PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

5916 Trafalgar Road North, Town of Erin, Ontario

Prepared for:

Fausto Saponara
Hillsburgh Heights Inc.
636 Edward Avenue, Suite 14,
Richmond Hill, Ontario L4C 0V4

Prepared by:

HLV2K ENGINEERING LIMITED

Project No. 2100428EE

April 25, 2022

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Hillsburgh Heights Inc.
636 Edward Avenue, Suite 14
Richmond Hill, ON
L4C 0V4

Attention: Mr. Fausto Saponara

Dear Mr. Fausto,

Re: Phase Two Environmental Site Assessment
5196 Trafalgar Road North, Town of Erin

Please find enclosed a copy of 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 Hillsburg Heights Inc. (hereinafter referred to as the client) to conduct a Phase Two Environmental Site Assessment (ESA) for the property located at 5916 Trafalgar Road North, Town of Erin, Ontario (hereinafter referred to as the site and Phase Two Property).

The objectives of the Phase Two ESA are to assess the quality of the soil and groundwater at the various Areas of Potential Environmental Concerns (APECs) derived from onsite and offsite potentially contaminating activities. The future use of the property will be residential. Given the proposed residential development on the Phase Two Property, there will be a land conveyance to the city and a Record of Site Condition (RSC) is required.

The Following is the executive summary of Phase Two Environmental Site Assessment done by HLV2K Engineering Limited:

Executive Summary	
Phase Two Property (the Site)	The Phase Two Property is irregular shaped and consists of one (1) land parcel with PIN 71139-0239 (LT), Part 1 with an area of 113.819 acres and Part 2 with an area of 2.546 acres. The total area is 47.09 Ha (116.36 acres). The property has the following PIN: • PIN # 71139-0239 (LT) Part of Lot 26 Concession 7, Town of Erin Plan 61R-9590; Erin S/T Easement in Favour of the Corporation of the Town of Erin Over Part 2, 61R8627 As in LT66248. The Phase Two Property is located at the municipal address of 5916 Trafalgar Road North, Town of Erin, Ontario. The property is owned by Hillsburgh Heights Inc. and the site is to be developed as a residential building.
Phase Two Investigations	Ontario Regulation (O. Reg.) 153/ 04 (as amended).
Geologic Conditions	The surficial deposits in the immediate vicinity of the Site are mapped as Orangeville Moraine with materials consisted of sand and gravel including some till or silt. The western side of the Site is modern alluvial deposits. Bedrock is comprised of upper Silurian to lower Devonian of Guelph Formation. The bedrock surface is expected to be approximately 60 mbgs. None of the boreholes drilled for this investigation reached the bedrock.
Hydrogeological Conditions	The closest water body is a pond draining into Credit River (Erin Branch) approximately 430 m southeast of the site. There is an intermittent creek approximately 40 m south and southwest of the property boundary flowing east to west into the pond. The intermittent creek was not observed at the time of site visit and is considered a seasonal creek and not a water body as defined by the Ministry Environment conservation Parks

	The groundwater wells were dry with the exception of one well south of the property and therefore, groundwater flow direction could not be measured. Based on the topology of the surrounding area and the proximity to the seasonal creek, the inferred groundwater flow direction is towards southeast Erin Branch of the Credit River System.
Applicable Site Condition Standard	Ministry of the Environment, Conservation, and Parks (MECP) "Table 2 Standards in a Potable Ground Water Condition for Residential Parkland Institutional (RPI)" uses site conditions standards for all parameters sampled in the soil.
Soil and Groundwater Quality Data	Soil samples were collected and analyzed for Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Organochlorine Pesticides (OCP), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), metals, As, Sb, Se, Hg, CN-, Cr (VI), Na, Cl-, Electrical Conductivity (EC), Sodium Adsorption Ratio (SAR), and pH. The chemical analysis results were compared to the values stated in the MECP document titled "Soil, Groundwater and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act". The site was compared to Table 2 Standards in a Potable Ground Water Condition for Residential Parkland Institutional (RPI) use site conditions standards for all parameters sampled in the soil. The site was found to meet the MECP Table 2 Standards RPI in Potable Groundwater Conditions for soil at the locations of the boreholes. However, there was an exceedance for Petroleum Hydrocarbons F4G (5290 > 250 µg/g) in Hand Sample 2 at the surface near the barn area. Hand Sample 1 met the MECP Table 2 RPI standards further southwest. According to the soil sampling plan drawing from Soil Engineers Ltd, there was an exceedance for Cyanide at 0 to 3 m bgs (0.06 > 0.05 µg/g) in test pit TP-3 near the central northwest boundary of the property. The groundwater was not analyzed as all the wells were dry on seven (7) site visits with the exception of one (1) well (BH5) at the southeast of the property which had 0.125 m of water at 5.64 m bgs. The amount of water present was not sufficient for sampling.
Conclusions	The soil from the Phase Two Property met the applicable MECP Table 2 RPI Standards except for one location which had an exceedance for Petroleum Hydrocarbons F4G Fraction and one (1) location for Cyanide. The groundwater was not analyzed as all the wells were dry with the exception of one (1) well which did not have enough water for sampling. Also the removal of the former UST was done so without confirmatory analysis that will be required for the RSC submission. Additional sampling in this location will be required for the RSC submission.
Recommendations	Further investigative work is required to address the exceedance for PHCs F4G fraction and Cyanide to determine the extent of the impact. Additional investigation is required to analyze the soil near the former underground storage tank. Additionally, it is recommended to excavate the contaminated soil and confirmatory

	samples are required to ensure no further contamination is present.
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, that 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 Hillsburg Heights Inc. (hereinafter referred to as the client) to conduct a Phase Two Environmental Site Assessment (ESA) for the property located at 5916 Trafalgar Road North, Town of Erin, 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 are to assess the quality of the soil and groundwater at the various Areas of Potential Environmental Concerns (APECs) derived from onsite and offsite potentially contaminating activities. The future use of the property will be residential. Given the proposed residential development on the Phase Two Property, there will be a land conveyance to the city and a Record of Site Condition (RSC) is required.

2.1 Site Description

The Phase Two Property is situated in a mixed rural, residential, and agricultural area. The property is on the southwest side of Trafalgar Road, between Sideroad 27 and Upper Canada Drive. The Phase Two Property is surrounded by residential housing, agricultural fields, and forested areas. The Phase Two Property is irregular in shape and is occupied by a house, three barns, and agricultural fields. The property has always been used for farming. The site is located at approximately 460 m to 470 m above sea level (asl) and covers an area of approximately 116.36 acres (47.09 ha).

The land surrounding the Phase Two Property slopes towards the southeast towards Credit River (Erin Branch).

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	5916 Trafalgar Road North, Town of Erin, Ontario **Drawing 1**: Site Location Plan
Property Identification Numbers (PINs)	The Phase Two Property reportedly consists of the following PINs: • PIN # 71139-0239 (LT)
Legal Description	Part of Lot 26 Concession 7, Town of Erin Plan 61R-9590 as in RO760763; Erin S/T Easement in Favour of the Corporation of the Town of Erin Over Part 2, 61R8627 As in LT66248. **Appendix A: Legal Survey**
Shape	The Phase Two Property is an irregular-shaped land parcel covering an approximate area of 116.36 Acres (or 47.09 Ha), Part 1 with an area of 113.819 acres and Part 2 with an area of 2.546 acres.
Access to the Phase Two Property	The Phase Two Property can be accessed from Trafalgar Road North.
Occupancy	Farmland
Current Land Use	Agricultural or Other
Proposed Future Land Use	Residential

2.2 Property Ownership

The Qualified Person from HLV2K was retained by the Client to carry out this Phase Two ESA. 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	Hillsburgh Heights Inc.
Phase Two Property Contact	**Fausto Saponara** Email: fausto@briarwoodhomes.ca

2.3 Current and Proposed Land Uses

At the time of the Phase One ESA site reconnaissance, the Phase Two Property was operating as a farm. HLV2K inspected the property on three (3) occasions in August 2021 for a site visit, September 2021 for the private locates followed by drilling of the monitoring wells and for the elevation survey and from September 2021 to April 2022 a total of (7) occasions for water level reading measurements. During all visits, the site continued to operate as a farm. The proposed development is going to be a residential building. Therefore, an RSC is required by the Town of Erin for the potential land conveyance prior to development.

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 Residential/Parkland/ Institutional (RPI) standards for coarse sand and potable groundwater. These standards were used to evaluate soil and groundwater quality based on the samples collected and tested, to determine whether soil and groundwater quality complied with the MECP Standards and to determine whether additional investigations are required or warranted.

The Phase Two Property was assessed using the Standards contained in the MECP Table 2 of the above referenced Standards. The use of the Table 2 Standards 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
Potable or Non-Potable Ground Water	Potable Groundwater
Proximity to Surface Water	The closest water body is a pond draining into Credit River (Erin Branch) approximately 430 m southeast of the site. There is an intermittent creek approximately 40 m south and southwest of the property boundary flowing east to west into the pond. The intermittent creek was not observed at the time of the site visit and is considered a seasonal creek and not a waterbody as noted by the MECP.

Parameters	Information
Areas of Natural Significance	There are no environmentally sensitive areas that encroach within 30 m of the Phase Two Property.
Nature and Depth of Bedrock Strata	Bedrock is comprised of upper Silurian to lower Devonian of Guelph Formation. The bedrock surface is expected to be approximately 60 m bgs. None of the boreholes drilled for this investigation reached the bedrock.
The direction of Groundwater Flow	There is an intermittent creek approximately 40 m south and southwest of the property boundary flowing east to west into the pond. The intermittent creek was not observed at the time of the site visit and is considered a seasonal creek. The groundwater wells were dry with the exception of one well south of the property and therefore, groundwater flow direction could not be measured. Based on the topology of the surrounding area and the proximity to the seasonal creek, the inferred groundwater flow direction is towards the south. The portion of the site is within the well head for the Town of Erin.
Grain Size Analysis	Coarse-grained soil will be applied for 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 Standards in a Potable Ground Water Condition for Residential Parkland Institutional (RPI) use site conditions standards, (Table 2 Standards) as per the MECP document titled “Soil, Groundwater 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 geodetic elevation of the site is approximately 460 m to 470 m above sea level (asl). The surrounding land slopes towards a tributary of the Credit River (Erin Branch), which runs to the southeast of the Phase Two Property. The closest water body is a pond draining into Credit River (Erin Branch) approximately 430 m southeast of the site.

A small portion of the Site (approximately 0.6 ha) in the northeast is located within the Well Head Protection Area A (WHPA-A) which represents a 100 m circle around a municipality water supply well. According to the Source Water Protection Information Atlas, three (3) well-head protection areas are located within the Phase One study area to the north and northeast

The site is in an area that emits high levels (Zone 1) of radon gas noted in the Radon Potential Map of Ontario.

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

3.2 Past Investigations

"Phase I Environmental Site Assessment Summary Letter Report due diligence for proposed development – 5916 Trafalgar Road North, Town of Erin (Hills burgh)" dated September 30, 2020, and Reference No. 2009-E020 prepared by Soil Engineers Ltd.

- The Phase I ESA was conducted for due diligence purposes.
- The Phase I property has been used for agricultural purposes for many years. The property has a barn and residential structures in the eastern-center portion.
- According to the topography of the property, groundwater flow is expected to be in the southeast direction.
- A total of three (3) PCA was identified based on the review of records, interview, and site inspections which includes pesticides used for agricultural activities, Fill material brought to the site in the center-eastern portion of the property.
- One (1) underground storage tank was reported to have been removed professionally.
- Based on the PCAs and APECs, a Phase II ESA was recommended.

"Preliminary Geotechnical Investigation for Proposed development for 5916 Trafalgar Road North, Town of Erin (Hills burgh)" dated October 2020 and Reference No. 2009-S020 prepared by Soil Engineers Ltd.

- The purpose of this report was to determine the surface conditions and engineering properties of the disclosed soils for future development.
- During the time of the investigations, the property was a farm field with a house. The elevation of the site has a difference greater than 20 m across the property.
- Twelve (12) boreholes were drilled to a depth ranging from 6.2 to 6.6m (bgs), performed on September 22nd and 23rd, 2020.
- The track-mounted continuous-fight power auger was used for soil sampling, standard Penetration tests were performed at each sampling depth and split-spoon samples were used for soil classification and the chemical analysis.

- All Twelve (12) boreholes were dry and minor seepage was evidenced in Borehole 9 at a depth of 6 m bgs.
- Soil Engineers Ltd recommended that the topsoil veneer should be removed, and earth fill and topsoil fill at Borehole 6 should be excavated. The debris from the existing structures and foundation should be removed and disposed of off-site. Earth fill is required to raise the level of the site. The conventional footing was recommended on this site, and the bearing capacity for the foundation must be inspected by a geotechnical engineer.
- The Soil Engineering Ltd recommended that further investigation may be required based on the design for the proposed development is finalized.

"Summary of the soil sampling plan prepared by the Soil Engineering Ltd", dated October 2020 for 5916 Trafalgar Road North, Town of Hills burgh, and Reference No. is 2009- E020.

- A total of eight (8) test pits were sampled across the site and analyzed named TP1, TP2, TP3, TP4, TP5, TP6, TP7, and TP8.
- A total of five (5) boreholes were drilled on the property mainly on the northeast portion named BH101, BH102, BH103, BH104, and BH105.
- No associated report was provided for the sampling plan view. No indication of what parameters were analyzed and at what depth was presented in the drawing.
- The drawing shows that there was an exceedance found at test pit 3 at the central north section in the farm fields at 0 to 3 m bgs for Cyanide (0.06 > 0.05 ug/g) compared to Table 8 RPI/ICC.
- The drawing shows that there was an exceedance found at test pit 7 at the central east section in the farm fields at 0 to 3 m bgs for DDE (0.056 > 0.05 ug/g) compared to Table 8 RPI/ICC.
- The values were compared to the MECP Table 8 RPI/ICC.

"ESA Phase I Report – 5916 Trafalgar Road North, Town of Erin (Hills burgh)" dated August 26, 2021, and Project No. 2100428CE prepared by HLV2K.

- The Phase I ESA was conducted to the CSA Standard for due diligence purposes that review the potential environmental liabilities for due diligence purposes.
- The current land use is agricultural or other. The land is still being farmed and varies in elevation throughout the property that slopes towards a branch of the Credit River to the southeast.
- The entire Phase One Property is situated in the Kame Moraine Physiographic region. The bedrock in the vicinity of the site is expected to be 56a of the Guelph Formation consisting of sandstone, shale, dolostone, and siltstone. The bedrock is estimated to be 15 m below ground surface (bgs).
- The closest water body is a pond draining into Credit River (Erin Branch) approximately 430 m southeast of the site. There is an intermittent creek approximately 40 m southwest of the property boundary flowing north to south into the pond.
- Based on the Historical Records Review, there is a possible impact from the Phase I Property. The pesticide uses for the agricultural fields, the previous oil tank on-site and fill material that had been brought to the site.
- HLV2K recommended carrying out the Phase II ESA investigation.

"ESA Phase II Report – 5916 Trafalgar Road North, Town of Erin (Hills burgh)" dated October 26, 2021, and Project No. 2100428DE prepared by HLV2K.

- The Phase II ESA was conducted in accordance with the CSA Standard for due diligence purposes in order to assess the condition of soil and groundwater on the property for due

diligence purposes.

- The Phase II property has been used for agricultural purposes for many years. The property has a barn and residential structures in the eastern-center portion.
- A total of five (5) boreholes were drilled to a maximum depth of approximately 6.2m to 9.8m below ground surface (bgs) across the property. All five (5) boreholes were converted into monitoring wells. Soil samples were collected and submitted to chemical laboratory analysis. The groundwater was not analyzed as the wells were dry.
- A total of eight (8) soil samples were collected for six (6) parameters including the duplicate, hand sample 1, and hand sample 2. The site was compared to Table 2 Standards in a Potable Ground Water Condition for Residential Parkland Institutional (RPI) use site conditions standards for all parameters sampled in the soil.
- The soil samples from the boreholes met the MECP Table 2 Standards RPI in a Potable Ground Water Condition. There was exceedance for Petroleum Hydrocarbons (F4G) in Hand Sample 2. Hand sample 1 met the MECP Table 2 RPI standards. The groundwater was not analyzed as the wells were dry.
- HLV2K recommended that the area where PHC F4G exceedance was encountered be excavated and confirmatory samples analyzed to ensure no contamination is present.

3.3 Adequacy of Previous Data

- The Phase I ESA report by Soil Engineers (Report number 2009-E020) was considered to be reliable and the findings generally matched our records review and site reconnaissance.
- The Geotechnical Report by Soil Engineers (Report number 2009-S020) was considered reliable and was used for general soil information and to determine the location of new boreholes and monitoring wells.
- The soil sampling drawing by Soil Engineers (Reference number 2009-E020) was provided by the client after drilling was completed. The exceedances presented were compared to Table 8 RPI/ICC standards. HLV2K is of the opinion that Table 2 RPI should be used for the applicable site condition standards (SCS) and therefore, only the Cyanide exceedance was considered an exceedance to the applicable SCS in this updated Phase Two Report.
- There are no water bodies within thirty (30) meters of the Phase Two Property hence the Table 8 Standards do not apply, and a seasonal Creek is not a water body.

Upon further investigation by HLV2K, a Phase Two ESA was conducted to address the potential impact on the soil and groundwater due to the agricultural operations of the property and the monitoring wells were installed based on the site inspection carried out and via historical aerial photographs obtained by HLV2K for the Phase Two Property. Hand samples were done as close as possible to the location of fill of unknown quality.

HLV2K chose to analyze the soil and groundwater for Petroleum Hydrocarbons (F1 to F4) fractions (PHCs), Volatile Organic Compounds (VOCs), OCPs, PAH, Metals and Inorganics, pH, SAR, EC and PCBs in soil and groundwater. The monitoring wells were chosen to intercept the groundwater table and they were placed downgradient to the inferred groundwater flow direction wherever possible. However, groundwater

was not encountered. This selection of analysis was made to cover the areas for all potential chemicals that may have or continue to be used on-site, such as pesticides and fill of unknown quality.

The Phase Two ESA report was required in order to file future RSC for the property which cannot be made with the CSA Standard Report write-up.

4 SCOPE OF INVESTIGATION

4.1 Overview of Site Investigation

HLV2K's Phase Two ESA included an analysis of field investigation carried out between September 1, 2021 to April 12, 2022. 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.
- Advancement of a total of five (5) boreholes, all to a maximum depth of 6.2 and 9.8 m below ground surface.
- All Five (5) boreholes were completed to monitoring wells designed to intercept the water table.
- Collection of the geodetic elevations for borehole locations.
- Groundwater elevation measurements using an interphase probe for the potential measurements of free phase product either floating on the water table or at 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**).
- Collected samples were submitted to and analyzed by ALS Environmental testing laboratories to the MECP Table 2 RPI Standards for soil.

4.2 Media Investigation

The Phase Two ESA was designed to investigate the potential for impact on soil and groundwater media on, in, and under 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:

- Five (5) boreholes were drilled on the Phase Two Property (BH1, BH2, BH3, BH4, BH5) to depths ranging from 6.2 to 9.8 m bgs.
- The boreholes were advanced by utilizing continuous flight hollow stem augers. Samples were retrieved at regular intervals with a 50 mm outside diameter split-barrel sampler driven with a hammer weighing 624 N (63.5 kg) and dropping 760 mm.
- 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 about 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, OCPs, metals, and metal forming hydrides.
- 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. Monitoring wells were installed at an approximate depth of 6.2 m to 9.8 m bgs in an attempt to intercept the shallow water table and meet the requirements of O. Reg. 903 requiring a minimum bentonite seal of 1.5 m bgs. The monitoring wells were dry at the time of groundwater sampling one (1) month after drilling. Therefore, groundwater sampling was not conducted. The following activities were completed to assess the groundwater:

- Five (5) monitoring wells (BH1, BH2, BH3, BH4, BH5) were installed to assess the potential impact on the groundwater.
- A three (3) m well screen was placed at the bottom of the borehole that was drilled to a maximum depth of 9.8 m bgs.
- Development of each well, prior to sampling by the removal (purge) was not conducted since the wells were dry.
- Determination of the presence of non-aqueous phase liquid-free product and the static groundwater elevation at each well.
- 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 was not conducted since the wells were dry.
- One (1) duplicate sample would have been collected for QA/QC analysis; one (1) for each ten (10) parameters measured in the field if water was present. However, no samples were collected.
- The cooler also contained a trip blank for the measurement of VOC samples for groundwater. The trip blank was not analyzed since no groundwater samples were collected.

The monitoring wells were dry at the time of groundwater sampling one (1) month after drilling with the exception of BH5 which had minimal water. HLV2K visited the property for groundwater elevation

measurements on seven (7) occasions from September 2021 to April 2022 and the wells were dry. Therefore, groundwater sampling was not conducted.

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 the Phase One Study Area identified through a records review, interview, and site reconnaissance are summarized in **Table 4 – Section 4.3** and include the inferred groundwater flow direction during the investigation (**Drawing 5**):

Table 4 – Section 4.3: Phase One CSM – PCAS

No.	PCA # (Table 2, Schedule D, Ontario Regulation 153/04)	Direction from/Location on Phase One Property	Approximate Distance from Phase One Property (m)	Relative to the groundwater flow direction
1	PCA #40: Pesticides (including Herbicides, Fungicides, and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage, and Large-Scale Applications.	On-Site	0.0	On-site
2	PCA #30: Importation of Fill Material of Unknown Quality	On-Site	0.0	On-site
3	PCA #28: Gasoline Associated Products Storage in Fixed Tanks	On-site	0.0	On-site

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 are summarized in **Table 5 – Section 4.3** 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	On-Site	PCA #40: Pesticides (including Herbicides, Fungicides, and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage, and Large-Scale Applications.	On-Site	PHCs, VOCs, OCPs, PAHs, Metals, and Metal Hydrides, EC, SAR, pH, Cl, Na	Soil and Groundwater

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)
APEC2	On-Site	PCA #30: Importation of Fill Material of Unknown Quality	On-Site	PHCs, VOCs, PCBs, PAHs, Metals, and Metal Hydrides, EC, SAR, pH, Cl, Na	Soil and Groundwater
APEC3	On-site	PCA #28: Gasoline Associated Products Storage in Fixed Tanks	On-Site	PHCs, VOCs, PCBs, PAHs, Metals, and Metal Hydrides, EC, SAR, pH, Cl, Na	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

4.4 Physical Settings

The site is located at approximately 460 m to 470 m above sea level (asl).

According to the physiographic regions of Ontario identified by Chapman and Putnam (2007), the Site is located in Hillsburgh Sandhills. The Hillsburgh Sandhills physiographic region is found in the northwestern portion of the watershed and consists of coarse-grained sediments. It is an area of high relief with thick deposits of glacial outwash (sandy materials) overlying glacial tills and bedrock (CVC, 2011).

The surficial deposits in the immediate vicinity of the Site are mapped as Orangeville Moraine with materials consisting of sand and gravel including some till or silt. The western side of the Site is modern alluvial deposits.

Bedrock is comprised of upper Silurian to lower Devonian of Guelph Formation. The bedrock surface is

expected to be approximately 60 m bgs. None of the boreholes drilled for this investigation reached the bedrock.

The closest water body is a pond draining into Credit River (Erin Branch) approximately 430 m southeast of the site. There is an intermittent creek approximately 40 m south and southwest of the property boundary flowing east to west into the pond. The intermittent creek was not observed at the time of the site visit and is considered a seasonal creek.

The nearest river is located to the southeast, which is a branch of the Credit River. The Groundwater table is approximately 20 meters below ground surface (m bgs). A portion of the Phase one Property fall within the well-head protection area for the Town of Erin.

4.5 Water Bodies and Areas of Natural Significance

The closest water body is a pond draining into Credit River (Erin Branch) approximately 430 m southeast of the site. There is an intermittent creek approximately 40 m south and southwest of the property boundary flowing east to west into the pond. The intermittent creek was not observed at the time of the site visit and is considered a seasonal creek. The creek is seasonal and does not have water all year round. The Phase Two Property does not include any areas of natural significance.

4.6 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 was not performed within 24 hours of purging as is required under the Ontario Regulation 153/04 (as amended) since there was no water in the wells.

No deviations occurred from the initial Sampling and Analysis Plan.

4.7 Impediments

The monitoring wells were dry at the time of well development one (1) month after drilling and the subsequent six (6) visits with the exception of MW5 on the southeast portion of the property with minimal water. Therefore, groundwater sampling was not conducted. The water table onsite and elsewhere in the surrounding area is very deep in accordance with the information from Domestic Water wells in the Water Well Information System.

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 contractor (MECP licensed well drillers) 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 attempt 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.

All five (5) boreholes were spaced across the Phase Two Property in the northwestern farm field, southeast farm field, and the northeastern gravel area to intersect any potential contaminants on, in or under the Phase Two Property.

Five (5) boreholes were drilled on the property to depths of 6.2 m, 6.3 m, 6.5 m, 6.7 m, and 9.8 m bgs with a track-mounted rig. The work was undertaken on September 7, 2021. Water was not encountered in any of the boreholes.

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

5.2.1 Name of the Contractor

Terra Firma, a licensed environmental and geotechnical driller was commissioned to drill the five (5) boreholes at the Phase Two Property and install the five (5) groundwater monitoring wells.

5.2.2 Description of the Equipment Used

The five (5) boreholes were drilled by Terra Firma, using a track-mounted drilling rig, equipped with 150 mm outside diameter rotary hollow stem augers and a 0.75 m in length split spoon sampler. The hollow stem augers were 5.5 inches in diameter as measured from the auger flights. The empty borehole was fitted with a 2-inch diameter PVC pipe and 10-foot well screen where well sand was added followed by bentonite chips.

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 0.75 m in length split spoon sampler from the ground surface to the bottom of the boreholes.

5.3 Soil Sampling

5.3.1 Description of Equipment Used for Soil Collection

Samples of soil were obtained using a 50 mm diameter split spoon sampler approximately 0.75 m in length. The soil is removed from the split spoon and placed in clear plastic bags marked as Soil Sample SS1 from 0.0 m to 0.75 m and 0.75 to 1.5 m for SS2 and so on.

Following field screening with a photo ionization detector, samples were placed in appropriate laboratory-supplied, pre-labelled 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 6 – Section 5.3.2** below.

Table 6 – Section 5.3.2: Geological Descriptions of Soil Samples

Exploratory Location BH/MW	Type	Geological Description	Depth Range (m bgs)	Soil Sample
BH1	Topsoil	Topsoil	0.0 – 0.2	SS1
	Sandy silt	Trace gravel/cobbles, trace clay, trace rootlets, oxidized, greyish brown, moist, loose to compact	0.2 – 3.1	SS1, SS2, SS3, & SS4
	Sand and gravel	Trace silt, trace clay, brown, moist, loose to very dense	3.1 – 9.8	SS5, SS6, SS7, SS8, & SS9
BH2	Topsoil	Topsoil	0.0 – 0.3	SS1
	Silty sand to sandy silt till	Trace clay, trace gravel/cobble, trace rootlets, brown, moist, loose to compact	0.3 – 1.5	SS1 & SS2
	Sandy silt till	Trace gravel, brown, moist, dense to very dense	1.5 – 6.2	SS3, SS4, SS5, SS6 & SS7
BH3	Topsoil	Topsoil	0.0 – 0.3	SS1
	Silty sand	Trace gravel, trace rootlets, greyish brown, moist, loose	0.3 – 1.5	SS1 & SS2
	Sand and gravel	Trace silt, some cobble, brown, moist, dense to very dense	1.5 – 6.3	SS3, SS4, SS5, SS6 & SS7
BH4	Topsoil	Topsoil	0.0 – 0.3	SS1
	Sand and gravel	Trace silt, trace clay, trace rootlets, some cobbles, brown, moist, loose to compact	0.3 – 1.5	SS1 & SS2
	Silty clay	Trace sand, trace gravel, brown moist, hard	1.5 – 2.3	SS3
	Sand and gravel	Trace silt, trace clay, some cobbles, brown, moist, compact to very dense	2.3 – 6.7	SS4, SS5, SS6 & SS7
BH5	Topsoil	Topsoil	0.0 – 0.3	SS1
	Silty sand	Trace clay, trace gravel. Trace	0.3 – 2.3	SS1, SS2, & SS3

Exploratory Location BH/MW	Type	Geological Description	Depth Range (m bgs)	Soil Sample
		rootlets, brown, moist, loose		
	Sand	Some gravel, some silt, trace clay, brown, moist, compact to very dense	2.3 – 6.5	SS4, SS5, SS6 & SS7

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 the 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 is calibrated by Maxim Environmental on a regular basis. 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 in the field notes. Soil samples with the highest combustible headspace vapours were then submitted to the laboratory for analysis. The summary of VOC measurements is summarized 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, H2S, 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 monitor is calibrated by Maxim Environmental on a regular basis with isobutylene calibration gas and hexane.

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. If the PID detects positive concentrations of any of the measurable parameters, the PID is re-calibrated using the auto-calibration function of the unit. If 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 before use for blockage and damage and are replaced frequently.

5.5 Groundwater: Monitoring Well Installation

The investigation method follows the analysis plan for groundwater shown in **Appendix B**.

The Phase Two ESA investigation was comprised of the advancement of a total of five (5) boreholes drilled to a maximum depth of approximately 6.2 m to 9.8 m below ground surface (bgs). The locations of each of the monitoring wells were selected to sample soil and groundwater pertaining to the three (3) APECs that were identified. All boreholes were converted to monitoring wells.

BH1 was drilled in the northwestern farm field on the northern side, BH2 was drilled in the northwestern farm field on the southern side, BH3 was drilled in the northwestern farm field in the center, and BH4 was drilled in the southern farm field to assess the soil and groundwater quality pertaining to APEC 1 for PCA #40 Pesticides (including Herbicides, Fungicides, and Anti-Fouling Agents) Manufacturing, Processing, Bulk, Storage, and Large-Scale Applications.

BH5 was drilled on the southeast portion of the property in the gravel road, along with Hand samples 1 and 2 to assess the soil and groundwater quality pertaining to APEC 2 for PCA #30 (Importation of Fill Material of Unknown Quality).

APEC 3 was not investigated at the time of this Phase Two ESA.

Selected samples for soil obtained during the course of the Phase Two ESA were submitted for chemical laboratory analysis, the scope which was agreed to by the Clients. The groundwater was not analyzed as the wells were dry.

A three (3) m well screen was placed at the base of the borehole with a J-Plug at end of the 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. The PVC standpipe was extended to the ground surface and was sealed with a removable vapour cap which can be used to measure the potential for the build-up of both flammable and inflammable soil gas. The standpipe was encased by a monument.

5.5.1 Name of the Contractor

Terra Firma, a licensed environmental and geotechnical driller was commissioned to drill the five (5) boreholes at the Phase Two Property and install the five (5) groundwater monitoring wells.

5.5.2 Description of the Equipment

The monitoring wells were drilled with a track-mounted drill rig using a 150 mm outside diameter auger.

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,
- Well monument with lockable lid protective well covering and PVC cap for the well riser pipe.

5.5.3 Measures to Minimize Potential Cross-Contamination

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

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

Before well development, the groundwater elevation at each monitoring well was established using a Solinst 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 before use at a subsequent well.

The monitoring wells were not developed as the wells were dry. The details of well development are summarized in **Table 7 – Section 5.5.5** as follows.

