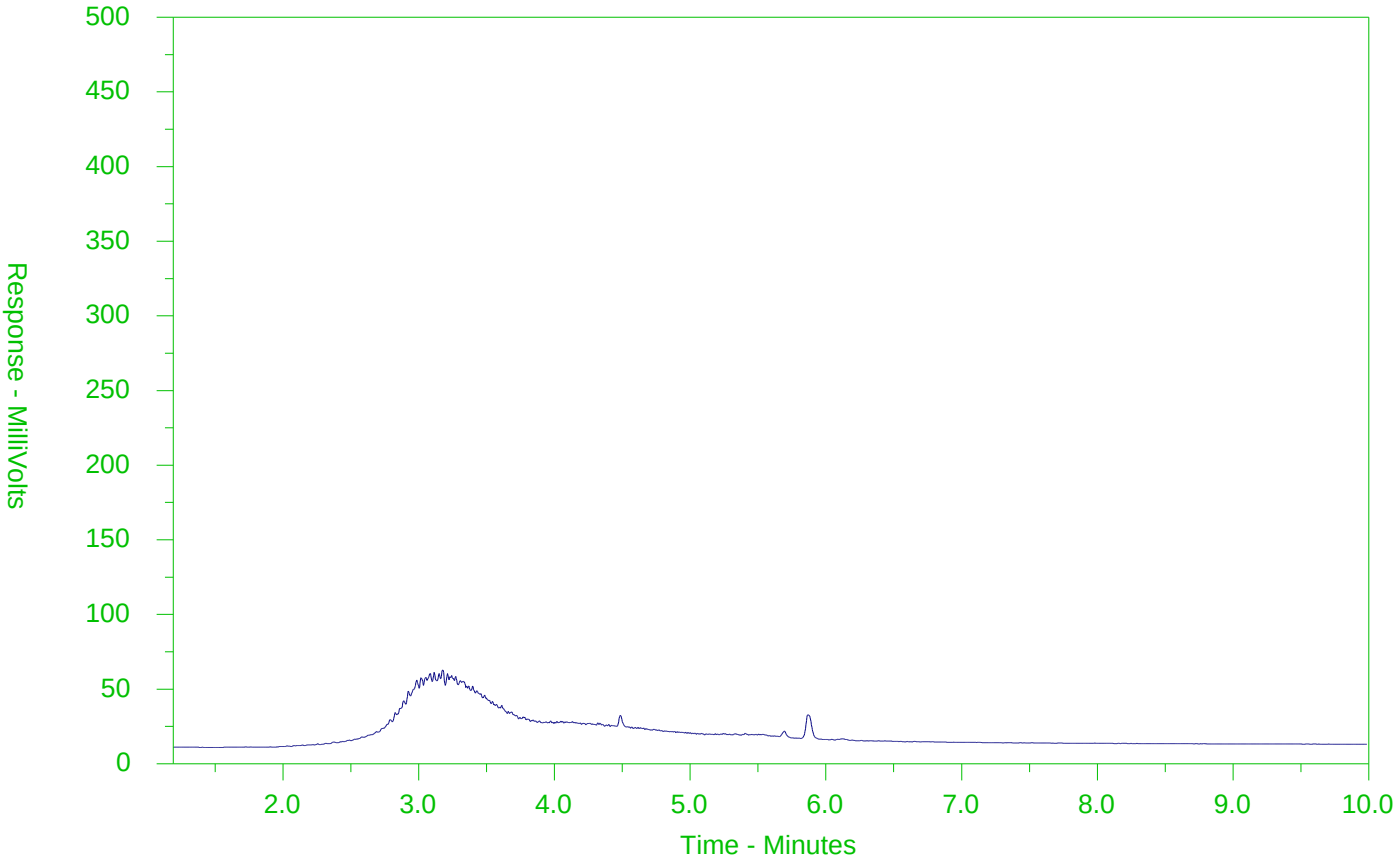
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141637-6
Client Sample ID: DUPE2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2141637-COFC

