



Terraprobe

*Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing*

**PHASE TWO
ENVIRONMENTAL SITE ASSESSMENT
571 WELHAM ROAD
BARRIE, ONTARIO**

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1.0 EXECUTIVE SUMMARY

Terraprobe Inc. (Terraprobe) was retained by Environmental 360 Solutions Ltd. to complete a Phase One Environmental Assessment (ESA) of the property (hereinafter referred to as ‘the Property’) situated at the northeast corner of the intersection of Welham Road and Maplevue Drive E. The Property has a municipal address of 571 Welham Road, Barrie, Ontario.

The Property is approximately rectangular in shape and covers an area of approximately 3.51 ha (8.8 acres). The Property consists of parcel of land that is occupied by a single storey industrial building of brick construction, with associated asphalt surfaced parking areas. The south and east portion of the Property is covered with soil, grass, and trees. A tributary of Lovers Creek traverses the southwest corner of the Property. The surrounding area is predominantly residential, commercial and industrial in land use. The Property is currently industrial in land use per Ontario Regulation 153/04(O.Reg.153/04).

Based on the preliminary Site Plan, the Property is proposed to be further developed with a new slab-on-grade one-story structure south of the existing building. The proposed structure is approximate 4,930 m² in size and will include a detached truck unloading area. The Phase Two Environmental Site Assessment (ESA) was completed in accordance with Ontario Regulation 153/04. Since the proposed development of the Property is also for industrial land use, the filing of a Record of Site Condition (RSC) will not be a mandatory requirement the Ministry of the Environment, Conservation and Parks (MECP).

Terraprobe completed a Phase One ESA in February 2020. The Phase One ESA recommended that a Phase Two Environmental Site Assessment must be completed to investigate the Areas of Potential Environmental Concern (APECs) for the Contaminants of Concern that have been identified on the Property. The Phase Two ESA was completed in compliance of amended O.Reg.153/04

The scope and results of the Phase Two ESA are summarized below:

- The work program for the subsurface investigation consisted of advancing fifteen (15) boreholes to depths ranging between 2.0 to 14.2 m below ground level, during February 24, 2020 to March 3, 2020. Eight (8) of these boreholes were instrumented with monitoring wells. The subsurface investigation was conducted in conjunction with geotechnical and hydrogeological investigations.
- The stratigraphy of the Property is generally summarized as a layer of surficial material; a pavement structure comprising of 100 to 300 mm thick asphaltic concrete and aggregate layer at borehole locations BH3, BH10, BH14, and BH15; and a layer of topsoil 50 to 100 mm thick at BH1, BH2, BH4, BH5, BH6, BH8, BH9, BH11, BH12, and BH13. Underlying the surficial material, the boreholes were advanced through a layer of earth fill that extends to depths of 0.8 and 3.0 metres below existing grade. The earth fill material generally consisted of sand with varying amounts of gravel, silt and clay, with trace amounts of organics, brown to dark brown, and moist. Underlying the earth fill, a layer of native soil was encountered. The native soil extended beyond the depths of investigation. The native soil consisted of sand, sand and silt to silt and sand with trace amounts of clay and gravel. The native soil was compact to very dense, brown in colour and damp to moist

- The applicable Site Condition Standards for the Property were considered to be those contained in Table 8 of the April 15, 2011 Ontario Ministry of Environment, Conservation and Parks (MECP) *“Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”* for Residential/Parkland/Institutional/Industrial/Commercial/Community property use within 30 m of a water body in a potable ground water condition (MECP Table 8 RPI/ICC Standards).
- Soil and ground water samples were tested for the Potential Contaminants of Concern (PCoCs) that were identified in the Phase One ESA. The chemical analyses included: Metals, Hydride-forming Metals, Selected Other Regulated Parameters (ORPs), Petroleum Hydrocarbons (PHC F1-F4) plus BTEX (Benzene, Toluene, Ethylbenzene, and Xylene), Volatile Organic Compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (PAHs).
- No exceedances of the applicable Site Condition Standards were found in any of the soil or ground water samples tested. All parameters analysed met the MECP Table 8 RPI/ICC Standards.

The results of the Phase Two ESA indicate that there were no exceedances of the MECP Table 8 RPI/ICC Standards in the soil and ground water on the Property.

2.0 INTRODUCTION

Terraprobe Inc. (Terraprobe) was retained by Environmental 360 Solutions Ltd. to complete a Phase Two Environmental Assessment (Phase Two ESA) of the property (hereinafter referred to as ‘the Property’) situated at the northeast quadrant of the intersection of Welham Road and Maplevue Drive E, in Barrie, Ontario. The municipal address of the Property is 571 Welham Road, Barrie, Ontario. The Phase Two ESA is required due to the conclusions of the Phase One ESA, which indicated Areas of Potential Environmental Concerns (APECs) were present on the Property. The Phase Two ESA was completed in compliance with Ontario Regulation 153/04 (O.Reg.153/04).

2.1 Site Description

The Property is roughly rectangular and covers an area of approximately 3.51 ha (8.8 acres). The Property is currently developed with a one-storey brick building, covering an area of approximately 1,376 m²; occupied by Regal Monuments and ICORIX Water Products, and is industrial in land use per O.Reg. 153/04. The remaining portion of the Property is covered with associated asphalt driveway, parking and landscaped areas. The surrounding area is predominantly residential, commercial and industrial in land use per O.Reg. 153/04. It is understood that the Property is proposed to be further developed with a one-storey, slab-on-grade structure south of the existing building, with an approximate foot print of 4,930 m². It is also understood that the proposed development is for industrial land use. The general location of the Property is presented on Figure 1.

2.2 Property Ownership

The ownership information for the Phase Two Property is as follows:

Legal Description	Part Lots 9 & 10 Con 12 Innisfil
PIN	58736-0254(LT)
Municipal Address	571 Welham Road, Barrie
Zoning	General Industrial
Property Owner Information	Fred PICALET, in Trust
Persons, other than Property Owner, who engaged the Qualified Person to conduct the Phase Two ESA	Joseph Campitelli

2.3 Current and Proposed Future Uses

2.3.1 Current Land Use

The Property is currently developed with a one-storey brick building, covering an area of approximately 1,376 m²; occupied by Regal Monuments and ICORIX Water Products, and is industrial in land use per O.Reg. 153/04. The location and extent of the Phase Two Property is identified on Figures 1.

2.3.2 Future Land Use

It is understood that the Property is proposed to be further developed for industrial land use, and includes the development of a one-storey, slab-on-grade structure south of the existing building, with an approximate foot print of 4,930 m². The future Land Use of the Property will remain to be industrial land use under O.Reg.153/04.

2.4 Applicable Site Condition Standard

The applicable soil and ground water Standards for the Property were determined to be those in Table 8 of the April 15, 2011 Ontario Ministry of Environment, Conservation and Parks (MECP) "*Soil, Ground Water and Sediment Standards for use under part XV.1 of the Environmental Protection Act*" for Residential/Parkland/Institutional/Industrial/Commercial/Community Land Use within 30 m of a Water Body in a Potable Ground Water Condition (Table 8 RPI/ICC Standards).

These are considered to be the applicable Standards for the following reasons:

- The site will be industrial in use.
- Soil at the Property was determined to be coarse textured soil standard.
- Bedrock across the Property is located at a depth of greater than 2 m.
- The Property is located in Durham Region, which obtains its potable water from surface water sources (such as Lake Ontario and Lake Simcoe), and ground water sources (such as wells). Also, domestic wells were identified in the MECP well records within the 250 m radius of the Property.
- A tributary of Lovers Creek is located adjacent of the Property to the south-southwest
- The soil pH on the Property was determined to be between 5 and 9
- The Property is not within an area of natural significance, and does not include land within 30 m of an area of natural significance.

2.5 Objectives of Investigation

The general objectives of the investigation include the following:

- To determine if Contaminants of Potential Concern identified in a Phase One ESA for the Property are found through the course of conducting the Phase Two ESA, in soil, sediment, and/or ground water, as applicable.
- To determine if the concentrations of the potential Contaminants of Concern identified in the investigation met the generic Site Condition Standard.

To ensure that the general objectives of the investigation were met, the Qualified Person ensured the following:

- That the investigation provided sufficient information to provide an understanding of the geological and hydrogeological conditions at the Phase Two Property; and
- That one or more rounds of field sampling are conducted for all Potential Contaminants of Concern (PCoCs) identified for each Area of Potential Environmental Concern (APEC), as identified in the Sampling and Analysis Plan (Appendix A) of the Phase Two ESA and found through the course of conducting the Phase Two ESA, in soil, sediment, and ground water, as applicable.

3.0 BACKGROUND INFORMATION

3.1 Physical Setting

3.1.1 Water Bodies, Wetlands and Areas of Natural Significance

Mapping from the Ontario Ministry of Natural Resources and Forestry (MNRF) was reviewed to determine if water bodies were present on the Property and within 250 m of the Property. The MNRF National Heritage Information Centre database for listings of Areas of Natural or Scientific Interest (ANSIs) was reviewed. The information is summarized below.

Water Bodies (Study Area)	A tributary of Lovers Creek is located adjacent of the Property to the south-southwest. The Lovers Creek is located approximately 800 m southeast of the Property.
Wetland (Property)	<u>Provincially Significant</u> - No Provincially Significant wetlands were present on the Property <u>Non- Provincially Significant</u> - No Non- Provincially Significant wetlands were present on the Property <u>Unevaluated</u> - No Unevaluated wetlands were present on the Property
Wetland (Study Area)	<u>Provincially Significant</u> - Provincially Significant wetlands were present in the Study Area. The Provincially Significant Wetlands were located north-east, east, and south-east of the Property, at least 70 m from the Property. <u>Non- Provincially Significant</u> - No Non- Provincially Significant wetlands were present in the Study Area <u>Unevaluated</u> - No unevaluated wetlands were present in the Study Area
ANSIs (Property)	<u>Provincially Significant Life Science ANSI</u> - No Life Science ANSIs were identified on the Property <u>Provincially Significant Earth Science ANSI</u> - No Earth Science ANSIs were identified on the Property
ANSIs (Study Area)	<u>Provincially Significant Life Science ANSI</u> - No Life Science ANSIs were identified in the Study Area <u>Provincially Significant Earth Science ANSI</u> - No Earth Science ANSIs were identified on the Property

3.1.2 Topography and Surface Water Drainage

A topographic map from the Atlas of Canada (Toporama) and the geological mapping produced by the Ontario Ministry of Northern Development and Mines - *Ontario Geological Survey* was reviewed. The information gleaned from the mapping is summarized below. It should be noted that the subsurface soil, rock and ground water conditions described above represent generalized conditions only, and should not be considered site specific.

Topography	The approximate elevation of the Property is between 274 and 262.5 masl and slopes to the south-southwest towards tributary of Lovers Creek.
Hydrogeology	The nearest water body is a tributary of Lovers Creek which is located adjacent of the Property to the south-southwest. The Lovers Creek is located approximately 800 m southeast of the Property. Ground water and surface water is expected to flow to the southeast towards Lovers Creek.

Geology (overburden)	The overburden on the Property is comprised of the following: • Coarse-textured glaciolacustrine deposits consisted of sand, gravel, minor silt and clay foreshore and basinal deposits (9c). • Ice-contact stratified deposits consisted of sand and gravel, minor silt, clay and till (6). • Till deposits consisted of stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain (5b).
Geology (bedrock)	The bedrock on the Property is of the Lindsay Formation, which is comprised of limestone, dolostone, shale, arkose and sandstone (54a).
Geology (depth to bedrock)	Based on the published information, bedrock in the vicinity is located approximately 252 m below ground surface.

3.2 Past Investigations

A Phase One was completed for the Property in February 2020 by Terraprobe Inc., the findings of which are summarized below:

Report Title	Phase One Environmental Site Assessment 571 Welham Road Barrie, Ontario
Report Date	February 03, 2020
Report Number	1-19-0792-41
Prepared By	Terraprobe Inc. (Report Authors- Muhammad I. Shahid, P.Geo., QP _{ESA} , and Nazifa Makrod, GIT)
Prepared For	Environmental 360 Solutions Ltd. 1815 Ironstone Manor Unit # 8 Pickering, Ontario L1W 3W9

- A Phase One ESA was completed as per the requirement of O.Reg.153/04. The Phase One Environmental Site Assessment (ESA) identified the following Areas of Potential Environmental Concern (APEC) on the Phase One Property:

APEC	Location APEC on the Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted
APEC 1	North portion of the Phase One Property	PCA #59 - Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products	On-site	Metal and Inorganics, VOCs, PAHs	Soil & Ground water
APEC 2	North portion of the Phase One Property	PCA #34 - Metal Fabrication	On-site	Metals, VOCs	Soil & Ground water
APEC 3	North portion of the Phase One Property	PCA #33 - Metal Treatment, Coating, Plating and Finishing	Off-site	VOCs	Ground water
APEC 4	North portion of the Phase One Property	PCA #34 - Metal Fabrication	Off-site	VOCs	Ground water
APEC 5	North portion of the Phase One Property	Other 2 - Waste Generator	Off-site	PHCs, BTEX	Ground water
APEC 6	Northwest portion of the Phase One Property	PCA #34 - Metal Fabrication	Off-site	VOCs	Ground water

APEC	Location APEC on the Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted
APEC 7	Northwest portion of the Phase One Property	PCA #58 - Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of bio-soils as soil conditioners	Off-site	PHCs, BTEX, Metals & Inorganics, VOCs	Ground water

It was determined that the absence of any information, specifically any outstanding responses from the regulatory agencies will not significantly affect the validity of the conceptual site model. A Phase Two Environmental Site Assessment was recommended to investigate issues of potential environmental concern that have been identified on the Phase One Property, which may have resulted in adverse impact to the environmental condition of the Phase One Property.

4.0 SCOPE OF THE INVESTIGATION

4.1 Overview of Site Investigation

The sampling program of Phase Two investigation was developed with regards to the potentially contaminating activities in the area as identified in Phase One Conceptual Site Model and the results of the previous subsurface investigations completed for surrounding properties. The Phase Two subsurface investigation was carried out in conjunction with geotechnical and hydrogeological assessments of the Property.

The sampling program involved investigation of soil and ground water quality across the Phase Two Property. The sampling program was designed to address the APECs and Potential Contaminants of Concern (PCoCs) identified in the Phase One Property. The Sampling and Analysis Plan is presented in Appendix A.

Terraprobe conducted the following work at the Property as part of the Phase Two investigation:

Summary of Scope of Work

Date	Scope of Investigation	Scope of Soil Analysis*	Scope of Ground Water Analysis*
February and March 2020	• 15 boreholes drilled • 8 monitoring wells installed • 1 set of water levels from all 8 monitoring wells • Survey of all boreholes and monitoring wells to a geodetic benchmark. • Measurement of ground water levels to determine ground water elevation • Development and sampling of 7 monitoring wells on one occasions	• 6 Metals, hydride-forming metals and ORPs analyses + 1 duplicate of each parameter • 2 pH analyses + 1 duplicate • 6 PHC and BTEX analyses + 1 duplicate of each parameter • 9 VOC analyses + 1 duplicate of each parameter • 3 PAH analyses + 1 duplicate	• Ground water was only encountered in 1 out of 8 monitoring wells that were installed on the Property • 1 PHC and BTEX analysis • 1 VOC analysis + 1 trip blank

*Note: PHC – petroleum hydrocarbons
BTEX – benzene, toluene, ethylbenzene and xylene
VOC – volatile organic compound
PAH – polycyclic aromatic hydrocarbons

4.2 Media Investigated

Based upon the potentially contaminating activities identified in the Phase One ESA, sample locations were selected to investigate the areas of potential environmental concern. The sampling program involved investigation of soil and ground water quality across the Phase Two Property. The sampling program was designed to address the APECs and PCoCs identified in the Phase One Study.

4.2.1 Rational for Inclusion or Exclusion of Media

Media	Included or Excluded	Rational
Soil	Included	Based upon the Phase One ESA, soil sampling was required on the Property of the identified Potential Contaminants of Concern (PCoCs). Sample locations were selected to investigate all the identified Areas of Potential Environmental Concern (APECs).
Sediment	Excluded	Surface water bodies were not present on the Property. As such, sediment sampling was not conducted during the investigation.
Ground Water	Included	Based upon the Phase One ESA, ground water sampling was required on the Property of the identified PCoCs). Sample locations were selected to investigate all the identified Areas of Potential Environmental Concern (APECs).
Surface Water	Excluded	Surface water bodies were not present on the Property. As such, surface water sampling was not conducted during the investigation.

4.2.2 Overview of Field Investigation of Media

Soil sampling was conducted during the drilling program by use of the split spoon method. Ground water sampling was conducted from monitoring wells installed within the completed boreholes.

4.3 Phase One Conceptual Site Model

The Phase One Conceptual Site Model was developed as part of the Phase One ESA for the Property through a review of historical records and a reconnaissance of the area. The Phase One Conceptual Site Model from the Phase One ESA is provided in Appendix C.

4.4 Deviations from Sampling and Analysis Plan

The sampling and analysis plan is provided in Appendix A. There were no deviations from the sampling and analysis plan with the exception that ground water sample was conducted from only one monitoring well (BH6). All other monitoring wells were noted to be dry during sampling.

4.5 Impediments

No Impediments were encountered during the investigation.

5.0 INVESTIGATION METHOD

5.1 General

Public and private utility clearances were undertaken prior to commencing the subsurface investigation. The Phase Two ESA generally followed the methods outlined in the following documents:

- Ontario Ministry of the Environment, Conservation and Parks “*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*” (December 1996)
- Ontario Ministry of Environment, Conservation and Parks “*Guide for Completing Phase Two Environmental Site Assessment under Ontario regulation 153/04*” (June 2011).
- Ontario Ministry of the Environment, Conservation and Parks “*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*” (July 2011).

The methods used in the Phase Two ESA investigation did not differ from the associated standard operating procedures. The Standard Field Investigation Protocol is presented in Appendix C.

5.2 Utility Clearances

Various utility agencies were contracted to identify buried services on public land in the vicinity of the subject property. A private locator was retained to survey the proposed borehole locations for buried services. No conflicts between the proposed borehole locations and underground utilities were encountered.

5.3 Drilling

Fifteen (15) boreholes were advanced on the Property to depths ranging from 2.0 m to 14.2 m below ground surface between February 24, 2020 and March 3, 2020. The borehole locations are shown on Figure 3.

Soil drilling was performed with a track-mounted drill rig with solid and hollow stem augers. In-situ Standard Penetration Testing (SPT) was conducted by driving a standard 2" diameter split spoon through a process of continuous sampling in areas of particular environmental concern. The sampling device was washed between each sample to minimize the potential for cross contamination.

The drilling was monitored by a Terraprobe field technician, who examined samples for visual and olfactory evidence of impact or inclusion of deleterious materials. The results of the individual boreholes are recorded on the Borehole Logs in Appendix D.

The drilling information for the Phase Two ESA is provided below:

Date of Drilling	February 24, 2020 – March 3, 2020
Borehole	BH1 – BH15
Name of Contractor	Walker Drilling Ltd.
Equipment Used	• Track-mount Drilling Rig • solid stem augers • 2 inch split spoon soil sampling device
Decontamination Measures	The split spoon sampling device was washed between each sample to minimize potential cross-contamination
Sample Frequency	Please refer to the borehole logs in Appendix D for recovered soil samples

5.4 Soil Sampling

Soil samples submitted for analytical testing, were collected from the undisturbed split spoon sample during the investigation. The samples collected for BTEX, VOCs and the F1 fraction of petroleum hydrocarbons analysis were collected directly from the split spoon. Representative soil samples were collected from borehole locations and immediately jarred for laboratory submission. Terraprobe personnel carried out all sampling of the materials. A clean pair of disposable nitrile gloves was worn for each sample to prevent any potential for cross-contamination associated with this sampling method.

5.4.1 Equipment Used

- Laboratory supplied sampling containers
- Nitrile gloves
- Cooler with loose ice
- Mini Rae Photo-Ionization Detector (PID)

5.4.2 Geological Description of Soil

Please refer to the borehole logs in Appendix D for the geological description soil stratigraphy.

5.5 Field Screening Measurements

Soil samples were screened in the field using portable hydrocarbon vapour testing equipment and following the procedure outlined in the “*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*” published by the Ontario Ministry of the Environment, Conservation and Parks.

Samples were screened using a Mini Rae Photo-Ionization Detector. The monitor has a range of 0 parts per million (ppm) to 10,000 ppm and an accuracy of +/- 5%. The monitor was calibrated with isobutylene gas prior to field screening as per the calibration procedure outlined by RAE Systems in “*Mini Rae 2000 Portable VOC Monitor Operation and Maintenance Manual, Rev. E*” released May, 2005.

Field screening measurements were used to help select samples for petroleum hydrocarbon and volatile organic compounds laboratory analysis. Complete field screening readings are provided on the borehole logs in Appendix D.

5.6 Ground Water Monitoring Well Installation

The monitoring well installation information for the Phase Two ESA is provided below:

Monitoring Wells	BH2, BH3, BH4, BH6, BH7, BH13, BH14, and BH15
Date of Drilling/ Installation	February 24, 2020 – March 3, 2020
Name of Contractor	Walker Drilling Ltd.
Equipment Used	Track-mount drilling rig, solid and hollow stem augers, split spoon sampling device
Decontamination Measures	The split spoon sampling device was washed between each sample to minimize the potential for cross-contamination.
Sample Frequency	No ground water samples collected during this drilling event.
Well Construction	The wells were constructed of 50-mm (2-in) ID PVC screens and risers. Filter sand was placed around the well screen to approximately 0.6 m above the top of the screen. The wells were then backfilled with bentonite to approximately 0.3 m below ground surface. The wells were finished with protective casings.
Well Elevations	Monitoring well elevations and depths are presented in Section 6.2.