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)
BH1	-	-	N/A	September 17, 2021	N/A
BH2	-	-	N/A	September 17, 2021	N/A
BH3	-	-	N/A	September 17, 2021	N/A
BH4	-	-	N/A	September 17, 2021	N/A
BH5	4.64	0.14	N/A	September 17, 2021	N/A

5.6 Groundwater: Field Measurements of Water Quality Parameters

Prior to the collection of groundwater samples, measurements of the groundwater quality (temperature, PH, conductivity) would have been 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. The Hanna Instrument was not used as the wells were dry.

Table 8 – Section 5.6 below summarizes the steady-state water quality parameters measured at each well, before 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
Sept 17, 2021	BH1	-	-	-
Sept 17, 2021	BH2	-	-	-
Sept 17, 2021	BH3	-	-	-
Sept 17, 2021	BH4	-	-	-
Sept 17, 2021	BH5	-	-	-

Following each use and prior to the commencement of the subsequent groundwater sample, the Hanna Instrument probe would have been flushed with de-ionized water and dried thoroughly. However, the Hanna Instrument was not used.

5.7 Groundwater: Sampling

Groundwater samples were not collected as the wells were dry at the maximum investigated depth of 9.8 m bgs except for BH5 with minimal water at 5.64 m bgs (0.14 m of water). The amount of water in the well was not enough for sampling.

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 labelled as Duplicate Sample 1, etc. However, the location and identity were not provided to the laboratory.

The required RDLs for all parameters 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

The monitoring wells were dry at the time of well development ten (10) days after drilling. Therefore, groundwater sampling was not conducted.

5.10.3 Equipment Cleaning Fluids

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

- 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 Sokkia GCX3 unit with SHC500 with an accuracy of +/- 2 mm in vertical elevation of the surface soil. The results of the elevation survey are summarized on the borehole logs and the cross-sectional drawings for each borehole, new and existing monitoring well.

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 soil showed good agreement with the duplicates taken in the field. Groundwater was not analyzed.

VOC trip blank was not analyzed since groundwater samples were not collected.

The relative percent difference (RPD) values were calculated and determined that all the parameters measured against their respective duplicate versus the actual samples were met for soil.

5.12.1 Laboratory Supplied Sample Containers and Shipment Procedures

Table 9 – Section 5.12.1 below provides a detailed description of the sample containers, preservation, labelling, 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.	Clear 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 labelled 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
VOCs, PHC (F1)	Vial	Methanol	

			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.
Groundwater Samples			
PHCs (F2-F4).	Clear Glass Bottles	HCL	Groundwater samples were collected using a low-flow waterra® pump and dispensed directly into the appropriate pre-labelled, 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.	Clear Glass Bottles	No preservatives	

Soil samples were collected using dedicated prepared 250 ml jars, syringes, and vials provided by ALS Environmental laboratories. 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 the 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 of 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 0.75 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 off-site 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;

- Towelled with dedicated disposable dry towels;
- Hanna instrument was flushed clean with de-ionized water; and,
- All fluids captured for off-site disposal in 205 L drums were clearly marked and labelled.

The soil samples were placed directly into pre-labelled jars specific to the chemical analysis desired. The location of each sampling point is recorded, and the pre-labelled 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.

5.12.3 Description of Field Quality Control Measures

Soil samples including duplicates were placed into laboratory-provided bottles and vials that were clearly labelled with the sample location, date, and chemical analysis to be conducted on each sample jar. The same labelling 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.

The following packaging and transportation procedures were followed:

- Correctly labelled 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 from the procedure undertaken in the Phase Two ESA Investigation was noted.

6 REVIEW AND EVALUATION

6.1 Geology

The surficial deposits in the immediate vicinity of the Site are mapped as Orangeville Moraine with materials consisting of sand and gravel including some till or silt. The western side of the Site is modern alluvial deposits.

6.1.1 Geological Conditions Encountered

Five (5) boreholes were advanced across the Phase Two Property. The soils encountered on-site are comprised of greyish/brown silty sand, sand with traces of gravel and clay.

No hydrocarbon odours were detected in any of the monitoring wells.

Groundwater contours and inferred groundwater flow direction are presented in **Drawing 5** along with the cross-section lines in the direction of groundwater flow and perpendicular to the flow in **Drawing 6**.

Table 10 – Section 6.1.1 below summarizes the properties of each geologic unit. **Table 10 – Section 6.1.1** and cross-sections describe the spatial arrangement of the soils as presented in **Drawings 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 asl)	Soil Sample
BH1 (473.5 m asl)	Topsoil	Topsoil	473.5 – 473.3	SS1
	Sandy silt	Trace gravel/cobbles, trace clay, trace rootlets, oxidized, greyish brown, moist, loose to compact	473.3 – 470.4	SS1, SS2, SS3, & SS4
	Sand and gravel	Trace silt, trace clay, brown, moist, loose to very dense	470.4 – 463.7	SS5, SS6, SS7, SS8, & SS9
BH2 (469.4 m asl)	Topsoil	Topsoil	469.4 – 469.1	SS1
	Silty sand to sandy silt till	Trace clay, trace gravel/cobble, trace rootlets, brown, moist, loose to compact	469.1 – 467.9	SS1 & SS2
	Sandy silt till	Trace gravel, brown, moist, dense to very dense	467.9 – 463.2	SS3, SS4, SS5, SS6 & SS7
BH3 (471.0 m asl)	Topsoil	Topsoil	471.0 – 470.7	SS1
	Silty sand	Trace gravel, trace rootlets, greyish brown, moist, loose	470.7 – 469.5	SS1 & SS2
	Sand and gravel	Trace silt, some cobble, brown, moist, dense to very dense	469.5 – 464.7	SS3, SS4, SS5, SS6 & SS7
BH4 (458.5 m asl)	Topsoil	Topsoil	458.5 – 458.2	SS1
	Sand and gravel	Trace silt, trace clay, trace rootlets, some cobbles, brown, moist, loose to compact	458.2 – 457.0	SS1 & SS2

Exploratory Location BH/MW	Type	Geological Description	Depth Range (m asl)	Soil Sample
	Silty clay	Trace sand, trace gravel, brown moist, hard	457.0 – 456.2	SS3
	Sand and gravel	Trace silt, trace clay, some cobbles, brown, moist, compact to very dense	456.2 – 451.8	SS4, SS5, SS6 & SS7
BH5 (454.0 m asl)	Topsoil	Topsoil	454.0 – 453.8	SS1
	Silty sand	Trace clay, trace gravel. Trace rootlets, brown, moist, loose	453.8 – 451.7	SS1, SS2, & SS3
	Sand	Some gravel, some silt, trace clay, brown, moist, compact to very dense	451.7 – 447.6	SS4, SS5, SS6 & SS7

6.1.2 Elevations Geodetic Benchmark

A handheld GPS unit was used to determine the geodetic elevations for each borehole and monitoring well. The elevations encountered for each borehole along with the cartesian coordinates are presented in **Table 12 – Section 6.2**.

6.1.3 Aquifer / Aquitard Properties

The soil stratigraphy indicated that the overburden was primarily comprised of coarse-grained sand. The monitoring wells were installed to a depth of 6.2 to 9.8 m bgs and exhibited no water. Based on the drinking water wells on the property, the depth to water is deep varying from 20 to 80 m bgs. Therefore, there appears to be one deep aquifer on-site for the Phase Two Property that was not investigated during this Phase Two ESA.

6.1.4 Rationale for the Choice of Aquifer

There is only one (1) deep aquifer on-site and it was not investigated. The soil on the property generally met the applicable SCS near the surface with the exception of two locations for PHC F4G and Cyanide. It is highly unlikely that any contamination from the property would be able to reach the groundwater in the deep aquifer at 20 to 80 m bgs.

6.1.5 Confirmatory Soil and Groundwater Monitoring Well Design and Rationale

The rationale for confirmatory monitoring of groundwater and placement of the wells is presented in **Table 11 – Section 6.1.5** below.

Table 11 – Section 6.1.5: Confirmatory Groundwater Monitoring and Well Design Rationale

Monitoring Well	Target Aquitard or Aquifer	Screen interval Depth (m bgs)	APEC	PCA	Rational
BH1	Sandy Silt and Sand and gravel	6.8 – 9.8	APEC 1	**PCA #40:** Pesticides (including Herbicides, Fungicides, and Anti-Fouling Agents) Manufacturing, Processing, Bulk	Soil and groundwater for Metals, As, Sb, Se, B-HWS, Cr (VI), CN-, EC, SAR, Na, Cl-, pH, Hg PAHs, PHCs, VOCs, BTEX. pH, EC, SAR, and OCPs

Monitoring Well	Target Aquitard or Aquifer	Screen interval Depth (m bgs)	APEC	PCA	Rational
				Storage, and Large-Scale Applications.	
BH2	Silty sand to sandy silt till and Sandy silt till	3.2 – 6.2	APEC 1	**PCA #40:** Pesticides (including Herbicides, Fungicides, and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage, and Large-Scale Applications.	Soil and groundwater for Metals, As, Sb, Se, B-HWS, Cr (VI), CN-, EC, SAR, Na, Cl-, pH, Hg PAHs, PHCs, VOCs, BTEX. pH, EC, SAR, and OCPs
BH3	Silty Sand and Sand and gravel	3.3 – 6.3	APEC 1 APEC 2	**PCA #40:** Pesticides (including Herbicides, Fungicides, and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage, and Large-Scale Applications. **PCA #30:** Importation of Fill Material of Unknown Quality	Soil and groundwater for Metals, As, Sb, Se, B-HWS, Cr (VI), CN-, EC, SAR, Na, Cl-, pH, Hg PAHs, PHCs, VOCs, BTEX. pH, EC, SAR, OCPs and PCBs
BH4	Sand and gravel and Silty clay	3.7 – 6.7	APEC 1	**PCA #40:** Pesticides (including Herbicides, Fungicides, and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage, and Large-Scale Applications.	Soil and groundwater for Metals, As, Sb, Se, B-HWS, Cr (VI), CN-, EC, SAR, Na, Cl-, pH, Hg PAHs, PHCs, VOCs, BTEX. pH, EC, SAR, and OCPs
BH5	Silty sand and Sand	3.5 – 6.5	APEC 2	**PCA #30:** Importation of Fill Material of Unknown Quality	Soil and groundwater for Metals, As, Sb, Se, B-HWS, Cr (VI), CN-, EC, SAR, Na, Cl-, pH, Hg PAHs, PHCs, VOCs, BTEX. pH, EC, SAR, and PCBs

6.2 Ground Water Elevations

Groundwater elevations could not be determined using the measured depth of water table in each monitoring well and ground surface elevation at that monitoring well. **Drawing 5** shows the inferred groundwater flow direction. **Table 12 – Section 6.2** below shows the measured groundwater depth and elevation at each monitoring well. The groundwater flow direction is inferred to be towards the south based

upon the proximity to a creek and a pond. The monitoring wells were dry at the time of well development and groundwater flow direction could not be calculated.

Table 12 – 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)
BH1	-	Dry	(60, 70)	473.50
BH2	-	Dry	(30, 35)	469.37
BH3	-	Dry	(50, 45)	471.00
BH4	-	Dry	(45, 20)	458.48
BH5	449.63	4.42	(80, 40)	454.05

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. Every effort was made so that the water table would fall within the screen interval. However, it did not happen for all wells. The groundwater table was encountered at deeper levels at 4.6 m bgs at one (1) location at the bottom of the well. The existing aquifer is expected to be at 20 to 80 m bgs throughout the property.

6.2.2 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.

No LNAPLs or DNAPLS were detected with the interphase probe during the measuring of the water level measurements at BH5. No odours were encountered in the monitoring wells. All other wells were dry.

6.2.3 Record of Measured Groundwater Elevations

The following **Table 13 – Section 6.2.3.1** shows the water level measurements collected from the Phase Two Property:

Table 13 – Section 6.2.3: 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	The volume of Fluid Removed from Well (L)
MW1	Dry	-	0	-	April 12, 2022	-
MW2	Dry	-	0	-	April 12, 2022	-
MW3	Dry	-	0	-	April 12, 2022	-
MW4	Dry	-	0	-	April 12, 2022	-
MW5	4.64	449.41	0.14	-	Sept 17, 2021	-
MW5	4.42	449.63	0.46	-	April 12, 2022	-
Piezometer	Dry	-	0	-	April 12, 2022	-

6.2.3.1 Inferred Groundwater Flow Direction

The groundwater flow direction was towards the southeast based upon the proximity to a creek and a pond. The monitoring wells were dry at the time of well development and groundwater flow direction could not be calculated.

6.2.3.2 Temporal Variations

As the Phase Two Property is underlain mainly with sand-dominated materials, and the single aquifer is very deep it is unlikely subject to seasonal fluctuation of groundwater levels.

6.2.3.3 Presence of Utilities

The Phase Two Property is serviced by the municipality for wastewater. The site likely uses city waste management for household wastes, a large private dumpster was also seen on site likely for farm waste. The Site has water service through a well and has a septic tank on site. These utilities may not influence the groundwater flow direction and the potential spread of contaminants if present in the soil and groundwater since the groundwater table is very deep.

6.3 Groundwater: Hydraulic Gradient

6.3.1 Horizontal Hydraulic Gradient

Hydraulic gradients could not be calculated as all wells were dry with the exception of one (1) at BH5.

6.3.2 Vertical Hydraulic Gradient

No vertical gradient in dry wells.

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 micrometres (µm) or larger in mean diameter. According to O. Reg. 153/04 (as amended), if one-third (1/3) of the soils at the Phase Two Property are coarse-grained, then the more stringent coarse-textured soil standards apply to the site; otherwise, the fine-medium grained soil standards are applicable. The soil at this property was considered mostly fine to medium coarse-grained sand and as such as be classified as fined grained soils, which requires a grain size analysis as proof. A grain size analysis was conducted, and the soil was considered to be coarse-grained soil.

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). 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)
BH1 September 7, 2021	1	0.0 – 0.2	Topsoil	None Detected	0	0
	1	0.2 – 0.8	Sandy silt	None Detected	0	0
	2	0.8 – 1.5	Sandy silt	None Detected	0	0
	3	1.5 – 2.3	Sandy silt	None Detected	0	0
	4	2.3 – 3.1	Sandy silt	None Detected	0	0
	5	3.1 – 3.9	Sand and gravel	None Detected	0	0
	6	4.6 – 5.4	Sand and gravel	None Detected	0	0
	7	6.2 – 7.0	Sand and gravel	None Detected	0	0
	8	7.8 – 8.3	Sand and gravel	None Detected	0	0
	9	9.0 – 9.8	Sand and gravel	None Detected	0	0
BH2 September 7, 2021	1	0.0 – 0.3	Topsoil	None Detected	0	5
	1	0.3 – 0.8	Silty sand to sandy silt till	None Detected	0	5
	2	0.8 – 1.5	Silty sand to sandy silt till	None Detected	0	0
	3	1.5 – 2.3	Sandy silt till	None Detected	0	6
	4	2.3 – 3.1	Sandy silt till	None Detected	0	4
	5	3.1 – 3.9	Sandy silt till	None Detected	0	2
	6	4.6 – 5.4	Sandy silt till	None Detected	0	10
	7	6.2 – 6.25	Sandy silt till	None Detected	0	0
BH3 September 7, 2021	1	0.0 – 0.3	Topsoil	None Detected	0	0
	1	0.3 – 0.8	Silty sand	None Detected	0	4
	2	0.8 – 1.5	Silty sand	None Detected	0	0
	3	1.5 – 2.3	Sand and gravel	None Detected	0	1
	4	2.3 – 3.1	Sand and gravel	None Detected	0	1
	5	3.1 – 3.9	Sand and gravel	None Detected	0	0
	6	4.6 – 5.4	Sand and gravel	None Detected	0	3
	7	6.2 – 6.3	Sand and gravel	None Detected	0	0
BH4 September 7, 2021	1	0.0 – 0.25	Topsoil	None Detected	0	2
	1	0.25 – 0.8	Sand and gravel	None Detected	0	0
	2	0.8 – 1.5	Silty clay	None Detected	0	0
	3	1.5 – 2.3	Sand and gravel	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)
	4	2.3 – 3.1	Sand and gravel	None Detected	0	0
	5	3.1 – 3.9	Sand and gravel	None Detected	0	0
	6	4.6 – 5.4	Sand and gravel	None Detected	0	0
	7	6.2 – 6.7	Sand and gravel	None Detected	0	2
BH5 September 7, 2021	1	0.0 – 0.25	Topsoil	None Detected	0	0
	1	0.25 – 0.8	Silty sand	None Detected	0	0
	2	0.8 – 1.5	Silty sand	None Detected	0	0
	3	1.5 – 2.3	Silty sand	None Detected	0	0
	4	2.3 – 3.1	Sand	None Detected	0	1
	5	3.1 – 3.9	Sand	None Detected	0	1
	6	4.6 – 5.4	Sand	None Detected	0	0
	7	6.2 – 6.5	Sand	None Detected	0	5

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 Potential Concern in the soil in relation to the PCAs and the three (3) APECs that may affect the Phase Two Property:

- Polycyclic Aromatic Hydrocarbons (PAHs);
- Metal, As, Sb, Se, Hg, CN^-, Cr (VI), pH, EC, SAR;
- Polychlorinated Biphenyl (PCBs);
- Volatile Organic Compounds (VOCs); and,
- Petroleum Hydrocarbons (PHCs) – Fraction F1 to F4.
- Organochlorine Pesticides (OCP)

On September 07, 2021, a total of eight (8) soil samples were collected for six (6) sample parameter groups including one (1) duplicate sample, to evaluate the level of potential chemical impact on the soils beneath the Phase Two Property in the areas of the APECs:

- Eight (8) samples for Metal, As, Sb, Se, Hg, CN^-, Cr (VI), pH, EC, SAR
- Three (3) samples for PCBs
- Eight (8) samples for PAHs
- Eight (8) samples for VOCs/F1
- Eight (8) samples for PHCs/F2-F4

- Five (5) samples for OCPs

The soil from the boreholes and hand samples met the applicable MECP Table 2 Standards RPI in potable groundwater conditions except for one of the hand samples taken from the site which had an exceedance for Petroleum Hydrocarbons F4G Fraction.

6.6.1 Location and Depth of Sampling

The following **Table 16 – Section 6.6.1** 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 2 RPI)
				PHC F2 – F4	VOCs/F1	PAHs	PCBs	OCPs	M & M Hyd	
MW1	MW1SS1	0.0 – 0.8	Sep 7,2021						✓	No Exceedances
	MW1SS2	1.0 – 1.5	Sep 7,2021			✓		✓		No Exceedances
	MW1SS8	7.7 – 8.3	Sep 7,2021	✓	✓					No Exceedances
MW2	MW2SS1	0.0 – 0.6	Sep 7,2021						✓	No Exceedances
	MW2SS2	0.8 – 1.4	Sep 7,2021			✓		✓		No Exceedances
	MW2SS6	4.6 – 5.2	Sep 7,2021	✓	✓					No Exceedances
MW3	MW3SS1	0.0 – 0.6	Sep 7,2021					✓		No Exceedances
	MW3SS2	0.8 – 1.3	Sep 7,2021	✓	✓	✓			✓	No Exceedances
MW4	MW4SS1	0.0 – 0.6	Sep 7,2021					✓	✓	No Exceedances
	MW4SS2	0.8 – 1.3	Sep 7,2021							No Exceedances
	MW4SS3&4	1.5 – 3.0	Sep 7,2021			✓				No Exceedances
	MW4SS7	6.1 – 6.7	Sep 7,2021	✓	✓					No Exceedances
MW5	MW5SS1	0.0 – 0.6	Sep 7,2021				✓		✓	No Exceedances
	MW5SS2	0.8 – 1.3	Sep 7,2021			✓				No Exceedances
	MW5SS7	6.1 – 6.5	Sep 7,2021	✓	✓					No Exceedances
HS1	HS1	-	Sep 7, 2021	✓	✓	✓	✓		✓	No Exceedances
HS2	HS2	-	Sep 7, 2021	✓	✓	✓	✓		✓	**Petroleum Hydrocarbons F4 Fraction**
TP3	-	0.0 – 3.0	October 2020							**Cyanide**
	Dup (MW1)		Sep 7,2021	✓	✓	✓		✓	✓	No Exceedances

The Laboratory Certificates of Analysis are presented in **Appendix D** and detailed assessments of the soil analytical results are presented in **Table 2** (attachments).

The environmental quality of the soil at, in, and under the Phase Two Property was compared to the MECP Table 2 RPI Standards. Soil samples from all locations submitted for analysis met the MECP Table 2 RPI Standards for coarse-grained soils with the exception of PHC F4G (5290 > 250 µg/g) in Hand Sample 2 near the barn area.

The previous sampling conducted by Soil Engineers Limited presented a cyanide exceedance compared to Table 2 RPI standards (0.06 > 0.05 µg/g).

6.6.2 Analytical Results

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

6.6.3 Contaminants of Concern (COC)

The soil from the boreholes and hand samples met the applicable MECP Table 2 RPI Standards except for one of the hand samples taken from the site which had an exceedance for Petroleum Hydrocarbons F4 Fraction. These findings suggest that the surrounding properties and Phase II Property activities have not adversely impacted the site at the locations sampled except for the soil near the barn.

Based on the previous investigations by Soil Engineers Limited, an exceedance of Cyanide was encountered in the northern section of the farmlands.

Therefore, the contaminants of concern in soil include:

- Petroleum Hydrocarbon F4 fraction
- Cyanide

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

The soil from the boreholes and hand samples met the SCS for the six (6) parameter groups analyzed except for one of the hand samples taken from the site which had an exceedance for Petroleum Hydrocarbons F4 Fraction at 1 m bgs. Groundwater was not analyzed as the monitoring wells were dry. It is highly unlikely that soil contamination would affect the groundwater since the on-site aquifer is expected to be more than 20 m bgs.

6.7 Groundwater Quality

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

- Polycyclic Aromatic Hydrocarbons (PAHs);
- Metal, As, Sb, Se, Hg, CN^-, Cr (VI), pH, EC, SAR;
- Polychlorinated Biphenyl (PCBs);
- Volatile Organic Compounds (VOCs); and,
- Petroleum Hydrocarbons (PHCs) – Fraction F1 to F4.
- Organochlorine Pesticides (OCP)

On September 17, 2021 and April 12, 2022, the monitoring wells were visited for groundwater elevation measurements and were found to be dry with the exception of one (1) monitoring well BH5 with 0.46 cm of water, not enough for sampling.

6.7.1 Location and Sample Depth

Table 18 – 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 8 Standards.

Table 16 – Section 6.7.1: Groundwater Chemical Laboratory Analysis

Well ID	Sample ID	Depth (m asl)	Date Sampled	Chemical Analysis						Standard Exceedance (Table 2 Standard for Potable Groundwater)
				PHCs F2 – F4	VOCs/F1	PAHs	OCPs	PCBs	M & M Hyd	
MW1	MW1	473	April 12,2022	-	-	-	-	-	-	**N/A**
MW2	MW2	469	April 12,2022	-	-	-	-	-	-	**N/A**
MW3	MW3	470	April 12,2022	-	-	-	-	-	-	**N/A**
MW4	MW4	458	April 12,2022	-	-	-	-	-	-	**N/A**
MW5	MW5	453	April 12,2022	-	-	-	-	-	-	**N/A**
	Dup1		April 12,2022	-	-	-	-	-	-	**N/A**

Groundwater was not analyzed as part of this Phase Two analysis.

6.7.2 Documentation of Field Filtering

Groundwater was not analyzed as part of this Phase Two analysis.

6.7.3 Analytical Results to SCS

Groundwater was not analyzed as part of this Phase Two analysis. It is highly unlikely that site activities would affect the groundwater since the on-site aquifer is expected to be more than 20 m bgs.

6.7.4 Contaminants of Concern

Groundwater was not analyzed as part of this Phase Two analysis. It is highly unlikely that site activities would affect the groundwater since the on-site aquifer is expected to be more than 20 m bgs.

6.7.5 Chemical and Biological Transformation

Groundwater was not analyzed as part of this Phase Two analysis.

6.7.6 Soil Serves as Source of Contamination to Groundwater

The soil from the boreholes and hand samples met the SCS for the six (6) parameter groups analyzed except for one of the hand samples taken from the site which had an exceedance for Petroleum Hydrocarbons F4 Fraction at 1 m bgs. Groundwater was not analyzed as the monitoring wells were dry. It is highly unlikely that soil contamination would affect the groundwater since the on-site aquifer is expected to be more than 20 m bgs.

6.7.7 Presence of LNAPLs or DNAPLs

No free phase products were encountered in the groundwater at BH5 using the interface meter.

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 samples were collected and submitted for chemical laboratory analyses for QA/QC purposes.

Table 19 – 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)	7	1	0	-	-
VOC (incl. BTEX)	7	1	0	-	-
PAH	7	1	0	-	-
PCB	3	-	0	-	-
OCPs	4	1	0	-	-
Metals & Metal Hydrides	7	1	0	-	-
TOTAL	**35**	**5**	**0**	**0**	**0**

Section 3. (3).5 of Schedule E of O. Reg. 153/04 (as amended) requires at least one (1) field duplicate be collected and analyzed 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. Groundwater samples were not taken due to well dry. The following formula was used to assess the various duplicates against their respective soil or groundwater samples.

Duplicate RPD = {([sample] – [sample duplicate])/([sample] + [sample duplicate])/2} x 100. The values calculated must fall in the Following Ranges shown on **Table 19 – Section 6.9.**

All the parameters met their respective RPD values except for electrical conductivity in soil for a value of 23% compared to the limit of 10%. The difference can be attributed to the non-homogenous nature of the soil.

Table 19 – Duplicate RPD Values in Less Than ≤

Parameter	Groundwater RPD Limit	Groundwater Duplicate	Soil RPD Limit	Soil Duplicate
PAH	≤30%	-	≤40%	≤0%
OC Pesticides	≤30%	-	≤40%	≤0%
PCB	≤30%	-	≤40%	N/A
VOC	≤30%	-	≤40%	≤0%
PHC	≤30%	-	≤40%	≤0%
Free CN	≤20%	-	≤35%	≤0%
EC	≤20%	-	≤10%	**≤23%**
Cr VI	≤20%	-	≤35%	≤0%
Hg	≤20%	-	≤30%	≤19%
Metals, Metal Hydrides, and Boron	≤20%	-	≤30%	≤3%
Boron Hot water	≤30%	-	≤40%	≤0%
pH	0.3 units	-	0.3 units	0.09

6.10 Phase Two Conceptual Site Model

The Phase Two Property is located at 5196 Trafalgar Road North, Erin, Ontario. The legal description of the Phase Two Property, Part 1 and Part 2 of Lot 26 Concession 7. The Phase Two Property has an irregular shape and covers an area of approximately 116.36 Acres (47.09 ha). The size and location are shown in **Drawing 1**, the Registered Legal Survey of the Phase Two Property.

The Phase Two Property is surrounded by residential housing, agricultural fields, and forested areas. The current land use of the Phase Two Property is Agricultural or Other use.

According to the physiographic regions of Ontario identified by Chapman and Putnam (2007), the Site is located in Hillsburgh Sandhills. The Hillsburgh Sandhills physiographic region is found in the northwestern portion of the watershed and consists of coarse-grained sediments. It is an area of high relief with thick deposits of glacial outwash (sandy materials) overlying glacial tills and bedrock (CVC, 2011).

The surficial deposits in the immediate vicinity of the Site are mapped as Orangeville Moraine with materials consisting of sand and gravel including some till or silt. The western side of the Site is modern alluvial deposits. Bedrock is comprised of upper Silurian to lower Devonian of Guelph Formation. The bedrock surface is expected to be approximately 60 m bgs. None of the boreholes drilled for this investigation reached the bedrock. The land surrounding the Phase Two Property is variable in elevation with a gentle slope towards the Credit River (Erin Branch) to the southeast.

The Conceptual Site Model shows three (3) PCAs on the property of which relative to the inferred groundwater flow direction may have had an impact on the Phase Two Property. **Drawing 2** represents the PCAs on and surrounding the Phase Two Property. The PCAs that affect the Phase Two Property includes **PCA 40** for Pesticides (including Herbicides, Fungicides, and anti-fouling agents) Manufacturing, processing, bulk storage, and large-scale applications, **PCA 30** for Importation of Fill Material of unknown quality and **PCA 28** for gasoline associated products storage in fixed tanks. The three (3) PCAs generated three (3) on-site Areas of Potential Environmental Concern (APECs). **APEC 1** was generated by PCA 40, as it has been used as farmland. **APEC 2** was generated by PCA 30 due to the potential fill material brought to the property to construct the gravel pathways. **APEC 3** was generated by PCA 28 due to the presence of the former underground storage tank east of the residential building. The APECs are shown in **Drawing 3.**

The CSM is based on the soil results from five (5) boreholes and five (5) monitoring wells. The parameters selected were to address the Contaminants of Potential Concern (COPC) from the Potential Contaminating Activities (PCA) and the Areas of Potential Environmental Concern (APECs) identified in the Phase One ESA. The precise location of each borehole and monitoring well are defined in **Drawing 4** via cartesian coordinates with values for the x-axis and y-axis in meters.

The groundwater flow direction is towards the south towards a seasonal creek 40 m south of the property boundary flowing east to west to a pond to the southeast. The groundwater table could not be measured as the wells were dry at the time of investigation with the exception of one (1) monitoring well BH5 at 4.42 m bgs. The inferred groundwater flow direction is shown in plan view **Drawing 5** of the site plan.

The Ministry of the Environment, Conservation, and Parks (MECP) “Table 2 Standards in a Potable Ground Water Condition for Residential Parkland Institutional (RPI) use site conditions standards, (Table 2 Standards) as per the MECP document titled “Soil, Groundwater and Sediment Standards was considered the applicable Site Condition Standard (SCS) for the Phase Two Property and have been used to assess the chemical quality of the soil samples obtained from the Phase Two Property. The soil was analyzed for PHCs F1 to F4 Fractions, Benzene, Toluene, Ethylbenzene, Xylene, VOCs, PAH, OCPs, Metal, Metals, As, Sb, Se, B-HWS, Cr (VI), CN-, EC, SAR, Na, Cl-, pH, Hg, EC, SAR, and PCBs.

Cross-sectional drawings based upon the Plan View **Drawing 6** of the site plan with cross-sectional lines **A to A’** in the direction of groundwater flow and cross-sectional lines **B to B’** perpendicular to cross-sectional lines **A to A’**. Cross-sections were drawn to scale vertically with geodetic elevations in meters above sea level (m asl) and horizontally in meters (m) to scale. In total, thirteen (13) cross-sectional drawings are prepared for the RSC submission produced for all parameters analyzed in soil.

The Phase Two CSM refers to the attached **Drawings 1 – 6** described in the previous sections and together with **Plan View Drawings 7 – 13** showing the sampling locations in soil, **Cross-Sectional Drawings 7A – 13A** for **A to A’** and **Cross-sectional Drawings 7B – 13B** for **B to B’** (as below) and is described in the proceeding sections. The Human, Fauna and Floral Exposure and Receptor Routes are summarized in

Drawing 14.

Please note that the cross-sectional drawings will be prepared as part of the RSC submission and the report will be updated at that time.

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 On-site.