COC Number: 17 - 630438

Page of

Report To	Contact and company name below will appear on the final report
Company:	HLVJK Engineering Limited
Contact:	John Lametti
Phone:	647-926-8070
	Company address below will appear on the final report
Street:	2179 Derwin Dr. Unit 4
City/Province:	Mississauga ON
Postal Code:	L5L 1X2
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	HLVJK Engineering Limited
Contact:	Manny Virani

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	John.lametti@HLVJK.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	MANNY.VIRANI@HLVJK.COM
Email 2	

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)			
Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply		
PRIORITY (Business Days)	4 day [P4-20%] ☐	EMERGENCY	1 Business day [E-100%] ☐
	3 day [P3-25%] ☐		Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐
	2 day [P2-50%] ☐		
Date and Time Required for all E&P TATs:	dd-mmm-yy hh:mm		
For tests that can not be performed according to the service level selected, you will be contacted.			

Project Information	
ALS Account # / Quote #:	180064 EDD Q61253
Job #:	180064AE
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2141637 04B

ALS Contact: AF.

Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET	ACB	PAH	PHC F2-F4	VOC + F1	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	BH1	02-Aug-18	7:00	Soil	V	V	V	V	V			
2	BH2	02-Aug-18	7:00	Soil	V	V	V	V	V			
3	BH3	02-Aug-18	7:00	Soil	V	V	V	V	V			
4	BH4	02-Aug-18	7:00	Soil	V	V	V	V	V			
5	Dupe1	02-Aug-18	7:00	Soil					X			
6	Dupe2	02-Aug-18	7:00	Soil	X	X	X	X				

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

TABLE 2 RPI

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☒ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
-0.3				8.0			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: J Hopkins	Date: 8/2/2018	Time: 8:00	Received by: AF	Date: Aug 3 2018	Time: 9:00AM	Received by: VW	Date: Aug-03/18	Time: 15:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

SIF.

Appendix E:
HLV2K Phase Two Standard of Operation (SOP)

PHASE TWO STANDARD OPERATING PROCEDURES FOLLOWING O.REG. 153/04 PROTOCOLS

1.0 INTRODUCTION

This Standard Operating Procedure (SOP) outlines procedures used during the conduct of a Phase Two Environmental Site Assessment (ESA) conducted in accordance with Ontario Regulation 153/04, as amended, effective July, 2011. SOPs are required in accordance with Section 3, Schedule E of O.Reg. 153/04, as amended. This SOP is intended to be used at "typical" urban and rural sites located where overburden is present. A site specific SOP is required if unusual soil, groundwater, environmental, access and/or health and safety concerns are present. The Project Manager (PM) may alter the SOP for project specific purposes. This SOP contains a section on preparation, including safety and the following field investigation methods:

1. Borehole drilling in overburden materials
2. Excavating and test pits
3. Soil sampling
4. Field screening measurements
5. Monitoring well installation
6. Monitoring well development
7. Field measurement of water quality indicators
8. Groundwater sampling

1.1 Preparation

Field staff should be familiar with the nature of the project and the long and short-term objectives. Field staff should review the findings of previous investigations Phase One & Two, Geotechnical or remediation conducted at the subject site, if available. The field staff should be familiar with all sampling requirements, procedures and protocols and the installation requirements, for monitoring wells, boreholes, test pits surface soil sampling if any, to be completed.

1.2 Safety

For safety requirements associated with the implementation of this SOP refer to the site specific safety plans. No borehole drilling, soil sampling and/or groundwater sampling is to be undertaken in a manner that is unsafe or likely to result in unsafe conditions. If other work is being conducted at the same time on the subject site, co-ordination with the appropriate responsible person such as the site superintendent, operations manager, or other contractors may be required.

Field staff should ensure that prior to the start of subsurface investigations (i.e. boreholes or test pits) that it is safe to do so, including the review of service locates and measures are in place to protect the public. The use of cones, caution tape and/or barricades may be required to control site access. Safe working procedures should be reviewed with HLV2K and subcontractor personnel, if applicable prior to commencing work.