Monitoring wells were installed in eight (8) boreholes by the drilling sub-contractor between February 24, 2020 and March 3, 2020, under the supervision of an experienced Terraprobe field technician. The wells were constructed of 50-mm (2-in) ID PVC screens and risers. Filter sand was placed around the well screen to approximately 0.6 m above the top of the screen. The wells were then backfilled with bentonite to approximately 0.3 m below ground surface. The wells were finished with flush mount caps / stick-up monument casing.

As per Ontario Regulation 903 the monitoring wells were tagged with cluster water well record. The monitoring well installation was conducted under the full-time monitoring of a Terraprobe field technician as directed by a Qualified Person.

The monitoring well locations are provided on Figure 3. The monitoring well installation details are provided on the borehole logs and Appendix D and Table 2.

5.7 Field Measurement of Water Quality Parameters Ground Water: Sampling

Field measurement of water quality parameters were measured using a Hanna Instruments portable pH/EC/TDS/Temperature meter (model HI 991301).

Range

- pH 0.00 to 14.00 pH
- EC 0.00 to 20.00 mS/cm
- TDS 0.00 to 10.00 ppt (g/L)
- Temperature 0.0 to 60.0°C

Resolution

- pH 0.01 pH
- EC 0.01 mS/cm
- TDS 0.01 ppt
- Temperature 0.1°C

Accuracy

- pH ± 0.01 pH
- EC $\pm 2\%$ F.S.
- TDS $\pm 2\%$ F.S.
- Temperature $\pm 0.5^\circ\text{C}$

5.8 Ground Water Sampling

The monitoring wells were purged and sampled using inertia pump and tubing. Stabilization of parameters (pH, D.O., conductivity, temperature, etc.) and turbidity of the purged water are monitored before a sample is taken, thus sampling methods facilitate equilibrium with the surrounding formation water and produces samples that are representative of the formation water.

Stabilization was considered to occur when consecutive readings were within the following:

- Conductivity $\pm 3\%$
- Temperature $\pm 3\%$
- pH ± 0.1 unit

5.9 Sediment Sampling

No sediment sampling was conducted as part of this investigation.

5.10 Analytical Testing

Analytical testing of all soil and ground water samples was conducted by AGAT Laboratories.

5.11 Residue Management Procedures

5.11.1 Soil Cuttings

Soil cuttings generated during the drilling activities were left on the Property near the vicinity of the borehole.

5.11.2 Ground Water

The development and purge water generated during the ground water sampling events was spread on the surface of the Property.

5.11.3 Fluids from Equipment Cleaning

The fluids from cleaning were removed from the Property and disposed of by the driller.

5.12 Elevation Surveying

The elevations of the boreholes on the Property were surveyed by Terraprobe using a Trimble R10 survey system. The Trimble R10 is a differential global positioning system (GPS) which involves the cooperation of two receivers, one that's stationary and another that's roving around making position measurements. The Trimble R10 system has a precision of 0.5 m with respect to the GNSS and a precision of 5 mm with respect to elevation surveying. The elevation of each borehole on the Property is presented on the borehole logs in Appendix D and summarized below.

Borehole Elevations

Borehole	BH1	BH2	BH3	BH4	BH5
Elevation (masl)	273.0	273.0	273.1	273.0	273.3
Borehole	BH6	BH7	BH8	BH9	BH10
Elevation (masl)	273.3	273.4	272.8	272.6	272.4
Borehole	BH11	BH12	BH13	BH14	BH15
Elevation (masl)	272.5	273.1	272.9	273.9	273.2

5.13 Quality Assurance and Quality Control Measures

5.13.1 Containers, Labelling, Handling and Chain of Custody

Containers

Laboratory-supplied sample containers, containing the appropriate preservatives as required by the given analyses, were used for all sampling conducted on the Property. All sample containers were labelled according to identify the sample location. Documentation related to sample location, and time of sampling was recorded for each sample.

The following laboratory supplied sample containers were used for all sampling conducted on the Property.

Soil Parameters	Container
Chloride, electrical conductivity	250 mL glass jar, Teflon lined lid
Cyanide (CN ⁻)	250 mL glass jar, Teflon lined lid
Fraction organic carbon (FOC)	250 mL glass jar, Teflon lined lid
Hexavalent chromium	250 mL glass jar, Teflon lined lid
Metals (includes hydride-forming metals, SAR, HWS boron, calcium, magnesium, sodium)	250 mL glass jar, Teflon lined lid
Mercury, methyl mercury	250 mL glass jar, Teflon lined lid
pH	250 mL glass jar, Teflon lined lid
BTEX, PHCs (F1), THMs, VOCs	40–60 mL glass vial (charged with methanol preservative, pre- weighed) and glass jar (for moisture content)
PHCs (F2–F4)	120 mL glass jar, Teflon lined lid
ABNs, CPs, OCs, PAHs	120 mL glass jar, Teflon lined lid
Dioxins, Furans, PCBs, Pesticides	120 mL glass jar, Teflon lined lid
Ground Water Parameters	Container
BTEX, PHCs (F1), THMs, VOCs;	40–60 mL glass vials (minimum of 2)
PHCs (F2–F4)	2 x 500 mL amber glass bottle, Teflon lined lid
PAHs	1000 mL amber glass bottle, Teflon lined lid
Metals (includes hydride-forming metals, SAR, HWS boron, calcium, magnesium, sodium, chromium VI)	100 mL plastic bottle

Soil Parameters	Container
Metals (dissolved) – Field Filtered	100 mL plastic bottle
Mercury	100 mL amber glass
Cyanide (CN-)	120 mL plastic bottle

Labelling

All sampling containers were identified with laboratory supplied labels. The labels included the following information:

- Unique Sample ID
- Company Name
- Date and Time
- Project Number

Handling

Samples were placed in coolers with loose ice after collection for transportation to the laboratory. Sample hold times were met for all submitted soil and ground water samples.

Chain of Custody

Laboratory supplied Chain of Custody forms were completed for all samples submitted for analysis. Terraprobe transferred custody of the samples that had been selected for analysis to AGAT Laboratories within an adequate time frame to ensure ‘hold times’ would be within the acceptable criteria.

5.13.2 Equipment Cleaning Procedures

All non-dedicated sampling and monitoring equipment must be cleaned following each use. During soil sampling a dedicated sampling device was used for each sample to prevent cross-contamination. During ground water sampling any part of the interface meter which came into contact with the ground water was cleaned between monitoring wells.

Dedicated equipment (nitrile gloves, terra core samplers, tubing) were changed between each sample to avoid cross contamination.

5.13.3 Field Quality Control Measures

- All non-dedicated sampling and monitoring equipment must be cleaned following each use.

- Where ground water samples are to be analyzed for volatile organic compounds one trip blank sample was submitted for laboratory analysis with each laboratory submission.
- Sufficient field duplicate samples were collected in each medium being sampled, so that at least one (1) field duplicate sample can be submitted for laboratory analysis for every ten (10) samples submitted for laboratory analysis
- Calibration checks on field instruments occurred daily prior to the commencement of sampling.

5.13.4 Deviations in the Quality Assurance and Quality Control Measures

No deviations from the quality assurance and quality control measures plan occurred.

6.0 REVIEW AND EVALUATION

6.1 Geology

Detailed geological information for the Property is presented on the borehole logs in Appendix D. The geology at the Property is summarized below.

6.1.1 Geological Unit Thickness (Estimate)

The geological unit thicknesses are presented in Table 1

6.1.2 Elevations of Geological Units

The geological unit elevations are presented in Table 1.

6.1.3 Material in Geological Units

Topsoil and Surficial Materials

All boreholes with the exception of BH7 encountered a layer of surficial material. An asphaltic concrete and aggregate layer of 100 to 300 mm was encountered at BH3, BH10, BH14, and BH15. A layer of topsoil of 50 to 100 mm was encountered at BH1, BH2, BH4, BH5, BH6, BH8, BH9, BH11, BH12, and BH13.

Earth Fill

A layer of earth fill material was encountered beneath the surficial materials at borehole location BH1, BH4, BH5, BH7, BH8, BH9, BH10, BH11, BH12, BH13, BH14, and BH15 which extended to depths of approximately between 0.8 and 3.0 mbgs. The earth fill material generally consisted of sand with varying amounts of gravel, silt and clay, with trace amounts of organics, brown to dark brown, and moist.

Native Soil

A layer of native soil was encountered below the surficial material, and extended beyond the depths of investigation. The native soil consisted of sand, sand and Silt to silt and Sand with trace amounts of clay and gravel, and was compact to very dense, brown in colour and moist.

Bedrock

Bedrock was not encountered during the Phase Two investigation.

6.1.4 Properties of Aquifers and Aquitards

Earth Fill

The earth fill on the Property is considered to be hydraulically interconnected to the native soil layer. Water within this layer is expected to migrate downwards into the native deposit.

Native Soil

The native soils consist of sand and silt with varying amounts of gravel and clay; as such the native soil layers are considered to be an aquifer. Recharge into the aquifer will primarily be through infiltration of rain fall events and migration from the adjoining properties. Ground water was only encountered in BH6, at an elevation of approximately 264 masl, indicating that the sand native soil is an aquifer.

6.1.5 Rationale for Choice of Aquifers and Aquitards Investigated

The native soils were chosen for investigation. This was chosen of investigation because:

- The likelihood of vertical migration of water from the fill material downward
- Possibility of free ground water present through recharge from larger area and up-gradient tributaries.

6.2 Ground Water Elevations and Flow Direction

6.2.1 Rationale for Monitoring Well Locations and Screen Intervals

Monitoring wells were located across the Property in order to provide full site coverage. A total of eight (8) monitoring wells (BH2, BH3, BH4, BH6, BH7, BH13, BH14, and BH15) were installed by Terraprobe, to identify the general direction of the ground water flow. The locations of the wells were placed with sufficient spatial variation across the Property to estimate the ground water flow direction. The eight (8) well screens were installed at a depth of approximately 6 to 14 m below grade.

6.2.2 Results of Interface Probe Measurements

Interface probe measurements indicated that only water was present in one monitoring well on the Property. No light non-aqueous phase liquids (LNAPL) or dense non-aqueous phase liquids (DNAPL) were detected.

6.2.3 Thickness of Free Flowing Product

No free flowing product was encountered on the Property.

6.2.4 Ground Water Elevations

Groundwater was measured upon completion of the drilling and during the sampling event on March 10, 2020. Detailed information is presented on Table 3.

Based on the March 10, 2020 readings, all monitoring wells were dry except for BH6. As such, it is not possible to interpret the direction of ground water flow from ground water elevations. Based on the site topography, significant drop in elevation in the south portion of the Property along Maplevue Drive, presence of a tributary of Lovers Creek, the ground water is expected to flow to the southeast towards Lovers Creek.

6.2.5 Assessment of Temporal Variability

One ground water level measurement was collected for the Property. Additional rounds of ground water measurements will be required in order to comment on the temporal variability of ground water.

6.2.6 Influence of Buried Utilities

Buried utilities such as water, sanitary and storm sewer are located along Welham road and Maplevue Drive. Ground water is found approximately 9.6 m below ground level. It is unlikely that the buried utilities would influence the ground water flow.

6.3 Ground Water Hydraulic Gradients and Hydraulic Conductivity

6.3.1 Horizontal Hydraulic Gradients

Ground water was only encountered in one well (BH6); as such it is not possible to comment on the horizontal hydraulic Gradient.

6.3.2 Vertical Hydraulic Gradients

The vertical hydraulic gradient could not be reliably determined from the available data.

6.3.3 Hydraulic Conductivity

According to Freeze and Cherry (1979), the typical hydraulic conductivity of the strata investigated at the Property is:

- Earth Fill (Silty Sand) 10^{-3} m/s to 10^{-7} m/s
- Native Soil (Sand) 10^{-2} m/s to 10^{-6} m/s
- Native Soil (Sand and Silt to Silt and Sand) 10^{-5} m/s to 10^{-9} m/s

6.4 Soil: Field Screening

All recovered soil samples were screened in the field using portable hydrocarbon vapour testing equipment and following the procedure outlined in the “*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*” published by the Ontario Ministry of the Environment.

Field screening measurements were used to help select samples for petroleum hydrocarbon and volatile organic compounds laboratory analysis.

There were no visual or olfactory observations that would suggest possible impact to the soil. Field screening for soil vapour did not indicate presence of significant concentration of volatile compounds. The maximum headspace reading recorded during this investigation was 5 ppm at the location of borehole. The complete field screening readings are provided on the borehole logs in Appendix D.

6.5 Soil Quality

6.5.1 Location, Depth of Samples

Soil sampling was conducted between February 24, 2020 and March 3, 2020. Based on the scope of work and field screening, a total of sixteen (16) select soil samples were analysed for the Potential Contaminants of Concern (PCoCs). PCoCs include petroleum hydrocarbons (PHCs) and BTEX (Benzene, Toluene, Ethylbenzene, Xylene), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), metals, hydride forming metals, other regulated parameters (ORPs) including hot water soluble boron, cyanide, mercury, hexavalent chromium, and pH.

The results of the analysis were compared to the applicable MECP site condition standard for the Property (MECP Table 8 RPI/ICC). The laboratory certificates of analysis are provided in Appendix E, and the results of the soil chemical analysis are provided in Tables 4 to 7. A summary of the soil samples and selected analyses is presented below.

Table 6.5.1-1: Soil Samples and Selected Analytical Parameters

No.	Borehole, Sample Number	Depth		Soil Type	Chemical Analysis							
					Metals	ORPs	Hydride- Forming Metals	pH	PAHs	PHCs	BTEX	VOCs
		(mbgs)	(masl)									
BH2												
1	SS2	0.8 – 1.4	272.2 – 271.6	Native	✓	✓	✓					
2	SS7	6.1 – 6.1	266.9 – 266.9	Native						✓	✓	✓
BH3												
3	SS2	0.8 – 1.2	272.3 – 271.9	Native	✓	✓	✓		✓			
4	SS4	2.3 – 2.7	270.8 – 270.4	Native				✓				✓
BH4												
5	SS1	0.0 – 0.6	273.0 – 272.4	FILL	✓	✓	✓					
6	SS7	6.1 – 6.2	266.9 -266.8	Native						✓	✓	✓

No.	Borehole, Sample Number	Depth		Soil Type	Chemical Analysis								
					Metals	ORPs	Hydride- Forming Metals	pH	PAHs	PHCs	BTEX	VOCs	
BH6													
7	SS7 & DUP1	6.1 – 6.4	267.2 – 266.9	Native				✓					
8	SS10 & DUP3	10.7 – 11.1	262.6 – 262.2	Native						✓	✓	✓	
BH7													
9	SS10	10.7 – 10.8	262.7 -262.6	Native						✓	✓	✓	
BH10													
10	SS3 & DUP2	1.5 – 2.1	270.9 – 270.3	FILL	✓	✓	✓						
BH14													
11	SS2	0.8 – 1.4	273.1 – 272.5	Native	✓	✓	✓					✓	
12	SS3	1.5 – 2.1	272.4 – 271.8	Native					✓				
13	SS7	6.1 – 6.2	267.8 – 267.7	Native						✓	✓	✓	
BH15													
14	SS2 & DUP4	0.8 – 1.2	273.2 – 272.7	FILL					✓				
15	SS3	1.5 – 2.0	271.7 – 271.2	Native	✓	✓	✓					✓	
16	SS5	3.0 – 3.5	270.2 – 269.7	Native					✓	✓	✓	✓	

Note: ✓ Meets MECP Table 8 RPI/ICC Standards
SS- Split Spoon sample and BH- Borehole

The chemical results indicated that all analyzed parameters in soil samples met the MECP Table 8 Standards.

6.5.2 PHCs

As illustrated in Figure 2A and 2B, APEC 5 was due to the presence of a waste generator of petroleum distillates, waste oils, and lubricants located 110 m northwest of the Property (555 Welham Road), and APEC 7 was due to the presence of a waste disposal site (transfer of solid non-hazardous wastes) located 35 m west of the Property (572 Welham Road); as such PHCs were identified as contaminants of potential concern in the soil and ground water on the Property.

Soil

A total of six (6) soil samples were collected during the subsurface investigation by Terraprobe to investigate APEC 5 & APEC 7, and to further establish soil quality across the Property. The results are shown in Table 6 and below.

Table 6.5.2-1: Soil Samples collected for PHCs Analysis

Sample Identification		Soil Type	Date Sampled	Soil PHCs
1	BH2/SS7	Native	March 3, 2020	✓
2	BH4/SS7	Native	March 3, 2020	✓
3	BH6/SS10 & DUP3	Native	February 26, 2020	✓
4	BH7/SS10	Native	March 3, 2020	✓
5	BH14/SS7	Native	March 3, 2020	✓
6	BH15/SS5	Native	February 25, 2020	✓

Note: ✓ Meets MECP Table 8 RPI/ICC Standards

SS- Split Spoon sample and BH- Borehole

The results indicated that all soil samples meet the applicable Table 8 RPI/ICC Standards for PHCs. The laboratory certificates of analysis are provided in Appendix E. Based on the results, there are no PHCs impacts within the soil at the Property.

6.5.3 BTEX

As illustrated in Figure 2A and 2B, APEC 5 was due to the presence of a waste generator of petroleum distillates, waste oils, and lubricants located 110 m northwest of the Property (555 Welham Road), and APEC 7 was due to the presence of a waste disposal site (transfer of solid non-hazardous wastes) located 35 m west of the Property (572 Welham Road); as such PHCs were identified as contaminants of potential concern in the soil and ground water on the Property.

Soil

A total of six (6) soil samples were collected during the subsurface investigation by Terraprobe to investigate APEC 5 & APEC 7, and to further establish soil quality across the Property. The results are shown in Table 6 and below.

Table 6.5.3-1: Soil Samples collected for BTEX Analysis

Sample Identification		Soil Type	Date Sampled	Soil BTEX
1	BH2/SS7	Native	March 3, 2020	✓
2	BH4/SS7	Native	March 3, 2020	✓
3	BH6/SS10 & DUP3	Native	February 26, 2020	✓
4	BH7/SS10	Native	March 3, 2020	✓
5	BH14/SS7	Native	March 3, 2020	✓
6	BH15/SS5	Native	February 25, 2020	✓

Note: ✓ Meets MECP Table 8 RPI/ICC Standards

SS- Split Spoon sample and BH- Borehole

The results indicated that all soil samples meet the applicable Table 8 RPI/ICC Standards for BTEX. The laboratory certificates of analysis are provided in Appendix E. Based on the results, there are no BTEX impacts within the soil at the Property.

6.5.4 VOCs

As illustrated in Figure 2A and 2B, APEC 1 and APEC 2 were due to the historical operation of a wood cabinet and counter top manufacturer, and historical operation of a heating and refrigeration equipment manufacturer, on the Property. APEC 3 and APEC 4 were due to historic metal fabrication and treatment operations that took place 55 m northwest of the Property, (561 Welham Road). APEC 6 was due to metal fabrication operations that took place 35 m northwest of the Property (566 Welham Road). APEC 7 was due to the presence of a waste disposal site (transfer of solid non-hazardous wastes) located 35 m west of the Property (572 Welham Road). As such, VOCs were identified as contaminants of potential concern in the soil and ground water on the Property.

Soil

A total of nine (9) soil samples were collected during the subsurface investigation by Terraprobe to investigate APEC 1, APEC 2, APEC 3, APEC 4, APEC 6, APEC 7, and to further establish soil quality across the Property. The results are shown in Table 7 and below.

Table 6.5.4-1: Soil Samples collected for VOCs Analysis

Sample Identification		Soil Type	Date Sampled	Soil VOCs
1	BH2/SS7	Native	March 3, 2020	✓
2	BH3/SS4	Native	February 24, 2020	✓
3	BH4/SS7	Native	March 3, 2020	✓
4	BH6/SS10 & DUP3	Native	February 26, 2020	✓
5	BH7/SS10	Native	March 3, 2020	✓
6	BH14/SS2	Native	March 3, 2020	✓
7	BH14/SS7	Native	March 3, 2020	✓
8	BH15/SS3	Native	February 25, 2020	✓
9	BH15/SS5	Native	February 25, 2020	✓

Note: ✓ Meets MECP Table 8 RPI/ICC Standards
SS- Split Spoon sample and BH- Borehole

The results indicated that all soil samples meet the applicable Table 8 RPI/ICC Standards for VOCs. Based on the results, there are no VOCs impacts within the soil at the Property. The laboratory certificates of analysis are provided in Appendix E.

6.5.5 PAHs

As illustrated in Figure 2A and 2B, APEC 1 was due to the historical operation of a wood cabinet and counter top manufacturer, on the Property. As such PAHs were identified as contaminants of potential concern in the soil and ground water on the Property.

Soil

A total of three (3) soil samples were collected during the subsurface investigation by Terraprobe to investigate APEC 1, and to further establish soil quality across the Property. The results are shown in Table 5 and below.

Table 6.5.5-1: Soil Samples collected for PAHs Analysis

Sample Identification		Soil Type	Date Sampled	Soil PAHs
1	BH3/SS2	Native	February 24, 2020	✓
2	BH14/SS3	Native	March 3, 2020	✓
3	BH15/SS2 & DUP4	FILL	February 25, 2020	✓

Note: ✓ Meets MECP Table 8 RPI/ICC Standards
SS- Split Spoon sample and BH- Borehole

The results indicated that all soil samples meet the applicable Table 8 RPI/ICC Standards for PAHs. Based on the results, there are no PAHs impacts within the soil at the Property. The laboratory certificates of analysis are provided in Appendix E.

6.5.6 Metals

As illustrated in Figure 2A and 2B, APEC 1 and APEC 2 were due to the historical operation of a wood cabinet and counter top manufacturer, and historical operation of a heating and refrigeration equipment manufacturer, on the Property. APEC 7 was due to the presence of a waste disposal site (transfer of solid non-hazardous wastes) located 35 m west of the Property (572 Welham Road). As such Metals were identified as contaminants of potential concern in the soil and ground water on the Property.