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: Plan View Drawing, Cartesian Coordinates of Cross-sectional Lines A to A' and B to B'

Drawing 7: Plan View Drawing for Sampling Locations for Metals, Hg, As, Se, and Sb in Soil

Drawing 7A: Cross-sectional Drawing A to A' for Metals, Hg, As, Se, and Sb in Soil

Drawing 7B: Cross-sectional Drawing B to B' for Metals, Hg, As, Se, and Sb in Soil

Drawing 8: Plan View Drawing for Sampling Locations for B-HWS, Cr (VI), CN^-, EC, SAR, and pH in Soil

Drawing 8A: Cross-sectional Drawing A to A' for B-HWS, Cr (VI), CN^-, EC, SAR, and pH in Soil

Drawing 8B: Cross-sectional Drawing B to B' for B-HWS, Cr (VI), CN^-, EC, SAR, and pH in Soil

Drawing 9: Plan View Drawing for Sampling Locations for VOCs and BTEX 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 10: Plan View Drawing for Sampling Locations for PHCs F1 to F4 Fractions 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 11: Plan View Drawing for Sampling Locations for PAHs 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 12: Plan View Drawing for Sampling Locations for PCB 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 13: Plan View Drawing for Sampling Locations for OCP in Soil

Drawing 13A: Cross-sectional Drawing A to A' OCP in Soil

Drawing 13B: Cross-sectional Drawing B to B' OCP in Soil

The full description of each of the drawings including the cross-sections under section 6.10 will be completed as part of the RSC submission. The complete Section 6 will be added to this report at that time.

7 CONCLUSIONS

The Phase Two ESA for the Phase Two 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 Phase Two ESA investigation was comprised of the advancement of a total of five (5) boreholes drilled to a maximum depth of approximately 6.2 m to 9.8 m below ground surface (bgs). All boreholes were converted to monitoring wells.

Selected samples for soil obtained during the course of the Phase Two ESA were submitted for chemical laboratory analysis, the scope which was agreed to by the Clients. The groundwater was not analyzed as the wells were dry with the exception of BH5 with minimal water.

The soil at the Phase Two Property was sampled at BH1, BH2, BH3, BH4, BH5, Hand Sample 1, and Hand Sample 2 analyzed for metals, Hg, As, Se, Sb, B-HWS, Cr (VI), CN^-, BTEX, PHCs F1 to F4, PCB, PAH, OCPs, VOCs, EC, SAR, and pH.

The soil that was analyzed at BH1, BH2, BH3, BH4, and BH5 met the site condition standards for the MECP Table 2 RPI Standards in a potable groundwater condition for all parameters with the exception of Petroleum Hydrocarbons (F4) in Hand Sample 2 near the barn area. Hand Sample 1 met the MECP Table 2 RPI standards.

The groundwater flow direction was inferred to be towards the south based on the proximity to a seasonal creek south of the property. The monitoring wells were dry at the time of well development and groundwater flow direction could not be calculated.

Based upon the results of the parameters tested across the five (5) monitoring well locations and two (2) hand sampling locations during the Phase Two ESA investigation, the soil samples collected met the applicable SCS for all parameters, including the duplicates with the exception of Hand Sample 2 for PHC F4 fraction (5290 > 250 µg/g). An exceedance of Cyanide (0.06 > 0.05 µg/g) was encountered at TP3 at the northwest portion of the property during a previous investigation by Soil Engineers Limited.

7.1 RECOMMENDATIONS

These findings suggest that the surrounding properties and Phase Two Property activities have not adversely impacted the site at the locations sampled except for the soil near the barn and one (1) location in the farmland. It is recommended that the areas where PHC F4 and Cyanide exceedances were encountered be delineated to investigate the extent of the contamination. The contaminated soil should be excavated, and confirmatory samples analyzed to ensure no contamination is left on-site.

An RSC filing cannot be undertaken at this time as the Phase Two Property does not meet the Table 2 Site Condition Standards. Confirmatory sampling will be required in accordance with Table 3 of Schedule E of O. Reg 153/04 as amended. Once the delineation and remediation have been completed, then the Phase Two ESA can be completed in preparation for the RSC submission.

The last site work for the Phase Two ESA was concluded on April 12, 2022.

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.

8 LIMITATIONS

The findings of the boreholes are believed to be representative of the area of investigation and are based on the facts and information determined by HLV2K. Soil and/or groundwater conditions at locations other than the boreholes may vary from conditions encountered at the drilling locations. The findings in this report are limited to the environmental conditions on the site at the time of the investigation. This report was prepared for the account of Hillsburgh Heights Inc. The Ontario Ministry of the Environment, Conservation, and Parks (MECP) may also rely on this report for the purpose of acknowledging a Record of Site Condition, including accepting any of its supporting documents. The material in it reflects HLV2K's judgment in light of the information available to it at the time of preparation. Any use, which a Third Party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of such Third Parties. HLV2K accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

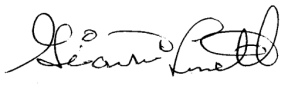
This report is to the *Statement of Limitations*, which forms an integral part of this document. The *Statement of Limitations* is not intended to reduce the level of responsibility accepted by HLV2K, but rather to ensure that all parties who have been given reliance for this report are aware of the responsibilities each assumes in so doing.

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

Swathy Mayandi
Junior 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

- Ontario Regulation 153/04: Records of Site Condition – Part XV.1 of the Environmental Protection Act (as amended)
- Environmental Protection Act, RSO 1990, Charter E. 19, 2004 (as amended)
- "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", Ministry of Environment, Conservation, and Parks, 1996
- Quaternary Geology of Ontario, southern sheet; Ontario Geological Survey, Map 2556, 1991
- Physiography of Southern Ontario; Ontario Geological Survey, Map P.2715, 1984
- Bedrock topography of the Greater Toronto and Oak Ridges Moraine areas, southern Ontario. Geological Survey of Canada, Map Open File. 3419, 1998
- Google Earth Maps
- The Atlas of Canada – Toporama Mapping Tool, Natural Resources Canada
- "Phase I Environmental Site Assessment Summary Letter Report due diligence for proposed development – 5916 Trafalgar Road North, Town of Erin (Hills burgh)" dated September 30, 2020, and Reference No. 2009-E020 prepared by Soil Engineers Ltd.
- "Preliminary Geotechnical Investigation for Proposed development for 5916 Trafalgar Road North, Town of Erin (Hills burgh)" dated October 2020 and Reference No. 2009-S020 prepared by Soil Engineers Ltd.
- "Summary of the soil sampling plan prepared by the Soil Engineering Ltd", dated October 2020 for 5916 Trafalgar Road North, Town of Hills burgh, and Reference No. is 2009- E020.
- "ESA Phase I Report – 5916 Trafalgar Road North, Town of Erin (Hills burgh)" dated August 26, 2021, and Project No. 2100428CE prepared by HLV2K.
- "ESA Phase II Report – 5916 Trafalgar Road North, Town of Erin (Hills burgh)" dated October 26, 2021, and Project No. 2100428DE prepared by HLV2K.
- Chapman, L.J., and Putnam, D.F. (2007). The Physiography of Southern Ontario, Ontario Geological Survey, Miscellaneous Release—Data 228.
- CVC (2011). Credit River Watershed and Region of Peel: Natural Areas Inventory – Volume 1, Credit River Conservation, September 2011.

HLV2K Engineering Limited

STATEMENT OF LIMITATIONS

Your report has been developed based on your unique project specific requirements as understood by HLV2K Engineering Limited (HLV2K) and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking HLV2K to assess how factors that changed subsequent to the date of the report affect the report's recommendations. HLV2K cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions, which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult HLV2K to be advised how time may have impacted on the project.

The findings derived from this investigation were based on information collected and/or provided by the Client. It may become apparent that soil and groundwater conditions differ between and beyond the testing locations examined during future investigations or other work that could not be detected or anticipated at the time of this study. As such, HLV2K cannot be held liable for environmental conditions that were not apparent from the available information. The conclusions presented represent the best judgment of the assessors based on limited investigations.

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature, external data source review, sampling, and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions, which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of HLV2K through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report is based on the assumption that he site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only HLV2K, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and HLV2K cannot be held responsible for such misinterpretation.

To avoid misuse of the information contained in your report it is recommended that you confer with HLV2K before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

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Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain HLV2K to work with other project design professionals who are affected by the report. Have HLV2K explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment.

Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact HLV2K for information relating to geoenvironmental issues.

HLV2K is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with HLV2K to develop alternative approaches to problems that may be of genuine benefit both in time and in cost.

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from HLV2K to other parties but are included to identify where HLV2K's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from HLV2K closely and do not hesitate to ask any questions you may have.

Third party information reviewed and used to formulate this report is assumed to be complete and correct. HLV2K used this information in good faith and will not accept any responsibility for deficiencies, misinterpretation or incompleteness of the information contained in documents prepared by third parties.

Nothing in this report is intended to constitute or provide a legal opinion.

Should additional information become available, HLV2K requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

Tables

Table 2: Summary of Soil Analysis Results

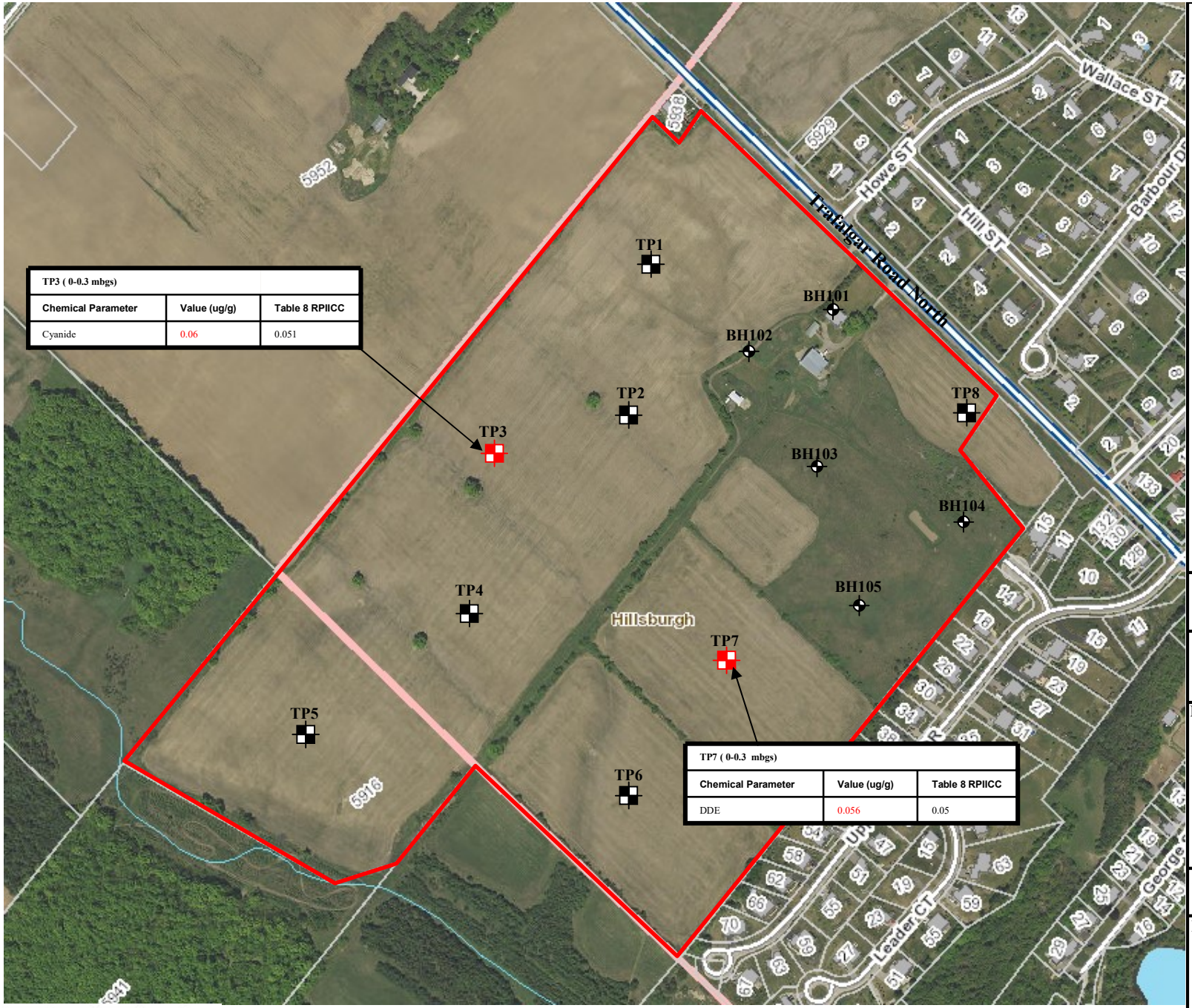
Parameter	MOE Table 2 RPI Standards Limit	Lowest Detection Limit	Units	MW1	MW2	MW3	MW4	MW5	DUP 1	HS1	HS2
				5-Oct-2021	5-Oct-2021	5-Oct-2021	5-Oct-2021	5-Oct-2021	5-Oct-2021	5-Oct-2021	5-Oct-2021
				L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6	L2649945-1	L2649945-2
				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Physical Tests (Soil)											
Conductivity	0.7 (U)	0.004	mS/cm	0.13	0.144	0.237	0.278	0.194	0.353	0.125	0.131
% Moisture		0.25	%	7.69	10.2	9.85	12.3	14.9	7.27	13.8	12.5
pH		0.1	pH units	7.76	7.95	7.78	7.71	7.35	7.85	7.46	6.89
Cyanides (Soil)											
Cyanide, Weak Acid Diss	0.051 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Saturated Paste Extractables (Soil)											
SAR	5 (U)	0.1	SAR	<0.10	<0.10	<0.10	0.27	<0.10	<0.10	<0.10	<0.10
Calcium (Ca)		0.5	mg/L	16.4	16	30.9	29	24.2	15.2	21.5	23
Magnesium (Mg)		0.5	mg/L	0.99	1.63	2.97	6.79	1.5	1.03	4.58	3.14
Sodium (Na)		0.5	mg/L	1.18	0.91	1.57	6.26	1.24	<0.50	0.85	0.58
Metals (Soil)											
Antimony (Sb)	7.5 (U)	1	ug/g	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic (As)	18 (U)	1	ug/g	2.4	2.9	3.9	6.4	2.8	3.4	3.8	4.1
Barium (Ba)	390 (U)	1	ug/g	18.4	33.9	35.1	26.9	43.6	25.7	40.6	36.2
Beryllium (Be)	4 (U)	0.5	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Boron (B), Hot Water Ext.	1.5 (U)	0.1	ug/g	<0.10	<0.10	<0.10	0.1	0.17	0.11	0.14	0.64
Boron (B)	120 (U)	5	ug/g	<5.0	6.1	5.1	8.3	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	1.2 (U)	0.5	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium (Cr)	160 (U)	1	ug/g	12.2	13.4	14.8	11.2	12.7	14.4	13.8	9.2
Cobalt (Co)	22 (U)	1	ug/g	3.7	5.2	5.2	4.4	4.3	3.9	4.5	4.8
Copper (Cu)	140 (U)	1	ug/g	7.5	13.8	13.6	24.7	7.7	7.7	12.6	18.8
Lead (Pb)	120 (U)	1	ug/g	9.8	39	9.2	13.5	10.5	9	15.1	35.2
Mercury (Hg)	0.27 (U)	0.005	ug/g	0.0073	0.0061	0.0146	0.0143	0.021	0.0162	0.0294	0.0383
Molybdenum (Mo)	6.9 (U)	1	ug/g	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel (Ni)	100 (U)	1	ug/g	7.4	10.6	10.4	8.5	7.5	7.9	9.4	7.8
Selenium (Se)	2.4 (U)	1	ug/g	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)	20 (U)	0.2	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)	1 (U)	0.5	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	23 (U)	1	ug/g	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium (V)	86 (U)	1	ug/g	32.2	24.9	30.6	21.8	30.2	37.1	31.7	20
Zinc (Zn)	340 (U)	5	ug/g	66.7	41.9	41.9	73.1	44.5	40	58	86.2
Speciated Metals (Soil)											
Chromium, Hexavalent	8 (U)	0.2	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	0.33	0.22	<0.20
Volatile Organic Compounds (Soil)											
Acetone	16 (U)	0.5	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	0.21 (U)	0.0068	ug/g	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068
Bromodichloromethane	1.5 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	0.27 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane	0.05 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Carbon tetrachloride	0.05 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	2.4 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	2.3 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroform	0.05 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dibromoethane	0.05 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	1.2 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	4.8 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	0.083 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane	16 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	0.47 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	0.05 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	0.05 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	1.9 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	0.084 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylene Chloride	0.1 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	0.05 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropene		0.03	ug/g	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene		0.03	ug/g	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
1,3-Dichloropropene (cis & trans)	0.05 (U)	0.042	ug/g	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042
Ethylbenzene	1.1 (U)	0.018	ug/g	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
n-Hexane	2.8 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	16 (U)	0.5	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	1.7 (U)	0.5	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MTBE	0.75 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Styrene	0.7 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	0.058 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	0.05 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	0.28 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	2.3 (U)	0.08	ug/g	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080
1,1,1-Trichloroethane	0.38 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	0.05 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	0.061 (U)	0.01	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Trichlorofluoromethane	4 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Vinyl chloride	0.02 (U)	0.02	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene		0.02	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
m+p-Xylenes		0.03	ug/g	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Xylenes (Total)	3.1 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Hydrocarbons (Soil)											
F1 (C6-C10)	55 (U)	5	ug/g	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	55 (U)	5	ug/g	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
F2 (C10-C16)	98 (U)	10	ug/g	<10	<10	<10	<10	<10	<10	<10	<10
F2-Naphth		10	ug/g	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16-C34)	300 (U)	50	ug/g	<50	72	<50	<50	<50	<50	<50	236
F3-PAH		50	ug/g	<50	72	<50	<50	<50	<50	<50	235
F4 (C34-C50)	2800 (U)	50	ug/g	<50	<50	<50	<50	<50	<50	<50	946
F4G-SG (GHH-Silica)	2800 (U)	250	ug/g								5290
Total Hydrocarbons (C6-C50)		72	ug/g	<72	<72	<72	<72	<72	<72	<72	1180
Polycyclic Aromatic Hydrocarbons (Soil)											

Acenaphthene	7.9 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	0.15 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	0.67 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)anthracene	0.5 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	0.3 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b&j)fluoranthene	0.78 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.06
Benzo(g,h,i)perylene	6.6 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	0.78 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	7 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	0.1 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	0.69 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.076
Fluorene	62 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	0.38 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1+2-Methylnaphthalenes	0.99 (U)	0.0424	ug/g	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042
1-Methylnaphthalene	0.99 (U)	0.03	ug/g	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
2-Methylnaphthalene	0.99 (U)	0.03	ug/g	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Naphthalene	0.6 (U)	0.013	ug/g	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Phenanthrene	6.2 (U)	0.046	ug/g	<0.046	<0.046	<0.046	<0.046	<0.046	<0.046	<0.046	<0.046
Pyrene	78 (U)	0.05	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.065
Polychlorinated Biphenyls (Soil)											
Aroclor 1242		0.01	ug/g					<0.010		<0.010	<0.010
Aroclor 1248		0.01	ug/g					<0.010		<0.010	<0.010
Aroclor 1254		0.01	ug/g					<0.010		<0.010	<0.010
Aroclor 1260		0.01	ug/g					<0.010		<0.010	0.026
Total PCBs	0.35 (U)	0.02	ug/g					<0.020		<0.020	0.026
Organochlorine Pesticides (Soil)											
Aldrin	0.05 (U)	0.0002	ug/g	<0.00020	<0.00020	<0.00020	<0.00020		<0.00020		
Lindane	0.056 (U)	0.0002	ug/g	<0.00020	<0.00020	<0.00020	<0.00020		<0.00020		
a-chlordane		0.0003	ug/g	<0.00030	<0.00030	<0.00030	<0.00030		<0.00030		
Chlordane (Total)	0.05 (U)	0.00042	ug/g	<0.00042	<0.00042	<0.00042	<0.00042		<0.00042		
g-chlordane		0.0003	ug/g	<0.00030	<0.00030	<0.00030	<0.00030		<0.00030		
o,p-DDD		0.0003	ug/g	<0.00030	<0.00030	<0.00030	<0.00030		<0.00030		
pp-DDD		0.0003	ug/g	<0.00030	0.00068	<0.00030	0.00104		<0.00030		
Total DDD	3.3 (U)	0.00042	ug/g	<0.00042	0.00068	<0.00042	0.00104		<0.00042		
o,p-DDE		0.0003	ug/g	<0.00030	<0.00030	<0.00030	<0.00030		<0.00030		
pp-DDE		0.0003	ug/g	0.00044	0.00203	<0.00030	0.00447		0.00042		
Total DDE	0.26 (U)	0.00042	ug/g	0.00044	0.00203	<0.00042	0.00447		<0.00042		
op-DDT		0.003	ug/g	<0.0030	<0.0030	<0.0030	<0.0030		<0.0030		
pp-DDT		0.003	ug/g	<0.0030	<0.0030	<0.0030	<0.0030		<0.0030		
Total DDT	1.4 (U)	0.0042	ug/g	<0.0042	<0.0042	<0.0042	<0.0042		<0.0042		
Dieldrin	0.05 (U)	0.0002	ug/g	<0.00020	<0.00020	<0.00020	<0.00020		<0.00020		
alpha-Endosulfan		0.0003	ug/g	<0.00030	<0.00030	<0.00030	<0.00030		<0.00030		
beta-Endosulfan		0.0003	ug/g	<0.00030	<0.00030	<0.00030	<0.00030		<0.00030		
Endosulfan (Total)	0.04 (U)	0.00042	ug/g	<0.00042	<0.00042	<0.00042	<0.00042		<0.00042		
Endrin	0.04 (U)	0.0005	ug/g	<0.00050	<0.00050	<0.00050	<0.00050		<0.00050		
Heptachlor	0.15 (U)	0.0004	ug/g	<0.00040	<0.00040	<0.00040	<0.00040		<0.00040		
Heptachlor Epoxide	0.05 (U)	0.0002	ug/g	<0.00020	<0.00020	<0.00020	<0.00020		<0.00020		
Hexachlorobenzene	0.52 (U)	0.0005	ug/g	<0.00050	<0.00050	<0.00050	<0.00050		<0.00050		
Hexachlorobutadiene	0.012 (U)	0.0005	ug/g	<0.00050	<0.00050	<0.00050	<0.00050		<0.00050		
Hexachloroethane	0.089 (U)	0.0005	ug/g	<0.00050	<0.00050	<0.00050	<0.00050		<0.00050		
Methoxychlor	0.13 (U)	0.005	ug/g	<0.0050	<0.0050	<0.0050	<0.0050		<0.0050		

Exceeds Guideline Limit

Detection Limit Exceeds Guideline



Source: Explore Wellington Maps

N

Borehole

Test Pit

Red: with exceedance

Subject Site

Soil Engineers Ltd.

Title
Soil Sampling Plan

Project
Proposed Residential Development
5916 Trafalgar Road North,
Town of Hillsburgh

Reference No.
2009-E020

Date
October 2020

Scale
Refer to Plan

Drawing No.
1

Drawings

PART SCHEDULE					
PART	LOT	CON.	MUNICIPALITY	PIN	AREA
1	26	7	TOWN OF ERIN	ALL OF 71139–0239(LT)	113.819 Acres
2					2.546 Acres

PART 2 IS SUBJECT TO AN EASEMENT IN FAVOUR OF THE TOWN OF ERIN AS SET OUT IN INST. LT66248

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

NOVEMBER 24, 2003
DATE

J. R. FINNIE
ONTARIO LAND SURVEYOR

PLAN 61R–9590

RECEIVED AND DEPOSITED

November 27, 2003
DATE

"N.L.Williams" AD

LAND REGISTRAR FOR THE LAND TITLES DIVISION OF WELLINGTON (No. 61)

Phase One Property
Phase Two Property
RSC Property

SOUTHWEST HALF LOT 27

PART 1 PLAN 61R–2909
PIN 71139–0085(LT)

NORTHEAST HALF LOT 27
PIN 71139–0229(LT)

PIN71139–0088(LT)

PLAN OF SURVEY OF

PART OF LOT 26
CONCESSION 7

GEOGRAPHIC TOWNSHIP OF ERIN

TOWN OF ERIN
COUNTY OF WELLINGTON

J. R. FINNIE O.L.S.
SCALE : 1 INCH = 200 FEET

0 100 200 400 600 FEET

IMPERIAL

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

NOTES

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE SOUTHWESTERLY LIMIT OF WELLINTON COUNTY ROAD 24, AS WIDENED, SHOWN AS N 46°04'40" W ON DEPOSITED PLAN 61R–7004.

375 DENOTES BLACK, SHOEMAKER, ROBINSON & DONALDSON LTD.
826 DENOTES M. B. WONG O.L.S.
1155 DENOTES VAN HARTEN SURVEYING INC.
1253 DENOTES D. J. CULLEN O.L.S.
1575 DENOTES J. R. FINNIE O.L.S.

P1 DENOTES DEPOSITED PLAN 61R–1478
P2 DENOTES DEPOSITED PLAN 61R–2909
P3 DENOTES DEPOSITED PLAN 61R–7004
P4 DENOTES DEPOSITED PLAN 61R–8627
P5 DENOTES DEPOSITED PLAN 61R–9090
P6 DENOTES A BUILDING LOCATION SURVEY BY VAN HARTEN LTD. DATED APR. 26, 1985.
P7 DENOTES A PLAN OF EXPROPRIATION BY BOWMAN, BLACK & SHOEMAKER DATED APRIL 29, 1964, ATTACHED TO INSTRUMENT M–39009.
P8 DENOTES UNREGISTERED PLAN OF SUBDIVISION BY D. J. CULLEN LTD. DATED OCTOBER 10, 1990.

M DENOTES MEASURED
PIN DENOTES PROPERTY IDENTIFICATION NUMBER
CON. DENOTES CONCESSION
PWF DENOTES POST AND WIRE FENCE

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 LAND TITLES ACT, AND THE REGULATIONS MADE UNDER THEM.

2. THIS SURVEY WAS COMPLETED ON THE 23th DAY OF OCTOBER, 2003.

OCTOBER 24, 2003
DATE

J. R. FINNIE
ONTARIO LAND SURVEYOR

PART 1
PIN 71139–0239(LT)

LOT 26
CONCESSION 7

PART 2 IS SUBJECT TO AN EASEMENT IN FAVOUR OF THE TOWN OF ERIN AS SET OUT IN INST. LT66248

PART 2

PART 1
PLAN 61R–7004

PART 1
PLAN 61R–8627

PART 1 PLAN 61R–1478
PIN 71139–0090(LT)

PIN 71139–0091(LT)

PIN 71139–0223(LT)

PIN 71139–0238(LT)

WELLINGTON COUNTY ROAD 24 (BY ORDER–IN–COUNCIL 582/99, DEPOSITED AS INST. 805102)

LOT 25 CONCESSION 7
PART 1 PLAN 61R–9090
PIN 71139–0484(LT)

EASTERLY ANGLE
LOT 26, CON. 7

J. R. FINNIE
ONTARIO LAND SURVEYOR
BOX 31, ERIN ON N0B 1T0
PH (519) 833–2380 FAX (519) 833–0208
EMAIL : rfinnie@sentex.net

DRAWN BY: tf | PROJECT: 03–891–R

Potentially Contaminating Activity (PCA) numbers are in accordance with Table 2, Schedule D of O.Reg. 153/04:

PCA #28: Gasoline and Associated Products Storage in Fixed Tanks
PCA #30: Fill Material of Unknown Quality
PCA #40: Pesticides (Herbicides, Fungicides, and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage, and Large Scale Applications.

HLV2K ENGINEERING LIMITED

Legend

- Phase Two Property
- 00 Potentially Contaminating Activities (PCAs) Contributing to an APEC
- 00 Potentially Contaminating Activities (PCAs) Not Contributing to an APEC

Project	Phase Two Environmental Assessment
Site Address	5916 Trafalgar Road North, Town of Erin
Title	Conceptual Site Model - PCAs
Drawn By: WG	Project No.: 2100428EE
Approved: JL	Date: APR 2022
Drawing No.: 2	Client: Hillsburgh Heights Inc.

0 65 130 260 Meters

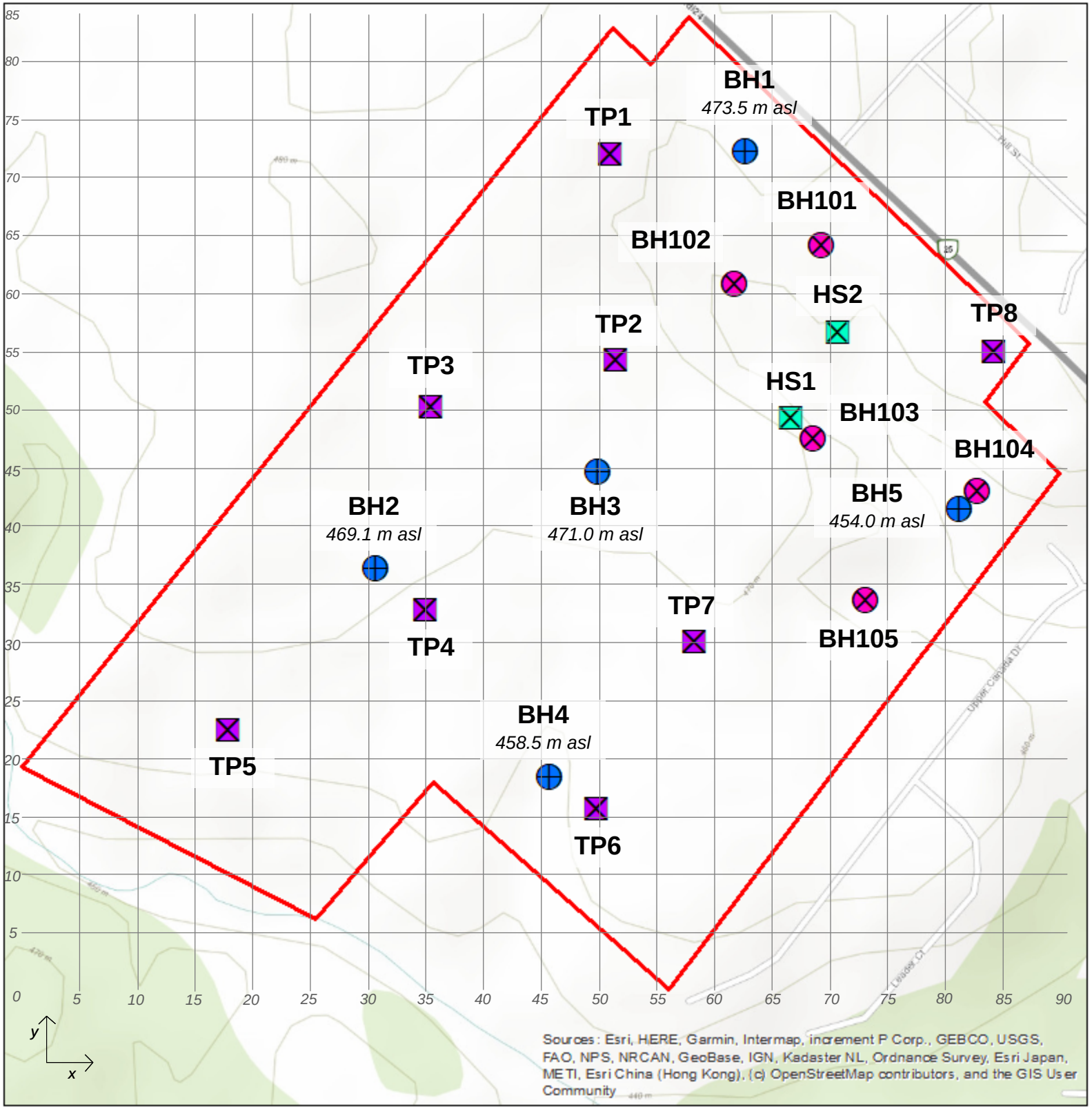
HLV2K ENGINEERING LIMITED

Legend

- Phase Two Property
- APEC 1 - PCA #40
- APEC 2 - PCA #30
- APEC 3 - PCA #28

Project	Phase Two Environmental Assessment
Site Address	5916 Trafalgar Road North, Town of Erin
Title	Conceptual Site Model - APECs
Drawn By: WG	Project No.: 2100428EE
Approved: JL	Date: APR 2022
Drawing No.: 3	Client: Hillsburgh Heights Inc.