The use of personal protective equipment (PPE) and a review and understanding of the site safety plan is required prior to the initiation of field work.

During borehole installations the site supervisor needs to always have potable gas detector to measure the gases that may be present in the boreholes. If the lower explosive limit LEL for methane or any Volatile Organic Compounds (VOCs) exceeds 20 % of the LEL then the work to stop momentarily to see of the gases dissipate in the air. If the gases dissipate quickly proceed with the drilling. If the gases persist call

your immediate supervisor for further instruction.

1.3 Equipment Requirements

Prior to initiating field investigations safe work method statements (SWMS) are to be prepared and these require the approval of the project manager and must be understood by field personnel. Depending on the scope of the investigation, equipment may be required. Equipment typically used in investigations is discussed later in this SOP but such equipment may include:

- Personal Protective Equipment
- Soil and/or groundwater sample containers and appropriate sample related items such as gloves, coolers, field logs and chain of custody forms
- Sample equipment such as hand tools for soil sampling and bailers, tubing and filters for groundwater sampling, if applicable
- Field meters such as those for headspace monitoring and groundwater quality (e.g., temperature, conductivity and pH)
- Survey equipment, if required

2.0 BOREHOLE DRILLING IN OVERBURDEN MATERIALS

2.1 Scope

The drilling procedures outlined are commonly used to investigate soil and groundwater conditions in overburden materials as part of a Phase Two ESA. The Project Manager (PM) may alter the SOP for project specific purposes. Insure the that before any intrusive program the public and private locates are conducted. For public locates remember to call Dial One.

2.2 Sampling Devices

If direct push drill procedures are used, soil samples are collected in disposable liners and as a new liner is used for each sample run, cross contamination from sampling equipment is not usually a concern.

Where soil samples are collected using a split spoon sampler, the sampler should be brushed clean of soil prior to use, washed in potable water containing phosphate free detergent, rinsed in potable water and followed by a final rinse with distilled water. Propane torches or other procedures may be required to heat the water in winter. Soil samples collected using split spoon samplers should be collected using Standard Penetration Test (SPT) procedures if the drill rig is equipped to collect samples by SPT procedures. When samples are collected using SPT procedures, the number of blows per 150 mm increments should be recorded in accordance with SPT protocols.

All tools used for sampling soil need to be cleaned prior to re-use.

2.3 Borehole Logs

Observations recorded during drilling such as a description of soil samples, drilling conditions and groundwater observations are to be recorded on field logs. Sand lenses or gravel layers need to be recorded with depth and shown on the borehole logs

2.4 Borehole Locations

Borehole locations are to be referenced to site features such as fence lines, buildings or other site features and the borehole locations marked on a site plan. Alternatively, borehole locations may be determined using an accurate GPS unit capable of providing elevations to the nearest centimeter.

3.0 EXCAVATING AND TEST PITS

Test pits have the advantage of providing better observations of the subsurface and the collection of

larger soil samples than is possible by borehole samples. O.Reg. 903 precludes the installation of monitoring wells in test pits. Where possible the test pit should be advanced to a sufficient depth to provide vertical delineation unless the depth of contamination is beyond that which can be assessed with the available equipment.

Soil samples can also be obtained from test pits, usually excavated by a rubber tired backhoe up to a maximum depth of approximately 3 m or by a tracked excavator capable of excavating to a depth of about 5 m.

At test pit/excavations, staff should stand in areas beyond the reach of the excavator and normally stand on the shorter side of the test pit where there is less likelihood of the excavation wall collapsing. Safe working procedures should be reviewed with the operator prior to commencing work. Ontario regulations preclude personnel from riding in the bucket of an excavator and prohibit personnel from entering any test pit or excavation that is deeper than 1.2 m unless the excavation is stabilized in accordance with Ministry of Labour (MOL) regulations. Stabilization measures include the use of a trench box and/or sloping the walls of the excavation in accordance with MOL regulations.