Soil

A total of six (6) soil samples were collected during the subsurface investigation by Terraprobe to investigate APEC 1, APEC 2, APEC 7, and to further establish soil quality across the Property. The results are shown in Table 4 and below.

Table 6.5.6-1: Soil Samples collected for Metals Analysis

Sample Identification		Soil Type	Date Sampled	Soil Metals
1	BH2/SS2	Native	March 3, 2020	✓
2	BH3/SS2	Native	February 24, 2020	✓
3	BH4/SS1	FILL	March 3, 2020	✓
4	BH10/SS3 & DUP2	FILL	February 24, 2020	✓
5	BH14/SS2	Native	March 3, 2020	✓
6	BH15/SS3	Native	February 25, 2020	✓

Note: ✓ Meets MECP Table 8 RPI/ICC Standards

SS- Split Spoon sample and BH- Borehole

The results indicated that all soil samples meet the applicable Table 8 RPI/ICC Standards for Metals. Based on the results, there are no metals impacts within the soil at the Property. The laboratory certificates of analysis are provided in Appendix E.

6.5.7 Hydride-Forming Metals

As illustrated in Figure 2A and 2B, APEC 1 and APEC 2 were due to the historical operation of a wood cabinet and counter top manufacturer, and historical operation of a heating and refrigeration equipment manufacturer, on the Property. APEC 7 was due to the presence of a waste disposal site (transfer of solid non-hazardous wastes) located 35 m west of the Property (572 Welham Road). As such Hydride-Forming Metals were identified as contaminants of potential concern in the soil and ground water on the Property.

Soil

A total of six (6) soil samples were collected during the subsurface investigation by Terraprobe to investigate APEC 1, APEC 2, APEC 7, and to further establish soil quality across the Property. The results are shown in Table 4 and below.

Table 6.5.7-1: Soil Samples collected for Hydride- Forming Metals Analysis

Sample Identification		Soil Type	Date Sampled	Soil Hydride-Forming Metals
1	BH2/SS2	Native	March 3, 2020	✓
2	BH3/SS2	Native	February 24, 2020	✓
3	BH4/SS1	FILL	March 3, 2020	✓
4	BH10/SS3 & DUP2	FILL	February 24, 2020	✓
5	BH14/SS2	Native	March 3, 2020	✓
6	BH15/SS3	Native	February 25, 2020	✓

Note: ✓ Meets MECP Table 8 RPI/ICC Standards

SS- Split Spoon sample and BH- Borehole

The results indicated that all soil samples meet the applicable Table 8 RPI/ICC Standards for hydride-forming metals. Based on the results, there are no hydride-forming metals impacts within the soil at the Property. The laboratory certificates of analysis are provided in Appendix E.

6.5.8 Other Regulated Parameters (ORPs)

As illustrated in Figure 2A and 2B, APEC 1 and APEC 2 were due to the historical operation of a wood cabinet and counter top manufacturer, and historical operation of a heating and refrigeration equipment manufacturer, on the Property. APEC 7 was due to the presence of a waste disposal site (transfer of solid non-hazardous wastes) located 35 m west of the Property (572 Welham Road). As such ORPs were identified as contaminants of potential concern in the soil and ground water on the Property.

Soil

A total of six (6) soil samples were collected during the subsurface investigation by Terraprobe to investigate APEC 2. The results are shown in Table 4 and below.

Table 6.5.8-1: Soil Samples collected for ORPs Analysis

Sample Identification		Soil Type	Date Sampled	Soil ORPs
1	BH2/SS2	Native	March 3, 2020	✓
2	BH3/SS2	Native	February 24, 2020	✓
3	BH4/SS1	FILL	March 3, 2020	✓
4	BH10/SS3 & DUP2	FILL	February 24, 2020	✓
5	BH14/SS2	Native	March 3, 2020	✓
6	BH15/SS3	Native	February 25, 2020	✓

Note: ✓ Meets MECP Table 8 RPI/ICC Standards
SS- Split Spoon sample and BH- Borehole

The results indicated that all soil samples meet the applicable Table 8 RPI/ICC Standards for ORPs. Based on the results, there are no ORPs impacts within the soil at the Property. The laboratory certificates of analysis are provided in Appendix E.

6.5.9 Contaminants of Concern (Soil)

No Contaminants of Concern associated with the fill or native soil were identified on the Property.

6.5.10 Chemical or Biological Transformations

No chemical or biological transformations are likely to occur with the Contaminants of Concern which exceeded the applicable site condition standards.

6.5.11 Contamination Impact On Other Media

The Contaminants of Concern exceeding the applicable site conditions are unlikely to impact other media.

6.5.12 Presence of Light or Dense Non-Aqueous Phase Liquids (In Soil)

No light non-aqueous phase liquids (LNAPL) or dense non-aqueous phase liquids (DNAPL) were detected in the soil on the Property.

6.6 Ground Water Quality

6.6.1 Location and Depth of Sample Locations

Ground water was only encountered in one monitoring well (BH6), the remaining seven (7) monitoring wells (BH2, BH3, BH4, BH7, BH13, BH14, and BH15) were dry. Ground water sample from BH6 were analyzed for parameters including PHC, BTEX, and VOCs. Laboratory certificates of analysis are provided in Appendix E. The results are shown in Table 8, Table 9 and below.

Table 6.5.1-1: Ground Water Samples and Selected Analytical Parameters

Monitoring Well	Screen/Sample Depth		VOCs	PHCs	BTEX
	(mbgs)	(masl)			
BH6	10.7 – 13.7	262.6 – 259.6	✓	✓	✓

Note: ✓ Meets MECP Table 2 Standards

BH - Borehole

Metals, Hydride-Forming Metals, PAHs and ORPs did not exceed Table 8 RPI/ICC Standards for any of the analyzed samples, and due to the significant depth at which ground water was encountered (approximately 12.5 m below grade), Metals, Hydride-Forming Metals, PAHs and ORPs related impact of ground water was deemed to be unlikely. As such ground water samples were not collected for these parameters.

6.6.1 PHCs

As illustrated in Figure 2A and 2B, APEC 5 was due to the presence of a waste generator of petroleum distillates, waste oils, and lubricants located 110 m northwest of the Property (555 Welham Road), and APEC 7 was due to the presence of a waste disposal site (transfer of solid non-hazardous wastes) located 35 m west of the Property (572 Welham Road); as such PHCs were identified as contaminants of potential concern in the soil and ground water on the Property.

Ground Water

One (1) ground water sample was collected from monitoring well (BH6) installed in February 2020. The results indicated that the ground water sample collected met the applicable Table 8 RPI/ICC Standards for PHCs. The results are presented in Table 8 and the laboratory certificates of analysis are provided in Appendix E.

6.6.2 BTEX

As illustrated in Figure 2A and 2B, APEC 5 was due to the presence of a waste generator of petroleum distillates, waste oils, and lubricants located 110 m northwest of the Property (555 Welham Road), and APEC 7 was due to the presence of a waste disposal site (transfer of solid non-hazardous wastes) located 35 m west of the Property (572 Welham Road); as such BTEX was identified as a contaminants of potential concern in the soil and ground water on the Property.

Ground Water

One (1) ground water sample was collected from monitoring well (BH6) installed in February 2020. The results indicated that the ground water sample collected met the applicable Table 8 RPI/ICC Standards for BTEX. The results are present in Table 8 and the laboratory certificates of analysis are provided in Appendix E.

6.6.3 VOCs

As illustrated in Figure 2A and 2B, APEC 1 and APEC 2 were due to the historical operation of a wood cabinet and counter top manufacturer, and historical operation of a heating and refrigeration equipment manufacturer, on the Property. APEC 3 and APEC 4 were due to historic metal fabrication and treatment operations that took place 55 m northwest of the Property, (561 Welham Road). APEC 6 was due to metal fabrication operations that took place 35 m northwest of the Property (566 Welham Road). APEC 7 was due to the presence of a waste disposal site (transfer of solid non-hazardous wastes) located 35 m west of the Property (572 Welham Road). As such, VOCs were identified as contaminants of potential concern in the soil and ground water on the Property.

Ground Water

One (1) ground water sample was collected from monitoring wells (BH6) installed in February 2020. The results indicated that the ground water sample collected meets the applicable Table 8 RPI/ICC Standards for VOCs. The results are presented in Table 9 and the laboratory certificates of analysis are provided in Appendix E.

6.6.4 Comparison to Applicable Standards (Ground Water)

Based on the results of chemical analyses, all analysed parameters in ground water samples met the MECP Table 8 Standards.

The measured pH value of the ground water sample was 7.80 and 7.85 within the MECP guideline.

The laboratory certificates of analysis are provided in Appendix E, and the results of the ground water chemical analysis are provided in Tables 8 and Table 9.

6.6.5 Contaminants of Concern (Ground Water)

There were no Contaminants of Concern associated with the ground water on the Property.

6.6.6 Chemical or Biological Transformations

No Contaminants of Concern associated with the ground water on the Property at the locations investigated and as such no chemical or biological transformations are expected to occur.

6.6.7 Contamination Impact On Other Media

No Contaminants of Concern associated with the ground water on the Property at the locations investigated.

6.6.8 Presence of Light or Dense Non-Aqueous Phase Liquids (Ground Water)

Light non-aqueous phase liquids (LNAPL) and dense non-aqueous phase liquids (DNAPL) were not detected in the ground water on the Property.

6.7 Sediment Quality

6.7.1 Location and Depth of Sample Locations

No sediment sampling was conducted as part of this investigation.

6.7.2 Comparison to Applicable Standards (Sediment)

No sediment sampling was conducted as part of this investigation.

6.7.3 Contaminants of Concern (Sediment)

No sediment sampling was conducted as part of this investigation.

6.7.4 Chemical or Biological Transformations

No sediment sampling was conducted as part of this investigation.

6.7.5 Contamination Impact On Other Media

No sediment sampling was conducted as part of this investigation.

6.8 Quality Assurance and Quality Control Results

6.8.1 Types of Quality Control Samples Collected and Results

In general, samples were handled in accordance with the Analytical Protocol with respect to holding time, preservation method, storage requirement and sample container type. Laboratory results were compared to MECP standards for quality control under Ontario Regulation 153/04 which require laboratory results to meet specific method detection limit (MDL) requirements. The sampling and analyses performed conformed with the following:

- Ministry of the Environment Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario.
- Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.I of the Environmental Protection Act of Ontario.

Duplicate samples were submitted at a rate of 10% for both soil and ground water samples.

6.8.2 Samples Not Handled in Accordance with the Analytical Methods

Holding Time

All samples met the holding times as specified in Ontario Ministry of the Environment, Conservation and Parks (MECP) - Laboratory Services Branch "*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*" July 1, 2011

Preservation Method

All samples met the preservation methods as specified in MECP - Laboratory Services Branch "*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*" July 1, 2011

Storage Requirement

All samples met the storage requirements as specified in MECP - Laboratory Services Branch "*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*" July 1, 2011

Container Type

All samples met the container type as specified in MECP - Laboratory Services Branch “*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*” July 1, 2011

6.8.3 Subsection 47 (3) of the Regulation

All certificates of analysis or analytical reports received pursuant to clause 47 (2) (b) of the regulation comply with subsection 47(3). A certificate of analysis or analytical report has been received for each sample submitted for analysis. All certificates of analysis or analytical reports received have been included in full in Appendix E to the Phase Two ESA report.

6.8.4 Results Qualified by Laboratory

The laboratory did not make any significant comments that changed the outcome of the analytical results regarding the soil and ground water samples.

6.8.5 Overall Quality of Field Data

Decision making regard the environmental condition of the Property was not affected by the overall quality of the field data. The overall quality of the field data was considered by the Qualified Person to meet the objectives of the investigation and assessment.

7.0 CONCLUSIONS

7.1 Location and Concentration of Contamination

7.1.1 Land

No exceedances of the applicable Site Condition Standards were found in the soil samples tested for all parameters. No contaminants in the soil were associated with the Property.

7.1.2 Ground Water

No exceedances of the applicable Site Condition Standards were found in the ground water sample tested for all parameters.

7.2 Environmental Conditions Requiring a Risk Assessment

There were no exceedances of the applicable site standards noted in the earth fill, the native soil, or the ground water on the Property. As such, there is no requirement for a Risk Assessment.

7.3 Whether Applicable Site Condition Standards Were Met

Soil – Earth Fill

The applicable site condition standards were met in the earth fill located on the Property.

Soil – Native Soils

The applicable site condition standards were met in the native soils located on the Property

Ground Water

The applicable site condition standards were met for the ground water on the Property.

Sediment

Sediment was not present on the Property and was not sampled as part of this investigation.

7.4 Conclusion & Recommendations

Based upon the results of the Phase Two ESA, the following conclusions are presented:

- The work program for the subsurface investigation consisted of advancing fifteen (15) boreholes to depths ranging between 2.0 to 14.2 m below ground level, during February 24, 2020 to March 3, 2020. Eight (8) of these boreholes were instrumented with monitoring wells. The subsurface investigation was conducted in conjunction with geotechnical and hydrogeological investigations.
- The stratigraphy of the Property is generally summarized as a layer of surficial material; a pavement structure comprising of 100 to 300 mm thick asphaltic concrete and aggregate layer at

borehole locations BH3, BH10, BH14, and BH15; and a layer of topsoil 50 to 100 mm thick at BH1, BH2, BH4, BH5, BH6, BH8, BH9, BH11, BH12, and BH13. Underlying the surficial material, the boreholes were advanced through a layer of earth fill that extends to depths of 0.8 and 3.0 metres below existing grade. The earth fill material generally consisted of sand with varying amounts of gravel, silt and clay, with trace amounts of organics, brown to dark brown, and moist. Underlying the earth fill, a layer of native soil was encountered. The native soil extended beyond the depths of investigation. The native soil consisted of sand, sand and silt to silt and sand with trace amounts of clay and gravel, and was compact to very dense, brown in colour and moist

- The applicable Site Condition Standards for the Property were considered to be those contained in Table 8 of the April 15, 2011 Ontario Ministry of Environment, Conservation and Parks (MECP) *“Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”* for Residential/Parkland/Institutional/Industrial/Commercial/Community property use within 30 m of a water body in a potable ground water condition (MECP Table 8 RPI/ICC Standards).
- Soil and ground water samples were tested for the Potential Contaminants of Concern (PCoCs) that were identified in the Phase One ESA. The chemical analyses included: Metals, Hydride-forming Metals, Selected Other Regulated Parameters (ORPs), Petroleum Hydrocarbons (PHC F1-F4) plus BTEX (Benzene, Toluene, Ethylbenzene, and Xylene), Volatile Organic Compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (PAHs).
- No exceedances of the applicable Site Condition Standards were found in any of the soil or ground water samples tested. All parameters analysed met the MECP Table 8 RPI/ICC Standards.

The results of the Phase Two ESA indicate that there were no exceedances of the MECP Table 8 RPI/ICC Standards in the soil and ground water on the Property.

8.0 LIMITATIONS AND USE OF THE REPORT

This report was prepared for the exclusive use of Environmental 360 Solutions Ltd. and is intended to provide an assessment of the environmental condition on the property located at 571 Welham Road in Barrie, Ontario. The report was prepared for the purpose of identifying potential environmental concerns, including an assessment of the likelihood that the environmental quality of the soil and ground water on the Property may have been adversely affected by past and present practices on the Property, and/or those of the surrounding properties prior to development of the Property. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Terraprobe accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report, including consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The assessment should not be considered a comprehensive audit that eliminates all risks of encountering environmental problems. The information presented in this report is based on information collected during the completion of the subsurface investigation conducted by Terraprobe Inc. It is based on conditions at the Property at the time of the site inspection. The subsurface conditions were assessed based on information collected at specific borehole and monitoring well locations. The actual subsurface conditions between the sampling points may vary.

There is no warranty expressed or implied by this report regarding the environmental status of the Property. Professional judgment was exercised in gathering and analyzing information collected by our staff, as well as that submitted by others. The conclusions presented are the product of professional care and competence, and cannot be construed as an absolute guarantee.

In the event that during future work new information regarding the environmental condition of the Property is encountered, or in the event that the outstanding responses from the regulatory agencies indicate outstanding issues on file with respect to the Property, Terraprobe should be notified in order that we may re-evaluate the findings of this assessment and provide amendments, as required.

9.0 SIGNATURES

The Phase Two Environmental Site Assessment has been completed by Mr. Jawwad Qureshi, EIT, under the direction and supervision of Muhammad I. Shahid, P.Geo., QP_{ESA}. The findings and conclusions presented in this report have been determined on the basis of the information that was obtained and reviewed from review of previous investigations provided and on the current investigation for the Phase Two Property.

We trust this report meets with your requirements. Should you have any questions regarding the information presented, please do not hesitate to contact our office.

Yours truly,

Terraprobe Inc.



Jawwad Qureshi, EIT
Environmental Engineer-In-Training



Muhammad I. Shahid, P.Geo., QP_{ESA}
Senior Project Manager

10.0 REFERENCES

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TABLES

TERRAPROBE INC.

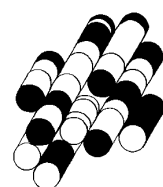


TABLE 1
Geological Units
571 Welham Road
Project #1-19-0792-42

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TABLE 2
Monitoring Well Construction
571 Welham Road
Project #1-19-0792-42

Well ID	BH2		BH3		BH4		BH6	
Stick Up (m)	1.1		1.1		1.0		1.0	
Ground Elev. (masl)	273.0		273.1		273.0		273.3	
Well Component	Depth (m)	Elev. (masl)	Depth (m)	Elev. (masl)	Depth (m)	Elev. (masl)	Depth (m)	Elev. (masl)
Bentonite - Top	0.0	273.0	0.0	273.1	0.0	273.0	0.0	273.3
Bentonite - Bottom	2.7	270.3	5.5	267.6	2.7	270.3	10.1	263.2
Sand - Top	2.7	270.3	5.5	267.6	2.7	270.3	10.1	263.2
Screen - Top	3.0	270.0	6.1	267.0	3.0	270.0	10.7	262.6
Screen - Bottom	6.1	266.9	9.1	264.0	6.1	266.9	13.7	259.6
Sand - Bottom	6.1	266.9	9.1	264.0	6.1	266.9	13.7	259.6

Well ID	BH7		BH13		BH14		BH15	
Stick Up (m)	1.0		0.9		0.0		0.0	
Ground Elev. (masl)	273.4		272.9		273.9		273.2	
Well Component	Depth (m)	Elev. (masl)	Depth (m)	Elev. (masl)	Depth (m)	Elev. (masl)	Depth (m)	Elev. (masl)
Bentonite - Top	0.0	273.4	0.0	272.9	0.3	273.6	0.3	272.9
Bentonite - Bottom	7.0	266.4	6.1	266.8	2.4	271.5	4.0	269.2
Sand - Top	7.0	266.4	6.1	266.8	2.4	271.5	4.0	269.2
Screen - Top	7.6	265.8	7.1	265.8	3.0	270.9	4.6	268.6
Screen - Bottom	10.7	262.7	10.1	262.8	6.1	267.8	7.6	265.6
Sand - Bottom	10.7	262.7	10.1	262.8	6.1	267.8	7.6	265.6

TABLE 3
Ground Water Elevations
571 Welham Road
Project #1-19-0792-42

Well ID	BH2		BH3		BH4		BH6	
Stick Up (m)	1.1		1.1		1.0		1.0	
Depth (mbgs)	6.0		8.9		5.9		12.7	
Ground Elev. (masl)	273.0		273.1		273.0		273.3	
Date	WL (m)	Elev. (masl)	WL (m)	Elev. (masl)	WL (m)	Elev. (masl)	WL (m)	Elev. (masl)
2020/10/03	DRY		DRY		DRY		9.6	263.7

Well ID	BH7		BH13		BH14		BH15	
Stick Up (m)	1.0		0.9		0.0		0.0	
Depth (mbgs)	10.6		10.5		5.8		7.7	
Ground Elev. (masl)	273.4		272.9		273.9		273.2	
Date	WL (m)	Elev. (masl)	WL (m)	Elev. (masl)	WL (m)	Elev. (masl)	WL (m)	Elev. (masl)
2020/10/03	DRY		DRY		DRY		DRY	