0 65 130 260 Meters



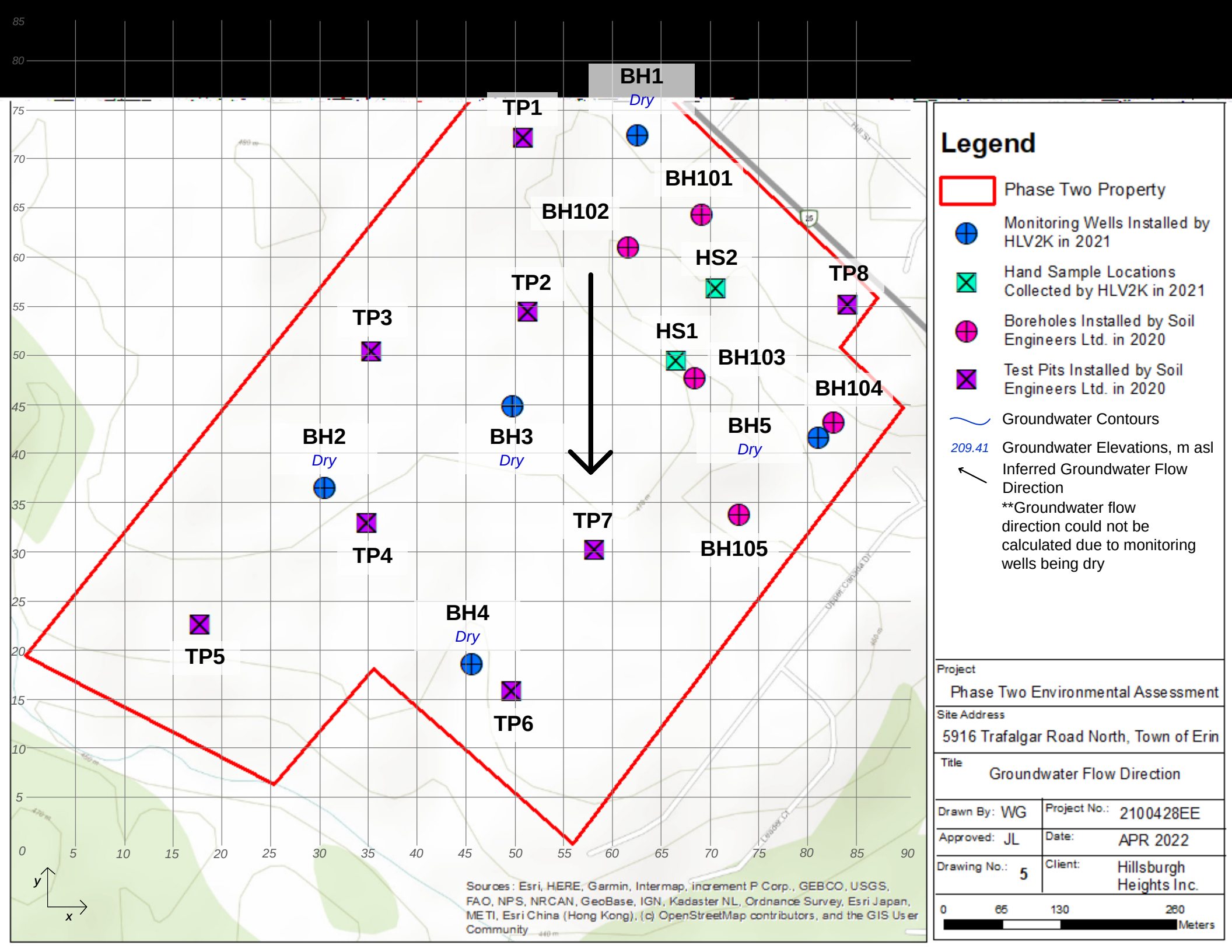
HLV2K ENGINEERING LIMITED

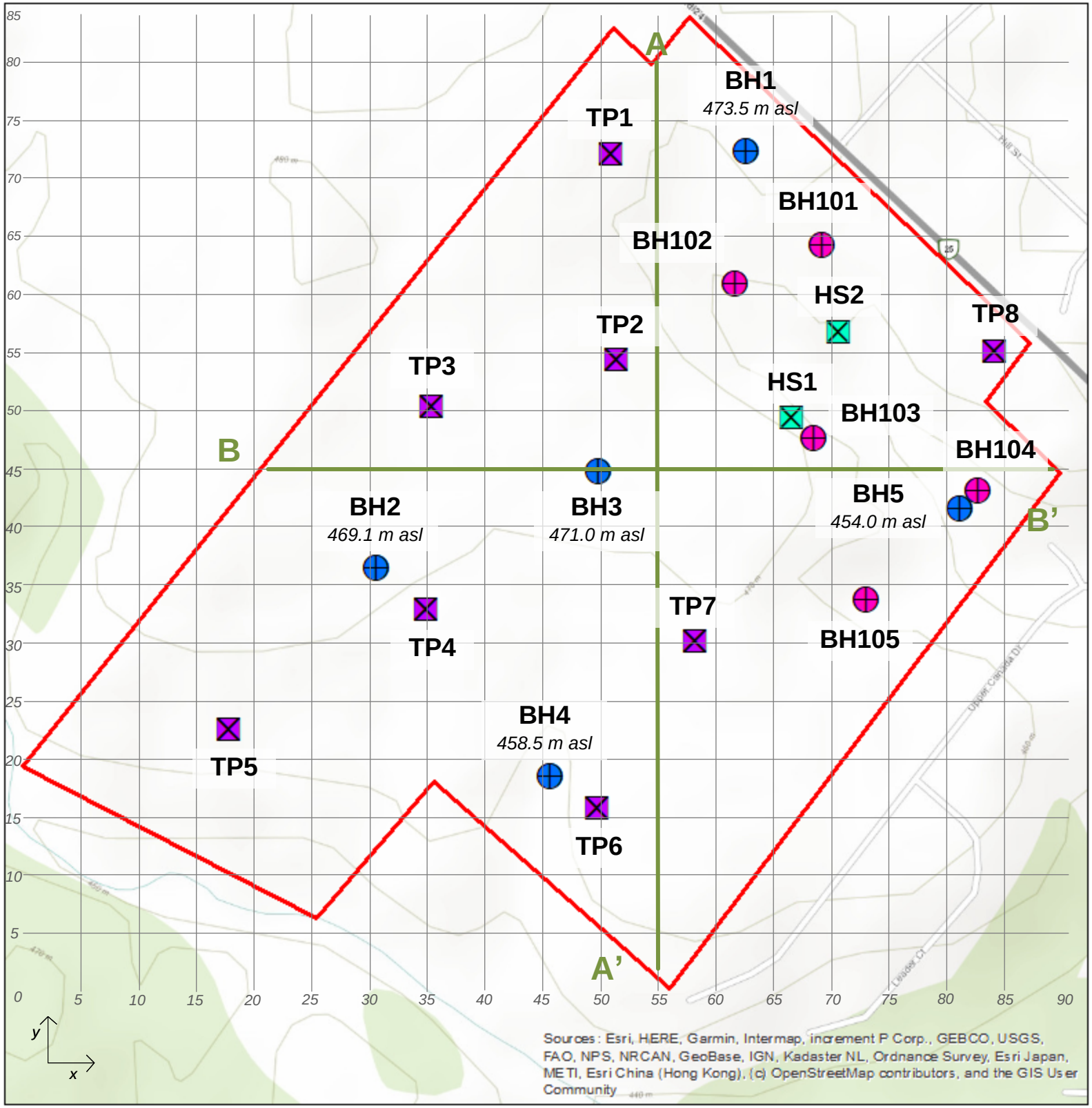
Legend

- Phase Two Property
- Monitoring Wells Installed by HLV2K in 2021
- Hand Sample Locations Collected by HLV2K in 2021
- Boreholes Installed by Soil Engineers Ltd. in 2020
- Test Pits Installed by Soil Enginners Ltd. in 2020
- Surface Contours
- 90.12 Surface Soil Elevations, m asl

Project	Phase Two Environmental Assessment
Site Address	5916 Trafalgar Road North, Town of Erin
Title	Borehole and Monitoring Well Location Plan
Drawn By: WG	Project No.: 2100428EE
Approved: JL	Date: APR 2022
Drawing No.: 4	Client: Hillsburgh Heights Inc.

0 65 130 260 Meters


BH1
Dry
TP1
BH101
BH102
HS2
TP8
TP2
TP3
HS1
BH103
BH104
BH2
Dry
BH3
Dry
BH5
Dry
TP7
TP4
BH105
BH4
Dry
TP5
TP6
Legend
Phase Two Property
Monitoring Wells Installed by HLV2K in 2021
Hand Sample Locations Collected by HLV2K in 2021
Boreholes Installed by Soil Engineers Ltd. in 2020
Test Pits Installed by Soil Engineers Ltd. in 2020
Groundwater Contours
209.41 Groundwater Elevations, m asl
Inferred Groundwater Flow Direction
**Groundwater flow direction could not be calculated due to monitoring wells being dry
Project
Phase Two Environmental Assessment
Site Address
5916 Trafalgar Road North, Town of Erin
Title
Groundwater Flow Direction
Drawn By: WG
Project No.: 2100428EE
Approved: JL
Date: APR 2022
Drawing No.: 5
Client: Hillsburgh Heights Inc.
0 65 130 260
Meters
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



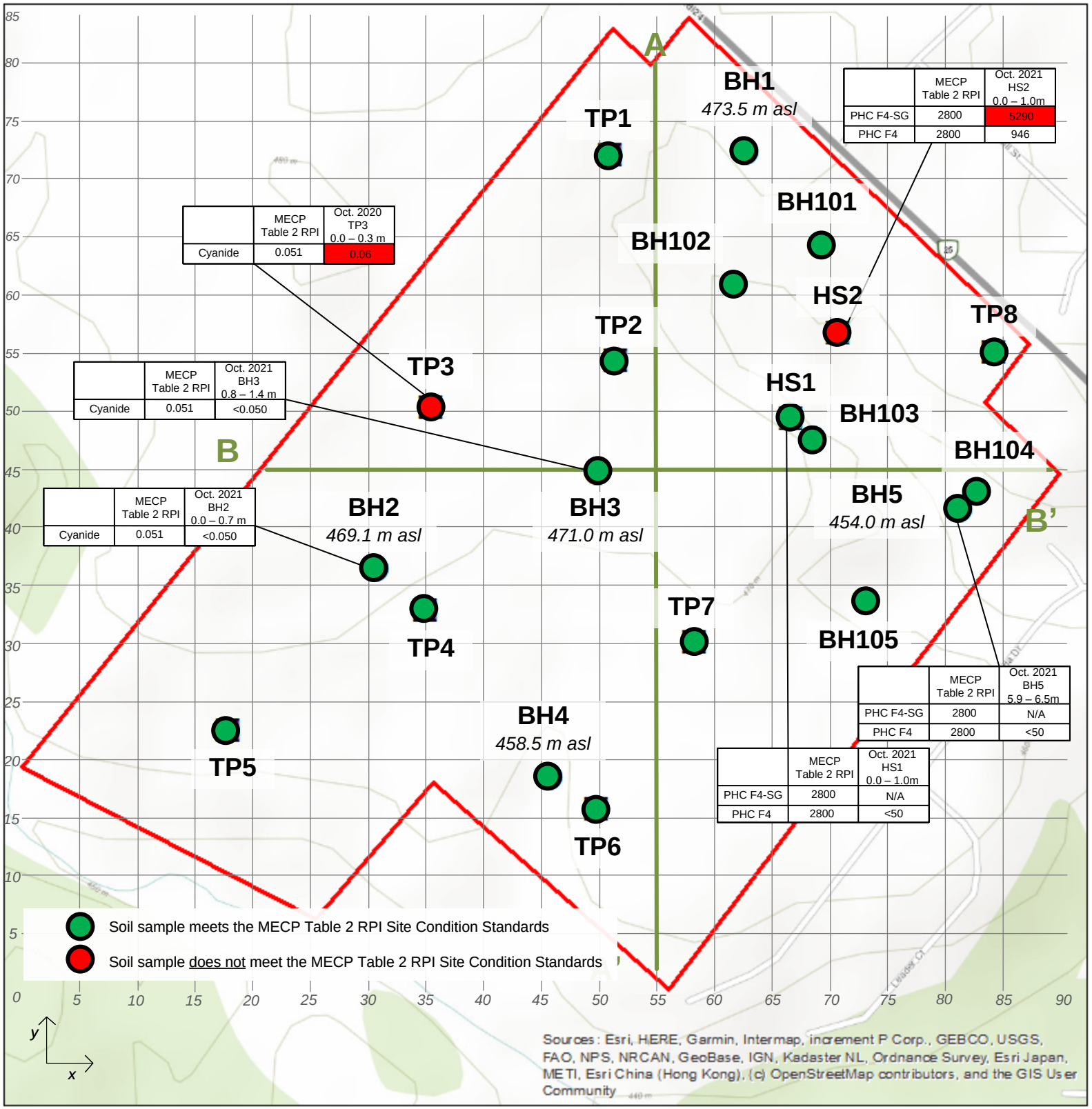
HLV2K ENGINEERING LIMITED

Legend

- Phase Two Property
- Monitoring Wells Installed by HLV2K in 2021
- Hand Sample Locations Collected by HLV2K in 2021
- Boreholes Installed by Soil Engineers Ltd. in 2020
- Test Pits Installed by Soil Engineers Ltd. in 2020
- Surface Contours
- 90.12 Surface Soil Elevations, m asl
- Cross-sectional Lines

Project	Phase Two Environmental Assessment
Site Address	5916 Trafalgar Road North, Town of Erin
Title	Planview of Boreholes and Monitoring Wells
Drawn By: WG	Project No.: 2100428EE
Approved: JL	Date: APR 2022
Drawing No.: 6	Client: Hillsburgh Heights Inc.

0 65 130 260 Meters



HLV2K ENGINEERING LIMITED

Legend

- Phase Two Property
- Monitoring Wells Installed by HLV2K in 2021
- Hand Sample Locations Collected by HLV2K in 2021
- Boreholes Installed by Soil Engineers Ltd. in 2020
- Test Pits Installed by Soil Engineers Ltd. in 2020
- Surface Contours
- 90.12 Surface Soil Elevations, m asl
- Cross-sectional Lines
- Soil sample does not meet the MECP Table 2 RPI Standards

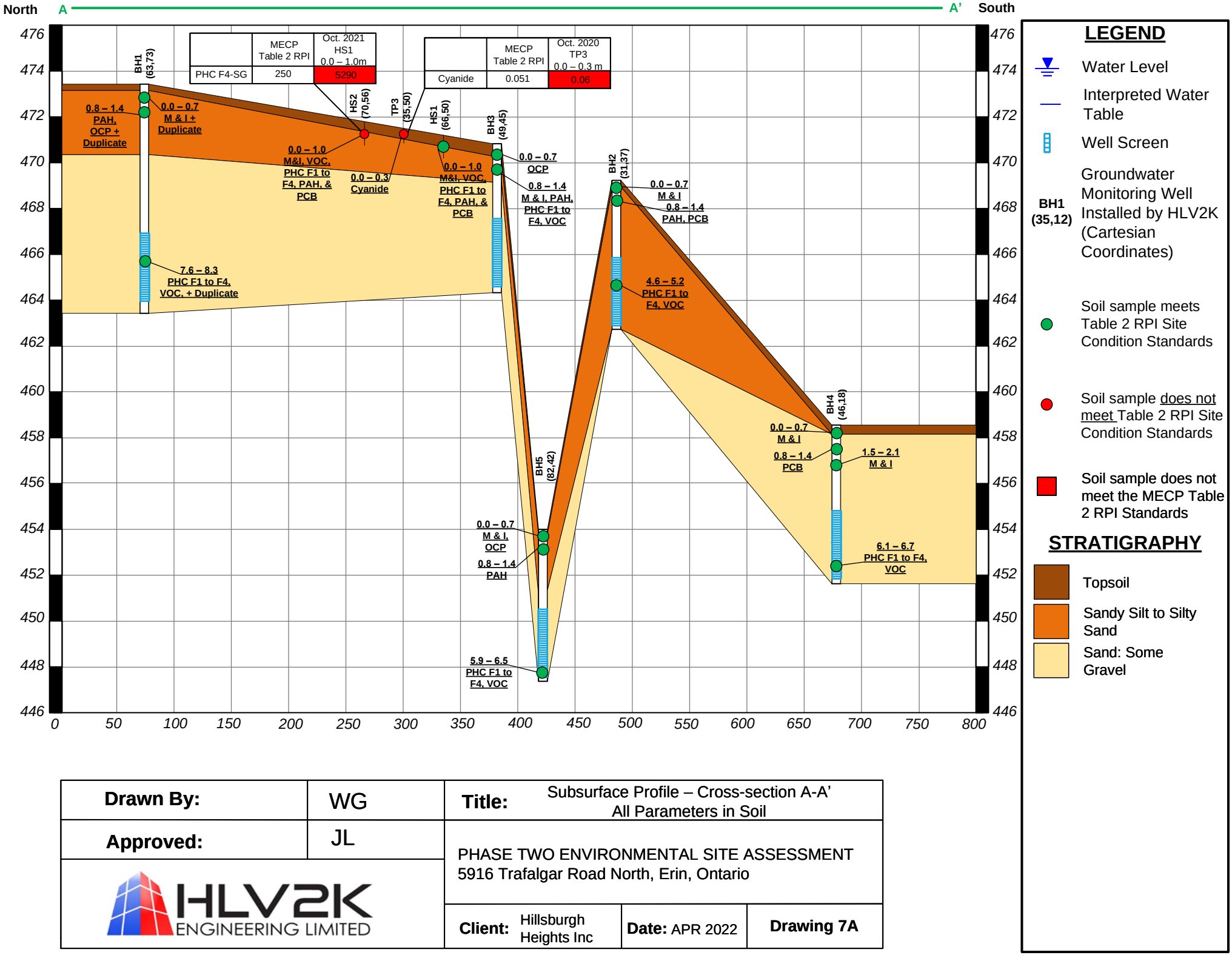
Project: Phase Two Environmental Assessment

Site Address: 5916 Trafalgar Road North, Town of Erin

Title: Planview of Sampling Locations – All Parameters in Soil

Drawn By:	WG	Project No.:	2100428EE
Approved:	JL	Date:	APR 2022
Drawing No.:	7	Client:	Hillsburgh Heights Inc.

0 65 130 260 Meters



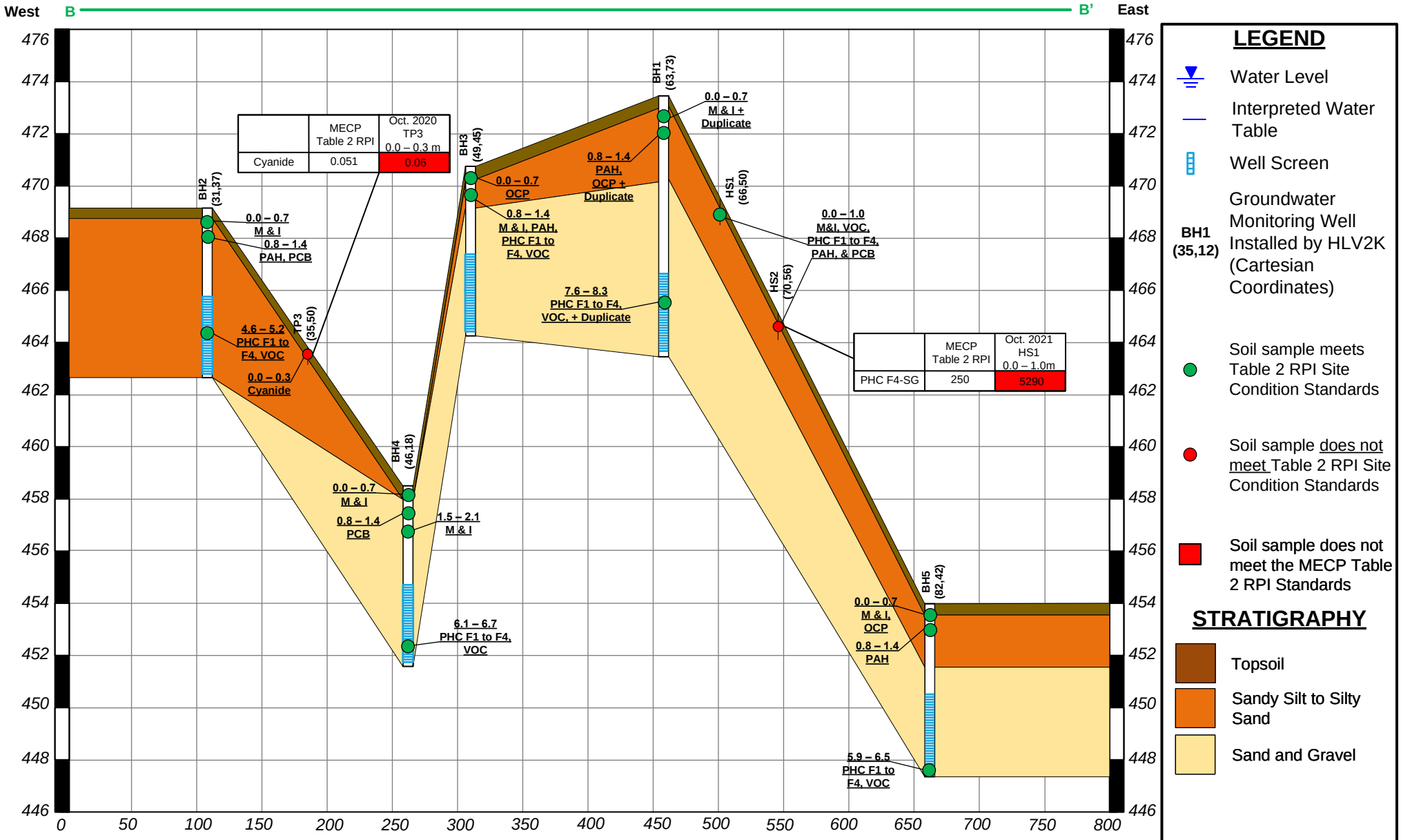
LEGEND

- Water Level
- Interpreted Water Table
- Well Screen
- BH1 (35,12) — Groundwater Monitoring Well Installed by HLV2K (Cartesian Coordinates)
- Soil sample meets Table 2 RPI Site Condition Standards
- Soil sample does not meet Table 2 RPI Site Condition Standards
- Soil sample does not meet the MECP Table 2 RPI Standards

STRATIGRAPHY

- Topsoil
- Sandy Silt to Silty Sand
- Sand: Some Gravel

Drawn By:	WG	**Title:**	Subsurface Profile – Cross-section A-A' All Parameters in Soil	
Approved:	JL	PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 5916 Trafalgar Road North, Erin, Ontario		
HLV2K ENGINEERING LIMITED		**Client:** Hillsburgh Heights Inc	**Date:** APR 2022	**Drawing 7A**



LEGEND

- Water Level
- Interpreted Water Table
- Well Screen
- BH1 (35,12) — Groundwater Monitoring Well Installed by HLV2K (Cartesian Coordinates)
- Soil sample meets Table 2 RPI Site Condition Standards
- Soil sample does not meet Table 2 RPI Site Condition Standards
- Soil sample does not meet the MECP Table 2 RPI Standards

STRATIGRAPHY

- Topsoil
- Sandy Silt to Silty Sand
- Sand and Gravel

Drawn By:	WG	**Title:**	Subsurface Profile – Cross-section B-B' All Parameters in Soil	
Approved:	JL	PHASE TWO ENVIRONMENTAL SITE ASSESSMENT 5916 Trafalgar Road North, Erin, Ontario		
HLV2K ENGINEERING LIMITED		**Client:** Hillsburgh Heights Inc	**Date:** APR 2022	**Drawing 7B**

Appendix A: Legal Survey

PART SCHEDULE					
PART	LOT	CON.	MUNICIPALITY	PIN	AREA
1	26	7	TOWN OF ERIN	ALL OF 71139–0239(LT)	113.819 Acres
2					2.546 Acres

PART 2 IS SUBJECT TO AN EASEMENT IN FAVOUR OF THE TOWN OF ERIN AS SET OUT IN INST. LT66248

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

NOVEMBER 24, 2003
DATE

J. R. FINNIE
ONTARIO LAND SURVEYOR

PLAN 61R–9590

RECEIVED AND DEPOSITED

November 27, 2003
DATE

"N.L.Williams" AD

LAND REGISTRAR FOR THE LAND TITLES DIVISION OF WELLINGTON (No. 61)

SOUTHWEST HALF LOT 27

PART 1 PLAN 61R–2909
PIN 71139–0085(LT)

NORTHEAST HALF LOT 27
PIN 71139–0229(LT)

PIN71139–0088(LT)

PLAN OF SURVEY OF

PART OF LOT 26
CONCESSION 7

GEOGRAPHIC TOWNSHIP OF ERIN

TOWN OF ERIN
COUNTY OF WELLINGTON

J. R. FINNIE O.L.S.
SCALE : 1 INCH = 200 FEET

0 100 200 400 600 FEET

IMPERIAL

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

NOTES

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE SOUTHWESTERLY LIMIT OF WELLINTON COUNTY ROAD 24, AS WIDENED, SHOWN AS N 46°04'40" W ON DEPOSITED PLAN 61R–7004.

375 DENOTES BLACK, SHOEMAKER, ROBINSON & DONALDSON LTD.
826 DENOTES M. B. WONG O.L.S.
1155 DENOTES VAN HARTEN SURVEYING INC.
1253 DENOTES D. J. CULLEN O.L.S.
1575 DENOTES J. R. FINNIE O.L.S.

P1 DENOTES DEPOSITED PLAN 61R–1478
P2 DENOTES DEPOSITED PLAN 61R–2909
P3 DENOTES DEPOSITED PLAN 61R–7004
P4 DENOTES DEPOSITED PLAN 61R–8627
P5 DENOTES DEPOSITED PLAN 61R–9090
P6 DENOTES A BUILDING LOCATION SURVEY BY VAN HARTEN LTD. DATED APR. 26, 1985.
P7 DENOTES A PLAN OF EXPROPRIATION BY BOWMAN, BLACK & SHOEMAKER DATED APRIL 29, 1964, ATTACHED TO INSTRUMENT M–39009.
P8 DENOTES UNREGISTERED PLAN OF SUBDIVISION BY D. J. CULLEN LTD. DATED OCTOBER 10, 1990.

M DENOTES MEASURED
PIN DENOTES PROPERTY IDENTIFICATION NUMBER
CON. DENOTES CONCESSION
PWF DENOTES POST AND WIRE FENCE

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 LAND TITLES ACT, AND THE REGULATIONS MADE UNDER THEM.