Soil samples from a test pit are to be collected using the bucket of the backhoe/excavator. In order to collect a discrete sample using an excavator a sample should be collected from a single point at the base of the test pit. This is done by first advancing the test pit to the desired depth and clearing the base of the test pit of the presence of sloughing and collapsed soil. Then the operator should provide a relatively small (i.e. compared to the volume of the bucket) volume of soil from a discrete position and depth minimizing the disruption of the soil. Often the soil on top of the tooth of the bucket is sufficient for sampling. Sampling from the excavator bucket should only be done when the bucket is resting on the ground and the operator has removed his hands from the controls.

The soil from the bucket is transferred using a new disposable glove or decontaminated sampling device to the appropriate sample containers.

After completion of the test pit, the soil excavated should be backfilled into their approximate original positions. A test pit is normally compacted using the bucket of the excavator in 0.3 to 0.6 m lifts. Heavily contaminated soil may be segregated and later removed from the site.

Borehole locations should be marked on a site plan and referenced by the distance from each borehole to site features such as buildings and fence lines.

4.0 SOIL SAMPLING

4.1 Purpose

The purpose of this procedure is to ensure consistency with sample identifications and sample labelling.

4.2 Scope

Care should be taken when naming sample nomenclature, especially when there are numerous staff members working on the same project, when other companies have undertaken previous work on the site and when the field work has an extended program, such as multiple soil and/or groundwater sampling events. The PM should decide if it is advisable to be consistent with previous nomenclature and labelling (ensuring that there is no repetition of sample numbers) or to use a different sample nomenclature provided it is consistent with O.Reg. 153/04 nomenclature protocols.

4.3 Procedure

Each sample should be collected using approved procedures and the sample identification number and associated information properly recorded on the field log and sample container. All soil samples for chemical analyses are to be placed in appropriate sample containers as quickly as practical after

collection to minimize the loss of potential volatile compounds. Soil for potential chemical analysis should only be handled using a new disposable glove that is discarded after each sampling event. Alternatively, sampling tools that are either disposed after each use or are decontaminated prior to each sampling event can be used to transfer soil from the sampler to the appropriate sample container.

Slough is often present within the top of the direct push and/or split spoon sampler and such soil should be discarded and is not included as part of the soil sample. Slough is also not included as part of the sample recovery length on the field log.

Where the Ministry of the Environment (MOE) has prescribed sampling methods and protocols, then these should be followed. The PM may modify such sampling protocols provided the reasons for such variations are documented. The use of single use soil sampling devices, such as the TerraCore sampler that collects approximately 5 grams of soil and enables the soil sample to be transferred to 40 ml vials containing methanol is acceptable when sampling soil for volatile organic compounds (VOCs) and/or F1 fraction petroleum hydrocarbons. Containers with chemical reagents, such as methanol should be obtained from the analytical laboratory. The use of hermetically sealed samplers such as the EnCore sampler is also permitted. Sampling procedures should be discussed with the PM prior to the start of the field work.

Soil from the sampling device that is representative of the sampling interval should be sampled. Where noticeable strata changes occur within the sample interval or the presence of stained or odorous soil within the sample that may indicate potential environmental concerns, more than one sample from the sample interval should be obtained. The collection of more than one sample is also advisable where the sampling interval is greater than approximately 0.6 m and sufficient sample has been retrieved to permit the collection of multiple samples from one sample interval.

If varying levels of apparent environmental impacts such as soil with unusual stains and/or odours are observed within the length of the sample, then normally a sample should be taken from each distinct zone within the sample.