TABLE 4
Metals and ORPs (Soil)
571 Welham Road
Project #1-19-0792-42

Sample Name	Unit	Table 8 RP/ICC	BH2/SS2	BH3/SS2	BH3/SS4	BH4/SS1	BH6/SS7	DUP 1 BH6/SS7	BH10/SS3	DUP 2 BH10/SS3	BH14/SS2	BH15/SS3
AGAT WO#			20T581563	20T581563	20T581563	20T581563	20T581563	20T581563	20T581563	20T581563	20T581563	20T581563
AGAT ID#			998285	998289	998319	998320	998357	998377	998361	998378	998362	998370
Date			3/3/2020	2/24/2020	2/24/2020	3/3/2020	2/26/2020	2/26/2020	2/24/2020	2/24/2020	3/3/2020	2/24/2020
Parameter/Depth of Sample (masl)			272.2 - 271.6	272.3 - 271.9	270.8 - 270.4	273.0 - 272.4	267.2 - 266.9	267.2 - 266.9	270.9 - 270.3	270.9 - 270.3	273.1 - 272.5	271.7 - 271.2
Antimony (Sb)	µg/g	1.3	<0.8	<0.8	NA	<0.8	NA	NA	<0.8	<0.8	<0.8	<0.8
Arsenic (As)	µg/g	18	<1	<1	NA	1	NA	NA	1	<1	<1	1
Barium (Ba)	µg/g	220	12	20	NA	40	NA	NA	21	20	6	40
Beryllium (Be)	µg/g	2.5	<0.5	<0.5	NA	<0.5	NA	NA	<0.5	<0.5	<0.5	<0.5
Boron (B)	µg/g	36	<5	<5	NA	<5	NA	NA	<5	<5	<5	<5
Boron (B), Hot Water Ext.	µg/g	1.5	<0.10	<0.10	NA	0.11	NA	NA	<0.10	<0.10	<0.10	<0.10
Cadmium (Cd)	µg/g	1.2	<0.5	<0.5	NA	<0.5	NA	NA	<0.5	<0.5	<0.5	<0.5
Chromium (Cr)	µg/g	70	<5	6	NA	11	NA	NA	8	7	7	12
Cobalt (Co)	µg/g	22	1.3	2.2	NA	3.5	NA	NA	2.5	2.4	2.1	3.8
Copper (Cu)	µg/g	92	3	5	NA	5	NA	NA	4	4	3	4
Lead (Pb)	µg/g	120	<1	1	NA	3	NA	NA	2	2	1	3
Molybdenum (Mo)	µg/g	2	<0.5	<0.5	NA	<0.5	NA	NA	<0.5	<0.5	<0.5	<0.5
Nickel (Ni)	µg/g	82	2	3	NA	6	NA	NA	4	4	3	6
Selenium (Se)	µg/g	1.5	<0.4	<0.4	NA	<0.4	NA	NA	<0.4	<0.4	<0.4	<0.4
Silver (Ag)	µg/g	0.5	<0.2	<0.2	NA	<0.2	NA	NA	<0.2	<0.2	<0.2	<0.2
Thallium (Tl)	µg/g	1	<0.4	<0.4	NA	<0.4	NA	NA	<0.4	<0.4	<0.4	<0.4
Uranium (U)	µg/g	2.5	<0.5	<0.5	NA	<0.5	NA	NA	<0.5	<0.5	<0.5	<0.5
Vanadium (V)	µg/g	86	6	15	NA	26	NA	NA	19	17	28	24
Zinc (Zn)	µg/g	290	5	10	NA	17	NA	NA	13	11	7	24
Chromium, Hexavalent	µg/g	0.66	<0.2	<0.2	NA	<0.2	NA	NA	<0.2	<0.2	<0.2	<0.2
Cyanides	µg/g	0.051	<0.040	<0.040	NA	<0.040	NA	NA	<0.040	<0.040	<0.040	<0.040
Mercury (Hg)	µg/g	0.27	<0.10	<0.10	NA	<0.10	NA	NA	<0.10	<0.10	<0.10	<0.10
pH, 2:1 CaCl2 Extraction	NV	NV	8.08	7.96	7.88	7.66	8.05	7.89	8.05	7.63	8.14	7.63

Comments:

Results compared to MECP2011 Table 8 Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Soil

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

<150 Detection limit exceeded Standard

150 Sample result exceeded Standard

pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

NV- No Value

NA-Not Analyzed

TABLE 5
PAHs (Soil)
571 Welham Road
Project #1-19-0792-42

Sample Name	Unit	Table 8 RPI/ICC	BH3/SS2	BH14/SS3	BH15/SS2	DUP 4 BH15/SS2
AGAT WO#			20T581563	20T581563	20T581563	20T581563
AGAT ID#			998285	998285	998285	998285
Date			2/24/2020	3/3/2020	2/24/2020	2/24/2020
Parameter/Depth of Sample (masl)			272.3 - 271.9	272.4 - 271.8	272.4 -272.0	272.4 -272.0
Naphthalene	µg/g	0.09	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.19	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.22	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.69	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	<0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g	0.36	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	<0.05	<0.05	<0.05	<0.05
Moisture Content	%	NV	8.6	9.9	13.3	9.3
Naphthalene-d8	%	NV	103	111	97	99
Acenaphthene-d10	%	NV	106	110	100	102
Chrysene-d12	%	NV	110	110	100	110

Comments:

Results compared to MECP2011 Table 8 Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Soil
RDL - Reported Detection Limit; G / S - Guideline / Standard

<150	Detection limit exceeded Standard
150	Sample result exceeded Standard

Note: The result for Benzo(b)Flouranthene is the total of the Benzo(b)&(j)Flouranthene isomers because the isomers co-elute on the GC column.
Results are based on the dry weight of the soil.

2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

NV-No Value

NA-Not Analyzed

TABLE 6
PHCs F1 - F4 (&BTEX) (Soil)
571 Welham Road
Project #1-19-0792-42

Sample Name	Unit	Table 8 RPI/ICC	BH2/SS7	BH4/SS7	BH6/SS10	DUP 3 BH6/SS10	BH7/SS10	BH14/SS7	BH15/SS5
AGAT WO#			20T581563	20T581563	20T581563	20T581563	20T581563	20T581563	20T581563
AGAT ID#			998286	4/28/4633	5/29/4633	998381	998359	998367	998376
Date			3/3/2020	3/3/2020	2/26/2020	2/26/2020	3/3/2020	3/3/2020	2/24/2020
Parameter/Depth of Sample (masl)			266.9 -266.9	266.9 - 266.8	262.6 -262.2	262.6 -262.2	262.7 - 262.6	267.8 - 267.7	270.2 - 269.7
Benzene	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g	25	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	120	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%	NV	2.6	2.2	16.8	8.0	15.4	8.0	7.1
Terphenyl	%	NV	63	69	82	96	86	77	64

Comments:

Results compared to MECP2011 Table 8 Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Soil

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

<150 Detection limit exceeded Standard

150 Sample result exceeded Standard

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Quality Control Data is available upon request.

NV- No Value

NA-Not Analyzed

TABLE 7
VOCs (Soil)
571 Welham Road
Project #1-19-0792-42

Sample Name	Unit	Table 8 RPI/ICC	BH2/SS7	BH3/SS4	BH4/SS7	BH6/SS10	DUP 3 BH6/SS10	BH7/SS10	BH14/SS2	BH14/SS7	BH15/SS3	BH15/SS5
AGAT WO#			20T581563	20T581563	20T581563	20T581563	20T581563	20T581563	20T581563	20T581563	20T581563	20T581563
AGAT ID#			998286	998319	998327	998358	998381	998359	998362	998367	998370	998376
Date			3/3/2020	2/24/2020	3/3/2020	2/26/2020	2/26/2020	3/3/2020	3/3/2020	3/3/2020	2/24/2020	2/24/2020
Parameter/Depth of Sample (masl)			266.9 - 266.9	270.8 - 270.4	266.9 - 266.8	262.6 - 262.2	262.6 - 262.2	262.7 - 262.6	273.1 - 272.5	267.8 - 267.7	271.7 - 271.2	270.2 - 269.7
Dichlorodifluoromethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	µg/g	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	µg/g	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	µg/g	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	µg/g	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	µg/g	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	µg/g	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	µg/g	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	µg/g	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	µg/g	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	µg/g	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	µg/g	NV	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g	NV	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene	µg/g	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene-d8	% Recovery	NV	107	104	100	107	105	105	112	105	104	101
4-Bromofluorobenzene	% Recovery	NV	84	88	88	87	88	84	87	88	88	91

Comments:

Results compared to MECP2011 Table 8 Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Soil
RDL - Reported Detection Limit; G / S - Guideline / Standard

<150 Detection limit exceeded Standard

150 Sample result exceeded Standard

The sample was analysed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed.

Results are based on the dry weight of the soil.

NV- No Value *elevation not recorded

NA-Not Analyzed

TABLE 8
PHCs F1 - F4 (Groundwater)
571 Welham Road
Project #1-19-0792-42

Sample Name	Unit	Table 8	BH6
AGAT WO#			20T583723
AGAT ID#			1014831
Date			3/10/2020
Parameter/Depth of Screen (masl)			262.6 - 259.6
Benzene	µg/L	5	<0.20
Toluene	µg/L	22	0.57
Ethylbenzene	µg/L	2.4	0.13
Xylene Mixture	µg/L	300	0.25
F1 (C6 to C10)	µg/L	420	<25
F1 (C6 to C10) minus BTEX	µg/L	420	<25
F2 (C10 to C16)	µg/L	150	<100
F3 (C16 to C34)	µg/L	500	<100
F4 (C34 to C50)	µg/L	500	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	NA
Terphenyl	%	NV	68

Comments:

Results compared to MECP2011 Table 8 Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - GW

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

<150 Detection limit exceeded Standard

150 Sample result exceeded Standard

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Quality Control Data is available upon request.

NV- No Value

NA-Not Analyzed

TABLE 9
VOCs (Ground Water)
571 Welham Road
Project #1-19-0792-42

Sample Name	Unit	Table 8	BH6	Trip Blank
AGAT WO#			20T583723	20T583723
AGAT ID#			1014831	1014832
Date			3/10/2020	3/10/2020
Parameter/Depth of Screen (masl)			262.6 - 259.6	-
Dichlorodifluoromethane	µg/L	4400	<0.20	<0.20
Vinyl Chloride	µg/L	1.7	<0.17	<0.17
Bromomethane	µg/L	56	<0.20	<0.20
Trichlorofluoromethane	µg/L	2500	<0.40	<0.40
Acetone	µg/L	130000	<1.0	<1.0
1,1-Dichloroethylene	µg/L	17	<0.30	<0.30
Methylene Chloride	µg/L	5500	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	17	<0.20	<0.20
Methyl tert-butyl ether	µg/L	1400	<0.20	<0.20
1,1-Dichloroethane	µg/L	3100	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	1500000	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	17	<0.20	<0.20
Chloroform	µg/L	22	<0.20	<0.20
1,2-Dichloroethane	µg/L	12	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	6700	<0.30	<0.30
Carbon Tetrachloride	µg/L	8.4	<0.20	<0.20
Benzene	µg/L	430	<0.20	<0.20
1,2-Dichloropropane	µg/L	140	<0.20	<0.20
Trichloroethylene	µg/L	17	<0.20	<0.20
Bromodichloromethane	µg/L	85000	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	580000	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	30	<0.20	<0.20
Toluene	µg/L	18000	0.57	<0.20
Dibromochloromethane	µg/L	82000	<0.10	<0.10
Ethylene Dibromide	µg/L	0.83	<0.10	<0.10
Tetrachloroethylene	µg/L	17	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	28	<0.10	<0.10
Chlorobenzene	µg/L	630	<0.10	<0.10
Ethylbenzene	µg/L	2300	0.13	<0.10
m & p-Xylene	µg/L	NV	0.25	<0.20
Bromoform	µg/L	770	<0.10	<0.10
Styrene	µg/L	9100	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	15	<0.10	<0.10
o-Xylene	µg/L	NV	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	67	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	9600	<0.10	<0.10
1,3-Dichloropropene	µg/L	45	<0.30	<0.30
Xylene Mixture	µg/L	4200	0.25	<0.20
n-Hexane	µg/L	520	0.55	<0.20
Toluene-d8	% Recovery	NV	106	108
4-Bromofluorobenzene	% Recovery	NV	93	87

Comments:

Results compared to MECP2011 Table 8 Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - GW
RDL - Reported Detection Limit; G / S - Guideline / Standard

<150

Detection limit exceeded Standard

150

Sample result exceeded Standard

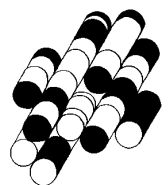
The sample was analysed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

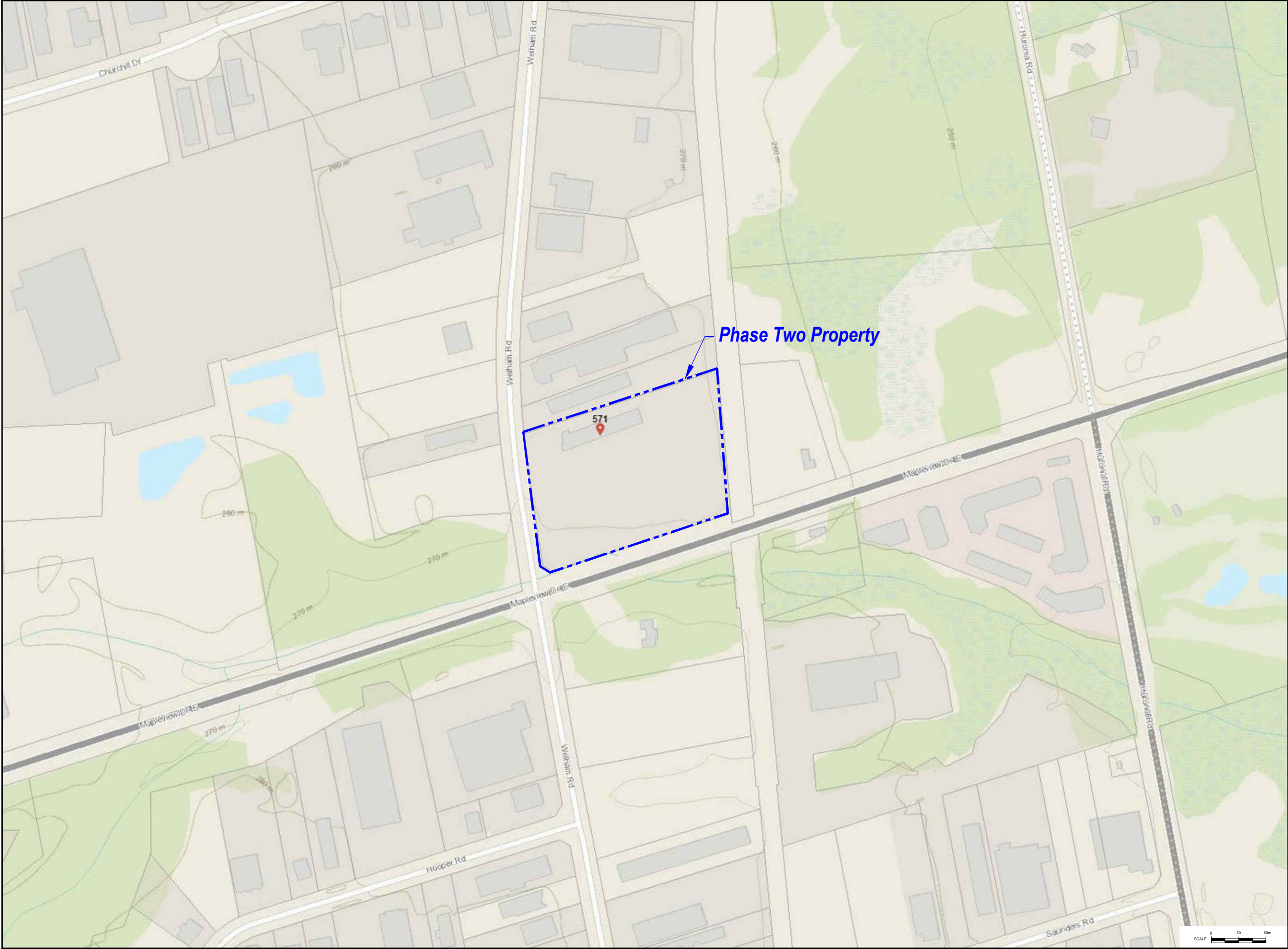
NV- No Value

NA-Not Analyzed

FIGURES

TERRAPROBE INC.







Terraprobe Inc.
Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing
11 Indell Lane - Brampton Ontario L6T 3Y3 (905) 796-2650



Reference:
County of Simcoe
Interactive Maps

Notes:

Legend:

Phase Two Property Boundary

Project Title:

Phase Two Environmental Site Assessment

Site Location:

571 Welham Road,
Barrie, Ontario

Figure Title:

PHASE TWO PROPERTY LOCATION

Designed By:

NM

Drawn By:

AA

Reviewed By:

MS

Date:

January 2020

File No.:

1-19-0792-42

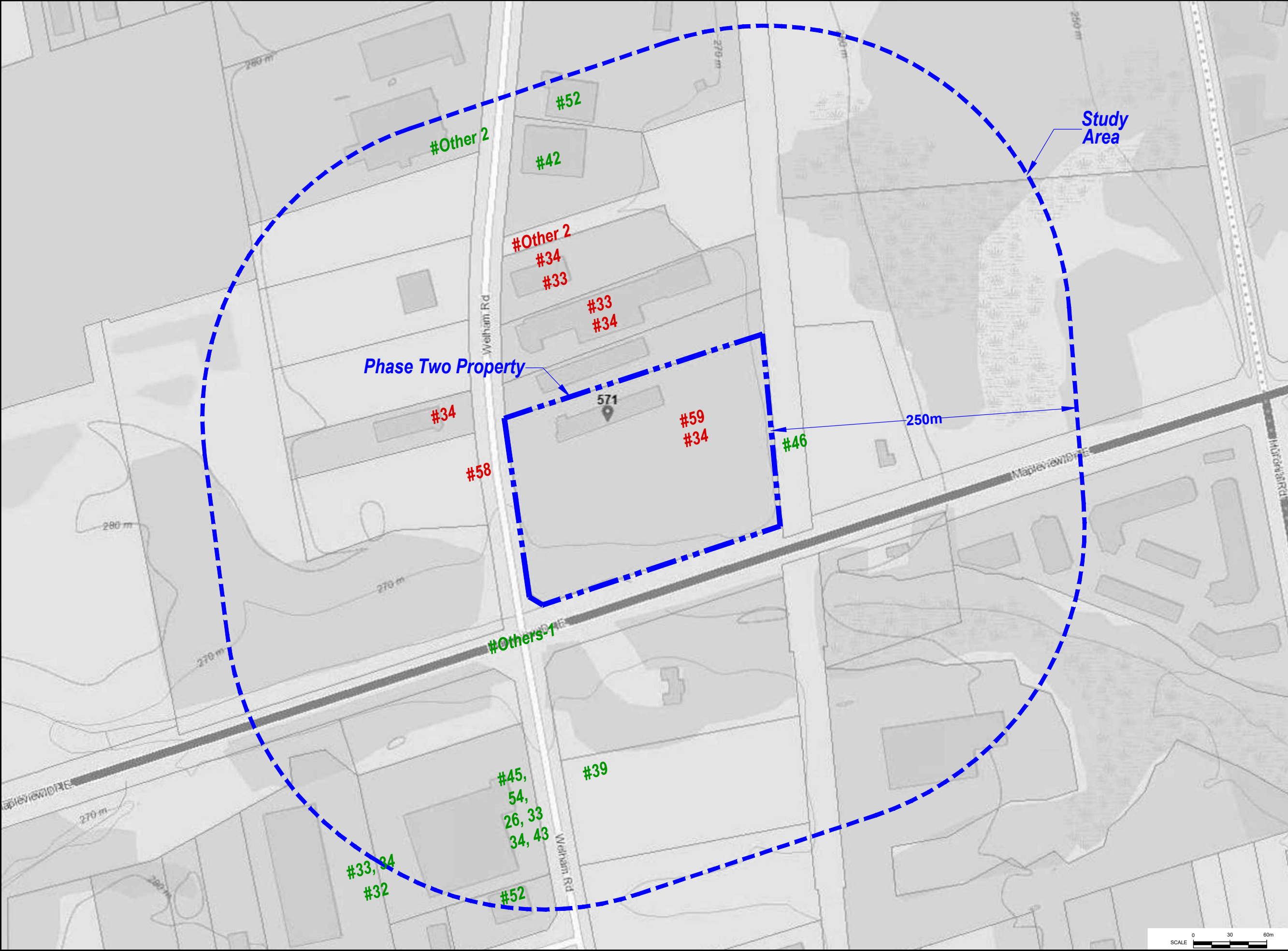
Scale:

As Shown

Figure No.:

1

Z:\1-Project Files\2019\1-19-0792 - 571 Welham Road, Barrie\2 - Phase Two ESA\A. Dwg's, Logs\AutoCAD\1-19-0792-571-42 Figs.dwg, NW





Terraprobe Inc.
Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing
11 Indell Lane - Brampton Ontario L6T 3Y3 (905) 796-2650



Reference:
 County of Simcoe
 Interactive Maps

Notes:
PCA - Potentially Contaminating Activity
Red PCA Causing APEC
Green PCA Not Causing APEC

Legend:

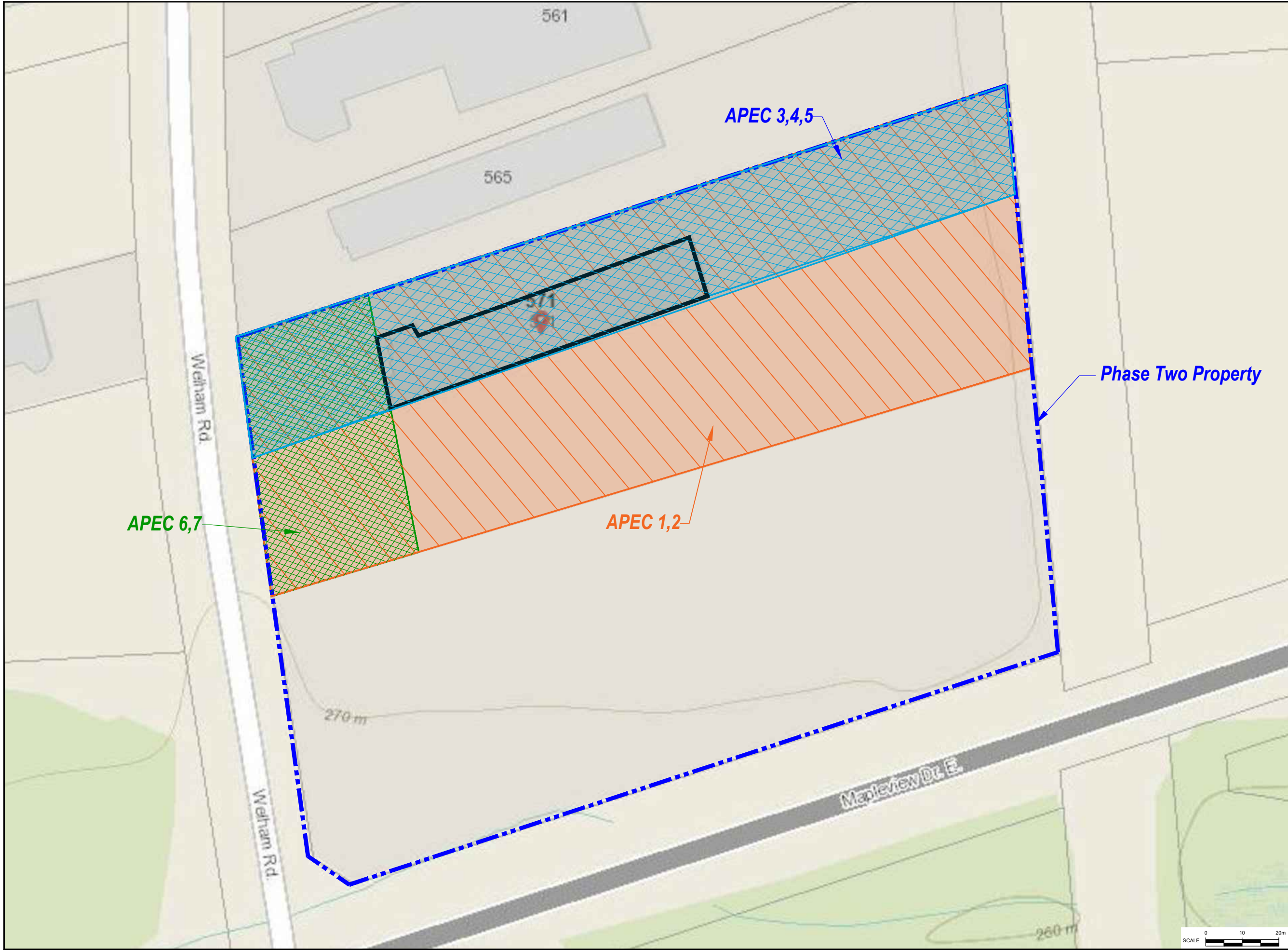
---	Phase Two Property Boundary
- . -	Phase Two Study Area, 250m
#26	Foam and Expanded Foam Manufacturing and Processing
#32	Iron and Steel Manufacturing and Processing
#33	Metal Treatment, Coating, Plating and Finishing
#34	Metal Fabrication
#39	Paints Manufacturing, Processing and Bulk Storage
#42	Pharmaceutical Manufacturing and Processing
#45	Pulp, Paper and Paperboard Manufacturing and Processing
#46	Rail Yards, Tracks and Spurs
#52	Storage, maintenace, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems
#59	Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products
#58	Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners
#Others1	Ontario Spill
#Others2	Waste generator

Project Title:
 Phase Two Environmental Site Assessment

Site Location:
 571 Welham Road,
 Barrie, Ontario

Figure Title:
 PCA LOCATIONS

Designed By: NM	File No.: 1-19-0792-42
Drawn By: AA	Scale: As Shown
Reviewed By: MS	Figure No.: 2A
Date: January 2020	





Terraprobe Inc.
Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing
11 Indell Lane - Brampton Ontario L6T 3Y3 (905) 796-2650



Reference:
County of Simcoe
Interactive Maps

Notes:
APEC - Area of Potential Environmental Concern

Legend:

Phase Two Property Boundary

APEC 1

APEC 2

APEC 3

APEC 4

APEC 5

APEC 6

APEC 7

Project Title:
Phase Two Environmental Site Assessment

Site Location:
571 Welham Road,
Barrie, Ontario

Figure Title:
APEC LOCATIONS

Designed By: NM	File No.: 1-19-0792-42
Drawn By: AA	Scale: As Shown
Reviewed By: MS	Figure No.: 2B
Date: January 2020	



Reference:

JOSEPH N CAMPITELLI
Architect Inc.
10 Bur Oak Ave, Markham ON

Notes:

Legend:



Borehole/Monitoring Well Locations
Terraprobe 2020

Project Title:

Phase Two Environmental Site Assessment

Site Location:

571 Welham Road,
Barrie, Ontario

Figure Title:

BOREHOLE/MONITORING WELL
LOCATION PLAN

Designed By:

NM

File No.:

1-19-0792-42

Drawn By:

AA

Scale:

As Shown

Reviewed By:

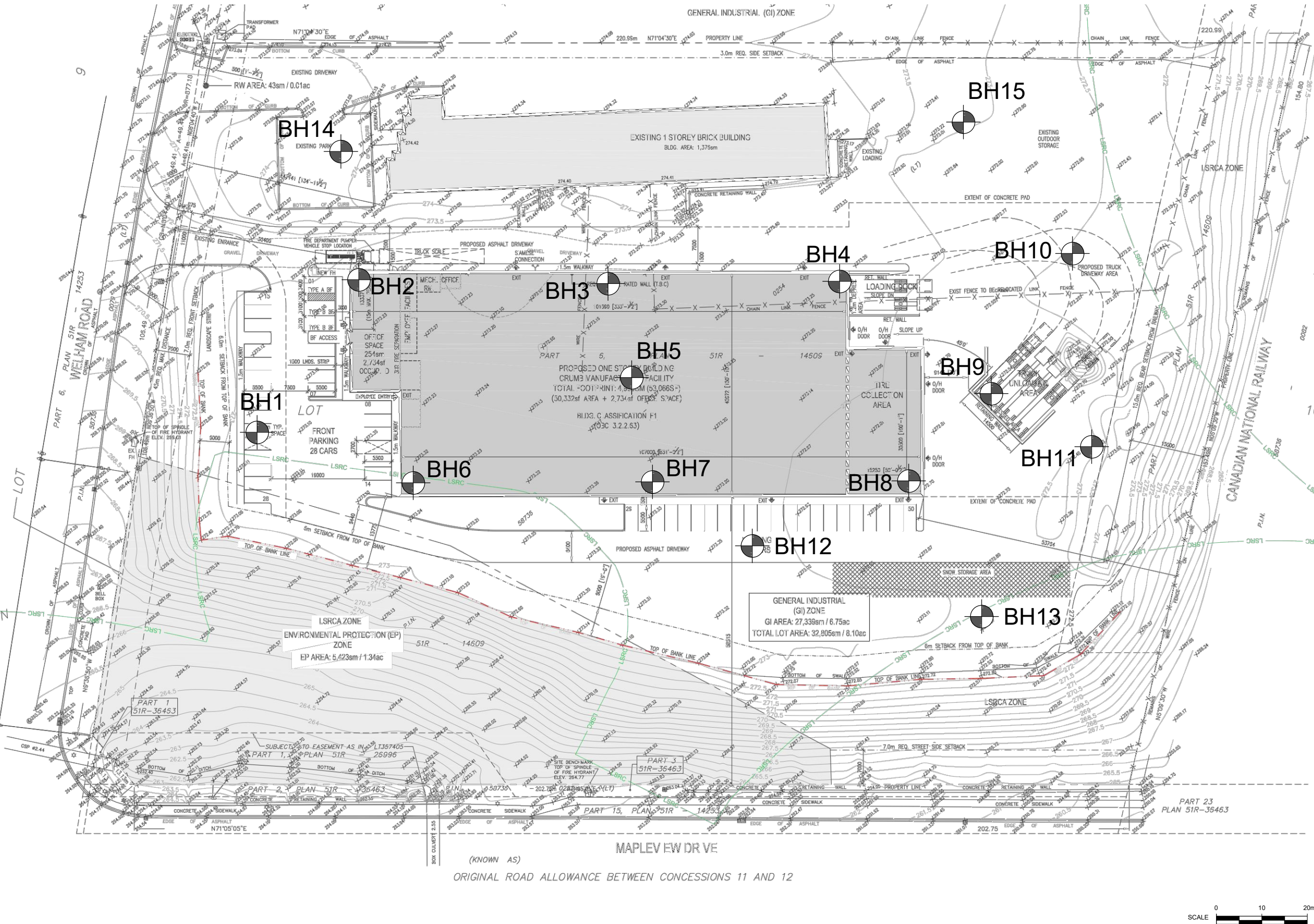
MS

Figure No.:

3

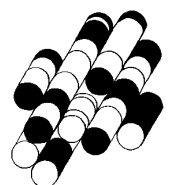
Date:

January 2020



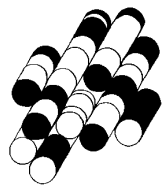
APPENDIX A

TERRAPROBE INC.



APPENDIX B

TERRAPROBE INC.



PHASE ONE CONCEPTUAL SITE MODEL

571 Welham Road, Barrie, ON

Phase One CSM	Information Pertaining to Property
<i>Figures of the Phase One Study Area are provided that:</i>	
i. Show any existing buildings and structures,	Existing structures are shown on Figure 2.
ii. Identify and locate water bodies located in whole or in part on the Phase One Study Area	The closest water body to the Phase One Property is a tributary of Lovers Creek, which is adjacent to the Property to the south-southwest. Lovers Creek is located approximately 800 m southeast of the Property. All water bodies on the Phase One Property and in the Phase One Study Area are shown on Figure 3.
iii. Identify and locate any Areas of Natural Significance located in whole or in part on the Phase One Study Area	Terraprobe reviewed the Ontario Ministry of Natural Resources and Forestry NHIC database for natural area listings. Areas of Natural Significance were located in the Phase One Study Area south of The Property. The area is considered as a Natural Heritage system.
iv. Locate any drinking water wells at the Phase One Property	No drinking water wells were identified on the Property during the site inspection. No records of wells on the Property were found in the MECP Water Well Information System (WWIS). Seven (7) monitoring wells or testing holes were within the Study Area. This included two (2) Water Supply wells.
v. Show roads, including names, within the Phase One Study Area	The Property is located in the southwest quadrant of Welham Rd and Mapleview Dr. E in Barrie, Ontario. Access to the Property is via Welham Street. Other roads and properties within the Study Area are presented on Figure 3.
vi. Show use of properties adjacent to the Phase One Property	The land uses of the adjacent properties are shown on Figure 4.
vii. Identify and locate area where any potentially contaminating activity has occurred, and show tanks in such areas	Potentially Contaminating Activities (PCAs) located on the Property and within the Study Area are shown on Figure 5.
viii. Identify and locate any areas of potential environmental concern	Seven Areas of Potential Environmental Concern (APECs) and associated Contaminants of Potential Concern are described on the Table of Areas of Potential Environmental Concern. The locations of the APECs on the Phase One Property are shown on Figure 6.



Phase One CSM	Information Pertaining to Property
<i>The following is a description and assessment of:</i>	
i. Any areas where potentially contaminating activity on or potentially affecting the Phase One Property has occurred,	Northern Portion of Phase One Property: • PCA #59, The Property was occupied by a wood cabinet and counter top manufacturer in 1993 • PCA #34, The Property was occupied by a heating and commercial refrigeration equipment manufacturer in 1995. Study Area: • PCA #34, The Property was occupied by various metal product and equipment manufacturers and was registered as a waste generator for aliphatic solvents and residues from 1933 to 2019. • PCA #58, the site was registered as a waste disposal site from 2017 to 2019. This site is currently identified as waste transfer station. • PCA #33 and #34, The site was occupied by metal product manufacturer from 1973 to 2010. • PCA #33, #34 & Other 2, the site was occupied by various metal manufacturers and a machine shop from 1973 to 2016. The site was registered as a waste generator for petroleum distillates and waste oils & lubricants from 1989 to 2019. •
ii. Any contaminants of potential concern	Contaminants of Potential Concern (CoPCs) identified on the Property include: • Metals & Inorganics, PAHs, VOCs in soil. • PHCs, VOCs and BTEX, Metals & Inorganics in ground water.
iii. The potential for underground utilities, if any present, to affect contaminant distribution and transport,	The building is serviced with municipal supply water, gas utilities and Hydro utilities. There is the potential for underground utilities to affect the horizontal distribution or transport of contaminants potentially due to underground service lines located on the Property.



Phase One CSM	Information Pertaining to Property
iv. Available regional or site specific geological and hydrogeological information,	Topography - The approximate elevation of the Property is between 274 and 262.5 masl and slopes to the east/southeast towards Lovers Creek. Hydrogeology - The nearest water body is a tributary of Lovers Creek which is located adjacent of the Property to the south-southwest. Ground water and surface water is expected to flow to the southeast towards Lovers Creek. Geology (overburden) - Coarse-textured glaciolacustrine deposits consisted of sand, gravel, minor silt and clay foreshore and basinal deposits (9c). - Ice-contact stratified deposits consisted of sand and gravel, minor silt, clay and till (6). - Till deposits consisted of stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain (5b). Geology (bedrock) - The bedrock on the Property is of the Lindsay Formation, which is comprised of limestone, dolostone, shale arkose and sandstone (54a). Geology (depth to bedrock) - Based on the published information, bedrock in the vicinity is located approximately 252 m below ground surface.
v. How any uncertainty or absence of information obtained in each of the components of the Phase One ESA could affect the validity of the model.	No uncertainty was encountered while conducting the Phase One ESA that could affect the validity of the model.

Figures:

Figure 1 – Phase One Property Location

Figure 2 – Phase One Property

Figure 3 – Phase One Study Area

Figure 4 – Adjacent Property Land Use

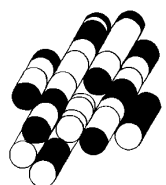
Figure 5 – PCA Locations

Figure 6 – APEC Locations



APPENDIX C

TERRAPROBE INC.





STANDARD OPERATING PROCEDURE – SOIL SAMPLING

General Procedures

Introduction

Subsurface investigations typically involve sampling of subsurface soils at various depths at locations of interest. Several soil sampling methods can be implemented depending on the nature of the investigations. Field screening of soil samples may be performed when potential contaminants of concern include VOC and PHC F1.

Equipment Required

- Nitrile Gloves
- Field Parameter Measurement Device (Gastech, PID)
- Laboratory Sample Bottles
- Terracores or sampling syringes (sampler)
- Field Notebook and/or Field Sheets
- Sampling Plan (from project manager)
- Access Agreements (if required)
- Ice and cooler

Procedure

1. Review sampling plan and sampling locations with project manager
2. Determine what equipment and supplies are required.
3. Obtain necessary sampling and monitoring equipment.
4. Coordinate with project manager and clients, as required, for site access.
5. Perform a general site survey in accordance with any applicable site-specific health and safety plans.
6. Identify and mark all sampling locations.
7. Assemble the appropriate laboratory supplied jars/vials.
8. Collect the samples to be analyzed
 - a. Borehole - split spoon, sample from spoon
 - i. Split spoon sampling methods are primarily used to collect shallow and deep subsurface soils.
 - ii. Gravel, concrete, asphalt and etc. present at or near the surface of the sampling location should be removed prior to split spoon sampling.

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- iii. Split spoons used for soil sampling must be constructed with stainless steel and are 2 inches in diameter and 18 to 24 inches in length.
 - iv. The top several inches of the material in the spoon must be discarded before remove any portion of the spoon for sampling.
 - b. Test pit (backhoe), bag from excavator bucket, then sample.
 - i. Usually used in the collection of surface and shallow soil samples. Allow soil samples to be collected from very specific intervals.
 - ii. The bucket must be decontaminated prior to sample collection.
 - iii. Ensure to scrap off any smeared material on the surface of the bucket that may cross-contaminate the sample prior to jarring the soil sample.
 - iv. Make sure to not physically enter backhoe excavations to collect a sample for safety issue.
 - c. Hand-dig (hand augers), sample.
 - i. Hand augers are typically used to advanced boreholes and collect surficial soils and shallow subsurface soils. A 4 inch stainless steel auger buckets with cutting heads are usually used. The bucket is advanced by simultaneously pushing and turning using an attached handle with extension.
 - ii. The top several inches of the soil collected by the auger bucket should be discarded and not be placed in the laboratory supplied container for sample submission.
 - iii. VOC samples need to be collected directly from the auger bucket, if possible.
 - iv. The entire hand auger assembly must be decontaminated before sampling at a new location. This is to minimize cross-contamination of soil samples.
9. Fill the appropriate jars, making sure to label properly; include the date, company name, parameter to be analyzed, and project number.
10. Change Nitrile gloves between samples.
11. Clean off loose soil that may be on the outside of the jar.
12. Place in a cooler with ice.
13. Log samples in field book.
14. Complete a Chain of Custody for all samples.
15. Package samples and complete necessary paperwork.
16. Transport samples (that have been kept cool) to laboratory or transport to office and call for pick up.

References

- *SESD Operating Procedure – Soil Sampling* U.S EPA, December 2011
- *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, July 2011



STANDARD OPERATING PROCEDURE – BOREHOLE DRILLING

Solid and Hollow Stem Augers

Introduction

Soil drilling, using a drill rig or other equipment based on site accessibility is a common way to obtain soil samples on a site. Soil drilling is typically completed with a truck or bombardier-mounted drill rig, or Pionjar (or other portable drilling equipment) depending on the site accessibility. The driller operator will handle all equipment, including opening the split spoon.

Hollow stem augers are typically used when wet or loose cohesionless materials are encountered to permit sampling without removing the augers. Alternatively, solid stem augers are advanced and removed at each sampling depth. Samples and in-situ Standard Penetration Testing (STP) are conducted by driving a standard 2" diameter split spoon (hollow sampling tube) through a process of continuous or intermittent sampling. If monitoring wells are to be installed in the boreholes, hollow stem augers are to be used.

Equipment Required

- Personal Protective Equipment (PPE)
 - Hard hat, safety vest, protective eyewear, steel toed boots
- Nitrile Gloves
- Slider Bags
- Borehole logs & Clipboard
- Portable Soil Vapour Measurement Device (Gastech/PID)
- Laboratory Sample Bottles
- Field Notebook and/or Field Sheets
- Well Keys or Tools Required
- Sampling Plan (from project manager)
- Access Agreements (if required)
- Ice
- Drums for Soil Storage

Procedure

1. Prior to drilling, boreholes will be numbered and marked and the site cleared for utilities.
2. Downhole equipment is cleaned/decontaminated by the contractor.

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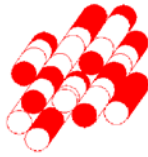
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3. All drill cuttings are to be placed in labeled drums or other container and moved to a designated location.
4. Review sampling plan and borehole locations with project manager
5. Determine what equipment and supplies are required.
6. Obtain necessary sampling and monitoring equipment.
7. Coordinate with project manager and clients and drilling crew, as required, for site access.
8. Perform a general site survey in accordance with any applicable site-specific health and safety plans.
9. Perform health and safety meeting, discuss safety around rig and muster points should there be an emergency.
10. The technician will direct the drill crew where to set up the rig to begin drilling.
11. A borehole log must be prepared for every borehole drilled. Include: elevation, GPS coordinates, depth, soil classification, drilling details, sampling, water levels, free product (if any).
12. Record the type of equipment used (solid stem or hollow, type of rig) and the start time when drilling begins.
13. Sampling will be at pre-specified intervals; typically every 2 ½" to 10-15 feet then once every 5 feet from then on. Between samples, split spoons will be cleaned (if an environmental sampling is being conducted).
14. At each sampling interval record; interval number (or sample ID), blow counts, soil description, PPM reading
15. Record depth of borehole, caving (if any) and water level when borehole is complete.
16. Upon completion of drilling in an open borehole that will not be converted to a well the borehole is to be properly filled and abandoned. There are two methods depending on whether the static water level is above or below the bottom of the borehole.
 - a. Above and less than 20 feet deep: Abandon borehole by mixing cement or cement/bentonite grout and pouring the mixture into the borehole until it is filled to ground surface.
 - b. Below and more than 20 feet deep: Mix and pump cement/bentonite mixture to the bottom of the hole until filled to ground surface.

References

- *Standard Operating Procedure No. 6. Drilling, Logging, and Sampling of Subsurface Materials.*
- *Geotechnical Field Investigations, Terraprobe Limited, July 1990.*



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STANDARD OPERATING PROCEDURE – FIELD SCREENING AND CALIBRATION

RKI Eagle Gastech and Mini Rae Photo-Ionization Detector

Introduction

Field screening is an important tool in that it provides data for onsite, real time total vapor measurements, evaluation of existing conditions, sample location optimization, extent of contamination, and health and safety evaluations.

RKI Eagle

Portable Multi-Gas Detector

The gastech can be used for reading headspace values in soil and water (wells). There are two types of ‘Gastechs’ in the Terraprobe office, the RKI Eagle 1 and Eagle 2. These portable gas detectors assist in screening field samples on many projects.

Portable VOC Monitor (Mini Rae 2000)

Portable VOC Monitors or PIDs (photo-ionization detector) monitors VOCs using the photo-ionization detector. If screening is required for VOCs, then this machine can be used. The PIDs are also used for health and safety for workers in enclosed spaces (such as trenches) in a known contaminated area.

Equipment Required

For Calibration

- Canister of gas (Hexane at 400ppm for Eagle 1, Hexane at 1650ppm for Eagle 2, Isobutylene at 100ppm for PID)
- Regulator.
- Tubing to attach probe to canister.

Field Screening

- Eagle or Mini Rae
- Nitrile Gloves
- Slider Bags
- Sampling Plan (from project manager)

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- Access Agreements (if required)
- Field Notebook and/or Field Sheets
- Appropriate Sampling Jars

Procedure (Calibration)

In order to ensure accuracy in the field, Terraprobe calibrates its Gastechs and PIDs each time they will be in the field.

There are three different gas canisters – one for the Eagle 1, the other for the Eagle 2 and a third for the MiniRae. The Eagle 1 is calibrated using the concentration of 400ppm while the Eagle 2 is calibrated with the concentration of 1650ppm. The PID is calibrated with Isobutylene at a concentration of 100ppm. Calibrating each machine is similar in principle but there are differences due to the different models we are using.