2. THIS SURVEY WAS COMPLETED ON THE 23th DAY OF OCTOBER, 2003.

OCTOBER 24, 2003
DATE

J. R. FINNIE
ONTARIO LAND SURVEYOR

PART 1
PIN 71139–0239(LT)

LOT 26
CONCESSION 7

PART 2 IS SUBJECT TO AN EASEMENT IN FAVOUR OF THE TOWN OF ERIN AS SET OUT IN INST. LT66248

LOT 25 CONCESSION 7
PART 1 PLAN 61R–9090
PIN 71139–0484(LT)

PART 1 PLAN 61R–1478
PIN 71139–0090(LT)

PIN 71139–0091(LT)

PIN 71139–0223(LT)

PIN 71139–0238(LT)

PART 1 PLAN 61R–7004

PART 1 PLAN 61R–8627

PART 2

WELLINGTON COUNTY ROAD 24 (BY ORDER–IN–COUNCIL 582/99, DEPOSITED AS INST. 805102)

EASTERLY ANGLE LOT 26, CON. 7

J. R. FINNIE
ONTARIO LAND SURVEYOR
BOX 31, ERIN ON N0B 1T0
PH (519) 833–2380 FAX (519) 833–0208
EMAIL : rfinnie@sentex.net

DRAWN BY: tf | PROJECT: 03–891–R

Appendix B:
Sampling and Analysis Plan

Sampling and Analysis Plan

Potentially Contaminating Activity	Boreholes	Sampling Frequency	Parameters	Rational
Farming Operations	**BH1**	1-GW	PHC F2 to F4	The monitoring well was placed where agricultural operations take place.
		1-GW	VOC F1	
		1-GW	PAH	
		1-GW	M & I	
		1-GW	OCP	
		1-S	PHC F2 to F4	
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	OCP	
Farming Operations	**BH2**	1-GW	PHC F2 to F4	The monitoring well was placed where agricultural operations take place.
		1-GW	VOC F1	
		1-GW	PAH	
		1-GW	M & I	
		1-GW	OCP	
		1-S	PHC F2 to F4	
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	PCB	
Farming Operations	**BH3**	1-GW	PHC F2 to F4	The monitoring well was a place where agricultural operations take place.
		1-GW	VOC F1	
		1-GW	PAH	
		1-GW	M & I	
		1-GW	OCP	
		1-S	PHC F2 to F4	
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	OCP	
Farming Operations	**BH4**	1-GW	PHC F2 to F4	The monitoring well was placed where agricultural operations take place.
		1-GW	VOC F1	
		1-GW	PAH	
		1-GW	M & I	
		1-GW	OCP	
		1-S	PHC F2 to F4	
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	OCP	
Fill Material	**BH5**	1-GW	PHC F2 to F4	The monitoring well was placed where areas of fill were observed.
		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	
Fill Material	Hand Sample 1	1-S	PHC F2 to F4	The hand sample

Potentially Contaminating Activity	Boreholes	Sampling Frequency	Parameters	Rational
		1-S	VOC F1	location was placed where areas of fill were observed.
		1-S	PAH	
		1-S	M & I	
		1-S	PCB	
Fill Material	Hand Sample 1	1-S	PHC F2 to F4	The hand sample location was placed where areas of fill were observed.
		1-S	VOC F1	
		1-S	PAH	
		1-S	M & I	
		1-S	PCB	

Notes:

S - Soil media
GW - Groundwater media
PHC - Petroleum Hydrocarbons F1 to F4 Fractions
PAH - Polycyclic Aromatic Hydrocarbons
M&MH - Metals and Metal Hydrides
PCB - Poly Chlorinated Biphenyls
VOC - Volatile Organic Compounds
OCP - Organochlorine pesticides

Appendix C: Borehole Logs

HLV2K ENGINEERING LIMITED

LOG OF BOREHOLE BH1

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4849474.973 E 568214.5891

DRILLING DATA

Method: Hollow Stem Auger

Diameter: 150mm

Date: Sep-07-2021

REF. NO.: 2100428AH

DRAWING NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
473.5												
0.0 / 473.3	**Topsoil:** 200mm											
0.2	**Sandy Silt:** trace gravel/cobblees, trace clay, trace rootlets, oxidized, greyish brown, moist, loose to compact		1	SS	4		473					
1			2	SS	12							
			3	SS	23		Bentonite					
2			4	SS	23		471					
3 / 470.4												
3.1	**Sand and gravel:** trace silt, trace clay, brown, moist, loose to very dense		5	SS	39		470					
4												
			6	SS	50/150		469					
5												
							468					
6			7	SS	67		Sand 467					
7												

Continued Next Page

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

$+^3$, $\times^3$: Numbers refer to Sensitivity

○ $^{\varepsilon}$=3% Strain at Failure

LOG OF BOREHOLE BH1

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4849474.973 E 568214.5891

DRILLING DATA

Method: Hollow Stem Auger

Diameter: 150mm

Date: Sep-07-2021

REF. NO.: 2100428AH

DRAWING NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
8	**Sand and gravel:** trace silt, trace clay, brown, moist, loose to very dense(Continued)		8	SS	13		Screen		○			
							465					
9			9	SS	6		464		○			
463.7												
9.8	**End of Borehole:** borehole terminated at 9.8m 1) 50 mm diameter monitoring well installed upon completion. Upon completion: open & dry											

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 BH2

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4849079.566 E 567864.1193

DRILLING DATA

Method: Hollow Stem Auger

Diameter: 150mm

Date: Sep-07-2021

REF. NO.: 2100428AH

DRAWING NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
469.4					
0.0 / 469.1	**Topsoil:** 300mm	1	SS	6	469
0.3	**Silty sand to sandy silt till:** trace clay, trace gravel/cobble, trace rootlets, brown, moist, loose to compact	2	SS	23	Bentonite
467.9					468
1.5	**Sandy silt till:** trace gravel, brown, moist, dense to very dense	3	SS	52	
		4	SS	44	467
		5	SS	39	466
					Sand
					465
					Screen
		6	SS	50/125mm	
					464
463.2		7	SS	50/75mm	
6.2	**End of Borehole:** borehole terminated at 6.2m 1) 50 mm diameter monitoring well installed upon completion. Upon completion: open & dry				

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE — 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%) — GR SA SI CL

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

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

HLV2K ENGINEERING LIMITED

LOG OF BOREHOLE BH3

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4849170.944 E 568075.1217

DRILLING DATA

Method: Hollow Stem Auger

Diameter: 150mm

Date: Sep-07-2021

REF. NO.: 2100428AH

DRAWING NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
471.0							
0.0 / 470.7	**Topsoil:**300mm		1	SS	8		
0.3	**Silty sand:** trace gravel, trace rootlets, greyish brown, moist, loose		2	SS	9		Bentonite 470
469.5							
1.5	**Sand and gravel:** trace silt, some cobbles, brown, moist, dense to very dense		3	SS	36		469
			4	SS	37		468
			5	SS	39		467 Sand
			6	SS	50/130mm		Screen 466
			7	SS	50/75mm		465
464.7							
6.3	**End of Borehole:**borehole terminated at 6.3m 1) 50 mm diameter monitoring well installed upon completion. Upon completion: open & dry						

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
- ○ UNCONFINED
- ● QUICK TRIAXIAL
- + FIELD VANE & Sensitivity
- × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

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 BH4

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4848881.638 E 568028.4108

DRILLING DATA

Method: Hollow Stem Auger

Diameter: 150mm

Date: Sep-07-2021

REF. NO.: 2100428AH

DRAWING NO.: 5

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
458.5					
0.0 / 458.2	**Topsoil:** 250mm				
0.3	**Sand and gravel:** trace silt, trace clay, trace rootlets, some cobbles, brown, moist, loose to compact	1	SS	4	458
		2	SS	17	Bentonite
457.0					457
1.5	**Silty clay:** trace sand, trace gravel, brown, moist, hard	3	SS	50/75mm	
456.2					
2.3	**Sand and gravel:** trace silt, trace clay, some cobbles, brown, moist, compact to very dense	4	SS	50/130mm	456
		5	SS	18	455
					Sand
		6	SS	30	454
					Screen
					453
		7	SS	50/100mm	452
451.8					
6.7	**End of Borehole:** borehole terminated at 6.7m 1) 50 mm diameter monitoring well installed upon completion. Upon completion: open & dry				

STRATA PLOT | GROUND WATER CONDITIONS

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%) — GR SA SI CL

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

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

HLV2K ENGINEERING LIMITED

LOG OF BOREHOLE BH5

PROJECT: Briarwood Hillsburgh Development

CLIENT: Briarwood Homes

PROJECT LOCATION: 5916 Trafalgar Road North, Town of Erin, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4849136.503 E 568418.3089

DRILLING DATA

Method: Hollow Stem Auger

Diameter: 150mm

Date: Sep-07-2021

REF. NO.: 2100428AH

DRAWING NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
454.0					454	
0.0 / 453.8	**Topsoil:** 250mm					
0.3	**Silty sand:** trace clay, trace gravel. trace rootlets, brown, moist, loose	1	SS	5		
		2	SS	5	Bentonite 453	
		3	SS	7		7 47 39 7
451.7					452	
2.3	**Sand:** some gravel, some silt, trace clay, brown, moist, compact to very dense	4	SS	12		15 64 17 4
		5	SS	50/130mm	451	
		6	SS	69	Sand 450 Screen 449	
447.6		7	SS	50/75mm	448	
6.5	**End of Borehole:** borehole terminated at 6.5m 1) 50 mm diameter monitoring well installed upon completion. 2) Water Level Readings: Date: Sept 07, 2021 — Water Level(mbgl): 4.8					

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
- ○ UNCONFINED
- ● QUICK TRIAXIAL
- + FIELD VANE & Sensitivity
- × LAB VANE

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

GROUND WATER CONDITIONS

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

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

Appendix D:
Certificate of Laboratory Analysis

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

Date Received: 05-OCT-21
Report Date: 14-OCT-21 10:57 (MT)
Version: FINAL

Client Phone: 437-370-0317

Certificate of Analysis

Lab Work Order #: L2647481

Project P.O. #: NOT SUBMITTED
Job Reference: 2100428DE
C of C Numbers:
Legal Site Desc: ERIN

Amanda Overholster
Account Manager

ANALYTICAL REPORT

Summary of Guideline Exceedances

Guideline ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit

Ontario Regulation 153/04 - April 15, 2011 Standards - T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

(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				
				L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6
				05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
				MW1	MW2	MW3	MW4	MW5	DUP 1
Conductivity	mS/cm	0.57	-	0.130	0.144	0.237	0.278	0.194	0.353 FR5
% Moisture	%	-	-	7.69	10.2	9.85	12.3	14.9	7.27
pH	pH units	-	-	7.76	7.95	7.78	7.71	7.35	7.85

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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 - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	Sample Date	Sample ID				
				L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6
				05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
				MW1	MW2	MW3	MW4	MW5	DUP 1
Cyanide, Weak Acid Diss	ug/g	0.051	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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.

Saturated Paste Extractables - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	Sample Date	Sample ID				
				L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6
				05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
				MW1	MW2	MW3	MW4	MW5	DUP 1
SAR	SAR	2.4	-	<0.10	<0.10	<0.10	0.27	<0.10	<0.10 SAR:DL
Calcium (Ca)	mg/L	-	-	16.4	16.0	30.9	29.0	24.2	15.2 FR5
Magnesium (Mg)	mg/L	-	-	0.99	1.63	2.97	6.79	1.50	1.03 FR5
Sodium (Na)	mg/L	-	-	1.18	0.91	1.57	6.26	1.24	<0.50 FR5

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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

Metals - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6
				Sample Date	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
				Sample ID	MW1	MW2	MW3	MW4	MW5	DUP 1
Antimony (Sb)	ug/g	1.3	-		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic (As)	ug/g	18	-		2.4	2.9	3.9	6.4	2.8	3.4
Barium (Ba)	ug/g	220	-		18.4	33.9	35.1	26.9	43.6	25.7
Beryllium (Be)	ug/g	2.5	-		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Boron (B)	ug/g	36	-		<5.0	6.1	5.1	8.3	<5.0	<5.0
Boron (B), Hot Water Ext.	ug/g	36	-		<0.10	<0.10	<0.10	0.10	0.17	0.11
Cadmium (Cd)	ug/g	1.2	-		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium (Cr)	ug/g	70	-		12.2	13.4	14.8	11.2	12.7	14.4
Cobalt (Co)	ug/g	21	-		3.7	5.2	5.2	4.4	4.3	3.9
Copper (Cu)	ug/g	92	-		7.5	13.8	13.6	24.7	7.7	7.7
Lead (Pb)	ug/g	120	-		9.8	39.0	9.2	13.5	10.5	9.0
Mercury (Hg)	ug/g	0.27	-		0.0073	0.0061	0.0146	0.0143	0.0210	0.0162
Molybdenum (Mo)	ug/g	2	-		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel (Ni)	ug/g	82	-		7.4	10.6	10.4	8.5	7.5	7.9
Selenium (Se)	ug/g	1.5	-		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)	ug/g	0.5	-		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)	ug/g	1	-		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	ug/g	2.5	-		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium (V)	ug/g	86	-		32.2	24.9	30.6	21.8	30.2	37.1
Zinc (Zn)	ug/g	290	-		66.7	41.9	41.9	73.1	44.5	40.0

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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.

Speciated Metals - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	Sample Date	Sample ID				
				L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6
				05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
				MW1	MW2	MW3	MW4	MW5	DUP 1
Chromium, Hexavalent	ug/g	0.66	-	<0.20	<0.20	<0.20	<0.20	<0.20	0.33

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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.

Volatile Organic Compounds - SOIL

				Lab ID	L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6
				Sample Date	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
				Sample ID	MW1	MW2	MW3	MW4	MW5	DUP 1
		Guide Limits								
Analyte	Unit	#1	#2							
Acetone	ug/g	0.5	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	ug/g	0.02	-	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068
Bromodichloromethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon tetrachloride	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroform	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dibromoethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylene Chloride	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	ug/g	0.05	-	<0.050	<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	<0.030
trans-1,3-Dichloropropene	ug/g	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
1,3-Dichloropropene (cis & trans)	ug/g	0.05	-	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042
Ethylbenzene	ug/g	0.05	-	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
n-Hexane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	ug/g	0.5	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	ug/g	0.5	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MTBE	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Styrene	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

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

Volatile Organic Compounds - SOIL

				Lab ID	L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6
				Sample Date	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
				Sample ID	MW1	MW2	MW3	MW4	MW5	DUP 1
		Guide Limits								
Analyte	Unit	#1	#2							
1,1,1,2-Tetrachloroethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	ug/g	0.2	-	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080
1,1,1-Trichloroethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	ug/g	0.05	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Trichlorofluoromethane	ug/g	0.25	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Vinyl chloride	ug/g	0.02	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene	ug/g	-	-	<0.020	<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	<0.030
Xylenes (Total)	ug/g	0.05	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Surrogate: 4-Bromofluorobenzene	%	-	-	85.8	82.2	85.6	83.3	74.0	86.7
Surrogate: 1,4-Difluorobenzene	%	-	-	94.0	89.8	90.9	89.5	79.5	94.2

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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 - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6
				Sample Date	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
				Sample ID	MW1	MW2	MW3	MW4	MW5	DUP 1
F1 (C6-C10)	ug/g	25	-		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
F1-BTEX	ug/g	25	-		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
F2 (C10-C16)	ug/g	10	-		<10	<10	<10	<10	<10	<10
F2-Naphth	ug/g	-	-		<10	<10	<10	<10	<10	<10
F3 (C16-C34)	ug/g	240	-		<50	72	<50	<50	<50	<50
F3-PAH	ug/g	-	-		<50	72	<50	<50	<50	<50
F4 (C34-C50)	ug/g	120	-		<50	<50	<50	<50	<50	<50
Total Hydrocarbons (C6-C50)	ug/g	-	-		<72	<72	<72	<72	<72	<72
Chrom. to baseline at nC50		-	-		YES	YES	YES	YES	YES	YES
Surrogate: 2-Bromobenzotrifluoride	%	-	-		92.7	89.9	94.5	88.2	92.1	91.5
Surrogate: 3,4-Dichlorotoluene	%	-	-		89.6	83.2	92.8	82.4	72.5	89.2

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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.

Polycyclic Aromatic Hydrocarbons - SOIL

		Guide Limits							
Lab ID				L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-5	L2647481-6
Sample Date				05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
Sample ID				MW1	MW2	MW3	MW4	MW5	DUP 1
Analyte	**Unit**	**#1**	**#2**						
Acenaphthene	ug/g	0.072	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	ug/g	0.093	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	ug/g	0.16	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)anthracene	ug/g	0.36	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	ug/g	0.3	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b&j)fluoranthene	ug/g	0.47	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	ug/g	0.68	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	ug/g	0.48	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	ug/g	2.8	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	ug/g	0.1	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	ug/g	0.56	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	ug/g	0.12	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	ug/g	0.23	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1+2-Methylnaphthalenes	ug/g	0.59	-	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042
1-Methylnaphthalene	ug/g	0.59	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
2-Methylnaphthalene	ug/g	0.59	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Naphthalene	ug/g	0.09	-	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Phenanthrene	ug/g	0.69	-	<0.046	<0.046	<0.046	<0.046	<0.046	<0.046
Pyrene	ug/g	1	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Surrogate: 2-Fluorobiphenyl	%	-	-	77.8	80.8	81.6	78.4	83.3	79.2
Surrogate: d14-Terphenyl	%	-	-	84.6	91.4	90.5	87.8	89.6	85.3

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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

Polychlorinated Biphenyls - SOIL

			Lab ID	L2647481-5
			Sample Date	05-OCT-21
			Sample ID	MW5
		Guide Limits		
Analyte	Unit	#1	#2	
Aroclor 1242	ug/g	-	-	<0.010
Aroclor 1248	ug/g	-	-	<0.010
Aroclor 1254	ug/g	-	-	<0.010
Aroclor 1260	ug/g	-	-	<0.010
Total PCBs	ug/g	0.3	-	<0.020
Surrogate: d14-Terphenyl	%	-	-	105.7

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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.

Organochlorine Pesticides - SOIL

		Lab ID	L2647481-1	L2647481-2	L2647481-3	L2647481-4	L2647481-6
		Sample Date	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21	05-OCT-21
		Sample ID	MW1	MW2	MW3	MW4	DUP 1
		Guide Limits					
Analyte	Unit	#1	#2				
Aldrin	ug/g	0.05	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Lindane	ug/g	0.01	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
a-chlordane	ug/g	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Chlordane (Total)	ug/g	0.05	-	<0.00042	<0.00042	<0.00042	<0.00042	<0.00042
g-chlordane	ug/g	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
o,p-DDD	ug/g	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
pp-DDD	ug/g	-	-	<0.00030	0.00068	<0.00030	0.00104	<0.00030
Total DDD	ug/g	0.05	-	<0.00042	0.00068	<0.00042	0.00104	<0.00042
o,p-DDE	ug/g	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
pp-DDE	ug/g	-	-	0.00044	0.00203	<0.00030	0.00447	0.00042
Total DDE	ug/g	0.05	-	0.00044	0.00203	<0.00042	0.00447	<0.00042
op-DDT	ug/g	-	-	<0.0030 DLM	<0.0030 DLM	<0.0030 DLM	<0.0030 DLM	<0.0030 DLM
pp-DDT	ug/g	-	-	<0.0030 DLM	<0.0030 DLM	<0.0030 DLM	<0.0030 DLM	<0.0030 DLM
Total DDT	ug/g	1.4	-	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042
Dieldrin	ug/g	0.05	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
alpha-Endosulfan	ug/g	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
beta-Endosulfan	ug/g	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Endosulfan (Total)	ug/g	0.04	-	<0.00042	<0.00042	<0.00042	<0.00042	<0.00042
Endrin	ug/g	0.04	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Heptachlor	ug/g	0.05	-	<0.00040 DLM	<0.00040 DLM	<0.00040 DLM	<0.00040 DLM	<0.00040 DLM
Heptachlor Epoxide	ug/g	0.05	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Hexachlorobenzene	ug/g	0.01	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Hexachlorobutadiene	ug/g	0.01	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Hexachloroethane	ug/g	0.01	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Methoxychlor	ug/g	0.05	-	<0.0050 DLM	<0.0050 DLM	<0.0050 DLM	<0.0050 DLM	<0.0050 DLM
Surrogate: Decachlorobiphenyl	%	-	-	98.6	97.4	102.9	95.1	104.4
Surrogate: Tetrachloro-m-xylene	%	-	-	78.8	80.8	80.9	78.3	85.2

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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

Qualifiers for Individual Parameters Listed:

Qualifier	Description
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
FR5	As per applicable reference method(s), soil:water ratio for Fixed Ratio Leach was modified to 1:5 due to high soil organic content.

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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

CHLORDANE-T-CALC-WT	Soil	Chlordane Total sums	CALCULATION

Aqueous sample is extracted by liquid/liquid extraction with a solvent mix. After extraction, a number of clean up techniques may be applied, depending on the sample matrix and analyzed by GC/MS.

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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

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).

DDD-DDE-DDT-CALC-WT	Soil	DDD, DDE, DDT sums	CALCULATION

Aqueous sample is extracted by liquid/liquid extraction with a solvent mix. After extraction, a number of clean up techniques may be applied, depending on the sample matrix and analyzed by GC/MS.

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).

ENDOSULFAN-T-CALC-WT	Soil	Endosulfan Total sums	CALCULATION

Aqueous sample is extracted by liquid/liquid extraction with a solvent mix. After extraction, a number of clean up techniques may be applied, depending on the sample matrix and analyzed by GC/MS.

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

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

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.

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 and as of November 30, 2020), 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 and as of November 30, 2020), 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)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

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 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

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 CCME PHC in Soil - Tier 1 (mod)

OCP-TRACE-WT Soil Low level OC Pesticides in Soil/Sediment SW846 8270

A 5g representative sub-sample of the soil sample is mixed with methanol and extracted with toluene. An aliquot is taken and analyzed by 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).

PAH-511-WT Soil PAH-O.Reg 153/04 (July 2011) SW846 3510/8270

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 and as of November 30, 2020), 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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

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

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

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 and as of November 30, 2020), 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:

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: L2647481 Report Date: 14-OCT-21

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R5614610								
WG3633912-4 DUP		**L2647481-1**						
Boron (B), Hot Water Ext.		<0.10	<0.10	RPD-NA	ug/g	N/A	30	08-OCT-21
WG3633912-2 IRM		**WT SAR4**						
Boron (B), Hot Water Ext.			98.4		%		70-130	08-OCT-21
WG3633912-3 LCS								
Boron (B), Hot Water Ext.			102.0		%		70-130	08-OCT-21
WG3633912-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	08-OCT-21
CN-WAD-R511-WT	**Soil**							
Batch R5614200								
WG3633108-3 DUP		**L2647481-1**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	07-OCT-21
WG3633108-2 LCS								
Cyanide, Weak Acid Diss			99.1		%		80-120	07-OCT-21
WG3633108-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	07-OCT-21
WG3633108-4 MS		**L2647481-1**						
Cyanide, Weak Acid Diss			108.9		%		70-130	07-OCT-21
CR-CR6-IC-WT	**Soil**							
Batch R5615870								
WG3633258-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			84.5		%		70-130	12-OCT-21
WG3633258-3 DUP		**L2647432-4**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	12-OCT-21
WG3633258-2 LCS								
Chromium, Hexavalent			92.0		%		80-120	12-OCT-21
WG3633258-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	12-OCT-21
EC-WT	**Soil**							
Batch R5617222								
WG3633906-4 DUP		**WG3633906-3**						
Conductivity		0.353	0.399		mS/cm	12	20	14-OCT-21
WG3633906-2 IRM		**WT SAR4**						
Conductivity			116.7		%		70-130	14-OCT-21
WG3637349-1 LCS								
Conductivity			93.4		%		90-110	14-OCT-21
WG3633906-1 MB								

Quality Control Report

Workorder: L2647481 Report Date: 14-OCT-21

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	**Soil**							
Batch R5617222								
WG3633906-1 MB								
Conductivity			<0.0040		mS/cm		0.004	14-OCT-21
F1-HS-511-WT	**Soil**							
Batch R5614789								
WG3633826-4 DUP		**WG3633826-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	08-OCT-21
WG3633826-2 LCS								
F1 (C6-C10)			101.4		%		80-120	08-OCT-21
WG3633826-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	08-OCT-21
Surrogate: 3,4-Dichlorotoluene			105.2		%		60-140	08-OCT-21
WG3633826-5 MS		**WG3633826-3**						
F1 (C6-C10)			103.7		%		60-140	08-OCT-21
F2-F4-511-WT	**Soil**							
Batch R5613862								
WG3632094-3 DUP		**WG3632094-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	07-OCT-21
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	07-OCT-21
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	07-OCT-21
WG3632094-2 LCS								
F2 (C10-C16)			91.8		%		80-120	07-OCT-21
F3 (C16-C34)			93.2		%		80-120	07-OCT-21
F4 (C34-C50)			98.7		%		80-120	07-OCT-21
WG3632094-1 MB								
F2 (C10-C16)			<10		ug/g		10	07-OCT-21
F3 (C16-C34)			<50		ug/g		50	07-OCT-21
F4 (C34-C50)			<50		ug/g		50	07-OCT-21
Surrogate: 2-Bromobenzotrifluoride			94.3		%		60-140	07-OCT-21
WG3632094-4 MS		**WG3632094-5**						
F2 (C10-C16)			87.2		%		60-140	07-OCT-21
F3 (C16-C34)			91.6		%		60-140	07-OCT-21
F4 (C34-C50)			99.6		%		60-140	07-OCT-21
HG-200.2-CVAA-WT	**Soil**							

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WT	**Soil**							
Batch R5614405								
WG3633895-2 CRM		**WT-SS-2**						
Mercury (Hg)			99.7		%		70-130	08-OCT-21
WG3633895-6 DUP		**WG3633895-5**						
Mercury (Hg)		0.0061	0.0058		ug/g	5.1	40	08-OCT-21
WG3633895-3 LCS								
Mercury (Hg)			102.0		%		80-120	08-OCT-21
WG3633895-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	08-OCT-21
MET-200.2-CCMS-WT	**Soil**							
Batch R5614612								
WG3633895-2 CRM		**WT-SS-2**						
Antimony (Sb)			101.6		%		70-130	08-OCT-21
Arsenic (As)			111.0		%		70-130	08-OCT-21
Barium (Ba)			110.3		%		70-130	08-OCT-21
Beryllium (Be)			118.3		%		70-130	08-OCT-21
Boron (B)			9.4		mg/kg		3.5-13.5	08-OCT-21
Cadmium (Cd)			109.1		%		70-130	08-OCT-21
Chromium (Cr)			105.5		%		70-130	08-OCT-21
Cobalt (Co)			107.3		%		70-130	08-OCT-21
Copper (Cu)			112.6		%		70-130	08-OCT-21
Lead (Pb)			107.5		%		70-130	08-OCT-21
Molybdenum (Mo)			104.7		%		70-130	08-OCT-21
Nickel (Ni)			108.9		%		70-130	08-OCT-21
Selenium (Se)			0.13		mg/kg		0-0.34	08-OCT-21
Silver (Ag)			102.1		%		70-130	08-OCT-21
Thallium (Tl)			0.072		mg/kg		0.029-0.129	08-OCT-21
Uranium (U)			98.5		%		70-130	08-OCT-21
Vanadium (V)			109.3		%		70-130	08-OCT-21
Zinc (Zn)			99.5		%		70-130	08-OCT-21
WG3633895-6 DUP		**WG3633895-5**						
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	08-OCT-21
Arsenic (As)		2.89	2.70		ug/g	7.0	30	08-OCT-21
Barium (Ba)		33.9	32.4		ug/g	4.4	40	08-OCT-21
Beryllium (Be)		0.35	0.31		ug/g	12	30	08-OCT-21
Boron (B)		6.1	5.8		ug/g	4.8	30	08-OCT-21

Quality Control Report

Workorder: L2647481 Report Date: 14-OCT-21

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5614612								
WG3633895-6 DUP		**WG3633895-5**						
Cadmium (Cd)		0.125	0.115		ug/g	7.6	30	08-OCT-21
Chromium (Cr)		13.4	12.3		ug/g	8.5	30	08-OCT-21
Cobalt (Co)		5.19	4.67		ug/g	11	30	08-OCT-21
Copper (Cu)		13.8	12.6		ug/g	9.3	30	08-OCT-21
Lead (Pb)		39.0	38.2		ug/g	2.1	40	08-OCT-21
Molybdenum (Mo)		0.23	0.23		ug/g	3.6	40	08-OCT-21
Nickel (Ni)		10.6	9.69		ug/g	9.0	30	08-OCT-21
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	08-OCT-21
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	08-OCT-21
Thallium (Tl)		0.076	0.071		ug/g	7.2	30	08-OCT-21
Uranium (U)		0.382	0.388		ug/g	1.6	30	08-OCT-21
Vanadium (V)		24.9	22.6		ug/g	9.9	30	08-OCT-21
Zinc (Zn)		41.9	38.5		ug/g	8.3	30	08-OCT-21
WG3633895-4 LCS								
Antimony (Sb)			114.8		%		80-120	08-OCT-21
Arsenic (As)			110.9		%		80-120	08-OCT-21
Barium (Ba)			112.8		%		80-120	08-OCT-21
Beryllium (Be)			112.9		%		80-120	08-OCT-21
Boron (B)			106.2		%		80-120	08-OCT-21
Cadmium (Cd)			106.1		%		80-120	08-OCT-21
Chromium (Cr)			109.4		%		80-120	08-OCT-21
Cobalt (Co)			108.4		%		80-120	08-OCT-21
Copper (Cu)			106.3		%		80-120	08-OCT-21
Lead (Pb)			103.7		%		80-120	08-OCT-21
Molybdenum (Mo)			111.6		%		80-120	08-OCT-21
Nickel (Ni)			108.2		%		80-120	08-OCT-21
Selenium (Se)			109.0		%		80-120	08-OCT-21
Silver (Ag)			96.8		%		80-120	08-OCT-21
Thallium (Tl)			104.1		%		80-120	08-OCT-21
Uranium (U)			102.7		%		80-120	08-OCT-21
Vanadium (V)			112.4		%		80-120	08-OCT-21
Zinc (Zn)			101.1		%		80-120	08-OCT-21
WG3633895-1 MB								
							0.1	