4.4 Sample Nomenclature

Each sample must be provided with a unique sample identification. Typically, samples obtained from boreholes have prefix of “BH” and those obtained from test pits have a prefix “TP”. Preferably, each sample should also indicate the approximate depth at which the sample was collected by adding the depth below the ground surface to the end of the sample name. Samples collected using a split spoon sampler typically include the letters “SS” as part of the sample identification (SS1, SS2, etc.). The “SS” designation should only be used when the sample is collected using the split spoon sampler. Other designations such as “A” or “S” may be used to designate samples collected directly from auger and those from direct push sample tubes, respectively. If more than one sample is collected per sample event, letters, such as “A” and “B” may be incorporated into the sample identification. Samples should be numbered consecutively (e.g., 1, 2, 3 etc.) regardless of the prefix used (e.g. S1, A2, S3, etc.).

4.5 Duplicate Soil Sample

Duplicate soil samples, sometimes referred to as replicate soil samples are to be collected to meet the minimum sampling requirements specified by MOE regulations, HLV2K’s sampling plan and/or project requirements.

Replicate soil samples may be obtained by placing representative samples into appropriate sample containers. Soil should be placed into the sample container by placing soil obtained from similar locations within the sampler into the sample containers and by alternating the filling of the sampler between the

sample and the replicate sample. Duplicate samples for volatile organic compounds should be sampled prior to sampling for inorganic parameters. Samples collected for duplicate analysis should have similar characteristics (i.e. appearance, stains, odours).

QA/QC samples including duplicates and trip blanks may be identified as QC1, QC2, QC2, etc. Other sample nomenclature is acceptable but the use of fictitious borehole numbers is not recommended. A record of the applicable QA/QC samples and corresponding sample identification number should be identified on the field log.

4.6 Sample Labels

Sample labels, particularly those that may get wet should be labelled with a permanent waterproof marker, although on some projects where trace VOCs are of interest, the PM may require that labels be pre-labelled or that permanent waterproof markers not be used to reduce the risk of cross contamination of the sample with ink from the permanent marker. Rags/cloths/paper towels can be used to dry sample containers if they are wet prior to writing on them.

Sample containers are to be labelled in accordance with approved procedures and sample nomenclature. As a minimum sample labels should contain at least three items: a unique sample identification, the HLV2K project number and the date of sample collection.

4.7 Sample Storage

All soil and groundwater samples for possible chemical analysis of organic parameters should be stored in a cooler with ice and/or freezer packs. It is advisable that sample containers in the cooler be kept in plastic bags to reduce the risk of the label on the container being washed off or becoming illegible from melting ice. Alternative sample storage practices may be required in winter to keep samples from freezing.

Soil samples for headspace measurements and/or potential inorganic analysis need not be stored in ice-filled coolers. However, such samples should not be stored in direct sunlight. During winter, measures may be required to prevent soil samples from freezing.

Samples should be transported to HLV2K's office where those samples that are required to be kept refrigerated are placed into the sample refrigerator. Samples for inorganic analysis normally do not require refrigeration. Samples for chemical analysis may also be taken directly to the analytical laboratory. In remote locations, samples for chemical analyses may be taken to a courier depot for shipment. Samples to be shipped require additional labelling and packaging so that sample containers are not damaged during transit and the samples arrive at the laboratory within the sample temperature requirements (i.e. <10°C for samples for organic analysis) and sample hold time requirements.

5.0 FIELD SCREENING MEASUREMENTS

5.1 Purpose

The methods described within this SOP relate to the use of hand held meters such as combustible vapour meters (e.g. RKI Eagle) or photoionization detectors (e.g. Ion Science PhoCheck 1000) for field screening of headspace soil vapours. The purpose of the screening is to provide a qualitative indication of the presence of volatile organic compounds in soil samples. Combustible vapour meters are a field screening tool; laboratory analysis is required to quantify the concentrations or organic parameters in soil.

5.2 Scope

These procedures do not contain specific details on calibration methods, trouble shooting or correction factors for the instrument. For specific details refer to the operators' instruction manual provided with the instrument or available for viewing at the manufacturer's website.

5.3 Safety

Site specific safety plans are required if working in areas where unusually elevated high concentrations of combustible vapours occur.