Eagle 1:

1. Take the Eagle to a fresh-air location
2. Turn the Eagle on and allow one minute for warm up
3. Hold the AIR button until a tone sounds
4. Press and hold SHIFT/▼ and then press the DISP/ADJ button. This will display the Calibration menu.
5. Select Single Calibration, press Enter
6. Press Enter to select HEX
7. The screen displays the channel selected, and the gas reading will flash
8. Connect the tubing from the regulator to the Eagle's probe.
9. If needed, use the AIR /▲ and SHIFT/▼ buttons to adjust the reading to match the concentration on the cylinder.
10. Press the ENTER button to set the value. Single Calibration will end and the menu will display.
11. Disconnect the tubing from the probe.
12. With the single calibration menu still displayed, use the SHIFT/▼ button until the ESC message displays, then press the ENTER button to return to the Calibration menu.
13. Press the SHIFT/▼ button to place the arrow next to Normal Operation and then press ENTER to return to the normal screen.

Eagle 2:

1. Take the Eagle to a fresh-air environment.
2. Turn the Eagle on and allow one minute for warm up.
3. Press and hold the RANGE/SHIFT button, when press the DISPLAY/ADJUST/NO button and release both buttons.
4. The Calibration Mode Screen displays with the cursor beside Auto Calibration.
5. Set the fresh air reading by: Moving the cursor to the Perform Air Adjust menu item by using the RANGE/SHIFT button. Press and release the POWER/ENTER/RESET button. The screen will say "Perform Air Adjust?" Press the AIR/YES button to continue. The Eagle 2 will indicate it is adjusting the zero reading before it returns to the Calibration Mode Screen.
6. Move the cursor to Single Calibration menu item by using the AIR/YES button.
7. Press and release the POWER/ENTER/RESET button. The "Select Sensor Screen" appears with the cursor flashing.
8. Move the cursor next to the sensor you want to calibrate with the AIR/YES and RANGE/SHIFT buttons.
9. Press and release the power enter reset button to proceed to the Single Calibration Gas Value screen. The calibration gas value is flashing
10. If necessary, adjust the calibration gas value to match the cylinder concentration with the air/yes and range/shift buttons.
11. Press and release the power/enter/reset button to proceed to the single calibration apply gas screen. Cal in Process is flashing.
12. Connect the tubing from the demand flow regulator to the probe. Allow the Eagle 2 to draw gas for one minute.

Mini Rae PID Calibration

1. Bring the Mini Rae to a fresh air environment.
2. Push the MODE and N/- buttons together to access a sub menu.
3. "Fresh Air Cal?" will appear.
4. Press the Y/+ key, the display shows "zero in progress" followed by "wait" and a countdown timer.
5. After about 15 seconds, the display shows the message "zeroed... reading = X.Xppm..." Press any key or wait, the monitor will return to "Fresh Air Calibration?" menu.
6. Connect the tubing to the regulator on the gas cylinder.
7. Press the Y/+ key at the "Span Cal?" to start calibration. The display shows the gas name and the span value of the corresponding gas.
8. The display shows "Apply gas now!" Turn on the valve of the span gas supply.



9. Display shows “wait... 30” with a countdown timer showing the number of remaining seconds while the monitor performs the calibration.
10. When the countdown timer reaches 0, the display gas shows the calibrated value.
11. After a span calibration is completed, the display will show the message “Span Cal Done! Turn Off Gas!”
12. Turn off the flow of gas and disconnect the calibration tubing from the Mini Rae.
13. Press any key to return to the sub menu. Press MENU to return to main menu and being operations.

Procedure (Field Screening)

1. Place soil sample in a slider bag and gently break up the pieces.
2. Using the Eagle, insert the probe into the bag and hold it above the soil. Do NOT put the probe in the soil. Wait 30 seconds for the probe to read the soil vapour.
3. Record the value and remove the probe from the slider bag.
4. PIDs can be used the same way HOWEVER, it must be noted that if sampling for VOCs, the sample must be preserved within 10-12 seconds of sampling. This means that any sample that is potentially going to be jarred must have a methanol vial stored immediately.
5. Using the probes to measure headspace readings in a well follows the same basic principles. Open the j-plug or slip cap and quickly insert the probe into the top of the well taking extreme caution not to allow the probe to touch any water, and cover the top of the well with your hand.
6. Wait 30 seconds for the probe to establish a reading.
7. Remove the probe and record the value.

References

- *US EPA Field Sampling Guidance Document #1210 “Soil Sampling for Volatile Compounds”*
- *MiniRae 2000 Portable VOC Monitor Operation and Maintenance Manual, Rev. C*
- *US EPA Field Screening Methods Catalog User’s Guide*
- *Instruction Manual Eagle Series Portable Multi Gas Detector. Rev.H.*
- *RKI Eagle 2 Operator’s Manual. Rev. Q.*



STANDARD OPERATING PROCEDURE – SOIL SAMPLING

VOC

Introduction

To properly screen for VOC and PHC F1 that may be present in the soil, it is necessary to preserve ALL samples. Upon retrieval of soil samples from borehole and test pit investigations, soil should be placed in methanol vials as quickly as possible (within 10 to 15 seconds after retrieval). Temporary storage of soil in split spoons, jars or ziplock bags is not permitted.

Field screening may still be used to decide which samples will be submitted for analysis but all potential samples must be immediately chemically preserved. Once the VOC or PHC F1 sample has been collected the remaining portion of the sample can be placed into plastic bags and sealed tightly with a nominal head space. Upon completion of each borehole, gas tech or PID readings can be taken of each sample collected to determine which sample(s) will be submitted for chemical analysis.

In addition to samples collected in methanol vials, a separate container must be collected to determine moisture content. The same jars that are used to collect other soil samples are appropriate containers (60ml or 120ml).

Equipment Required

- Nitrile Gloves
- Field Parameter Measurement Device (Gastech, PID)
- Laboratory Sample Bottles
- Terracores or sampling syringes (sampler)
- Field Notebook and/or Field Sheets
- Sampling Plan (from project manager)
- Access Agreements (if required)
- Ice

Procedure

1. Review sampling plan and sampling locations with project manager
2. Determine what equipment and supplies are required.

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3. Obtain necessary sampling and monitoring equipment.
4. Coordinate with project manager and clients, as required, for site access.
5. Perform a general site survey in accordance with any applicable site-specific health and safety plans.
6. Identify and mark all sampling locations.
7. Assemble the appropriate laboratory supplied bottles.
8. Collect the sample to be analyzed
 - a. Borehole - split spoon, sample from spoon
 - b. Test pit, collect sample in bag from excavator bucket, then sample immediately
9. Push the sampler into the soil to retrieve the sample.
10. Remove the sampler from the soil.
11. Clean off loose soil that may be on the outside of the sampler and remove extra soil if applicable.
12. Place the mouth of the sampler into the 40ml methanol vial.
13. Ensure vial is at an angle to reduce the chance of splashing chemical.
14. Collect samples in the laboratory supplied bottle
15. Log all samples in the site logbook and label all samples.
16. Package samples and complete necessary paperwork.
17. Transport sample to staging area for preparation for transport to analytical laboratory.

References

- *Field Sampling guidance Document # 1210 – Soil Sampling for Volatile Compounds*, U.S.EPA,
- *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, July 2011



STANDARD OPERATING PROCEDURE – WELL INSTALLATION

Introduction

All wells are to be constructed with flush-thread joints and factory-slotted screen. Terraprobe monitoring wells are 2-inch (50 mm) inside diameter PVC unless otherwise stipulated or required by site specific standards or sampling requirements. Other possible well diameters and materials include:

- 1-inch (25 mm) PVC,
- 1.5 –inch (37 mm) PVC,
- 4-inch (100mm) steel,
- 6 inch (150 mm) steel,
- 10 inch (255 mm) steel and;
- 3 foot (915 mm) concrete.

Water washed silica sand is used for the filter pack, bentonite is used to create a seal above the screen to just below the surface and sand is added to ground level. Well casings are installed using cement to secure them.

Notes:

- Monitoring wells are to be installed by a licenced well driller only.
- The installation procedures outlined in this document are for reference only to insure familiarization with the process.
- The installation procedures outlined in this document are for the installation of a typical 2-inch PVC monitoring well.
- Maximum length of well screen allowed under O.Reg. 153/04 is 3 m (10 feet)
- A MOE Well Record is required under O.Reg. 903 if:
 - The monitoring well is greater than 3 m (10 feet) and/or
 - The monitoring well will be in place longer than 30 days
- Well Records can be either for a single well or a group of wells (cluster).
- A well cluster record can be written only if all the wells are within the same property, or adjacent properties owned by the same owner.

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Equipment Required

- Interface or Water Level Meter
- Field Notebook and/or Field Sheets
- Well Keys/Locks or Tools Required
- PVC Pipe (risers/casing)
- PVC Screen
- J-Plugs
- Flush Mount Casing or Above Grade Casing
- Bentonite
- Silica Sand
- Sampling Plan (from project manager)
- Access Agreements (if required)

Procedure

1. After borehole completion, measure total depth before riser casing and screen are installed and before the augers are removed. This confirms drilling depths are accurate.
2. Decontaminate screen and casing (typically done off-site by water well driller), check that casing sections are straight and not cracked or damaged.
3. Verify and record diameter and lengths of casings and screen.
4. The casing/screen will be installed by:
 - a. Placing an end cap on the screen section
 - b. Attaching a section of riser to the screen and lowering into the borehole
 - c. Additional sections of riser will be added and lowered into the borehole until the desired screened interval is reached
5. Record the length of screen and riser pipe used for the monitoring well.
6. Verify and record that the proper filter (sand) pack has been selected.
7. The sand is poured into the space around the screen. Ensure it fills the hole to at least two feet above the screen.
 - a. In hollow stem auger wells, the sand pack must be poured down the hollow stem of the augers. Augers are then pulled out of the borehole in 2-1/2 to 5 feet increments, sand is poured and level measured with a weighted tape.
8. Use a weighted tape and take continuous measurements while the sand is being poured to ensure proper installation. Pack the sand down to verify.
9. Record how much sand is used.
10. A bentonite seal is placed directly above the sand pack, minimum two feet thick, and should extend into the next soil strata.
11. Record how much bentonite is used.
12. A grout seal is then placed above the bentonite and can be a mixture of cement, bentonite, sand and water.

13. Surface completion is to be completed one of two ways.
 - a. Above grade: Locking well cover sticking above grade, secured by lock and key.
 - b. At grade: Flush mount casing, lock with ratchet bolts or allen key.
14. Each casing is installed over the PVC pipe and cemented into place.
15. Record GPS coordinates and measure stick up (if above grade).
16. Confirm that a well record will be completed for the monitoring well. Confirm the information to be submitted on the well record or the cluster of wells.
17. Survey the completed monitoring well to a geodetic or recoverable benchmark

References

- *Geotechnical Field Investigations, Terraprobe Ltd, July 26, 1990*
- *Ontario Water Resources Act R.R.O. 1990 Regulation 903 Wells*
- *Environmental Protection Act Ontario Regulation 153/04*



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STANDARD OPERATING PROCEDURE – GROUND WATER SAMPLING

Inertial Pump (Waterra/Footvalve)

Introduction

The inertial pump consists of a one way foot valve and low density or high density tubing. The inertial pump can be used in the development, purging and sampling of ground water monitoring wells.

Equipment Required

- Interface or Water Level Meter
- Waterra Tubing (typically 5/8" in diameter)
- Footvalve(s)
- Surge Block(s)
- Nitrile Gloves
- Bucket
- Field Parameter Measurement Device (Horiba Flow Cell, YSI Meter, Hanna Meter, etc.)
- Laboratory Sample Bottles
- Field Notebook and/or Field Sheets
- Well Keys or Tools Required
- Sampling Plan (from project manager)
- Access Agreements (if required)
- Ice

Procedure

1. Review sampling plan and monitoring well locations with project manager
2. Review borehole logs and determine monitoring well depths and well screen locations.
3. Determine what equipment and supplies are required.
4. Obtain necessary sampling and monitoring equipment.
5. Decontaminate or pre-clean equipment, and ensure that it is in working order.
6. Coordinate with project manager and clients, as required, for site access.
7. Perform a general site survey in accordance with any applicable site-specific health and safety plans.
8. Identify and mark all sampling locations.
9. Start sampling at the least contaminated monitoring well (if known).

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10. Remove locking well cap, note location time of day, and date in your notebook
11. Remove well casing cap.
12. Lower water level measuring device or equivalent into well until water surface is encountered.
13. Measure distance from water surface to reference measuring point on well casing and in field notebook. Alternatively, if there is no reference point, note that water level measurement is from top of steel casing, top of PVC riser pipe, from ground surface.
14. Measure total depth of well. Repeat at least twice to confirm measurement and record in field notebook
15. Calculate the volume of water in the well and record in field notebook.
16. Assemble Waterra tubing and footvalve.
17. Lower tubing (Footvalve first) into the well until the foot valve is at the depth of the well screen.
18. Cut Waterra, leaving enough room to purge and sample comfortably.
19. Purge well until field parameters (such as temperature, pH, conductivity, etc.) have stabilized. Field parameters are measured by a hand held device (YSI or similar). Record field parameters until parameters have stabilized, and record the water level in the monitoring well.
 - a. If the calculated purge volume is small, the measurements should be taken frequently to provide a sufficient number of measurements to evaluate stability (every $\frac{1}{4}$ casing volume). If the purge volume is large, measurements taken every $\frac{1}{2}$ to 1 casing volume may be sufficient.
 - b. Stabilization occurs when:
 - i. Turbidity ($\pm 10\%$ for values greater than 5 NTU; if three Turbidity values are less than 5 NTU, consider the values as stabilized),
 - ii. Conductivity ($\pm 3\%$),
 - iii. Temperature ($\pm 3\%$),
 - iv. pH (± 0.1 unit),
 - c. If after three well volumes have been removed, the chemical parameters have not stabilized according to the above criteria, additional well volumes should be removed.
 - d. If the field parameters have not stabilized within five volumes, contact the project manager to determine whether or not to collect a sample or to continue purging.
20. Collect and dispose of purge waters as specified in the site-specific sampling plan.
21. Assemble the appropriate laboratory supplied bottles.
22. Organize sample bottles so as to easily fill them if alone. If with a partner, have them hold the bottles as pumping occurs.
23. Collect samples in the laboratory supplied bottle
 - a. For non-filtered samples collect directly from the tubing into the sample bottle.
 - b. For filtered samples, connect the tubing directly to the filter unit.
24. Cap the sample bottle tightly and place relabeled sample container in a carrier
25. Replace the well cap.
26. Log all samples in the site logbook and label all samples.

27. Package samples and complete necessary paperwork.
28. Transport sample to staging area for preparation for transport to analytical laboratory.

NOTE: Purging should be completed immediately prior to sample collection although it is acceptable to purge and then collect samples within 24 hours.

References

- *Field Sampling guidance Document # 1220 – Groundwater Well Sampling*, U.S.EPA, September 2004
- *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*, Ontario Ministry of the Environment, July 2011



STANDARD OPERATING PROCEDURE – WELL DEVELOPMENT

Introduction

Monitoring well development is necessary to ensure that complete hydraulic connection is made and maintained between the well and the aquifer material surrounding the well screen and filter pack. It also serves to restore the groundwater properties disturbed during drilling.

Most common techniques at Terraprobe include ‘surging’, and bailing, often used together. Other development methods that may be used include jetting, airlift, and submersible pump methods. Jetting is typically not used as a development method for environmental investigations, but is commonly used for water resource monitoring wells or drinking water wells. Generally a phased process is used to develop wells, starting with a gentle bailing phase to remove sand, followed by a surging phase, and finally a pumping phase after the well begins to clear up.

After a well is first installed, and in fact, often before the bentonite pellet seal is set, gentle bailing is used to remove water and sand from the well. Bailing can be accomplished through the use of dedicated bailers or Waterra inertia pumps. The purpose of this technique is used to settle the sand pack. After further well sealant materials have been added and allowed to set for approximately 48 hours, bailing is resumed as part of well development. The purpose of bailing is to remove any fine material that may have accumulated in the well, and start pulling in natural material into the sand pack. Bailing is often conducted until the sand content in the removed water begins to decrease.

After the sand content begins to decrease, surging is conducted. A surge block is used to move sediments from the filter pack into the well casing. All surge blocks will be constructed of materials that will not introduce contamination into the well. Surge blocks should have some manner of allowing pressure release to prevent casing collapse. Terraprobe uses Waterra surge blocks which fit onto Waterra inertia pumps. The surge block is moved up and down the well screen interval and then removed, followed by a return to bailing to remove any sand brought into the well by the surging action. Care should be taken to not surge too strongly with subsequent casing deformation or collapse; the well screen interval is often the weakest part of a well. Surging should be followed by additional bailing to remove fine materials that may have entered the well during the surging effort.

After surging has been completed and the sand content of the bailed water has decreased, a submersible pump or inertia pump is used to continue well development. The pump should be moved up and

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down the well screen interval until the obtained water is relatively clear. Well development will continue until the water in the well clarifies and monitoring parameters such as pH, specific conductivity, and temperature stabilize as defined in the project-specific planning documents. It should be noted that where very fine-grained formations are present at the screened interval, continued well development until clear water is obtained might be impossible. Decisions regarding when to cease development where very fine-grained conditions exist should be made between the field supervisor and project manager.

During well development pH, specific conductivity, temperature, and turbidity should be monitored frequently to establish natural conditions and evaluate whether the well has been completely developed. The main criterion for well development is clear water (Nephelometric turbidity units or NTU of less than 5). As mentioned above, clear water can often be impossible to obtain with environmental monitoring wells. A further criterion for completed well development is that the other water quality parameters mentioned above stabilize to within 10 percent between readings over one well volume. The minimum volume of water purged from the well during development will be approximately a minimum of 3 borehole volumes (wells will typically not reach stabilization of water quality parameters before this condition is achieved and may not have reached stability even after this threshold has been achieved).

Equipment Required

- Interface or Water Level Meter
- Nitrile Gloves
- Water Quality Meter (EC, pH, Temperature)
- Bucket
- Field Notebook and/or Field Sheets
- Well Keys or Tools Required
- Waterra
- Waterra cutters (avoid using knives)
- Surge Blocks (if required)
- Foot valves
- Storage for contaminated (or suspected contaminated) water.
- Access Agreements (if required)

Procedure

1. Review monitoring well locations with project manager
2. Review borehole logs and determine monitoring well depths and well screen locations.
3. Obtain Waterra tubing, foot valves and surge blocks.
4. Coordinate with project manager and clients, as required, for site access.
5. Perform a general site survey in accordance with any applicable site-specific health and safety plans.
6. Identify and mark all monitoring wells.

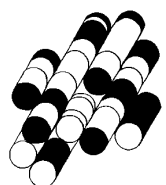
7. Open the monitoring well and take initial readings (ie; head space air monitor readings, water level, well depth) and record in the field notebook.
8. Organize equipment.
9. Bailing the monitoring well:
 - a. Calculate casing volume to determine the ideal amount to be purged (three casing volumes).
 - b. Attach foot valve to that end of Waterra
 - c. Slowly lower Waterra down the well. Once it hits the bottom, leave some extra Waterra above the top of the well to easily handle pumping and cut the Waterra.
 - d. Slowly remove three casing volumes from the monitoring well.
 - e. Dispose of purged water in barrels if known or suspected contaminants are of concern, or however the project manager instructs.
10. Surging the monitoring well
 - a. Slip surge block onto the end of the Waterra and reattach the foot valve, securing the surge block
 - b. Place surge block and Waterra back into the monitoring well
 - c. Raise and lower the surge block along the screen. (Should be able to feel location of the well screen)
 - d. Continue surging for 5-10 minutes.
11. Final purge of the monitoring well
 - a. Remove surge block from Waterra
 - b. Lower the Waterra back down the well. Begin pumping water out of the well, taking care to note water quality and appearance (smell, clarity, etc.).
 - c. Continue to purge the monitoring well until the following water quality parameters have stabilized:
 - i. Turbidity ($\pm 10\%$ for values greater than 5 NTU; if three Turbidity values are less than 5 NTU, consider the values as stabilized),
 - ii. Conductivity ($\pm 3\%$),
 - iii. Temperature ($\pm 3\%$),
 - iv. pH (± 0.1 unit),
 - d. Dispose of purged water in barrels if known or suspected contaminants are of concern, or however the project manager instructs.
12. Record final measurements in field book, record date, water level before and after development, quantity of water removed, equipment used and techniques (surge and purge, or purge only).

References

- *ASTM Standard Practice and Installation of Ground Water Monitoring Wells in Aquifers*
- *EPA SOP#2044 Well Development March 10, 199*

APPENDIX D

TERRAPROBE INC.



Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : CM
Date started : March 3, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 1 of 1	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606050, N: 4910474 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Solid stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value		X Dynamic Cone	Undrained Shear Strength (kPa)	Plastic Limit	Natural Water Content	Liquid Limit			
0	273.0	GROUND SURFACE						10 20 30 40							
		100mm TOPSOIL						40 80 120 160							
		FILL, sand, trace to some silt, trace gravel, trace organics, compact, brown / dark brown, moist		1	AS										
1				2	SS	13									
	271.5														
	1.5	SAND, trace to some silt, compact, brown, moist		3	SS	17									
2	270.9														
	2.1														

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

<u>Date</u>	<u>Water Depth (m)</u>	<u>Elevation (m)</u>
Mar 10, 2020	dry	n/a

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : CM
Date started : March 3, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 1 of 1	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606063, N: 4910504 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Solid stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)				Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value		X Dynamic Cone				Plastic Limit	Natural Water Content	Liquid Limit			
								Undrained Shear Strength (kPa)									
0	273.0	GROUND SURFACE		1	SS	50 / 75mm											
1	272.2 0.8	Trace organics (WEATHERED/DISTURBED)															
		SAND, trace to some silt, very dense, brown, moist		2	SS	65											
				3	SS	50 / 100mm											
2																	
				4	SS	63											
3																	
		...moist to wet below		5	SS	50 / 75mm											
4																	
				6	SS	80 / 250mm											
5																	
6	266.7 6.3			7	SS	50 / 50mm											

Penetration Test Values (Blows / 0.3m)

X Dynamic Cone

10 20 30 40

Undrained Shear Strength (kPa)

○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane

40 80 120 160

Moisture / Plasticity

Plastic Limit Natural Water Content Liquid Limit

PL MC LL

10 20 30

Unstabilized Water Level

GR SA SI CL

GRAIN SIZE DISTRIBUTION (%) (MIT)

SS2 Analysis: M&I

SS7 Analysis: BTEX, VOC, PHC

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

<u>Date</u>	<u>Water Depth (m)</u>	<u>Elevation (m)</u>
Mar 10, 2020	dry	n/a

SS2 Analysis: M&I

SS7 Analysis: BTEX, VOC, PHC

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : BO
Date started : February 24, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 1 of 1	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606112, N: 4910523 (UTM 17T)	Elevation Datum : Geodetic	
Rig type : Track-mounted	Drilling Method : Solid stem augers	

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments		
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value		X Dynamic Cone		Plastic Limit	Natural Water Content	Liquid Limit					
								10	20							30	40
								Undrained Shear Strength (kPa)									
								○ Unconfined ● Pocket Penetrometer 40 80 120 160	✚ Field Vane ■ Lab Vane	PL MC LL 10 20 30							
0	273.1	GROUND SURFACE															
		75mm AGGREGATE															
		SAND AND SILT to SILT AND SAND, trace clay, trace gravel, dense to very dense, brown, moist		1	AS		273						PID: 0				
1				2	SS	57	272						PID: 5				
				3	SS	57							PID: 5				
2							271										
				4	SS	35							PID: 5				
3																	
				5	SS	34	270						PID: 0				
4																	
							269										
5				6	SS	32							PID: 0				
							268										
6																	
							267						PID: 0				
	266.5			7	SS	54											
	6.6																
7		Augered to about 9.1m below grade to install monitoring well					266										
8																	
9	264.0						264										

END OF BOREHOLE

Water level and cave could not measured due to hollow stem auger.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS		
Date	Water Depth (m)	Elevation (m)
Mar 10, 2020	dry	n/a

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : CM
Date started : March 3, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 1 of 1	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606160, N: 4910530 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Solid stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)				Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value		X Dynamic Cone				Plastic Limit	Natural Water Content	Liquid Limit			
								10	20	30	40						
0	273.0	GROUND SURFACE						Undrained Shear Strength (kPa)									
		100mm TOPSOIL		1	SS	56											SS1 Analysis: M&I
	272.2	FILL, gravel and sand, some silt, trace organics, compact, brown / dark brown, moist															
1	0.8	SAND, some silt to silty, trace gravel, trace clay, very dense, brown, moist		2	SS	63											
2				3	SS	75											
				4	SS	64											
3																	
				5	SS	70											
4																	
				6	SS	50 / 75mm											
5																	
				7	SS	50 / 125mm											
6	266.8																
	6.2															SS7 Analysis: BTEX, VOC, PHC	

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

<u>Date</u>	<u>Water Depth (m)</u>	<u>Elevation (m)</u>
Mar 10, 2020	dry	n/a



Project No. : 1-19-0792-01

Client : Environmental 360 Solutions Ltd

Originated by : BO

Date started : February 24, 2020

Project : 571 Welham Road

Compiled by : AS

Sheet No. : 1 of 1

Location : Barrie, Ontario

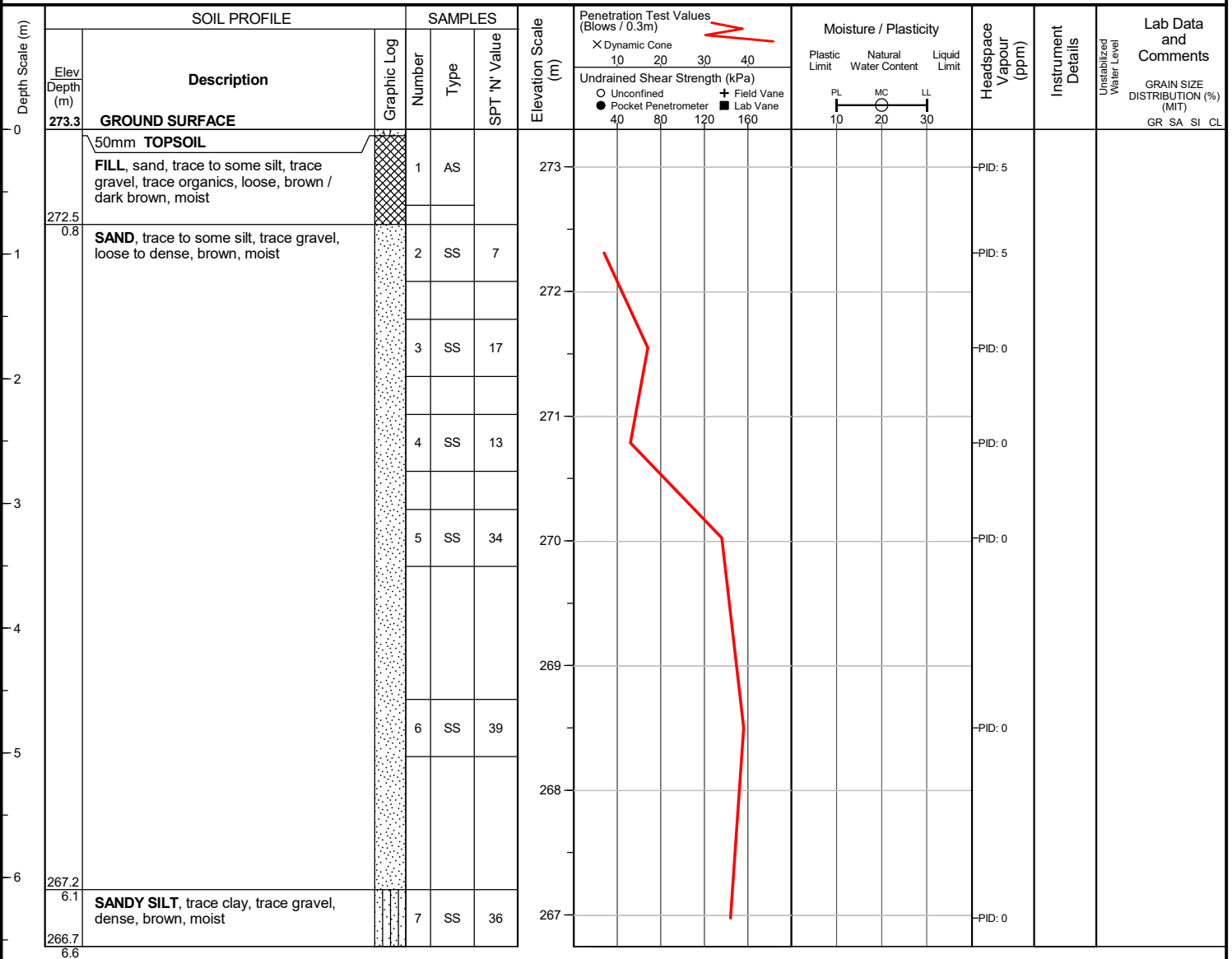
Checked by : MMT

Position : E: 606125, N: 4910506 (UTM 17T)

Elevation Datum : Geodetic

Rig type : Track-mounted

Drilling Method : Hollow stem augers



END OF BOREHOLE

Water level and cave could not measured due to hollow stem auger.



Originated by : BO

Compiled by : AS

Checked by : MMT

Drilling Method : Hollow stem augers

(continued next page)

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : BO
Date started : February 26, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 2 of 2	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606088, N: 4910475 (UTM 17T)			Elevation Datum : Geodetic		
Rig type : Track-mounted			Drilling Method : Hollow stem augers		

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) X Dynamic Cone 10 20 30 40 Undrained Shear Strength (kPa) ○ Unconfined ● Pocket Penetrometer 40 80 120 160	Moisture / Plasticity Plastic Limit Natural Water Content Liquid Limit PL MC LL 10 20 30	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL		
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value								
		(continued)												
11		SAND, trace to some silt, very dense, brown, damp (continued)		10	SS	67					PID: 0		SS10 Analysis: BTEx, VOC, PHC	
12														
13				11	SS	31								PID: 0
	260.7 12.6	Augered to about 13.7m below grade to install monitoring well												
	259.6 13.7													

END OF BOREHOLE

Water level and cave could not measured due to hollow stem auger.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Mar 10, 2020	9.6	263.7



Project No. : 1-19-0792-01

Date started : March 3, 2020

Sheet No. : 1 of 2

Client : Environmental 360 Solutions Ltd

Project : 571 Welham Road

Location : Barrie, Ontario

Originated by : CM

Compiled by : AS

Checked by : MMT

Position : E: 606136, N: 4910490 (UTM 17T)

Elevation Datum : Geodetic

Rig type : Track-mounted

Drilling Method : Solid stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value		Dynamic Cone	Undrained Shear Strength (kPa)	Plastic Limit	Natural Water Content	Liquid Limit			
0	273.4	GROUND SURFACE													
	273.2	150mm TOPSOIL		1	SS	61	273						PID: 0		
	0.2	FILL, silty sand, some gravel, trace organics, compact, brown / dark brown, moist													
	272.6	SAND AND SILT to SILTY SAND, trace clay, trace gravel, compact to very dense, brown, moist		2	SS	27	272						PID: 0		
	0.8														
				3	SS	54	271						PID: 0		
				4	SS	42	270						PID: 0		
				5	SS	98	269						PID: 0		
				6	SS	50 / 50mm	268						PID: 0		
				7	SS	61	267						PID: 0		
				8	SS	50 / 100mm	266						PID: 0		
				9	SS	50 / 50mm	265						PID: 0		
		...wet below					264								

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : CM
Date started : March 3, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 2 of 2	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606136, N: 4910490 (UTM 17T)		Elevation Datum : Geodetic	
Rig type : Track-mounted		Drilling Method : Solid stem augers	

Depth Scale (m)	SOIL PROFILE		SAMPLES		Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)	Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number			Type	SPT 'N' Value	Plastic Limit			
		(continued)										
		SAND AND SILT to SILTY SAND , trace clay, trace gravel, compact to very dense, brown, moist (continued)										
262.5				10	SS	50 / 125mm						
11	10.9											

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

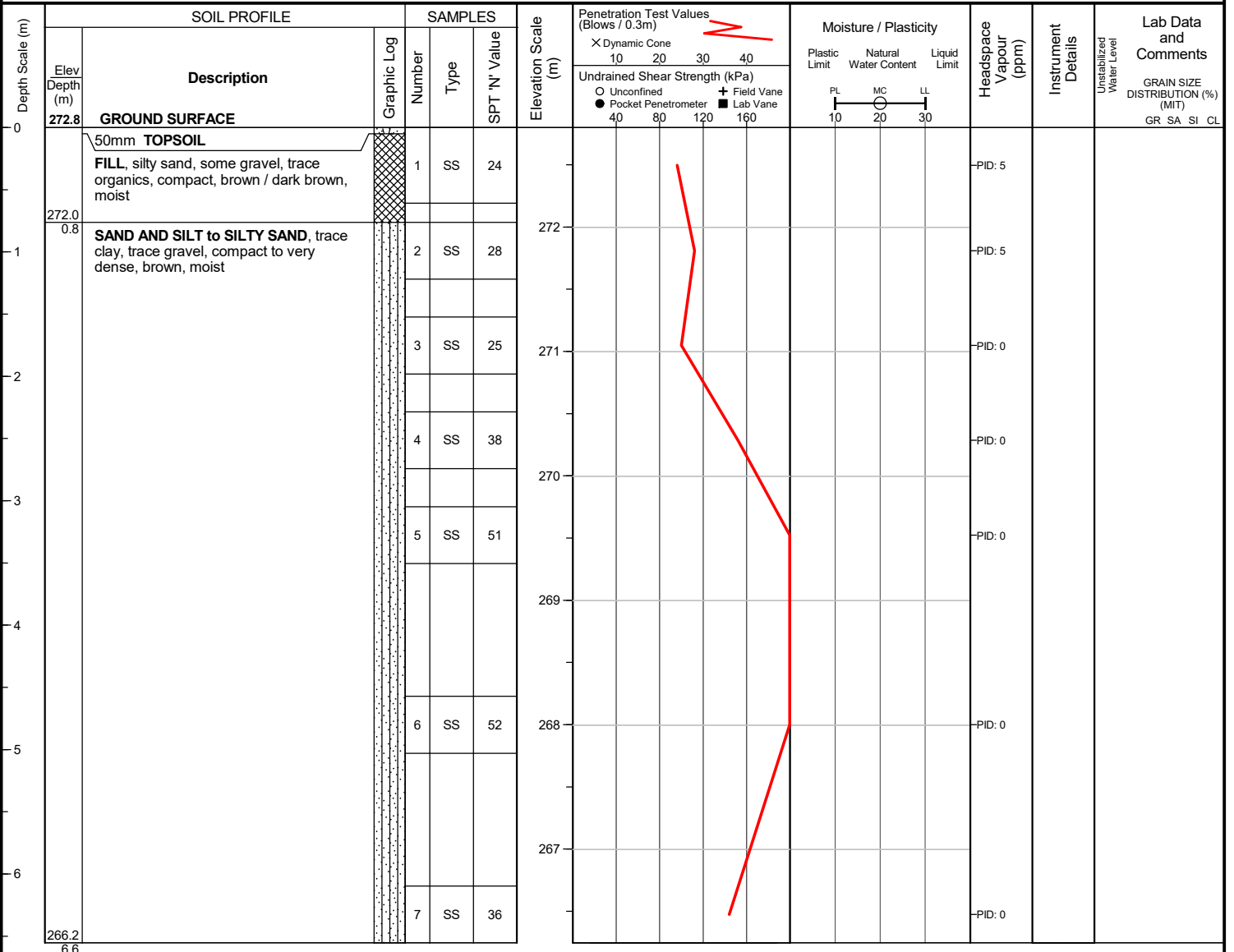
50 mm dia. monitoring well installed.

WATER LEVEL READINGS

<u>Date</u>	<u>Water Depth (m)</u>	<u>Elevation (m)</u>
Mar 10, 2020	dry	n/a

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : BO
Date started : February 29, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 1 of 1	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606184, N: 4910499 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Hollow stem augers



END OF BOREHOLE

Water level and cave could not measured due to hollow stem auger.

Project No. : 1-19-0792-01 Client : Environmental 360 Solutions Ltd Originated by : BO
 Date started : February 25, 2020 Project : 571 Welham Road Compiled by : AS
 Sheet No. : 1 of 1 Location : Barrie, Ontario Checked by : MMT

Position : E: 606193, N: 4910527 (UTM 17T) Elevation Datum : Geodetic
 Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value		Dynamic Cone	Undrained Shear Strength (kPa)	Plastic Limit	Natural Water Content	Liquid Limit			
0	272.6	GROUND SURFACE													
		75mm TOPSOIL		1	SS	35	272						PID: 5		
	271.8	FILL , sand, trace to some silt, trace gravel, trace organics, stone pieces inclusion, compact, brown / dark brown, moist													
-1	0.8	SAND AND SILT to SILTY SAND , trace clay, trace gravel, compact to dense, brown, moist		2	SS	12	271						PID: 5		
				3	SS	22	270						PID: 0		
-2				4	SS	29	269						PID: 5		
-3				5	SS	26	268						PID: 0		
-4															
-5				6	SS	32	267						PID: 0		
-6				7	SS	30							PID: 0		
	266.0	END OF BOREHOLE													

Water level and cave could not measured due to hollow stem auger.

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : BO
Date started : February 24, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 1 of 1	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606201, N: 4910558 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Solid stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value						
0	272.4	GROUND SURFACE										
		100mm AGGREGATE		1	AS		272					PID: 0 PID: 5 PID: 5 <u>SS3 Analysis:</u> M&I
		FILL , silty sand, some gravel, trace organics, compact, brown / dark brown, moist										
		...topsoil inclusions		2	SS	12						
	270.9						271					
	1.5	FILL , sand, trace to some silt, trace gravel, trace organics, compact, brown / dark brown, moist		3	SS	24						
2	270.3											
	2.1											

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : BO
Date started : February 24, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 1 of 1	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606216, N: 4910520 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Hollow stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value		X Dynamic Cone		Plastic Limit	Natural Water Content	Liquid Limit			
								10	20						
								Undrained Shear Strength (kPa)							
								○ Unconfined ● Pocket Penetrometer	+ Field Vane ■ Lab Vane	PL MC LL					
	272.5	GROUND SURFACE						40	80	120	160	10	20	30	
0		100mm TOPSOIL		1	AS		272								PID: 5
		FILL, silty sand, some gravel, trace organics, compact, brown / dark brown, moist		2	SS	23									PID: 5
1		...wood pieces inclusion		3	SS	15	271								PID: 5
	270.5														
2.0															

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : BO
Date started : February 25, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 1 of 1	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606159, N: 4910483 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Solid stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value		X Dynamic Cone 10 20 30 40	Plastic Limit Natural Water Content Liquid Limit						
0	273.1	GROUND SURFACE													
		100mm TOPSOIL		1	AS										
	272.3	FILL, silty sand, some gravel, trace organics, compact, dark brown, moist													
1	272.3 0.8	SANDY SILT to SILT AND SAND, trace clay, trace gravel, compact to dense, brown, moist		2	SS	24									
															
	271.1			3	SS	44									
															

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.



Project No. : 1-19-0792-01

Client : Environmental 360 Solutions Ltd

Originated by : BO

Date started : February 25, 2020

Project : 571 Welham Road

Compiled by : AS

Sheet No. : 1 of 2

Location : Barrie, Ontario

Checked by : MMT

Position : E: 606203, N: 4910484 (UTM 17T)

Elevation Datum : Geodetic

Rig type : Track-mounted

Drilling Method : Hollow stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)	Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value			Plastic Limit	Natural Water Content	Liquid Limit			
0	272.9	GROUND SURFACE												
		100mm TOPSOIL		1	AS							PID: 5		
		FILL , silty sand, some gravel, trace organics, compact, brown / dark brown, moist												
-1				2	SS	38	272					PID: 5		
	271.4													
	1.5	FILL , sandy silt, some clay, trace gravel, trace organics, compact, dark brown, moist		3	SS	13	271					PID: 5		
-2														
		...at 2.3 m, cobble / stone pieces inclusion		4	SS	50 / 125mm						PID: 5		
-3	269.9						270							
	3.0	SAND , trace to some silt, compact, brown, moist		5	SS	23						PID: 0		
-4							269							
	268.3													
	4.6	SANDY SILT to SILT AND SAND , trace clay, trace gravel, very dense, brown, moist		6	SS	80	268					PID: 0		
-5														
	266.5						267							
	6.4	Augered to about 10.7m below grade to install monitoring well on Feb 26, 2020.		7	SS	50 / 150mm						PID: 0		
-6														
-7							266							
-8							265							
-9							264							
-10							263							

(continued next page)

Project No. : 1-19-0792-01 Client : Environmental 360 Solutions Ltd Originated by : BO
 Date started : February 25, 2020 Project : 571 Welham Road Compiled by : AS
 Sheet No. : 2 of 2 Location : Barrie, Ontario Checked by : MMT

Position : E: 606203, N: 4910484 (UTM 17T) Elevation Datum : Geodetic
 Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	SOIL PROFILE			SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)	Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value			Plastic Limit	Natural Water Content	Liquid Limit			
		(continued)						X Dynamic Cone 10 20 30 40 Undrained Shear Strength (kPa) ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160						
	262.2 10.7	Augered to about 10.7m below grade to install monitoring well on Feb 26, 2020. (continued)												

END OF BOREHOLE

Water level and cave could not measured due to hollow stem auger.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS
 Date Water Depth (m) Elevation (m)
 Mar 10, 2020 dry n/a

Project No. : 1-19-0792-01	Client : Environmental 360 Solutions Ltd	Originated by : CM
Date started : March 3, 2020	Project : 571 Welham Road	Compiled by : AS
Sheet No. : 1 of 1	Location : Barrie, Ontario	Checked by : MMT

Position : E: 606052, N: 4910529 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Solid stem augers

SOIL PROFILE				SAMPLES			Elevation Scale (m)	Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity			Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments		
Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value		X Dynamic Cone				Plastic Limit					Natural Water Content	Liquid Limit
								10	20	30	40							
								Undrained Shear Strength (kPa)				PL MC LL						
								○ Unconfined + Field Vane										
								● Pocket Penetrometer ■ Lab Vane										
								40 80 120 160				10 20 30						
0	273.9	GROUND SURFACE		1	AS	50 / 50mm							PID: 0					
	273.7	150mm ASPHALTIC CONCRETE																
	273.6	150mm AGGREGATE																
	0.3	FILL, sand, some silt, trace gravel, trace organics, loose, brown / dark brown, moist																
1	273.1	SAND, trace to some silt, trace gravel, very dense, brown, damp to moist		2	SS	57		273					PID: 0			SS2 Analysis: M&I, VOC		
2				3	SS	62		272					PID: 0			SS3 Analysis: .pH		
				4	SS	91 / 225mm							PID: 0					
3				5	SS	97 / 250mm		271					PID: 0					
4								270										
5				6	SS	50 / 100mm							PID: 0					
6								269										

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS
Date Water Depth (m) Elevation (m)
 Mar 10, 2020 dry n/a

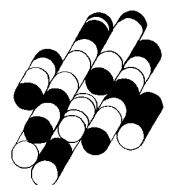


Position	: E: 606168, N: 4910578 (UTM 17T)	Elevation Datum	: Geodetic
Rig type	: Track-mounted	Drilling Method	: Hollow stem augers

WATER LEVEL READINGS		
<u>Date</u>	<u>Water Depth (m)</u>	<u>Elevation (m)</u>
Mar 10, 2020	dry	n/a

APPENDIX E

TERRAPROBE INC.