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5614612								
WG3633895-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	08-OCT-21
Arsenic (As)			<0.10		mg/kg		0.1	08-OCT-21
Barium (Ba)			<0.50		mg/kg		0.5	08-OCT-21
Beryllium (Be)			<0.10		mg/kg		0.1	08-OCT-21
Boron (B)			<5.0		mg/kg		5	08-OCT-21
Cadmium (Cd)			<0.020		mg/kg		0.02	08-OCT-21
Chromium (Cr)			<0.50		mg/kg		0.5	08-OCT-21
Cobalt (Co)			<0.10		mg/kg		0.1	08-OCT-21
Copper (Cu)			<0.50		mg/kg		0.5	08-OCT-21
Lead (Pb)			<0.50		mg/kg		0.5	08-OCT-21
Molybdenum (Mo)			<0.10		mg/kg		0.1	08-OCT-21
Nickel (Ni)			<0.50		mg/kg		0.5	08-OCT-21
Selenium (Se)			<0.20		mg/kg		0.2	08-OCT-21
Silver (Ag)			<0.10		mg/kg		0.1	08-OCT-21
Thallium (Tl)			<0.050		mg/kg		0.05	08-OCT-21
Uranium (U)			<0.050		mg/kg		0.05	08-OCT-21
Vanadium (V)			<0.20		mg/kg		0.2	08-OCT-21
Zinc (Zn)			<2.0		mg/kg		2	08-OCT-21
MOISTURE-WT	**Soil**							
Batch R5610151								
WG3632067-3 DUP		**L2647481-1**						
% Moisture		7.69	7.56		%	1.7	20	05-OCT-21
WG3632067-2 LCS								
% Moisture			99.9		%		90-110	05-OCT-21
WG3632067-1 MB								
% Moisture			<0.25		%		0.25	05-OCT-21
OCP-TRACE-WT	**Soil**							
Batch R5615827								
WG3633059-3 DUP		**WG3633059-5**						
Aldrin		<0.00020	<0.00020	RPD-NA	ug/g	N/A	50	12-OCT-21
a-chlordane		<0.00030	<0.00030	RPD-NA	ug/g	N/A	50	12-OCT-21
g-chlordane		<0.00030	<0.00030	RPD-NA	ug/g	N/A	50	12-OCT-21
o,p-DDD		<0.00030	<0.00030	RPD-NA	ug/g	N/A	50	12-OCT-21
pp-DDD		0.00067	0.00071		ug/g	6.6	50	12-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OCP-TRACE-WT	**Soil**							
Batch R5615827								
WG3633059-3 DUP		**WG3633059-5**						
o,p-DDE		<0.00030	<0.00030	RPD-NA	ug/g	N/A	50	12-OCT-21
pp-DDE		0.00155	0.00141		ug/g	9.3	50	12-OCT-21
op-DDT		<0.0030	<0.0030	RPD-NA	ug/g	N/A	50	12-OCT-21
pp-DDT		<0.0030	<0.0030	RPD-NA	ug/g	N/A	50	12-OCT-21
Dieldrin		<0.00020	<0.00020	RPD-NA	ug/g	N/A	50	12-OCT-21
alpha-Endosulfan		0.00045	<0.00030	RPD-NA	ug/g	N/A	50	12-OCT-21
beta-Endosulfan		0.00184	0.00158		ug/g	15	50	12-OCT-21
Endrin		<0.00050	<0.00050	RPD-NA	ug/g	N/A	50	12-OCT-21
Heptachlor		<0.00040	<0.00040	RPD-NA	ug/g	N/A	50	12-OCT-21
Heptachlor Epoxide		<0.00020	<0.00020	RPD-NA	ug/g	N/A	50	12-OCT-21
Hexachlorobenzene		<0.00050	<0.00050	RPD-NA	ug/g	N/A	50	12-OCT-21
Hexachlorobutadiene		<0.00050	<0.00050	RPD-NA	ug/g	N/A	50	12-OCT-21
Hexachloroethane		<0.00050	<0.00050	RPD-NA	ug/g	N/A	50	12-OCT-21
Lindane		<0.00020	<0.00020	RPD-NA	ug/g	N/A	50	12-OCT-21
Methoxychlor		<0.0050	<0.0050	RPD-NA	ug/g	N/A	50	12-OCT-21
WG3633059-2 LCS								
Aldrin			88.2		%		50-150	12-OCT-21
a-chlordane			91.3		%		50-150	12-OCT-21
g-chlordane			95.5		%		50-150	12-OCT-21
o,p-DDD			107.9		%		50-150	12-OCT-21
pp-DDD			112.8		%		50-150	12-OCT-21
o,p-DDE			78.1		%		50-150	12-OCT-21
pp-DDE			88.8		%		50-150	12-OCT-21
op-DDT			31.5	RRQC	%		50-150	12-OCT-21
pp-DDT			19.7	RRQC	%		50-150	12-OCT-21
Dieldrin			85.4		%		50-150	12-OCT-21
alpha-Endosulfan			84.7		%		50-150	12-OCT-21
beta-Endosulfan			85.7		%		50-150	12-OCT-21
Endrin			40.2	LCS-L	%		50-150	12-OCT-21
Heptachlor			56.7		%		50-150	12-OCT-21
Heptachlor Epoxide			92.1		%		50-150	12-OCT-21
Hexachlorobenzene			82.4		%		50-150	12-OCT-21
Hexachlorobutadiene			76.5		%		50-150	12-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OCP-TRACE-WT	**Soil**							
Batch R5615827								
WG3633059-2 LCS								
Hexachloroethane			71.4		%		50-150	12-OCT-21
Lindane			70.7		%		50-150	12-OCT-21
Methoxychlor			29.8	RRQC	%		50-150	12-OCT-21
COMMENTS: RRQC: Analyte recovery below ALS DQO. Detection limits have been adjusted.								
WG3633059-1 MB								
Aldrin			<0.00020		ug/g		0.0002	12-OCT-21
a-chlordane			<0.00030		ug/g		0.0003	12-OCT-21
g-chlordane			<0.00030		ug/g		0.0003	12-OCT-21
o,p-DDD			<0.00030		ug/g		0.0003	12-OCT-21
pp-DDD			<0.00030		ug/g		0.0003	12-OCT-21
o,p-DDE			<0.00030		ug/g		0.0003	12-OCT-21
pp-DDE			<0.00030		ug/g		0.0003	12-OCT-21
op-DDT			<0.00030		ug/g		0.0003	12-OCT-21
pp-DDT			<0.00030		ug/g		0.0003	12-OCT-21
Dieldrin			<0.00020		ug/g		0.0002	12-OCT-21
alpha-Endosulfan			<0.00030		ug/g		0.0003	12-OCT-21
beta-Endosulfan			<0.00030		ug/g		0.0003	12-OCT-21
Endrin			<0.00050		ug/g		0.0005	12-OCT-21
Heptachlor			<0.00020		ug/g		0.0002	12-OCT-21
Heptachlor Epoxide			<0.00020		ug/g		0.0002	12-OCT-21
Hexachlorobenzene			<0.00050		ug/g		0.0005	12-OCT-21
Hexachlorobutadiene			<0.00050		ug/g		0.0005	12-OCT-21
Hexachloroethane			<0.00050		ug/g		0.0005	12-OCT-21
Lindane			<0.00020		ug/g		0.0002	12-OCT-21
Methoxychlor			<0.00050		ug/g		0.0005	12-OCT-21
Surrogate: Tetrachloro-m-xylene			90.2		%		50-150	12-OCT-21
Surrogate: Decachlorobiphenyl			119.8		%		50-150	12-OCT-21
WG3633059-4 MS		**WG3633059-5**						
Aldrin			86.0		%		50-150	12-OCT-21
a-chlordane			65.3		%		50-150	12-OCT-21
g-chlordane			67.6		%		50-150	12-OCT-21
o,p-DDD			84.2		%		50-150	12-OCT-21
pp-DDD			94.5		%		50-150	12-OCT-21
o,p-DDE			57.0		%		50-150	12-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OCP-TRACE-WT	**Soil**							
Batch R5615827								
WG3633059-4 MS		**WG3633059-5**						
pp-DDE			65.5		%		50-150	12-OCT-21
op-DDT			12.2	RRQC	%		50-150	12-OCT-21
pp-DDT			49.0	RRQC	%		50-150	12-OCT-21
Dieldrin			61.4		%		50-150	12-OCT-21
alpha-Endosulfan			60.1		%		50-150	12-OCT-21
beta-Endosulfan			85.7		%		50-150	12-OCT-21
Endrin			54.6		%		50-150	12-OCT-21
Heptachlor			46.0	RRQC	%		50-150	12-OCT-21
Heptachlor Epoxide			62.0		%		50-150	12-OCT-21
Hexachlorobenzene			80.0		%		50-150	12-OCT-21
Hexachlorobutadiene			77.9		%		50-150	12-OCT-21
Hexachloroethane			66.4		%		50-150	12-OCT-21
Lindane			63.4		%		50-150	12-OCT-21
Methoxychlor			10.5	RRQC	%		50-150	12-OCT-21
COMMENTS: RRQC: Analyte recovery below ALS DQO. Detection limits have been adjusted.								
PAH-511-WT	**Soil**							
Batch R5613336								
WG3632088-3 DUP		**WG3632088-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	07-OCT-21
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	07-OCT-21
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Benzo(b&j)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Dibenz(a,h)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R5613336								
WG3632088-3 DUP		**WG3632088-5**						
Naphthalene		<0.013	<0.013	RPD-NA	ug/g	N/A	40	07-OCT-21
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	07-OCT-21
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-OCT-21
WG3632088-2 LCS								
1-Methylnaphthalene			89.2		%		50-140	07-OCT-21
2-Methylnaphthalene			87.1		%		50-140	07-OCT-21
Acenaphthene			90.3		%		50-140	07-OCT-21
Acenaphthylene			86.7		%		50-140	07-OCT-21
Anthracene			80.8		%		50-140	07-OCT-21
Benzo(a)anthracene			96.2		%		50-140	07-OCT-21
Benzo(a)pyrene			76.5		%		50-140	07-OCT-21
Benzo(b&j)fluoranthene			80.2		%		50-140	07-OCT-21
Benzo(g,h,i)perylene			89.4		%		50-140	07-OCT-21
Benzo(k)fluoranthene			87.1		%		50-140	07-OCT-21
Chrysene			96.0		%		50-140	07-OCT-21
Dibenz(a,h)anthracene			91.5		%		50-140	07-OCT-21
Fluoranthene			92.2		%		50-140	07-OCT-21
Fluorene			86.9		%		50-140	07-OCT-21
Indeno(1,2,3-cd)pyrene			83.7		%		50-140	07-OCT-21
Naphthalene			86.3		%		50-140	07-OCT-21
Phenanthrene			90.8		%		50-140	07-OCT-21
Pyrene			89.8		%		50-140	07-OCT-21
WG3632088-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	07-OCT-21
2-Methylnaphthalene			<0.030		ug/g		0.03	07-OCT-21
Acenaphthene			<0.050		ug/g		0.05	07-OCT-21
Acenaphthylene			<0.050		ug/g		0.05	07-OCT-21
Anthracene			<0.050		ug/g		0.05	07-OCT-21
Benzo(a)anthracene			<0.050		ug/g		0.05	07-OCT-21
Benzo(a)pyrene			<0.050		ug/g		0.05	07-OCT-21
Benzo(b&j)fluoranthene			<0.050		ug/g		0.05	07-OCT-21
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	07-OCT-21
Benzo(k)fluoranthene			<0.050		ug/g		0.05	07-OCT-21
Chrysene			<0.050		ug/g		0.05	07-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R5613336								
WG3632088-1 MB								
Dibenz(a,h)anthracene			<0.050		ug/g		0.05	07-OCT-21
Fluoranthene			<0.050		ug/g		0.05	07-OCT-21
Fluorene			<0.050		ug/g		0.05	07-OCT-21
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	07-OCT-21
Naphthalene			<0.013		ug/g		0.013	07-OCT-21
Phenanthrene			<0.046		ug/g		0.046	07-OCT-21
Pyrene			<0.050		ug/g		0.05	07-OCT-21
Surrogate: 2-Fluorobiphenyl			81.5		%		50-140	07-OCT-21
Surrogate: d14-Terphenyl			86.8		%		50-140	07-OCT-21
WG3632088-4 MS		**WG3632088-5**						
1-Methylnaphthalene			91.2		%		50-140	07-OCT-21
2-Methylnaphthalene			89.1		%		50-140	07-OCT-21
Acenaphthene			91.6		%		50-140	07-OCT-21
Acenaphthylene			88.7		%		50-140	07-OCT-21
Anthracene			80.7		%		50-140	07-OCT-21
Benzo(a)anthracene			97.3		%		50-140	07-OCT-21
Benzo(a)pyrene			77.6		%		50-140	07-OCT-21
Benzo(b&j)fluoranthene			83.2		%		50-140	07-OCT-21
Benzo(g,h,i)perylene			88.6		%		50-140	07-OCT-21
Benzo(k)fluoranthene			88.4		%		50-140	07-OCT-21
Chrysene			96.7		%		50-140	07-OCT-21
Dibenz(a,h)anthracene			91.2		%		50-140	07-OCT-21
Fluoranthene			94.1		%		50-140	07-OCT-21
Fluorene			90.2		%		50-140	07-OCT-21
Indeno(1,2,3-cd)pyrene			89.5		%		50-140	07-OCT-21
Naphthalene			87.5		%		50-140	07-OCT-21
Phenanthrene			91.4		%		50-140	07-OCT-21
Pyrene			92.9		%		50-140	07-OCT-21
PCB-511-WT	**Soil**							
Batch R5614076								
WG3632088-3 DUP		**WG3632088-5**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	07-OCT-21
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	07-OCT-21
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	07-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Soil**							
Batch R5614076								
WG3632088-3 DUP		**WG3632088-5**						
Aroclor 1260		0.074	0.081		ug/g	8.9	40	07-OCT-21
WG3632088-2 LCS								
Aroclor 1242			97.4		%		60-140	07-OCT-21
Aroclor 1248			83.2		%		60-140	07-OCT-21
Aroclor 1254			95.3		%		60-140	07-OCT-21
Aroclor 1260			89.3		%		60-140	07-OCT-21
WG3632088-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	07-OCT-21
Aroclor 1248			<0.010		ug/g		0.01	07-OCT-21
Aroclor 1254			<0.010		ug/g		0.01	07-OCT-21
Aroclor 1260			<0.010		ug/g		0.01	07-OCT-21
Surrogate: d14-Terphenyl			102.1		%		60-140	07-OCT-21
WG3632088-4 MS		**WG3632088-5**						
Aroclor 1242			95.0		%		60-140	07-OCT-21
Aroclor 1254			100.7		%		60-140	07-OCT-21
Aroclor 1260			107.5		%		60-140	07-OCT-21
PH-WT	**Soil**							
Batch R5615789								
WG3632092-1 DUP		**L2647211-1**						
pH		7.63	7.61	J	pH units	0.02	0.3	12-OCT-21
WG3635759-1 LCS								
pH			6.95		pH units		6.9-7.1	12-OCT-21
SAR-R511-WT	**Soil**							
Batch R5614899								
WG3633906-4 DUP		**WG3633906-3**						
Calcium (Ca)		15.2	16.6		mg/L	8.8	30	08-OCT-21
Sodium (Na)		<0.50	0.50	RPD-NA	mg/L	N/A	30	08-OCT-21
Magnesium (Mg)		1.03	1.13		mg/L	9.3	30	08-OCT-21
WG3633906-2 IRM		**WT SAR4**						
Calcium (Ca)			106.3		%		70-130	08-OCT-21
Sodium (Na)			98.4		%		70-130	08-OCT-21
Magnesium (Mg)			109.4		%		70-130	08-OCT-21
WG3633906-5 LCS								
Calcium (Ca)			110.0		%		80-120	08-OCT-21
Sodium (Na)			106.0		%		80-120	08-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R5614899								
WG3633906-5 LCS								
Magnesium (Mg)			108.4		%		80-120	08-OCT-21
WG3633906-1 MB								
Calcium (Ca)			<0.50		mg/L		0.5	08-OCT-21
Sodium (Na)			<0.50		mg/L		0.5	08-OCT-21
Magnesium (Mg)			<0.50		mg/L		0.5	08-OCT-21
VOC-511-HS-WT	**Soil**							
Batch R5614789								
WG3633826-4 DUP		**WG3633826-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	08-OCT-21
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	08-OCT-21
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	08-OCT-21
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	08-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5614789								
WG3633826-4 DUP		**WG3633826-3**						
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	12-OCT-21
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	08-OCT-21
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	08-OCT-21
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	08-OCT-21
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	08-OCT-21
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	08-OCT-21
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	08-OCT-21
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	08-OCT-21
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-OCT-21
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	08-OCT-21
WG3633826-2 LCS								
1,1,1,2-Tetrachloroethane			93.4		%		60-130	08-OCT-21
1,1,2,2-Tetrachloroethane			90.4		%		60-130	08-OCT-21
1,1,1-Trichloroethane			95.0		%		60-130	08-OCT-21
1,1,2-Trichloroethane			94.6		%		60-130	08-OCT-21
1,1-Dichloroethane			88.6		%		60-130	08-OCT-21
1,1-Dichloroethylene			94.2		%		60-130	08-OCT-21
1,2-Dibromoethane			89.5		%		70-130	08-OCT-21
1,2-Dichlorobenzene			90.0		%		70-130	08-OCT-21
1,2-Dichloroethane			90.7		%		60-130	08-OCT-21
1,2-Dichloropropane			93.0		%		70-130	08-OCT-21
1,3-Dichlorobenzene			89.5		%		70-130	08-OCT-21
1,4-Dichlorobenzene			88.9		%		70-130	08-OCT-21
Acetone			91.1		%		60-140	08-OCT-21
Benzene			91.0		%		70-130	08-OCT-21
Bromodichloromethane			99.3		%		50-140	08-OCT-21
Bromoform			89.9		%		70-130	08-OCT-21
Bromomethane			90.8		%		50-140	08-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5614789								
WG3633826-2 LCS								
Carbon tetrachloride			95.7		%		70-130	08-OCT-21
Chlorobenzene			92.7		%		70-130	08-OCT-21
Chloroform			94.0		%		70-130	08-OCT-21
cis-1,2-Dichloroethylene			95.0		%		70-130	08-OCT-21
cis-1,3-Dichloropropene			86.9		%		70-130	08-OCT-21
Dibromochloromethane			92.4		%		60-130	08-OCT-21
Dichlorodifluoromethane			73.4		%		50-140	08-OCT-21
Ethylbenzene			90.3		%		70-130	08-OCT-21
n-Hexane			85.2		%		70-130	08-OCT-21
Methylene Chloride			89.6		%		70-130	08-OCT-21
MTBE			86.6		%		70-130	08-OCT-21
m+p-Xylenes			92.4		%		70-130	08-OCT-21
Methyl Ethyl Ketone			83.1		%		60-140	08-OCT-21
Methyl Isobutyl Ketone			75.4		%		60-140	08-OCT-21
o-Xylene			89.1		%		70-130	08-OCT-21
Styrene			89.6		%		70-130	08-OCT-21
Tetrachloroethylene			94.4		%		60-130	08-OCT-21
Toluene			90.5		%		70-130	08-OCT-21
trans-1,2-Dichloroethylene			89.3		%		60-130	08-OCT-21
trans-1,3-Dichloropropene			84.7		%		70-130	08-OCT-21
Trichloroethylene			94.0		%		60-130	08-OCT-21
Trichlorofluoromethane			86.9		%		50-140	08-OCT-21
Vinyl chloride			81.8		%		60-140	08-OCT-21
WG3633826-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	08-OCT-21
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	08-OCT-21
1,1,1-Trichloroethane			<0.050		ug/g		0.05	08-OCT-21
1,1,2-Trichloroethane			<0.050		ug/g		0.05	08-OCT-21
1,1-Dichloroethane			<0.050		ug/g		0.05	08-OCT-21
1,1-Dichloroethylene			<0.050		ug/g		0.05	08-OCT-21
1,2-Dibromoethane			<0.050		ug/g		0.05	08-OCT-21
1,2-Dichlorobenzene			<0.050		ug/g		0.05	08-OCT-21
1,2-Dichloroethane			<0.050		ug/g		0.05	08-OCT-21
1,2-Dichloropropane			<0.050		ug/g		0.05	08-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5614789								
WG3633826-1 MB								
1,3-Dichlorobenzene			<0.050		ug/g		0.05	08-OCT-21
1,4-Dichlorobenzene			<0.050		ug/g		0.05	08-OCT-21
Acetone			<0.50		ug/g		0.5	08-OCT-21
Benzene			<0.0068		ug/g		0.0068	08-OCT-21
Bromodichloromethane			<0.050		ug/g		0.05	08-OCT-21
Bromoform			<0.050		ug/g		0.05	08-OCT-21
Bromomethane			<0.050		ug/g		0.05	08-OCT-21
Carbon tetrachloride			<0.050		ug/g		0.05	08-OCT-21
Chlorobenzene			<0.050		ug/g		0.05	08-OCT-21
Chloroform			<0.050		ug/g		0.05	08-OCT-21
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	08-OCT-21
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	08-OCT-21
Dibromochloromethane			<0.050		ug/g		0.05	08-OCT-21
Dichlorodifluoromethane			<0.050		ug/g		0.05	08-OCT-21
Ethylbenzene			<0.018		ug/g		0.018	08-OCT-21
n-Hexane			<0.050		ug/g		0.05	08-OCT-21
Methylene Chloride			0.057	B	ug/g		0.05	08-OCT-21
MTBE			<0.050		ug/g		0.05	08-OCT-21
m+p-Xylenes			<0.030		ug/g		0.03	08-OCT-21
Methyl Ethyl Ketone			<0.50		ug/g		0.5	08-OCT-21
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	08-OCT-21
o-Xylene			<0.020		ug/g		0.02	08-OCT-21
Styrene			<0.050		ug/g		0.05	08-OCT-21
Tetrachloroethylene			<0.050		ug/g		0.05	08-OCT-21
Toluene			<0.080		ug/g		0.08	08-OCT-21
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	08-OCT-21
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	08-OCT-21
Trichloroethylene			<0.010		ug/g		0.01	08-OCT-21
Trichlorofluoromethane			<0.050		ug/g		0.05	08-OCT-21
Vinyl chloride			<0.020		ug/g		0.02	08-OCT-21
Surrogate: 1,4-Difluorobenzene			101.9		%		50-140	08-OCT-21
Surrogate: 4-Bromofluorobenzene			96.6		%		50-140	08-OCT-21
WG3633826-5 MS		**WG3633826-3**						
1,1,1,2-Tetrachloroethane			102.5		%		50-140	08-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5614789								
WG3633826-5 MS		**WG3633826-3**						
1,1,2,2-Tetrachloroethane			100.3		%		50-140	08-OCT-21
1,1,1-Trichloroethane			102.5		%		50-140	08-OCT-21
1,1,2-Trichloroethane			104.6		%		50-140	08-OCT-21
1,1-Dichloroethane			95.8		%		50-140	08-OCT-21
1,1-Dichloroethylene			99.0		%		50-140	08-OCT-21
1,2-Dibromoethane			99.8		%		50-140	08-OCT-21
1,2-Dichlorobenzene			97.7		%		50-140	08-OCT-21
1,2-Dichloroethane			99.98		%		50-140	08-OCT-21
1,2-Dichloropropane			102.2		%		50-140	08-OCT-21
1,3-Dichlorobenzene			97.2		%		50-140	08-OCT-21
1,4-Dichlorobenzene			96.2		%		50-140	08-OCT-21
Acetone			104.7		%		50-140	08-OCT-21
Benzene			98.3		%		50-140	08-OCT-21
Bromodichloromethane			108.8		%		50-140	08-OCT-21
Bromoform			100.2		%		50-140	08-OCT-21
Bromomethane			92.9		%		50-140	08-OCT-21
Carbon tetrachloride			102.5		%		50-140	08-OCT-21
Chlorobenzene			101.3		%		50-140	08-OCT-21
Chloroform			102.6		%		50-140	08-OCT-21
cis-1,2-Dichloroethylene			101.7		%		50-140	08-OCT-21
cis-1,3-Dichloropropene			93.7		%		50-140	08-OCT-21
Dibromochloromethane			101.7		%		50-140	08-OCT-21
Dichlorodifluoromethane			83.6		%		50-140	08-OCT-21
Ethylbenzene			98.4		%		50-140	08-OCT-21
n-Hexane			90.6		%		50-140	08-OCT-21
Methylene Chloride			94.0		%		50-140	08-OCT-21
MTBE			91.3		%		50-140	08-OCT-21
m+p-Xylenes			100.5		%		50-140	08-OCT-21
Methyl Ethyl Ketone			96.2		%		50-140	08-OCT-21
Methyl Isobutyl Ketone			85.7		%		50-140	08-OCT-21
o-Xylene			97.3		%		50-140	08-OCT-21
Styrene			98.5		%		50-140	08-OCT-21
Tetrachloroethylene			101.6		%		50-140	08-OCT-21

Quality Control Report

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

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5614789								
WG3633826-5 MS		**WG3633826-3**						
Toluene			98.6		%		50-140	08-OCT-21
trans-1,2-Dichloroethylene			95.0		%		50-140	08-OCT-21
trans-1,3-Dichloropropene			91.7		%		50-140	08-OCT-21
Trichloroethylene			101.2		%		50-140	08-OCT-21
Trichlorofluoromethane			90.9		%		50-140	08-OCT-21
Vinyl chloride			84.1		%		50-140	08-OCT-21

Quality Control Report

Workorder: L2647481 Report Date: 14-OCT-21

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

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
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-L	Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
RRQC	Refer to report remarks for information regarding this QC result.

Hold Time Exceedances:

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

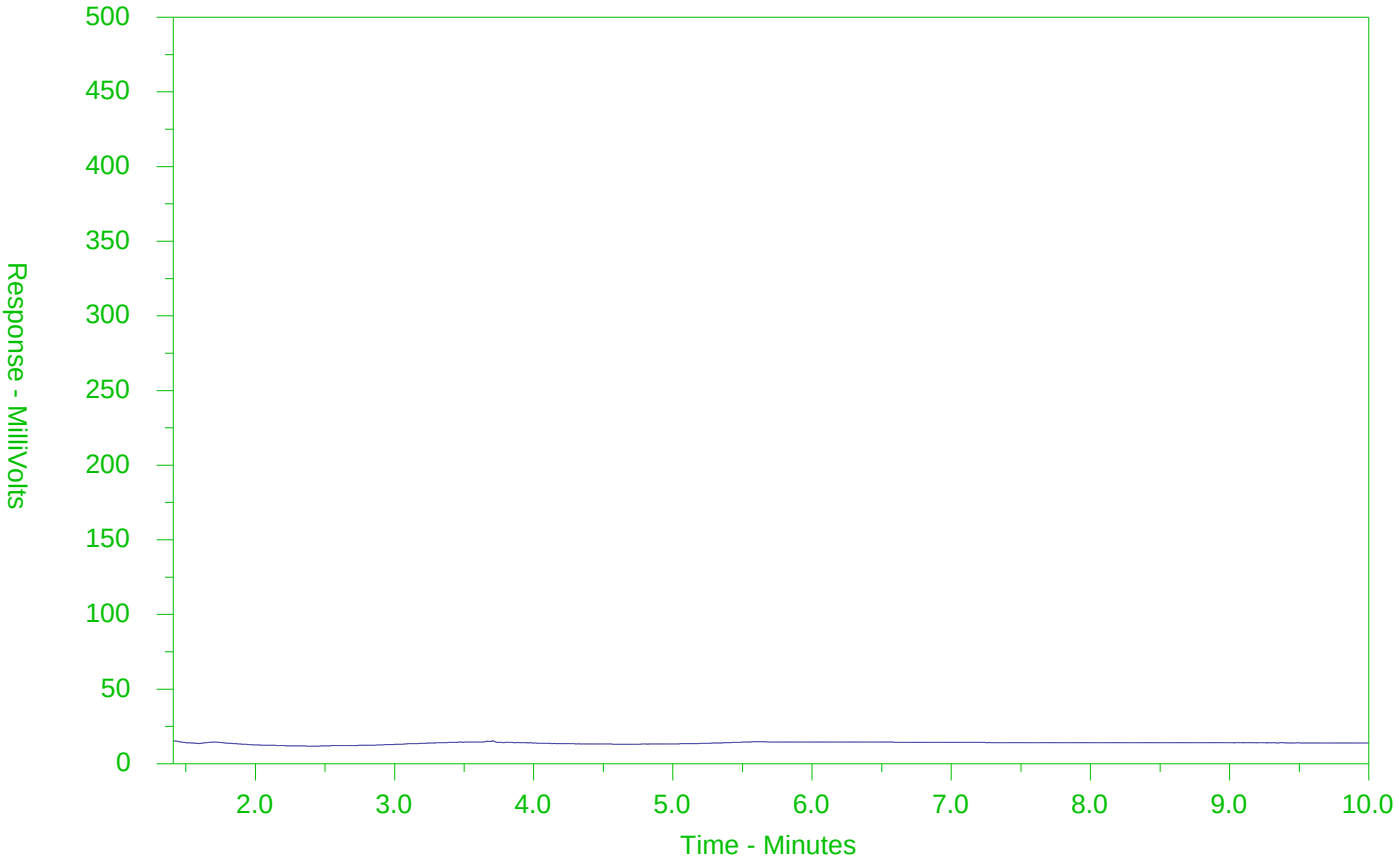
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where 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: L2647481-1
Client Sample ID: MW1



←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.

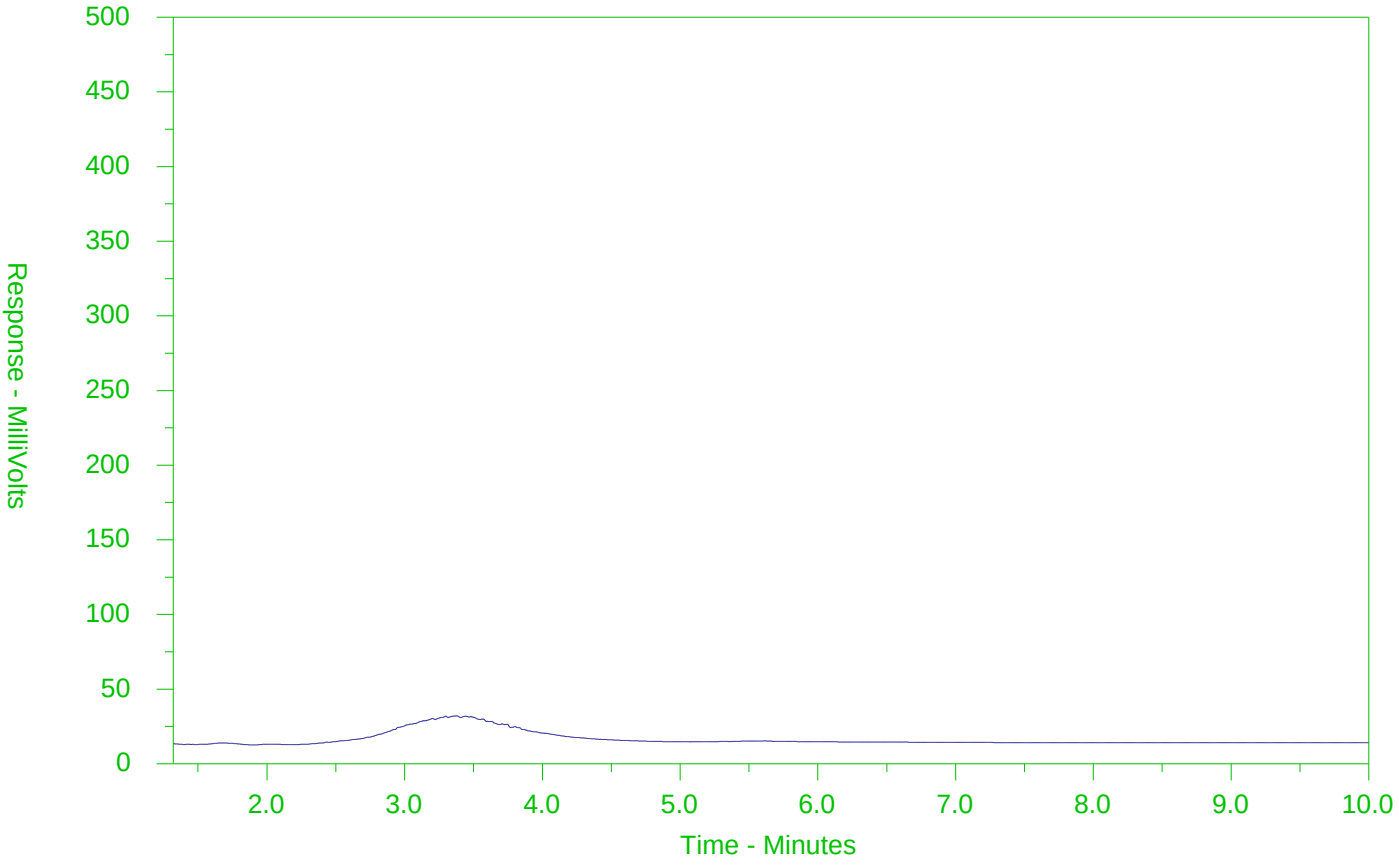
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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: L2647481-2
Client Sample ID: MW2



←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.

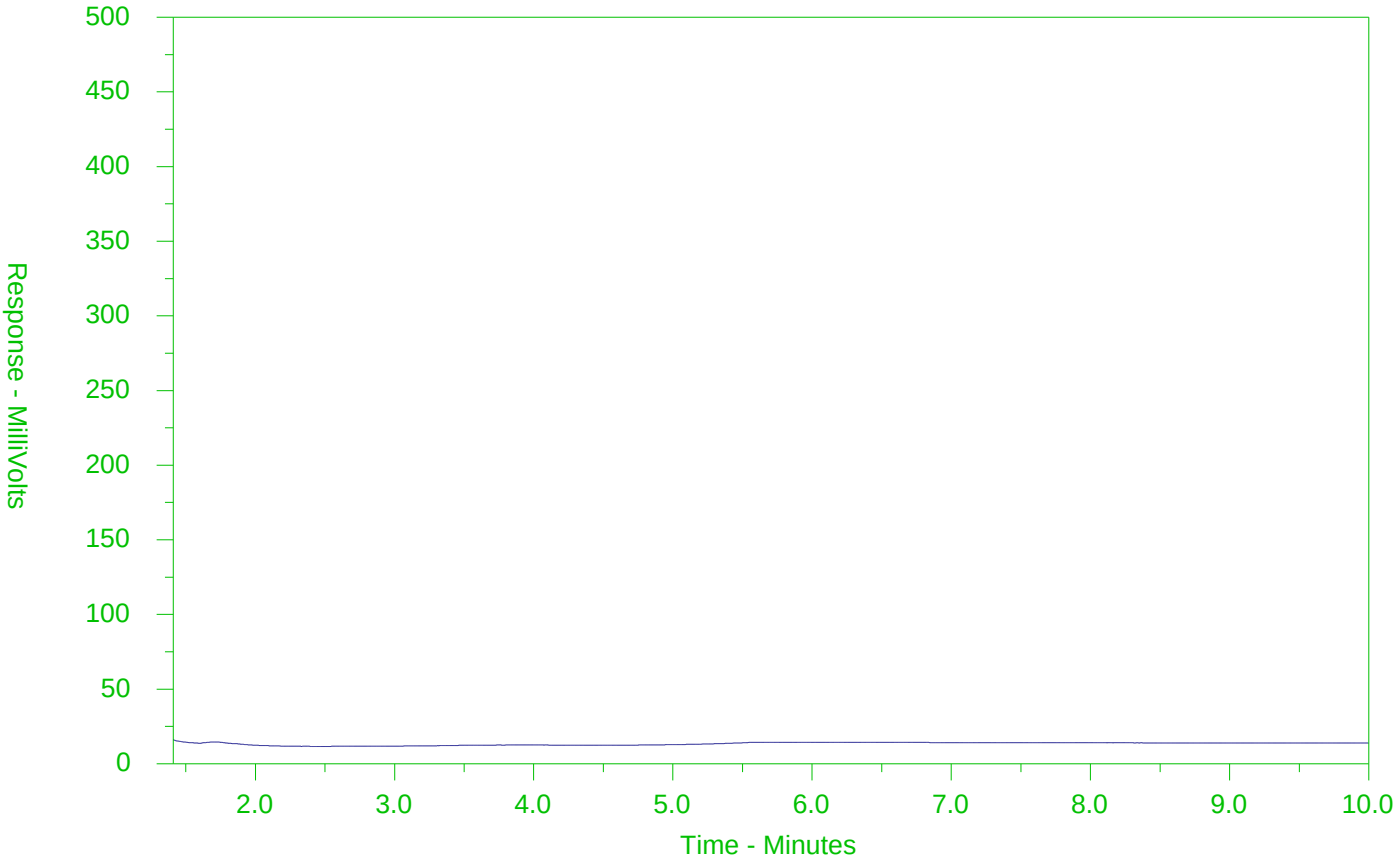
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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: L2647481-3
Client Sample ID: MW3



←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.