5.4 Equipment

The instrument should be calibrated in accordance with the maufacturer's instructions and at a frequency recommended by the instrument manufacturer and/or project specific requirements. The equipment may also be calibrated in accordance with directions provided by the manufacturer's Canadian representative.

For most applications, the RKI Eagle instrument (or equivalent) should be set so that the instrument is not sensitive to methane gas. Therefore the readings are an indication of organic vapours, exclusive of methane. Most photoionization detectors (PID) are equipped with a 10.6eV lamp which is suitable for most applications. For specific applications, different instruments, calibration gases, different lamp and/or response correction factors can be applied to the readings. Instrument settings that are different from the standard settings should be discussed with the Project Manager prior to recording the readings and the revised settings highlighted on the soil vapour headspace form. The choice of instrument (i.e. combustible vapour meter or PID) should be discussed with the project manager prior to the start of the field work.

5.5 Headspace Screening Procedure

The procedures should comply with those outlined on pages 11-12 of the MOE document "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", revised December 1996.

Soil samples for headspace combustible vapour testing should be placed immediately upon sampling into approximately 1 litre plastic bags about ¼ filled and sealed tightly with nominal headspace. Any lumps of soil within the bag should be gently broken by hand. The soil sample must be allowed to come to room temperature. The soil vapour readings should not be taken until the sample temperatures has reached a minimum of 15°C, and a time of 2 hours has elapsed since the sample was bagged. The sample temperature should not exceed the ambient air temperature where the air temperature is greater than 15°C. These time and temperature restrictions are critical to ensure consistency of readings between samples.

The samples should be stored in the field out of direct sunlight to reduce the amount of moisture build up in the plastic bag.

To measure soil vapours, insert the analyzer probe into the nominal headspace above the soil sample. Agitate or gently manipulate the sample by hand as the measurement is taken. Do not let the tip of the probe come into contact with water or saturated soil in the bag as most sensors are damaged by water.

Record the peak measurement registered by the instrument during the first 15 seconds of measurement. The measurement should be recorded on a soil vapour headspace form, a copy of which is kept in the project file. It is also good practice to record the measurement on the plastic bag to document that the headspace measurement was conducted on the sample.

Erratic meter response may occur under conditions of high humidity in which case, the headspace measurements may be discounted. All results should be recorded and decisions to discount data should be made following discussions with the Project Manager.

6.0 MONITORING WELL INSTALLALTION

6.1 Purpose

This SOP outlines the procedures for installing monitoring wells in boreholes advanced by a soil drilling rig. Normally monitoring wells for environmental purposes are 50 mm in diameter, constructed of PVC schedule 40 pipe and installed inside hollow stem augers. However, depending on site conditions, other pipe sizes, materials and installation methods are acceptable . The Project Manager should be kept informed of variations to the planned installations.

6.2 Scope

The procedures in this document refer to well installations for environmental monitoring only. The described procedure is not applicable to wells for potable water purposes. Well installation procedures must comply with O.Reg. 903, made under the Ontario Water Resources Act. Environmental monitoring wells are not permitted to be installed in test pits.

This SOP applies to groundwater monitoring wells installed in overburden at typical sites. Site specific SOPs may apply at highly contaminated sites, those installed in bedrock and those wells installed as injection wells at remediation sites.

6.3 Well Contractor

Under O.Reg. 903, only licensed well contractors can install monitoring wells. Drilling contractors who are not licensed are not permitted to install monitoring wells.

6.4 Well Design

Before the start of field work, a strategy should be adopted for well location and design. This strategy should consider factors as: the purpose of the monitoring program and wells; the expected sub-surface conditions to be encountered, including geology, aquifer conditions, groundwater depth and likely contaminants; and, the anticipated design of the wells including screen depths, seals and protective casing.

To investigate different aquifers, the recommended procedure is to advance a separate borehole in proximity to the initial borehole and another monitoring well is installed at the appropriate depth. O.Reg. 903 requires that the borehole diameter be at least 5.1 centimetres greater than the outside diameter of the casing to be used. This places certain restrictions on the maximum diameter of a well that can be installed using various diameters of augers. Well diameters and the use of appropriate borehole procedures and equipment selection should be discussed with the Project Manager and/or the drilling contractor prior to the start of the field work.

The well screen should not span separate aquifers. If more than one aquifer is present, precautions must be taken to prevent cross-contamination of the aquifers and the Project Manager should be consulted before installing the well.

HLV2K's interpretation is that O.Reg. 903 prohibts the use of more than one monitoring well in a borehole. However, HLV2K understands that the MOE personnel may permit more than one monitoring well to be

installed in a single borehole. As a result, if more than one monitoring well is proposed to be installed in one borehole, approval from the MOE for this procedure should be documented by the Project Manager.

6.5 Water, Drilling Fluids and Grout

The use of water or other drilling fluids during the advancement of the borehole should be minimized. Water used in the drilling process or to prepare grout mixtures should be obtained from potable water sources.

6.6 Well Materials and Screen

Monitoring wells are typically installed using Schedule 40 PVC materials and are usually 50 mm nominal diameter. Other well diameters are also acceptable but should be discussed with the Project Manager prior to the start of the field work (O.Reg. 903 may govern the diameter of the well size and consultation with the driller may be required prior to the start of the field investigation).

New materials should be used for each well and well materials should be wrapped in plastic that is removed just prior to installation. The use of threaded joints is recommended. Glued or solvent welded joints are not recommended since glues and solvents may alter the chemistry of the groundwater samples. In no circumstances should grease or oil be used to lubricate the section joints as this will contaminate the groundwater samples.

The well screen is typically constructed of Schedule 40 PVC with a factory machine slot width of 0.25 mm. Well screens may be composed of other materials, such as stainless steel, or well screens may have a different slot width, but the use of alternate materials and slot width should be discussed with the Project Manager prior to its use. O.Reg. 153/04 requires that the saturated length of the well screen not exceed 3.1 m in length. As a result, well screens are typically 1.5 to 3.0 m in length. The well screen must be plugged at the bottom of the screen and the plug should be of the same material as the well screen. A weep hole may be placed in the bottom plug to allow perched water to drain from the well screen if the groundwater level drops below the bottom of the well screen.

5.7 Filter Pack

When placing the filter pack into the borehole, it is suggested that a minimum of 0.15 m of the filter pack material be placed under the bottom of the well screen to provide a firm base. In cases where DNAPL is present, it may not be desirable to have a filter pack beneath the well. Typically the elevation of the top of the filter pack is approximately 0.6 m above the top of the well screen. As a guide, the top of the filter pack often extends about 20% above the length of the well screen.

Typically, the filter pack material is composed of silica sand with a uniformity coefficient of 1.1 to 1.7 and a grain size diameter ranging from 1.5 mm to 3.0 mm is appropriate for most applications. Finer grain sizes may be used in fine grained materials and the potential use of such materials should be discussed with the Project Manager prior to the start of the field work.

Filter pack material can be added using a tremie pipe or by allowing the sand to free fall by gravity into the borehole annulus. If materials are added by gravity free fall, the materials should be added slowly to minimize bridging or void formation within the filter pack. Periodic sounding of the annular space with a weighted tape measure is recommended as a method to ensure that bridging of the sand is not occurring.

Filter pack placement should be carefully performed concurrent with the removal of the augers if collapsing borehole conditions exist. The filter pack level should be maintained within the augers or temporary casing to ensure a proper filter pack “envelope” around the well screen.

If the addition of potable and/or drilling muds within the augers is required to maintain a positive pressure head, the volume used should be recorded as additional purging volumes may be required.

5.8 Annular Seal

A plug of benonite chips/pellets should be placed directly on top of the filter pack for a minimum thickness of 0.6 m. Above the water table, the bentonite should be hydrated by adding potable water. Bentonite chips/pellets can be added to the borehole annulus using gravity free fall and by using a weighted tape to confirm that the bentonite has been placed at the proper depth. If the seal is to be placed at a depth greater than approximately 15 m, the use of a tremie pipe or coated pellets should be considered.