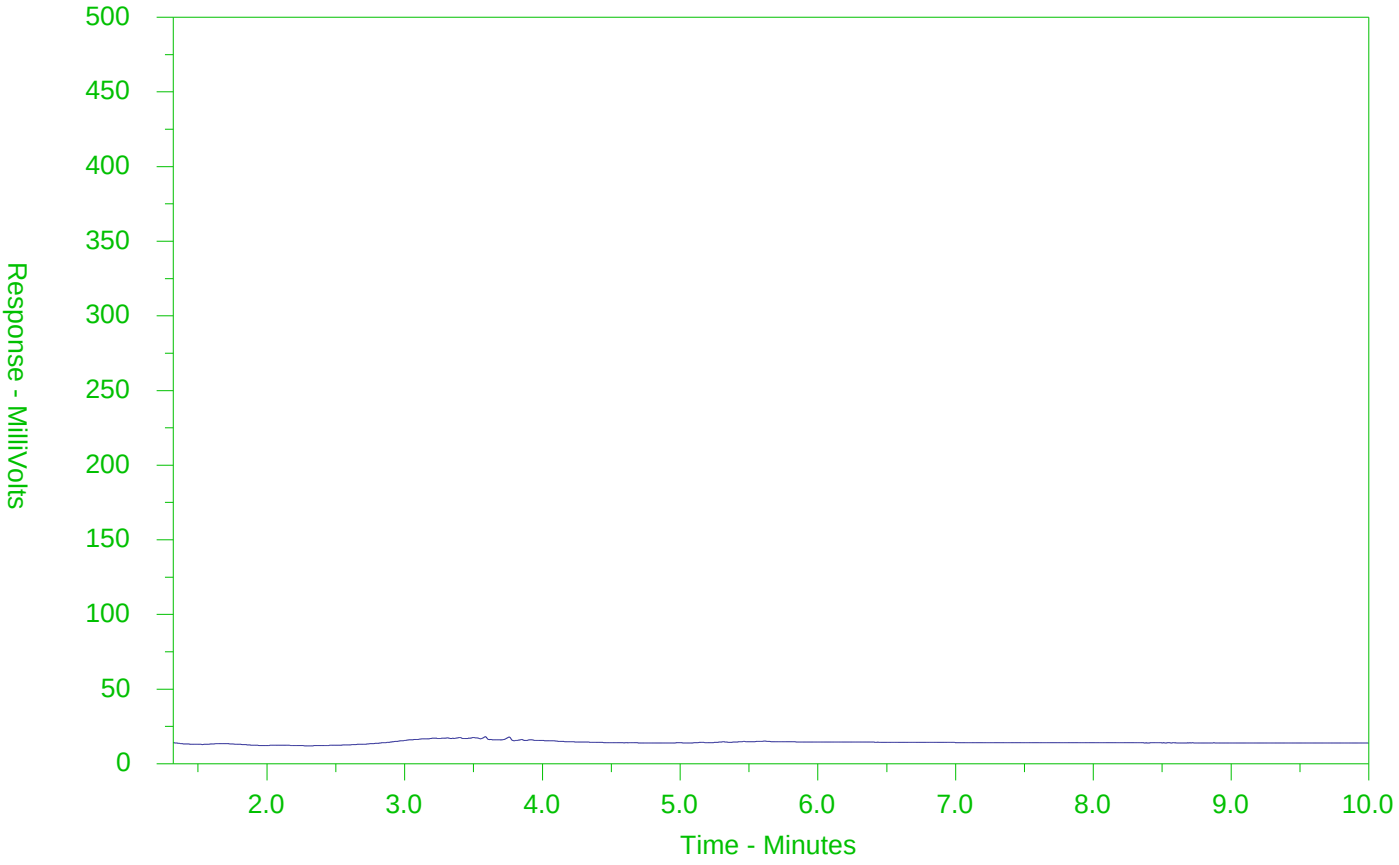
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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: L2647481-4
Client Sample ID: MW4



←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.

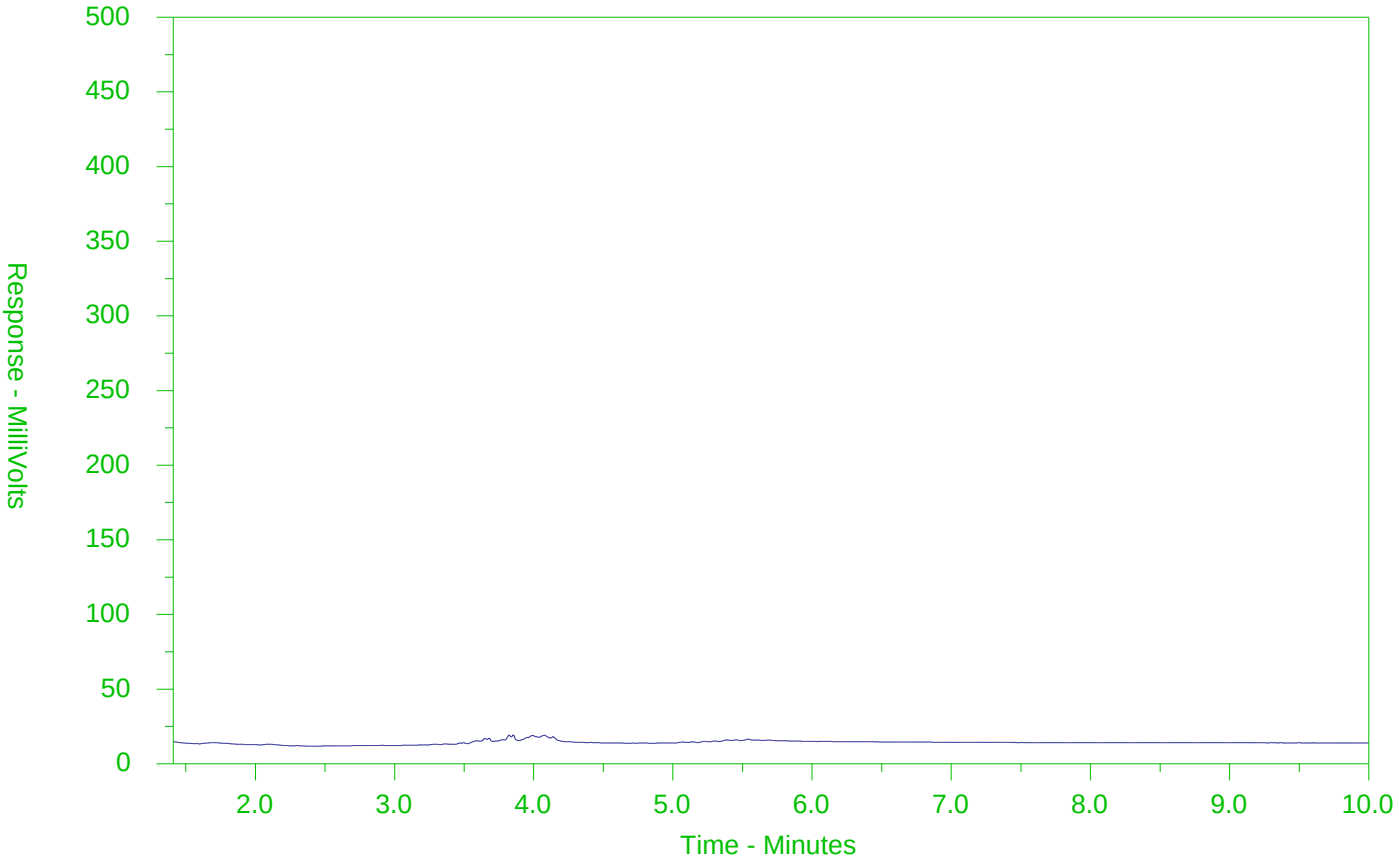
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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: L2647481-5
Client Sample ID: MW5



←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.

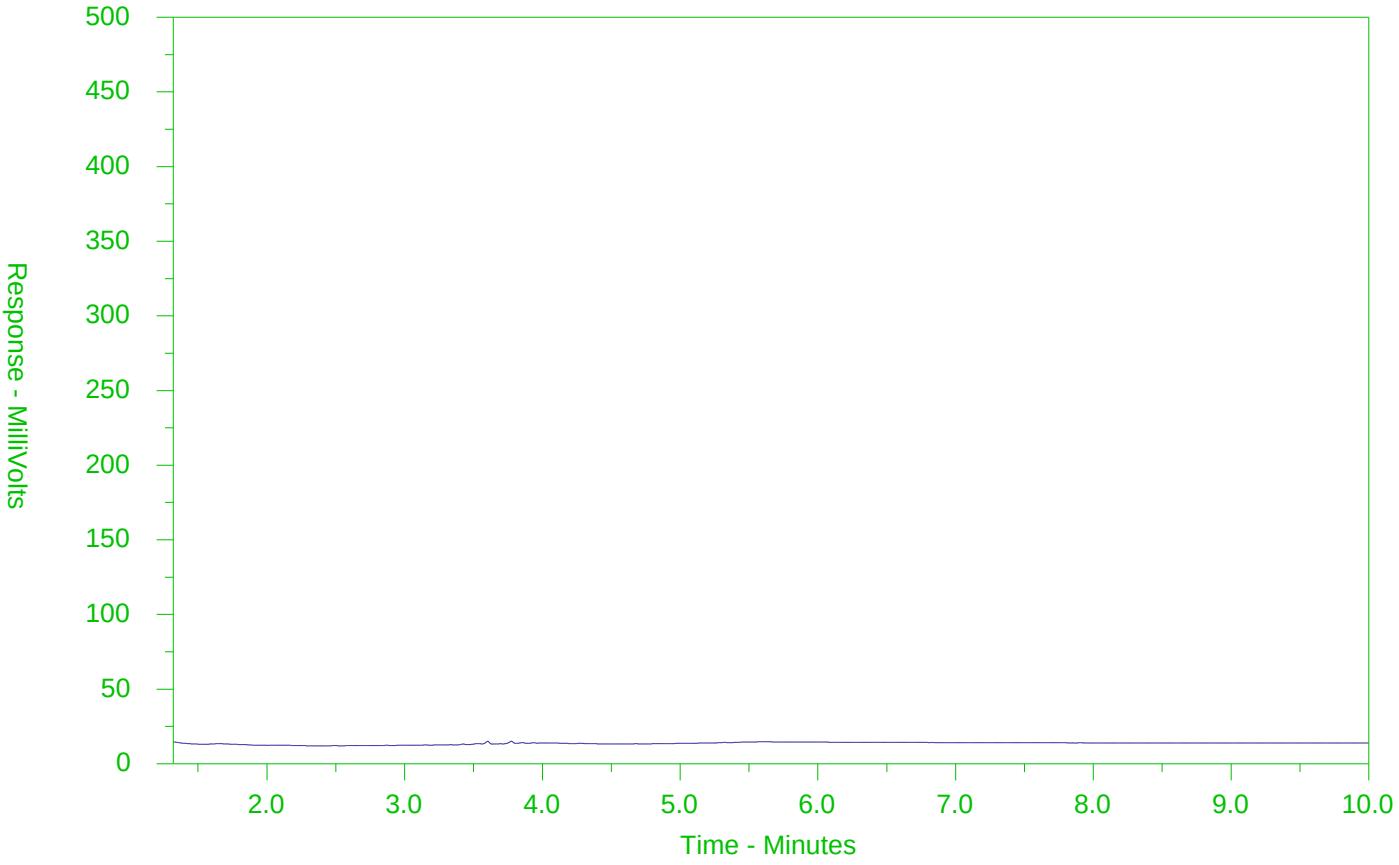
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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: L2647481-6
Client Sample ID: DUP 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.

www.alsglobal.com

L2647481-COFC

...tical Request Form

668 9878

COC Number: 20 -

Page of

Report To	Contact and company name below will appear on the final report	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Turnaround Time (TAT) Requested	AFFIX ALS BARCODE LABEL HERE (ALS use only)
Company:	HLV2K Engineering Limited	Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A	☑ Routine [R] if received by 3pm M-F - no surcharges apply	
Contact:	Mariam Mohammadi	☑ Compare Results to Criteria on Report - provide details below if box checked	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum	
Phone:	6479753676	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum	
	Company address below will appear on the final report	Email 1 or Fax mariam.mohammadi@HLV2K.com	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum	
Street:	4-2179 Dunwin Drive	Email 2 john.lametti@HLV2K.com	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum	
City/Province:	Mississauga, ON	Email 3	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests	
Postal Code:	L5L 1X2		Date and Time Required for all E&P TAT's:	
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients	For all tests with rush TAT's requested, please contact your AM to confirm availability.	
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX		
Company:	HLV2K Engineering Limited	Email 1 or Fax Invoice@HLV2K.com		
Contact:	Manny Virani	Email 2		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	84316	AFE/Cost Center:	PO#
Job #:	2100428DE	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:	Erin	Location:	
ALS Lab Work Order # (ALS use only):	L2647481	ALS Contact:	Sampler:

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Analysis Request: Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
						F			
						O. Reg. 153/04 - Metals & Inorganics			
						O. Reg. 153/04 - VOC / F1			
						O. Reg. 153/04 - PHC F2-F4			
						O. Reg. 153/04 - PAH			
						O. Reg. 153/04 - OC Pesticides			
						O. Reg. 153/04 - PCB			
						O. Reg. 153/04 - Moisture			
	MW1	5-Oct-21	9:00	Soil		R R R R R			
	MW2	5-Oct-21	9:00	Soil		R R R R R			
	MW3	5-Oct-21	9:00	Soil		R R R R R			
	MW4	5-Oct-21	9:00	Soil		R R R R R			
	MW5	5-Oct-21	9:00	Soil		R R R R R R			
	Dup1	5-Oct-21	9:00	Soil		R R R R R			

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	Ontario Regulation 153/04 - April 15, 2011 Standards - T1 - Soil - RPI/ICC Property Use
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☒ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
2.2				7.8			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)		FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by: Karan	Date: 10/5/2021	Time: 14:53	Received by: WC	Date: 05/10/21 Time: 17:27

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 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**.

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

Date Received: 08-OCT-21
Report Date: 21-OCT-21 07:38 (MT)
Version: FINAL

Client Phone: 437-370-0317

Certificate of Analysis

Lab Work Order #: L2649945

Project P.O. #: NOT SUBMITTED
Job Reference: 2100428DE
C of C Numbers:
Legal Site Desc: 5196 TRAFALGAR ROAD N ERIN, ON

Amanda Overholster
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 - T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use						
L2649945-2	HS2	Hydrocarbons	F4 (C34-C50)	946	120	ug/g
			F4G-SG (GHH-Silica)	5290	120	ug/g

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

Physical Tests - SOIL

		Guide Limits			
Lab ID				L2649945-1	L2649945-2
Sample Date				08-OCT-21	08-OCT-21
Sample ID				HS1	HS2
Analyte	**Unit**	**#1**	**#2**		
Conductivity	mS/cm	0.57	-	0.125	0.131
% Moisture	%	-	-	13.8	12.5
pH	pH units	-	-	7.46	6.89

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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

Cyanides - SOIL

		Guide Limits			
Lab ID				L2649945-1	L2649945-2
Sample Date				08-OCT-21	08-OCT-21
Sample ID				HS1	HS2
Analyte	**Unit**	**#1**	**#2**		
Cyanide, Weak Acid Diss	ug/g	0.051	-	<0.050	<0.050

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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

Saturated Paste Extractables - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2649945-1 / Sample Date: 08-OCT-21 / Sample ID: HS1	Lab ID: L2649945-2 / Sample Date: 08-OCT-21 / Sample ID: HS2
SAR	SAR	2.4	-	<0.10	<0.10
Calcium (Ca)	mg/L	-	-	21.5	23.0
Magnesium (Mg)	mg/L	-	-	4.58	3.14
Sodium (Na)	mg/L	-	-	0.85	0.58

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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

Metals - SOIL

				Lab ID	L2649945-1	L2649945-2
				Sample Date	08-OCT-21	08-OCT-21
				Sample ID	HS1	HS2
		Guide Limits				
Analyte	Unit	#1	#2			
Antimony (Sb)	ug/g	1.3	-		<1.0	<1.0
Arsenic (As)	ug/g	18	-		3.8	4.1
Barium (Ba)	ug/g	220	-		40.6	36.2
Beryllium (Be)	ug/g	2.5	-		<0.50	<0.50
Boron (B)	ug/g	36	-		<5.0	<5.0
Boron (B), Hot Water Ext.	ug/g	36	-		0.14	0.64
Cadmium (Cd)	ug/g	1.2	-		<0.50	<0.50
Chromium (Cr)	ug/g	70	-		13.8	9.2
Cobalt (Co)	ug/g	21	-		4.5	4.8
Copper (Cu)	ug/g	92	-		12.6	18.8
Lead (Pb)	ug/g	120	-		15.1	35.2
Mercury (Hg)	ug/g	0.27	-		0.0294	0.0383
Molybdenum (Mo)	ug/g	2	-		<1.0	<1.0
Nickel (Ni)	ug/g	82	-		9.4	7.8
Selenium (Se)	ug/g	1.5	-		<1.0	<1.0
Silver (Ag)	ug/g	0.5	-		<0.20	<0.20
Thallium (Tl)	ug/g	1	-		<0.50	<0.50
Uranium (U)	ug/g	2.5	-		<1.0	<1.0
Vanadium (V)	ug/g	86	-		31.7	20.0
Zinc (Zn)	ug/g	290	-		58.0	86.2

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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.

Speciated Metals - SOIL

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID	Sample Date	Sample ID
				L2649945-1	08-OCT-21	HS1
				L2649945-2	08-OCT-21	HS2
Chromium, Hexavalent	ug/g	0.66	-	0.22		<0.20

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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.

Volatile Organic Compounds - SOIL

				Lab ID	L2649945-1	L2649945-2
				Sample Date	08-OCT-21	08-OCT-21
				Sample ID	HS1	HS2
		Guide Limits				
Analyte	Unit	#1	#2			
Acetone	ug/g	0.5	-		<0.50	<0.50
Benzene	ug/g	0.02	-		<0.0068	<0.0068
Bromodichloromethane	ug/g	0.05	-		<0.050	<0.050
Bromoform	ug/g	0.05	-		<0.050	<0.050
Bromomethane	ug/g	0.05	-		<0.050	<0.050
Carbon tetrachloride	ug/g	0.05	-		<0.050	<0.050
Chlorobenzene	ug/g	0.05	-		<0.050	<0.050
Dibromochloromethane	ug/g	0.05	-		<0.050	<0.050
Chloroform	ug/g	0.05	-		<0.050	<0.050
1,2-Dibromoethane	ug/g	0.05	-		<0.050	<0.050
1,2-Dichlorobenzene	ug/g	0.05	-		<0.050	<0.050
1,3-Dichlorobenzene	ug/g	0.05	-		<0.050	<0.050
1,4-Dichlorobenzene	ug/g	0.05	-		<0.050	<0.050
Dichlorodifluoromethane	ug/g	0.05	-		<0.050	<0.050
1,1-Dichloroethane	ug/g	0.05	-		<0.050	<0.050
1,2-Dichloroethane	ug/g	0.05	-		<0.050	<0.050
1,1-Dichloroethylene	ug/g	0.05	-		<0.050	<0.050
cis-1,2-Dichloroethylene	ug/g	0.05	-		<0.050	<0.050
trans-1,2-Dichloroethylene	ug/g	0.05	-		<0.050	<0.050
Methylene Chloride	ug/g	0.05	-		<0.050	<0.050
1,2-Dichloropropane	ug/g	0.05	-		<0.050	<0.050
cis-1,3-Dichloropropene	ug/g	-	-		<0.030	<0.030
trans-1,3-Dichloropropene	ug/g	-	-		<0.030	<0.030
1,3-Dichloropropene (cis & trans)	ug/g	0.05	-		<0.042	<0.042
Ethylbenzene	ug/g	0.05	-		<0.018	<0.018
n-Hexane	ug/g	0.05	-		<0.050	<0.050
Methyl Ethyl Ketone	ug/g	0.5	-		<0.50	<0.50
Methyl Isobutyl Ketone	ug/g	0.5	-		<0.50	<0.50
MTBE	ug/g	0.05	-		<0.050	<0.050
Styrene	ug/g	0.05	-		<0.050	<0.050

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

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

Volatile Organic Compounds - SOIL

			Lab ID	L2649945-1	L2649945-2
			Sample Date	08-OCT-21	08-OCT-21
			Sample ID	HS1	HS2
		Guide Limits			
Analyte	**Unit**	**#1**	**#2**		
1,1,1,2-Tetrachloroethane	ug/g	0.05	-	<0.050	<0.050
1,1,2,2-Tetrachloroethane	ug/g	0.05	-	<0.050	<0.050
Tetrachloroethylene	ug/g	0.05	-	<0.050	<0.050
Toluene	ug/g	0.2	-	<0.080	<0.080
1,1,1-Trichloroethane	ug/g	0.05	-	<0.050	<0.050
1,1,2-Trichloroethane	ug/g	0.05	-	<0.050	<0.050
Trichloroethylene	ug/g	0.05	-	<0.010	<0.010
Trichlorofluoromethane	ug/g	0.25	-	<0.050	<0.050
Vinyl chloride	ug/g	0.02	-	<0.020	<0.020
o-Xylene	ug/g	-	-	<0.020	<0.020
m+p-Xylenes	ug/g	-	-	<0.030	<0.030
Xylenes (Total)	ug/g	0.05	-	<0.050	<0.050
Surrogate: 4-Bromofluorobenzene	%	-	-	79.9	93.6
Surrogate: 1,4-Difluorobenzene	%	-	-	89.4	104.9

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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 - SOIL

		Guide Limits			
Lab ID				L2649945-1	L2649945-2
Sample Date				08-OCT-21	08-OCT-21
Sample ID				HS1	HS2
Analyte	**Unit**	**#1**	**#2**		
F1 (C6-C10)	ug/g	25	-	<5.0	<5.0
F1-BTEX	ug/g	25	-	<5.0	<5.0
F2 (C10-C16)	ug/g	10	-	<10	<10
F2-Naphth	ug/g	-	-	<10	<10
F3 (C16-C34)	ug/g	240	-	<50	236
F3-PAH	ug/g	-	-	<50	235
F4 (C34-C50)	ug/g	120	-	<50	946
F4G-SG (GHH-Silica)	ug/g	120	-		5290
Total Hydrocarbons (C6-C50)	ug/g	-	-	<72	1180
Chrom. to baseline at nC50		-	-	YES	NO
Surrogate: 2-Bromobenzotrifluoride	%	-	-	83.0	86.8
Surrogate: 3,4-Dichlorotoluene	%	-	-	92.8	92.2

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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.

Polycyclic Aromatic Hydrocarbons - SOIL

		Guide Limits			
Lab ID				L2649945-1	L2649945-2
Sample Date				08-OCT-21	08-OCT-21
Sample ID				HS1	HS2
Analyte	**Unit**	**#1**	**#2**		
Acenaphthene	ug/g	0.072	-	<0.050	<0.050
Acenaphthylene	ug/g	0.093	-	<0.050	<0.050
Anthracene	ug/g	0.16	-	<0.050	<0.050
Benzo(a)anthracene	ug/g	0.36	-	<0.050	<0.050
Benzo(a)pyrene	ug/g	0.3	-	<0.050	<0.050
Benzo(b&j)fluoranthene	ug/g	0.47	-	<0.050	0.060
Benzo(g,h,i)perylene	ug/g	0.68	-	<0.050	<0.050
Benzo(k)fluoranthene	ug/g	0.48	-	<0.050	<0.050
Chrysene	ug/g	2.8	-	<0.050	<0.050
Dibenz(a,h)anthracene	ug/g	0.1	-	<0.050	<0.050
Fluoranthene	ug/g	0.56	-	<0.050	0.076
Fluorene	ug/g	0.12	-	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	ug/g	0.23	-	<0.050	<0.050
1+2-Methylnaphthalenes	ug/g	0.59	-	<0.042	<0.042
1-Methylnaphthalene	ug/g	0.59	-	<0.030	<0.030
2-Methylnaphthalene	ug/g	0.59	-	<0.030	<0.030
Naphthalene	ug/g	0.09	-	<0.013	<0.013
Phenanthrene	ug/g	0.69	-	<0.046	<0.046
Pyrene	ug/g	1	-	<0.050	0.065
Surrogate: 2-Fluorobiphenyl	%	-	-	91.5	86.7
Surrogate: d14-Terphenyl	%	-	-	96.6	92.0

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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 - SOIL

			Lab ID	L2649945-1	L2649945-2
			Sample Date	08-OCT-21	08-OCT-21
			Sample ID	HS1	HS2
Analyte	Unit	Guide Limits #1	#2		
Aroclor 1242	ug/g	-	-	<0.010	<0.010
Aroclor 1248	ug/g	-	-	<0.010	<0.010
Aroclor 1254	ug/g	-	-	<0.010	<0.010
Aroclor 1260	ug/g	-	-	<0.010	0.026 PRAR
Total PCBs	ug/g	0.3	-	<0.020	0.026
Surrogate: d14-Terphenyl	%	-	-	125.3	112.5

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu 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

Qualifiers for Individual Parameters Listed:

Qualifier	Description
PRAR	PCB Pattern Most Closely Resembles Aroclor Reported

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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

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.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

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.

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 and as of November 30, 2020), 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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F4G-ADD-511-WT Soil F4G SG-O.Reg 153/04 (July 2011) MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

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 and as of November 30, 2020), 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 200.2/6020B (mod)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

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	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

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 and as of November 30, 2020), 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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

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 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
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:

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: L2649945 Report Date: 21-OCT-21

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 R5624368								
WG3640252-4 DUP		**L2649928-3**						
Boron (B), Hot Water Ext.		<0.10	<0.10	RPD-NA	ug/g	N/A	30	19-OCT-21
WG3640252-2 IRM		**WT SAR4**						
Boron (B), Hot Water Ext.			101.5		%		70-130	19-OCT-21
WG3640252-3 LCS								
Boron (B), Hot Water Ext.			103.0		%		70-130	19-OCT-21
WG3640252-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	19-OCT-21
CN-WAD-R511-WT	**Soil**							
Batch R5625199								
WG3639685-3 DUP		**L2649999-5**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	20-OCT-21
WG3639685-2 LCS								
Cyanide, Weak Acid Diss			91.1		%		80-120	20-OCT-21
WG3639685-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	20-OCT-21
WG3639685-4 MS		**L2649999-5**						
Cyanide, Weak Acid Diss			92.1		%		70-130	20-OCT-21
CR-CR6-IC-WT	**Soil**							
Batch R5625319								
WG3639861-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			83.6		%		70-130	20-OCT-21
WG3639861-3 DUP		**L2647649-15**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	20-OCT-21
WG3639861-2 LCS								
Chromium, Hexavalent			95.1		%		80-120	20-OCT-21
WG3639861-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	20-OCT-21
EC-WT	**Soil**							
Batch R5624291								
WG3640253-4 DUP		**WG3640253-3**						
Conductivity		0.738	0.737		mS/cm	0.1	20	19-OCT-21
WG3640253-2 IRM		**WT SAR4**						
Conductivity			109.9		%		70-130	19-OCT-21
WG3640604-1 LCS								
Conductivity			104.3		%		90-110	19-OCT-21
WG3640253-1 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
EC-WT	**Soil**							
Batch R5624291								
WG3640253-1 MB								
Conductivity			<0.0040		mS/cm		0.004	19-OCT-21
F1-HS-511-WT	**Soil**							
Batch R5619859								
WG3636810-4 DUP		**WG3636810-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	15-OCT-21
WG3636810-2 LCS								
F1 (C6-C10)			97.9		%		80-120	15-OCT-21
WG3636810-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	15-OCT-21
Surrogate: 3,4-Dichlorotoluene			113.1		%		60-140	15-OCT-21
WG3636810-5 MS		**WG3636810-3**						
F1 (C6-C10)			121.2		%		60-140	15-OCT-21
F2-F4-511-WT	**Soil**							
Batch R5624236								
WG3639432-3 DUP		**WG3639432-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	19-OCT-21
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	19-OCT-21
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	19-OCT-21
WG3639432-2 LCS								
F2 (C10-C16)			88.9		%		80-120	19-OCT-21
F3 (C16-C34)			88.9		%		80-120	19-OCT-21
F4 (C34-C50)			86.8		%		80-120	19-OCT-21
WG3639432-1 MB								
F2 (C10-C16)			<10		ug/g		10	19-OCT-21
F3 (C16-C34)			<50		ug/g		50	19-OCT-21
F4 (C34-C50)			<50		ug/g		50	19-OCT-21
Surrogate: 2-Bromobenzotrifluoride			88.7		%		60-140	19-OCT-21
WG3639432-4 MS		**WG3639432-5**						
F2 (C10-C16)			86.6		%		60-140	19-OCT-21
F3 (C16-C34)			85.4		%		60-140	19-OCT-21
F4 (C34-C50)			91.9		%		60-140	19-OCT-21
F4G-ADD-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
F4G-ADD-511-WT	**Soil**							
Batch R5625711								
WG3642273-2 LCS								
F4G-SG (GHH-Silica)			80.2		%		60-140	18-OCT-21
WG3642273-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	18-OCT-21
HG-200.2-CVAA-WT	**Soil**							
Batch R5624401								
WG3640251-2 CRM		**WT-SS-2**						
Mercury (Hg)			96.8		%		70-130	19-OCT-21
WG3640251-6 DUP		**WG3640251-5**						
Mercury (Hg)		0.0143	0.0134		ug/g	6.7	40	19-OCT-21
WG3640251-3 LCS								
Mercury (Hg)			95.0		%		80-120	19-OCT-21
WG3640251-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	19-OCT-21
MET-200.2-CCMS-WT	**Soil**							
Batch R5624564								
WG3640251-2 CRM		**WT-SS-2**						
Antimony (Sb)			93.1		%		70-130	19-OCT-21
Arsenic (As)			105.9		%		70-130	19-OCT-21
Barium (Ba)			117.0		%		70-130	19-OCT-21
Beryllium (Be)			104.8		%		70-130	19-OCT-21
Boron (B)			8.5		mg/kg		3.5-13.5	19-OCT-21
Cadmium (Cd)			101.9		%		70-130	19-OCT-21
Chromium (Cr)			104.1		%		70-130	19-OCT-21
Cobalt (Co)			107.3		%		70-130	19-OCT-21
Copper (Cu)			106.2		%		70-130	19-OCT-21
Lead (Pb)			101.5		%		70-130	19-OCT-21
Molybdenum (Mo)			103.9		%		70-130	19-OCT-21
Nickel (Ni)			112.8		%		70-130	19-OCT-21
Selenium (Se)			0.13		mg/kg		0-0.34	19-OCT-21
Silver (Ag)			97.1		%		70-130	19-OCT-21
Thallium (Tl)			0.074		mg/kg		0.029-0.129	19-OCT-21
Uranium (U)			98.0		%		70-130	19-OCT-21
Vanadium (V)			105.8		%		70-130	19-OCT-21
Zinc (Zn)			101.1		%		70-130	19-OCT-21
WG3640251-6 DUP		**WG3640251-5**						