O.Reg. 903 requires that the annular space extending from the top of the filter pack to the ground surface be filled with a suitable sealant such as bentonite or grout. Sand and/or soil cuttings from the borehole should not be used in any portion of the annular space, other than for grading purposes at the surface.

5.9 Surface Completion

The top of the monitoring well should be set in a protective casing. Typically, the decision to use a flush mount or an above ground protective casing is made prior to the field work but such decisions may be altered in the field depending on site specific factors. The ground surface around the monitoring well should be sloped to drain surface water away from the well. Above ground protectors are often preferred as they normally require less maintenance and are more visible, especially in winter when flush mount casings may be covered by snow.

6 MONITORING WELL DEVELOPMENT

6.1 Water Level Measurements

A permanent survey point, usually the highest point of the top of the casing should be used as the reference point for all groundwater level measurements. Groundwater level measurements should be made using either an electronic water level indicator or an interface probe. These instruments should be cleaned and decontaminated prior to use at each monitoring well to reduce the risk of cross contamination among wells. If known or suspected contaminants are present, then water level measurements should be made from the least to the most contaminated monitoring well.

Purging is conducted so that the groundwater sample will be representative of the formation water and does not contain any stagnant water from the well or filter pack. Purging is normally performed using low density polyethylene tubing and inertial pumps (foot-valves). For wells deeper than approximately 25 m, the use of high density polyethylene tubing may be required. Bailers may also be used to purge wells and if bailers are used the cord should not be coloured and care should be taken to keep the cord clean so that potential contaminants are not transferred from the ground into the monitoring well. During purging field water quality measurements can be measured at suitable intervals based on volumes purged.

Purging should continue until at least one of the three following objectives has been met:

- The monitoring well has been purged dry
- A minimum of three well volumes of water based on the borehole annulus has been purged from the well
- Water quality measurements indicate that water quality stabilization has occurred.

7 FIELD MEASUREMENT OF WATER QUALITY INDICATORS

The instruments used for water quality measurements should be calibrated in accordance with the frequency and procedures recommended by the manufacturer or by the manufacturer's Canadian representative.

Field water quality stabilization may be indicated by three consecutive measurements which record values with the following limits:

pH	±0.1 unit
Temperature	±0.2°C
Electrical Conductivity (µm/cm)	± 3%
Dissolved Oxygen (mg/L)	± 10%

Note: Readings of dissolved oxygen can be more erratic and hence less reliable as stabilization indicators. A greater emphasis should be placed on pH, EC and temperature.

8 GROUNDWATER SAMPLING

Unless otherwise instructed by the Project Manager, groundwater samples should be collected in laboratory supplied containers in the following order:

- Volatiles
- Semi-Volatiles
- Non Volatiles

In accordance with O.Reg. 153/04, groundwater samples for analysis of metals should be field filtered using a 0.45 micron filter.

A sufficient number of duplicate groundwater samples are to be collected so that at least one duplicate groundwater sample can be submitted for laboratory analysis for every ten samples submitted for laboratory analysis.

Where groundwater samples are to be analyzed for volatile organic compounds, one trip blank is to be submitted for analytical analysis with each laboratory submission containing one or more groundwater samples for volatile organic compound analysis.

9 REFERENCES

The following documents may be consulted for clarification and elaboration of Standard Operating Procedures. Some of the procedures advocated in the documents below may not be consistent with the current requirements of O.Reg. 153/04 and/or best practice procedures recommended by HLV2K.

- Ontario Regulation 153/04, Records of Site Condition – Part XV.1 of the Environmental Protection Act.
- "Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)" prepared by the Association of Professional Geoscientists of Ontario, 2011.
- "Guidance on sampling and Analytical Methods for Use at Contaminated Sites in Ontario" Ministry of the Environment, revised December, 1996.