Quality Control Report

Client: HLV2K Engineering Limited (Brampton)
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5624564								
WG3640251-6 DUP		**WG3640251-5**						
Antimony (Sb)		0.11	0.12		ug/g	12	30	19-OCT-21
Arsenic (As)		4.60	4.80		ug/g	4.3	30	19-OCT-21
Barium (Ba)		123	136		ug/g	10	40	19-OCT-21
Beryllium (Be)		0.79	0.90		ug/g	13	30	19-OCT-21
Boron (B)		10.0	12.1		ug/g	19	30	19-OCT-21
Cadmium (Cd)		0.095	0.102		ug/g	6.6	30	19-OCT-21
Chromium (Cr)		27.0	28.3		ug/g	4.9	30	19-OCT-21
Cobalt (Co)		13.0	13.4		ug/g	3.1	30	19-OCT-21
Copper (Cu)		24.4	25.7		ug/g	5.2	30	19-OCT-21
Lead (Pb)		11.2	13.6		ug/g	19	40	19-OCT-21
Molybdenum (Mo)		0.30	0.32		ug/g	5.7	40	19-OCT-21
Nickel (Ni)		28.4	30.0		ug/g	5.4	30	19-OCT-21
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	19-OCT-21
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	19-OCT-21
Thallium (Tl)		0.169	0.198		ug/g	16	30	19-OCT-21
Uranium (U)		0.557	0.662		ug/g	17	30	19-OCT-21
Vanadium (V)		36.8	38.5		ug/g	4.4	30	19-OCT-21
Zinc (Zn)		61.5	63.7		ug/g	3.5	30	19-OCT-21
WG3640251-4 LCS								
Antimony (Sb)			101.3		%		80-120	19-OCT-21
Arsenic (As)			107.0		%		80-120	19-OCT-21
Barium (Ba)			108.9		%		80-120	19-OCT-21
Beryllium (Be)			103.0		%		80-120	19-OCT-21
Boron (B)			99.6		%		80-120	19-OCT-21
Cadmium (Cd)			100.1		%		80-120	19-OCT-21
Chromium (Cr)			105.7		%		80-120	19-OCT-21
Cobalt (Co)			106.3		%		80-120	19-OCT-21
Copper (Cu)			104.0		%		80-120	19-OCT-21
Lead (Pb)			103.0		%		80-120	19-OCT-21
Molybdenum (Mo)			102.4		%		80-120	19-OCT-21
Nickel (Ni)			104.5		%		80-120	19-OCT-21
Selenium (Se)			100.7		%		80-120	19-OCT-21
Silver (Ag)			91.6		%		80-120	19-OCT-21

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 R5624564								
WG3640251-4 LCS								
Thallium (Tl)			103.3		%		80-120	19-OCT-21
Uranium (U)			104.3		%		80-120	19-OCT-21
Vanadium (V)			108.0		%		80-120	19-OCT-21
Zinc (Zn)			99.99		%		80-120	19-OCT-21
WG3640251-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	19-OCT-21
Arsenic (As)			<0.10		mg/kg		0.1	19-OCT-21
Barium (Ba)			<0.50		mg/kg		0.5	19-OCT-21
Beryllium (Be)			<0.10		mg/kg		0.1	19-OCT-21
Boron (B)			<5.0		mg/kg		5	19-OCT-21
Cadmium (Cd)			<0.020		mg/kg		0.02	19-OCT-21
Chromium (Cr)			<0.50		mg/kg		0.5	19-OCT-21
Cobalt (Co)			<0.10		mg/kg		0.1	19-OCT-21
Copper (Cu)			<0.50		mg/kg		0.5	19-OCT-21
Lead (Pb)			<0.50		mg/kg		0.5	19-OCT-21
Molybdenum (Mo)			<0.10		mg/kg		0.1	19-OCT-21
Nickel (Ni)			<0.50		mg/kg		0.5	19-OCT-21
Selenium (Se)			<0.20		mg/kg		0.2	19-OCT-21
Silver (Ag)			<0.10		mg/kg		0.1	19-OCT-21
Thallium (Tl)			<0.050		mg/kg		0.05	19-OCT-21
Uranium (U)			<0.050		mg/kg		0.05	19-OCT-21
Vanadium (V)			<0.20		mg/kg		0.2	19-OCT-21
Zinc (Zn)			<2.0		mg/kg		2	19-OCT-21
MOISTURE-WT	**Soil**							
Batch R5624261								
WG3640377-3 DUP		**L2649800-3**						
% Moisture		13.0	12.4		%	5.2	20	20-OCT-21
WG3640377-2 LCS								
% Moisture			99.8		%		90-110	20-OCT-21
WG3640377-1 MB								
% Moisture			<0.25		%		0.25	20-OCT-21
PAH-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
PAH-511-WT	**Soil**							
Batch R5624005								
WG3639449-3 DUP		**WG3639449-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	18-OCT-21
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	18-OCT-21
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Benzo(b&j)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Dibenz(a,h)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
Naphthalene		<0.013	<0.013	RPD-NA	ug/g	N/A	40	18-OCT-21
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	18-OCT-21
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-21
WG3639449-2 LCS								
1-Methylnaphthalene			90.1		%		50-140	18-OCT-21
2-Methylnaphthalene			86.8		%		50-140	18-OCT-21
Acenaphthene			86.2		%		50-140	18-OCT-21
Acenaphthylene			71.6		%		50-140	18-OCT-21
Anthracene			72.4		%		50-140	18-OCT-21
Benzo(a)anthracene			84.2		%		50-140	18-OCT-21
Benzo(a)pyrene			69.0		%		50-140	18-OCT-21
Benzo(b&j)fluoranthene			83.0		%		50-140	18-OCT-21
Benzo(g,h,i)perylene			92.4		%		50-140	18-OCT-21
Benzo(k)fluoranthene			88.7		%		50-140	18-OCT-21
Chrysene			98.3		%		50-140	18-OCT-21
Dibenz(a,h)anthracene			92.2		%		50-140	18-OCT-21
Fluoranthene			85.0		%		50-140	18-OCT-21
Fluorene			82.9		%		50-140	18-OCT-21

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 R5624005								
WG3639449-2 LCS								
Indeno(1,2,3-cd)pyrene			83.1		%		50-140	18-OCT-21
Naphthalene			86.1		%		50-140	18-OCT-21
Phenanthrene			91.0		%		50-140	18-OCT-21
Pyrene			84.3		%		50-140	18-OCT-21
WG3639449-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	18-OCT-21
2-Methylnaphthalene			<0.030		ug/g		0.03	18-OCT-21
Acenaphthene			<0.050		ug/g		0.05	18-OCT-21
Acenaphthylene			<0.050		ug/g		0.05	18-OCT-21
Anthracene			<0.050		ug/g		0.05	18-OCT-21
Benzo(a)anthracene			<0.050		ug/g		0.05	18-OCT-21
Benzo(a)pyrene			<0.050		ug/g		0.05	18-OCT-21
Benzo(b&j)fluoranthene			<0.050		ug/g		0.05	18-OCT-21
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	18-OCT-21
Benzo(k)fluoranthene			<0.050		ug/g		0.05	18-OCT-21
Chrysene			<0.050		ug/g		0.05	18-OCT-21
Dibenz(a,h)anthracene			<0.050		ug/g		0.05	18-OCT-21
Fluoranthene			<0.050		ug/g		0.05	18-OCT-21
Fluorene			<0.050		ug/g		0.05	18-OCT-21
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	18-OCT-21
Naphthalene			<0.013		ug/g		0.013	18-OCT-21
Phenanthrene			<0.046		ug/g		0.046	18-OCT-21
Pyrene			<0.050		ug/g		0.05	18-OCT-21
Surrogate: 2-Fluorobiphenyl			82.2		%		50-140	18-OCT-21
Surrogate: d14-Terphenyl			83.5		%		50-140	18-OCT-21
WG3639449-4 MS		**WG3639449-5**						
1-Methylnaphthalene			88.9		%		50-140	18-OCT-21
2-Methylnaphthalene			86.3		%		50-140	18-OCT-21
Acenaphthene			85.5		%		50-140	18-OCT-21
Acenaphthylene			74.8		%		50-140	18-OCT-21
Anthracene			76.9		%		50-140	18-OCT-21
Benzo(a)anthracene			92.3		%		50-140	18-OCT-21
Benzo(a)pyrene			75.8		%		50-140	18-OCT-21
Benzo(b&j)fluoranthene			83.2		%		50-140	18-OCT-21

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 R5624005								
WG3639449-4 MS		**WG3639449-5**						
Benzo(g,h,i)perylene			88.4		%		50-140	18-OCT-21
Benzo(k)fluoranthene			87.6		%		50-140	18-OCT-21
Chrysene			95.3		%		50-140	18-OCT-21
Dibenz(a,h)anthracene			89.7		%		50-140	18-OCT-21
Fluoranthene			87.0		%		50-140	18-OCT-21
Fluorene			83.3		%		50-140	18-OCT-21
Indeno(1,2,3-cd)pyrene			87.4		%		50-140	18-OCT-21
Naphthalene			83.9		%		50-140	18-OCT-21
Phenanthrene			87.5		%		50-140	18-OCT-21
Pyrene			85.4		%		50-140	18-OCT-21
PCB-511-WT	**Soil**							
Batch R5624758								
WG3639449-3 DUP		**WG3639449-5**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	19-OCT-21
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	19-OCT-21
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	19-OCT-21
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	19-OCT-21
WG3639449-2 LCS								
Aroclor 1242			98.9		%		60-140	19-OCT-21
Aroclor 1248			94.2		%		60-140	19-OCT-21
Aroclor 1254			97.9		%		60-140	19-OCT-21
Aroclor 1260			95.1		%		60-140	19-OCT-21
WG3639449-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	19-OCT-21
Aroclor 1248			<0.010		ug/g		0.01	19-OCT-21
Aroclor 1254			<0.010		ug/g		0.01	19-OCT-21
Aroclor 1260			<0.010		ug/g		0.01	19-OCT-21
Surrogate: d14-Terphenyl			102.9		%		60-140	19-OCT-21
WG3639449-4 MS		**WG3639449-5**						
Aroclor 1242			98.1		%		60-140	19-OCT-21
Aroclor 1254			91.0		%		60-140	19-OCT-21
Aroclor 1260			88.7		%		60-140	19-OCT-21
PH-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
PH-WT	**Soil**							
Batch R5625196								
WG3639512-1 DUP		**L2650118-2**						
pH		8.03	7.91	J	pH units	0.12	0.3	20-OCT-21
WG3641646-1 LCS								
pH			7.01		pH units		6.9-7.1	20-OCT-21
SAR-R511-WT	**Soil**							
Batch R5624445								
WG3640253-4 DUP		**WG3640253-3**						
Calcium (Ca)		0.66	0.59		mg/L	12	30	19-OCT-21
Sodium (Na)		141	141		mg/L	0.0	30	19-OCT-21
Magnesium (Mg)		<0.50	<0.50	RPD-NA	mg/L	N/A	30	19-OCT-21
WG3640253-2 IRM		**WT SAR4**						
Calcium (Ca)			88.8		%		70-130	19-OCT-21
Sodium (Na)			95.4		%		70-130	19-OCT-21
Magnesium (Mg)			95.7		%		70-130	19-OCT-21
WG3640253-5 LCS								
Calcium (Ca)			105.7		%		80-120	19-OCT-21
Sodium (Na)			106.6		%		80-120	19-OCT-21
Magnesium (Mg)			105.0		%		80-120	19-OCT-21
WG3640253-1 MB								
Calcium (Ca)			<0.50		mg/L		0.5	19-OCT-21
Sodium (Na)			<0.50		mg/L		0.5	19-OCT-21
Magnesium (Mg)			<0.50		mg/L		0.5	19-OCT-21
VOC-511-HS-WT	**Soil**							
Batch R5619859								
WG3636810-4 DUP		**WG3636810-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21

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 R5619859								
WG3636810-4 DUP		**WG3636810-3**						
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	15-OCT-21
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	15-OCT-21
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	15-OCT-21
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	15-OCT-21
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	15-OCT-21
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	15-OCT-21
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	15-OCT-21
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	15-OCT-21
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	15-OCT-21
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	15-OCT-21
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	15-OCT-21
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	15-OCT-21
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	15-OCT-21
WG3636810-2 LCS								
1,1,1,2-Tetrachloroethane			88.0		%		60-130	15-OCT-21
1,1,2,2-Tetrachloroethane			83.4		%		60-130	15-OCT-21

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 R5619859								
WG3636810-2 LCS								
1,1,1-Trichloroethane			88.7		%		60-130	15-OCT-21
1,1,2-Trichloroethane			83.6		%		60-130	15-OCT-21
1,1-Dichloroethane			85.2		%		60-130	15-OCT-21
1,1-Dichloroethylene			82.6		%		60-130	15-OCT-21
1,2-Dibromoethane			81.6		%		70-130	15-OCT-21
1,2-Dichlorobenzene			89.9		%		70-130	15-OCT-21
1,2-Dichloroethane			84.6		%		60-130	15-OCT-21
1,2-Dichloropropane			87.2		%		70-130	15-OCT-21
1,3-Dichlorobenzene			90.0		%		70-130	15-OCT-21
1,4-Dichlorobenzene			91.0		%		70-130	15-OCT-21
Acetone			80.2		%		60-140	15-OCT-21
Benzene			88.3		%		70-130	15-OCT-21
Bromodichloromethane			90.2		%		50-140	15-OCT-21
Bromoform			79.7		%		70-130	15-OCT-21
Bromomethane			79.9		%		50-140	15-OCT-21
Carbon tetrachloride			89.7		%		70-130	15-OCT-21
Chlorobenzene			92.2		%		70-130	15-OCT-21
Chloroform			90.4		%		70-130	15-OCT-21
cis-1,2-Dichloroethylene			92.1		%		70-130	15-OCT-21
cis-1,3-Dichloropropene			82.2		%		70-130	15-OCT-21
Dibromochloromethane			82.7		%		60-130	15-OCT-21
Dichlorodifluoromethane			51.2		%		50-140	15-OCT-21
Ethylbenzene			84.0		%		70-130	15-OCT-21
n-Hexane			80.6		%		70-130	15-OCT-21
Methylene Chloride			85.4		%		70-130	15-OCT-21
MTBE			87.9		%		70-130	15-OCT-21
m+p-Xylenes			88.4		%		70-130	15-OCT-21
Methyl Ethyl Ketone			83.8		%		60-140	15-OCT-21
Methyl Isobutyl Ketone			76.7		%		60-140	15-OCT-21
o-Xylene			88.1		%		70-130	15-OCT-21
Styrene			90.7		%		70-130	15-OCT-21
Tetrachloroethylene			92.6		%		60-130	15-OCT-21
Toluene			89.3		%		70-130	15-OCT-21

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 R5619859								
WG3636810-2 LCS								
trans-1,2-Dichloroethylene			84.4		%		60-130	15-OCT-21
trans-1,3-Dichloropropene			76.2		%		70-130	15-OCT-21
Trichloroethylene			93.9		%		60-130	15-OCT-21
Trichlorofluoromethane			80.9		%		50-140	15-OCT-21
Vinyl chloride			65.6		%		60-140	15-OCT-21
WG3636810-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	15-OCT-21
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	15-OCT-21
1,1,1-Trichloroethane			<0.050		ug/g		0.05	15-OCT-21
1,1,2-Trichloroethane			<0.050		ug/g		0.05	15-OCT-21
1,1-Dichloroethane			<0.050		ug/g		0.05	15-OCT-21
1,1-Dichloroethylene			<0.050		ug/g		0.05	15-OCT-21
1,2-Dibromoethane			<0.050		ug/g		0.05	15-OCT-21
1,2-Dichlorobenzene			<0.050		ug/g		0.05	15-OCT-21
1,2-Dichloroethane			<0.050		ug/g		0.05	15-OCT-21
1,2-Dichloropropane			<0.050		ug/g		0.05	15-OCT-21
1,3-Dichlorobenzene			<0.050		ug/g		0.05	15-OCT-21
1,4-Dichlorobenzene			<0.050		ug/g		0.05	15-OCT-21
Acetone			<0.50		ug/g		0.5	15-OCT-21
Benzene			<0.0068		ug/g		0.0068	15-OCT-21
Bromodichloromethane			<0.050		ug/g		0.05	15-OCT-21
Bromoform			<0.050		ug/g		0.05	15-OCT-21
Bromomethane			<0.050		ug/g		0.05	15-OCT-21
Carbon tetrachloride			<0.050		ug/g		0.05	15-OCT-21
Chlorobenzene			<0.050		ug/g		0.05	15-OCT-21
Chloroform			<0.050		ug/g		0.05	15-OCT-21
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	15-OCT-21
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	15-OCT-21
Dibromochloromethane			<0.050		ug/g		0.05	15-OCT-21
Dichlorodifluoromethane			<0.050		ug/g		0.05	15-OCT-21
Ethylbenzene			<0.018		ug/g		0.018	15-OCT-21
n-Hexane			<0.050		ug/g		0.05	15-OCT-21
Methylene Chloride			<0.050		ug/g		0.05	15-OCT-21
MTBE			<0.050		ug/g		0.05	15-OCT-21

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 R5619859								
WG3636810-1 MB								
m+p-Xylenes			<0.030		ug/g		0.03	15-OCT-21
Methyl Ethyl Ketone			<0.50		ug/g		0.5	15-OCT-21
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	15-OCT-21
o-Xylene			<0.020		ug/g		0.02	15-OCT-21
Styrene			<0.050		ug/g		0.05	15-OCT-21
Tetrachloroethylene			<0.050		ug/g		0.05	15-OCT-21
Toluene			<0.080		ug/g		0.08	15-OCT-21
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	15-OCT-21
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	15-OCT-21
Trichloroethylene			<0.010		ug/g		0.01	15-OCT-21
Trichlorofluoromethane			<0.050		ug/g		0.05	15-OCT-21
Vinyl chloride			<0.020		ug/g		0.02	15-OCT-21
Surrogate: 1,4-Difluorobenzene			106.8		%		50-140	15-OCT-21
Surrogate: 4-Bromofluorobenzene			95.6		%		50-140	15-OCT-21
WG3636810-5 MS		**WG3636810-3**						
1,1,1,2-Tetrachloroethane			101.9		%		50-140	15-OCT-21
1,1,2,2-Tetrachloroethane			98.9		%		50-140	15-OCT-21
1,1,1-Trichloroethane			104.1		%		50-140	15-OCT-21
1,1,2-Trichloroethane			98.8		%		50-140	15-OCT-21
1,1-Dichloroethane			100.9		%		50-140	15-OCT-21
1,1-Dichloroethylene			104.1		%		50-140	15-OCT-21
1,2-Dibromoethane			96.5		%		50-140	15-OCT-21
1,2-Dichlorobenzene			102.7		%		50-140	15-OCT-21
1,2-Dichloroethane			100.7		%		50-140	15-OCT-21
1,2-Dichloropropane			102.3		%		50-140	15-OCT-21
1,3-Dichlorobenzene			101.7		%		50-140	15-OCT-21
1,4-Dichlorobenzene			103.2		%		50-140	15-OCT-21
Acetone			99.4		%		50-140	15-OCT-21
Benzene			104.3		%		50-140	15-OCT-21
Bromodichloromethane			105.9		%		50-140	15-OCT-21
Bromoform			94.6		%		50-140	15-OCT-21
Bromomethane			110.0		%		50-140	15-OCT-21
Carbon tetrachloride			105.1		%		50-140	15-OCT-21
Chlorobenzene			106.1		%		50-140	15-OCT-21

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 R5619859								
WG3636810-5 MS		**WG3636810-3**						
Chloroform			106.2		%		50-140	15-OCT-21
cis-1,2-Dichloroethylene			109.0		%		50-140	15-OCT-21
cis-1,3-Dichloropropene			94.8		%		50-140	15-OCT-21
Dibromochloromethane			97.3		%		50-140	15-OCT-21
Dichlorodifluoromethane			112.0		%		50-140	15-OCT-21
Ethylbenzene			95.5		%		50-140	15-OCT-21
n-Hexane			104.2		%		50-140	15-OCT-21
Methylene Chloride			103.7		%		50-140	15-OCT-21
MTBE			103.8		%		50-140	15-OCT-21
m+p-Xylenes			100.1		%		50-140	15-OCT-21
Methyl Ethyl Ketone			104.2		%		50-140	15-OCT-21
Methyl Isobutyl Ketone			93.8		%		50-140	15-OCT-21
o-Xylene			100.5		%		50-140	15-OCT-21
Styrene			103.6		%		50-140	15-OCT-21
Tetrachloroethylene			105.0		%		50-140	15-OCT-21
Toluene			102.9		%		50-140	15-OCT-21
trans-1,2-Dichloroethylene			101.2		%		50-140	15-OCT-21
trans-1,3-Dichloropropene			87.4		%		50-140	15-OCT-21
Trichloroethylene			108.4		%		50-140	15-OCT-21
Trichlorofluoromethane			107.7		%		50-140	15-OCT-21
Vinyl chloride			98.6		%		50-140	15-OCT-21

Quality Control Report

Workorder: L2649945 Report Date: 21-OCT-21

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.

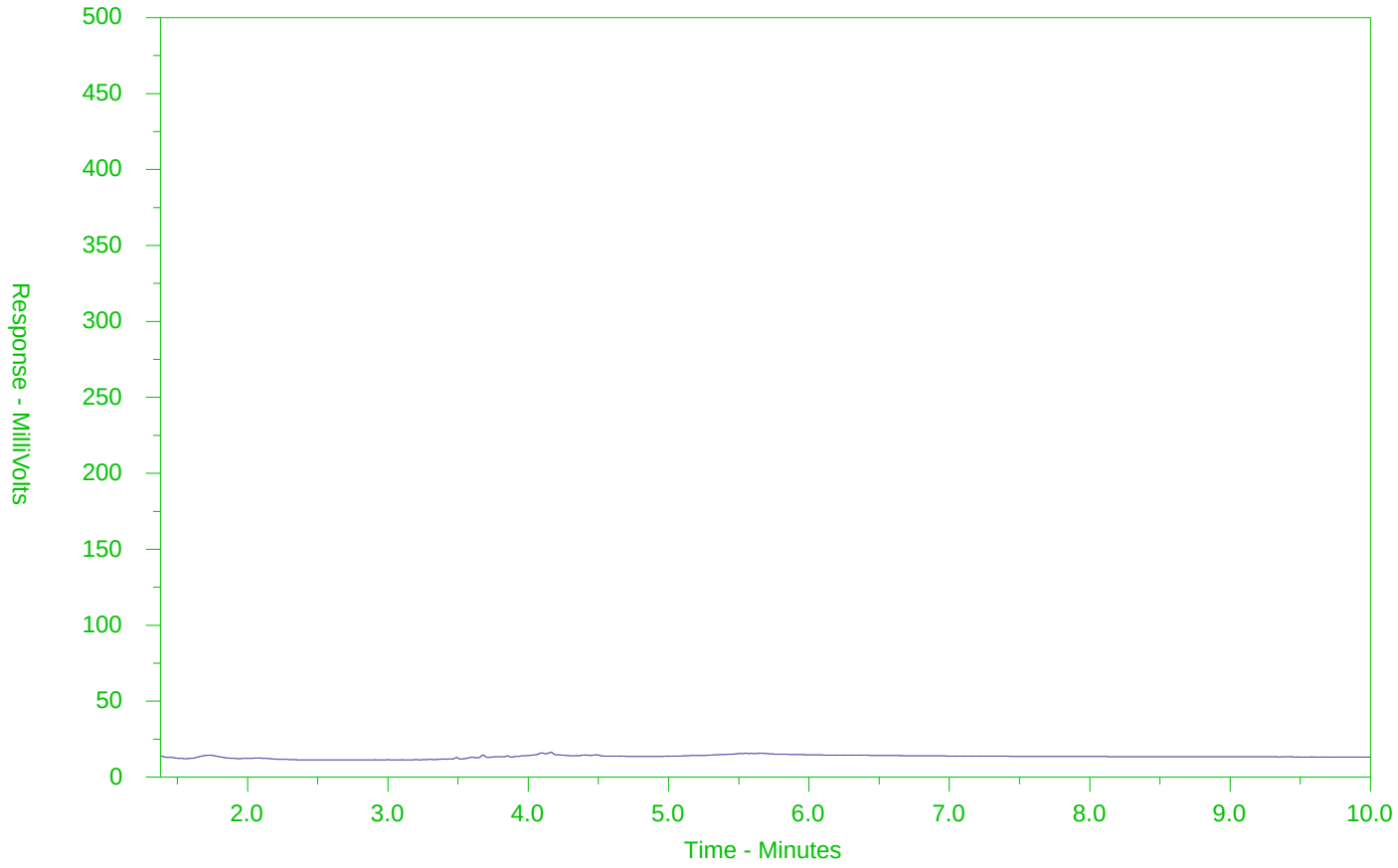
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where 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: L2649945-1
Client Sample ID: HS1



←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.

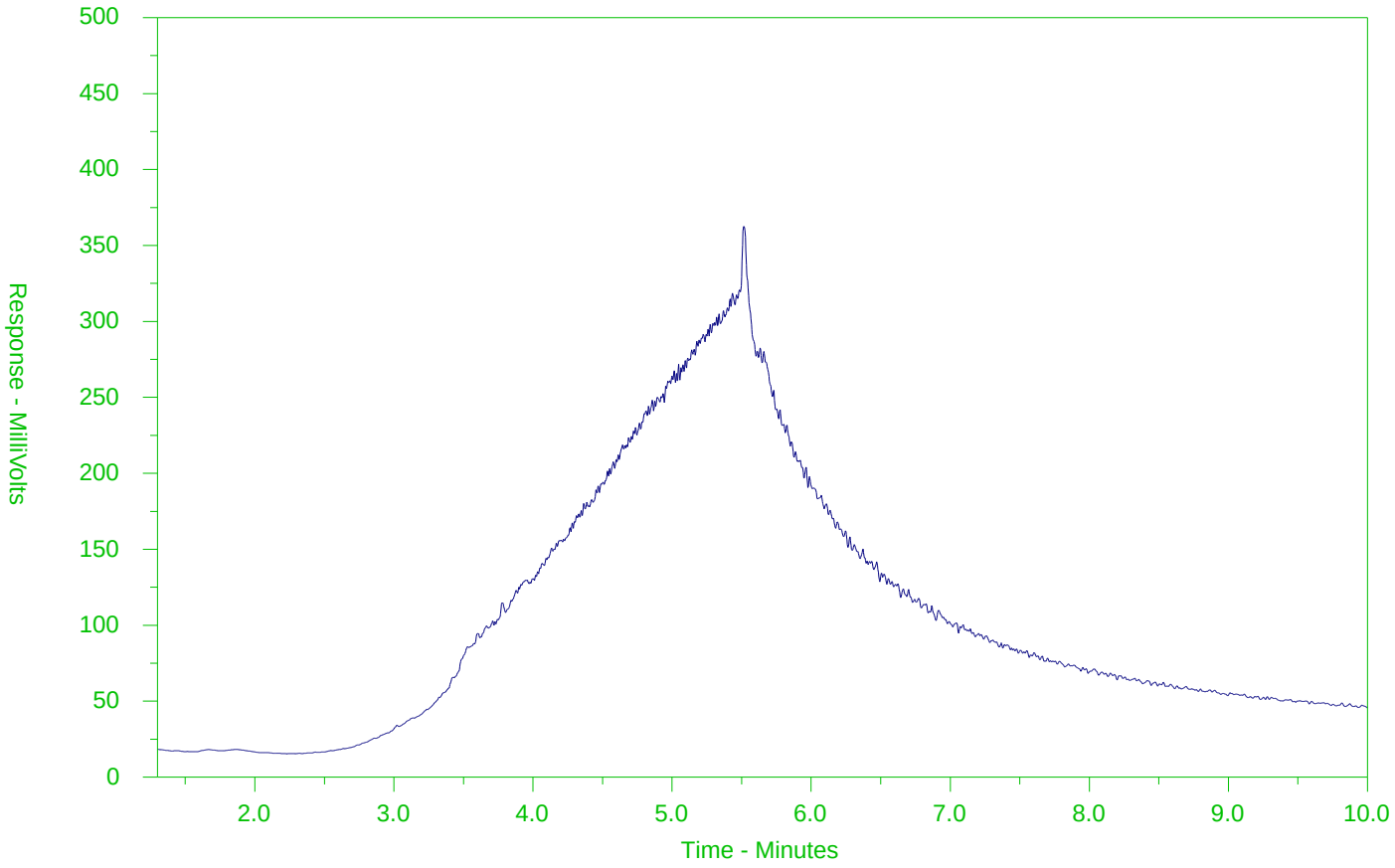
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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: L2649945-2
Client Sample ID: HS2



←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 (

Canada

L2649945-COFC

COC Number: 20 -

Page of

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	HLV2K Engineering Limited
Contact:	Mariam Mohammadi
Phone:	6479753676
	Company address below will appear on the final report
Street:	4-2179 Dunwin Drive
City/Province:	Mississauga, ON
Postal Code:	L5L 1X2
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	HLV2K Engineering Limited
Contact:	Manny Virani

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: mariam.mohammadi@HLV2K.com

Email 2: john.lametti@HLV2K.com

Email 3:

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: Invoice@HLV2K.com

Email 2:

Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	84316
Job #:	2100428DE
PO / AFE:	
LSD:	5196 Trafalgar Road N, Erin, ON

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only): LQ649945

ALS Contact: AO

Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	O. Reg. 153/04 - Metals & Inorganics	O.Reg. 153/04 - VOC / F1	O.Reg. 153/04 - PHC F2-F4	O.Reg. 153/04 - PAH	O.Reg. 153/04 - PCB	O.Reg. 153/04 - Moisture	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	HS1	8-Oct-21	09:00	Soil		R	R	R	R	R	R			
	HS2	8-Oct-21	09:00	Soil		R	R	R	R	R	R			

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

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Ontario Regulation 153/04 - April 15, 2011 Standards - T1 - Soil - RPI/ICC Property Use

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☒ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
6.2				11.4			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
Karan	10/8/2021	9:58

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	OCT 8/21	18:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 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**.

Appendix E:
HLV2K Phase Two Standard of Operation (SOP)

PHASE TWO STANDARD OPERATING PROCEDURES FOLLOWING O.REG. 153/04 PROTOCOLS

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 an 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, coordination 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 fieldwork.

During borehole installations, the site supervisor needs to always have a portable 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 if 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. Ensure 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 drillings 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 centimetre.

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 tire 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.

During 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 its 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 nominating 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 fieldwork 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 of 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 fieldwork.

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 unique sample identification. Typically, samples obtained from boreholes have a 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 numbers 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 handheld 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 of organic parameters in soil.

5.2 Scope

These procedures do not contain specific details on calibration methods, troubleshooting 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 manufacturer'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 fieldwork.

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 have 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 pipes 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 fieldwork, 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 fieldwork.

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 prohibits 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 fieldwork (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 is 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 fieldwork.

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. The 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 concurrently 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 bentonite 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 fieldwork 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.