CLIENT NAME: TERRAPROBE INC.
11 INDELL LANE
BRAMPTON, ON L6T3Y3
(905) 796-2650

ATTENTION TO: Muhammad Shahid

PROJECT: 1-19-0792-42

AGAT WORK ORDER: 20T581563

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Mar 11, 2020

PAGES (INCLUDING COVER): 18

VERSION*: 1

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

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This report shall not be reproduced or distributed, in whole or in part, without the prior written consent of AGAT Laboratories.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



Certificate of Analysis

AGAT WORK ORDER: 20T581563

PROJECT: 1-19-0792-42

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

CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE: Barrie, ON

ATTENTION TO: Muhammad Shahid

SAMPLED BY: BH

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

DATE RECEIVED: 2020-03-05

DATE REPORTED: 2020-03-11

Parameter	Unit	SAMPLE DESCRIPTION:		BH2/SS2	BH3/SS2	BH4/SS1	BH10/SS3	BH14/SS2	BH15/SS3	DUP 2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2020-03-03	2020-02-24	2020-03-03	2020-02-24	2020-03-03	2020-02-24	2020-02-24
		G / S	RDL	998285	998289	998320	998361	998362	998370	998378
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	<1	<1	1	1	<1	1	<1
Barium	µg/g	220	2	12	20	40	21	6	40	20
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	<5	<5	<5	<5	<5	<5	<5
Boron (Hot Water Extractable)	µg/g	1.5	0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	5	<5	6	11	8	7	12	7
Cobalt	µg/g	22	0.5	1.3	2.2	3.5	2.5	2.1	3.8	2.4
Copper	µg/g	92	1	3	5	5	4	3	4	4
Lead	µg/g	120	1	<1	1	3	2	1	3	2
Molybdenum	µg/g	2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	µg/g	82	1	2	3	6	4	3	6	4
Selenium	µg/g	1.5	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Silver	µg/g	0.5	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vanadium	µg/g	86	1	6	15	26	19	28	24	17
Zinc	µg/g	290	5	5	10	17	13	7	24	11
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pH, 2:1 CaCl2 Extraction	pH Units		NA	8.08	7.96	7.66	8.05	8.14	7.63	7.63

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 8: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

998285-998378 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Divine Basily



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20T581563

PROJECT: 1-19-0792-42

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

CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE: Barrie, ON

ATTENTION TO: Muhammad Shahid

SAMPLED BY: BH

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

DATE RECEIVED: 2020-03-05

DATE REPORTED: 2020-03-11

		SAMPLE DESCRIPTION:		BH3/SS4	BH6/SS7	DUP 1
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2020-02-24	2020-02-26	2020-02-26
Parameter	Unit	G / S	RDL	998319	998357	998377
pH, 2:1 CaCl ₂ Extraction	pH Units		NA	7.88	8.05	7.89

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

998319-998377 pH was determined on the 0.01M CaCl₂ extract obtained from 2:1 leaching procedure (2 parts extraction fluid:1 part wet soil).

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Divine Basily



Certificate of Analysis

AGAT WORK ORDER: 20T581563

PROJECT: 1-19-0792-42

5835 COOPERS AVENUE
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<http://www.agatlabs.com>

CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE: Barrie, ON

ATTENTION TO: Muhammad Shahid

SAMPLED BY: BH

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

DATE RECEIVED: 2020-03-05

DATE REPORTED: 2020-03-11

		SAMPLE DESCRIPTION:		BH3/SS2	BH14/SS3	BH15/SS2	DUP 4
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2020-02-24	2020-03-03	2020-02-24	2020-02-24
Parameter	Unit	G / S	RDL	998289	998364	998369	998411
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.19	0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.22	0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	8.6	9.9	13.3	9.3
Surrogate	Unit	Acceptable Limits					
Naphthalene-d8	%	50-140		103	111	97	99
Acenaphthene-d10	%	50-140		106	110	100	102
Chrysene-d12	%	50-140		110	110	100	110

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 8: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

998289-998411 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 20T581563

PROJECT: 1-19-0792-42

5835 COOPERS AVENUE
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<http://www.agatlabs.com>

CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE: Barrie, ON

ATTENTION TO: Muhammad Shahid

SAMPLED BY: BH

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

DATE RECEIVED: 2020-03-05

DATE REPORTED: 2020-03-11

Parameter	Unit	SAMPLE DESCRIPTION:		BH2/SS7	BH4/SS7	BH6/SS10	BH7/SS10	BH14/SS7	BH15/SS5	DUP 3
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2020-03-03	2020-03-03	2020-02-26	2020-03-03	2020-03-03	2020-02-24	2020-02-26
		G / S	RDL	998286	998327	998358	998359	998367	998376	998381
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	120	50	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	2.6	2.2	16.8	15.4	8.0	7.1	8.0
Surrogate	Unit	Acceptable Limits								
Terphenyl	%	60-140		63	69	82	86	77	64	96

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 8: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

998286-998381 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

N Popmukolof



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20T581563

PROJECT: 1-19-0792-42

5835 COOPERS AVENUE
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<http://www.agatlabs.com>

CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE:Barrie, ON

ATTENTION TO: Muhammad Shahid

SAMPLED BY:BH

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

DATE RECEIVED: 2020-03-05

DATE REPORTED: 2020-03-11

		SAMPLE DESCRIPTION:		BH3/SS4	BH14/SS2	BH15/SS3
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2020-02-24	2020-03-03	2020-02-24
Parameter	Unit	G / S	RDL	998319	998362	998370
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 20T581563

PROJECT: 1-19-0792-42

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

CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE: Barrie, ON

ATTENTION TO: Muhammad Shahid

SAMPLED BY: BH

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

DATE RECEIVED: 2020-03-05

DATE REPORTED: 2020-03-11

		SAMPLE DESCRIPTION:		BH3/SS4	BH14/SS2	BH15/SS3
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2020-02-24	2020-03-03	2020-02-24
Parameter	Unit	G / S	RDL	998319	998362	998370
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	8.0	4.8	6.4
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery	50-140		104	112	104
4-Bromofluorobenzene	% Recovery	50-140		88	87	88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 8: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

998319-998370 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.

1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 20T581563

PROJECT: 1-19-0792-42

5835 COOPERS AVENUE
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CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE: Barrie, ON

ATTENTION TO: Muhammad Shahid

SAMPLED BY: BH

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

DATE RECEIVED: 2020-03-05

DATE REPORTED: 2020-03-11

Parameter	Unit	SAMPLE DESCRIPTION:		BH2/SS7	BH4/SS7	BH6/SS10	BH7/SS10	BH14/SS7	BH15/SS5	DUP 3
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2020-03-03	2020-03-03	2020-02-26	2020-03-03	2020-03-03	2020-02-24	2020-02-26
		G / S	RDL	998286	998327	998358	998359	998367	998376	998381
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By:

N Popiwko



Certificate of Analysis

AGAT WORK ORDER: 20T581563

PROJECT: 1-19-0792-42

5835 COOPERS AVENUE
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<http://www.agatlabs.com>

CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE: Barrie, ON

ATTENTION TO: Muhammad Shahid

SAMPLED BY: BH

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

DATE RECEIVED: 2020-03-05

DATE REPORTED: 2020-03-11

		SAMPLE DESCRIPTION:		BH2/SS7	BH4/SS7	BH6/SS10	BH7/SS10	BH14/SS7	BH15/SS5	DUP 3
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2020-03-03	2020-03-03	2020-02-26	2020-03-03	2020-03-03	2020-02-24	2020-02-26
Parameter	Unit	G / S	RDL	998286	998327	998358	998359	998367	998376	998381
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits								
Toluene-d8	% Recovery	50-140		107	100	107	105	105	101	105
4-Bromofluorobenzene	% Recovery	50-140		84	88	87	84	88	91	88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 8: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

998286-998381 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Quality Assurance

CLIENT NAME: TERRAPROBE INC.

PROJECT: 1-19-0792-42

SAMPLING SITE: Barrie, ON

AGAT WORK ORDER: 20T581563

ATTENTION TO: Muhammad Shahid

SAMPLED BY: BH

Soil Analysis

RPT Date: Mar 11, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	984995		<0.8	<0.8	NA	< 0.8	127%	70%	130%	102%	80%	120%	74%	70%	130%
Arsenic	984995		5	6	18.2%	< 1	114%	70%	130%	103%	80%	120%	104%	70%	130%
Barium	984995		136	139	2.2%	< 2	111%	70%	130%	102%	80%	120%	101%	70%	130%
Beryllium	984995		0.6	0.6	NA	< 0.5	101%	70%	130%	106%	80%	120%	93%	70%	130%
Boron	984995		12	12	NA	< 5	81%	70%	130%	103%	80%	120%	82%	70%	130%
Boron (Hot Water Extractable)	998285	998285	<0.10	<0.10	NA	< 0.10	101%	60%	140%	96%	70%	130%	93%	60%	140%
Cadmium	984995		<0.5	<0.5	NA	< 0.5	118%	70%	130%	99%	80%	120%	99%	70%	130%
Chromium	984995		20	21	NA	< 5	104%	70%	130%	94%	80%	120%	88%	70%	130%
Cobalt	984995		12.2	12.3	0.8%	< 0.5	101%	70%	130%	104%	80%	120%	95%	70%	130%
Copper	984995		26	27	3.8%	< 1	103%	70%	130%	104%	80%	120%	88%	70%	130%
Lead	984995		8	8	0.0%	< 1	106%	70%	130%	90%	80%	120%	85%	70%	130%
Molybdenum	984995		0.5	0.5	NA	< 0.5	102%	70%	130%	104%	80%	120%	101%	70%	130%
Nickel	984995		24	24	0.0%	< 1	99%	70%	130%	101%	80%	120%	92%	70%	130%
Selenium	984995		<0.4	<0.4	NA	< 0.4	109%	70%	130%	103%	80%	120%	102%	70%	130%
Silver	984995		<0.2	<0.2	NA	< 0.2	98%	70%	130%	98%	80%	120%	90%	70%	130%
Thallium	984995		<0.4	<0.4	NA	< 0.4	93%	70%	130%	101%	80%	120%	96%	70%	130%
Uranium	984995		0.7	0.7	NA	< 0.5	95%	70%	130%	100%	80%	120%	99%	70%	130%
Vanadium	984995		31	32	3.2%	< 1	107%	70%	130%	103%	80%	120%	99%	70%	130%
Zinc	984995		64	66	3.1%	< 5	105%	70%	130%	104%	80%	120%	104%	70%	130%
Chromium, Hexavalent	998362	998362	<0.2	<0.2	NA	< 0.2	89%	70%	130%	87%	80%	120%	89%	70%	130%
Cyanide	998361	998361	<0.040	<0.040	NA	< 0.040	102%	70%	130%	99%	80%	120%	108%	70%	130%
Mercury	984995		<0.10	<0.10	NA	< 0.10	113%	70%	130%	107%	80%	120%	107%	70%	130%
pH, 2:1 CaCl2 Extraction	992912		6.71	6.82	1.6%	NA	100%	80%	120%						

Comments: NA signifies Not Applicable.

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

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Certified By:

Divine Basily

Quality Assurance

CLIENT NAME: TERRAPROBE INC.

PROJECT: 1-19-0792-42

SAMPLING SITE: Barrie, ON

AGAT WORK ORDER: 20T581563

ATTENTION TO: Muhammad Shahid

SAMPLED BY: BH

Trace Organics Analysis

RPT Date: Mar 11, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

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

Dichlorodifluoromethane	999549		< 0.05	< 0.05	NA	< 0.05	83%	50%	140%	92%	50%	140%	86%	50%	140%
Vinyl Chloride	999549		< 0.02	< 0.02	NA	< 0.02	89%	50%	140%	101%	50%	140%	83%	50%	140%
Bromomethane	999549		< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	96%	50%	140%	94%	50%	140%
Trichlorofluoromethane	999549		< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	108%	50%	140%	109%	50%	140%
Acetone	999549		< 0.50	< 0.50	NA	< 0.50	104%	50%	140%	103%	50%	140%	99%	50%	140%
1,1-Dichloroethylene	999549		< 0.05	< 0.05	NA	< 0.05	97%	50%	140%	106%	60%	130%	102%	50%	140%
Methylene Chloride	999549		< 0.05	< 0.05	NA	< 0.05	80%	50%	140%	93%	60%	130%	107%	50%	140%
Trans- 1,2-Dichloroethylene	999549		< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	106%	60%	130%	117%	50%	140%
Methyl tert-butyl Ether	999549		< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	91%	60%	130%	92%	50%	140%
1,1-Dichloroethane	999549		< 0.02	< 0.02	NA	< 0.02	108%	50%	140%	87%	60%	130%	86%	50%	140%
Methyl Ethyl Ketone	999549		< 0.50	< 0.50	NA	< 0.50	97%	50%	140%	97%	50%	140%	95%	50%	140%
Cis- 1,2-Dichloroethylene	999549		< 0.02	< 0.02	NA	< 0.02	111%	50%	140%	106%	60%	130%	106%	50%	140%
Chloroform	999549		< 0.04	< 0.04	NA	< 0.04	113%	50%	140%	117%	60%	130%	86%	50%	140%
1,2-Dichloroethane	999549		< 0.03	< 0.03	NA	< 0.03	106%	50%	140%	107%	60%	130%	107%	50%	140%
1,1,1-Trichloroethane	999549		< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	115%	60%	130%	88%	50%	140%
Carbon Tetrachloride	999549		< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	101%	60%	130%	98%	50%	140%
Benzene	999549		< 0.02	< 0.02	NA	< 0.02	114%	50%	140%	89%	60%	130%	111%	50%	140%
1,2-Dichloropropane	999549		< 0.03	< 0.03	NA	< 0.03	104%	50%	140%	82%	60%	130%	106%	50%	140%
Trichloroethylene	999549		< 0.03	< 0.03	NA	< 0.03	111%	50%	140%	108%	60%	130%	92%	50%	140%
Bromodichloromethane	999549		< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	105%	60%	130%	98%	50%	140%
Methyl Isobutyl Ketone	999549		< 0.50	< 0.50	NA	< 0.50	95%	50%	140%	86%	50%	140%	97%	50%	140%
1,1,2-Trichloroethane	999549		< 0.04	< 0.04	NA	< 0.04	105%	50%	140%	114%	60%	130%	102%	50%	140%
Toluene	999549		< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	117%	60%	130%	114%	50%	140%
Dibromochloromethane	999549		< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	112%	60%	130%	106%	50%	140%
Ethylene Dibromide	999549		< 0.04	< 0.04	NA	< 0.04	105%	50%	140%	110%	60%	130%	86%	50%	140%
Tetrachloroethylene	999549		< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	102%	60%	130%	106%	50%	140%
1,1,1,2-Tetrachloroethane	999549		< 0.04	< 0.04	NA	< 0.04	117%	50%	140%	114%	60%	130%	86%	50%	140%
Chlorobenzene	999549		< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	86%	60%	130%	97%	50%	140%
Ethylbenzene	999549		< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	110%	60%	130%	96%	50%	140%
m & p-Xylene	999549		< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	112%	60%	130%	106%	50%	140%
Bromoform	999549		< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	88%	60%	130%	106%	50%	140%
Styrene	999549		< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	103%	60%	130%	117%	50%	140%
1,1,2,2-Tetrachloroethane	999549		< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	102%	60%	130%	118%	50%	140%
o-Xylene	999549		< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	114%	60%	130%	106%	50%	140%
1,3-Dichlorobenzene	999549		< 0.05	< 0.05	NA	< 0.05	82%	50%	140%	109%	60%	130%	93%	50%	140%
1,4-Dichlorobenzene	999549		< 0.05	< 0.05	NA	< 0.05	91%	50%	140%	107%	60%	130%	114%	50%	140%
1,2-Dichlorobenzene	999549		< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	100%	60%	130%	93%	50%	140%
1,3-Dichloropropene (Cis + Trans)	999549		< 0.04	< 0.04	NA	< 0.04	89%	50%	140%	106%	60%	130%	100%	50%	140%
n-Hexane	999549		< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	115%	60%	130%	108%	50%	140%

Quality Assurance

CLIENT NAME: TERRAPROBE INC.

PROJECT: 1-19-0792-42

SAMPLING SITE:Barrie, ON

AGAT WORK ORDER: 20T581563

ATTENTION TO: Muhammad Shahid

SAMPLED BY:BH

Trace Organics Analysis (Continued)

RPT Date: Mar 11, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

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

F1 (C6 to C10)	992895		< 5	< 5	NA	< 5	101%	60%	140%	101%	60%	140%	95%	60%	140%
F2 (C10 to C16)	987107		< 10	< 10	NA	< 10	122%	60%	140%	90%	60%	140%	89%	60%	140%
F3 (C16 to C34)	987107		< 50	< 50	NA	< 50	119%	60%	140%	108%	60%	140%	90%	60%	140%
F4 (C34 to C50)	987107		< 50	< 50	NA	< 50	102%	60%	140%	85%	60%	140%	93%	60%	140%

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

Naphthalene	993595		< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	101%	50%	140%	108%	50%	140%
Acenaphthylene	993595		< 0.05	< 0.05	NA	< 0.05	119%	50%	140%	101%	50%	140%	110%	50%	140%
Acenaphthene	993595		< 0.05	< 0.05	NA	< 0.05	119%	50%	140%	101%	50%	140%	115%	50%	140%
Fluorene	993595		< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	103%	50%	140%	116%	50%	140%
Phenanthrene	993595		< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	99%	50%	140%	102%	50%	140%
Anthracene	993595		< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	99%	50%	140%	102%	50%	140%
Fluoranthene	993595		< 0.05	< 0.05	NA	< 0.05	114%	50%	140%	102%	50%	140%	110%	50%	140%
Pyrene	993595		< 0.05	< 0.05	NA	< 0.05	112%	50%	140%	100%	50%	140%	117%	50%	140%
Benz(a)anthracene	993595		< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	100%	50%	140%	108%	50%	140%
Chrysene	993595		< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	107%	50%	140%	93%	50%	140%
Benzo(b)fluoranthene	993595		< 0.05	< 0.05	NA	< 0.05	74%	50%	140%	95%	50%	140%	113%	50%	140%
Benzo(k)fluoranthene	993595		< 0.05	< 0.05	NA	< 0.05	70%	50%	140%	101%	50%	140%	97%	50%	140%
Benzo(a)pyrene	993595		< 0.05	< 0.05	NA	< 0.05	83%	50%	140%	95%	50%	140%	102%	50%	140%
Indeno(1,2,3-cd)pyrene	993595		< 0.05	< 0.05	NA	< 0.05	73%	50%	140%	90%	50%	140%	107%	50%	140%
Dibenz(a,h)anthracene	993595		< 0.05	< 0.05	NA	< 0.05	80%	50%	140%	86%	50%	140%	104%	50%	140%
Benzo(g,h,i)perylene	993595		< 0.05	< 0.05	NA	< 0.05	76%	50%	140%	88%	50%	140%	115%	50%	140%

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

Certified By:



Method Summary

CLIENT NAME: TERRAPROBE INC.

PROJECT: 1-19-0792-42

SAMPLING SITE:Barrie, ON

AGAT WORK ORDER: 20T581563

ATTENTION TO: Muhammad Shahid

SAMPLED BY:BH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Extractable)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	modified from ON MOECC E3015 and SM 4500-CN- I	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
pH, 2:1 CaCl2 Extraction	INOR-93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER

Method Summary

CLIENT NAME: TERRAPROBE INC.
PROJECT: 1-19-0792-42
SAMPLING SITE: Barrie, ON
AGAT WORK ORDER: 20T581563
ATTENTION TO: Muhammad Shahid
SAMPLED BY: BH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Benz(a)anthracene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Moisture Content	ORG-91-5106	Tier 1 Method	BALANCE
Naphthalene-d8	ORG-91-5106	modified from EPA SW-846 3541 & 8270E50	GC/MS
Acenaphthene-d10	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
Chrysene-d12	ORG-91-5106	modified from EPA SW-846 3541 & 8270E	GC/MS
F1 (C6 to C10)	VOL-91-5009	modified from CCME Tier 1 Method, SW846 5035	P&T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method, SW846 5035	P&T GC/FID
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: TERRAPROBE INC.
PROJECT: 1-19-0792-42
SAMPLING SITE:Barrie, ON
AGAT WORK ORDER: 20T581563
ATTENTION TO: Muhammad Shahid
SAMPLED BY:BH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Vinyl Chloride	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: TERRAPROBE INC.

PROJECT: 1-19-0792-42

SAMPLING SITE:Barrie, ON

AGAT WORK ORDER: 20T581563

ATTENTION TO: Muhammad Shahid

SAMPLED BY:BH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
m & p-Xylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
Moisture Content		MOE E3139	BALANCE

Chain of Custody Record

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

Report Information:

Company: Terraprobe
Contact: Jawad Qureshi
Address: 11 Indell Lane
Brampton, ON
Phone: _____ Fax: _____
Reports to be sent to:
1. Email: jqureshi@terraprobe.ca
2. Email: mshahid@terraprobe.ca

Project Information:

Project: 1-19-0792-42
Site Location: BARRIE, ON
Sampled By: BH
AGAT Quote #: _____ PO: _____
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐
Company: Lorena Rossi
Contact: _____
Address: _____
Email: Lrossi@terraprobe.ca

Regulatory Requirements: ☐ No Regulatory Requirement

☒ Regulation 153/04
Table 2 Indicate One
☒ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture (Check One)
☒ Coarse
☐ Fine
Region _____ Indicate One
☐ MISA
☐ Sewer Use
☐ Sanitary
☐ Storm
☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other

Is this submission for a Record of Site Condition?

☐ Yes ☒ No

Report Guideline on Certificate of Analysis

☒ Yes ☐ No

Sample Matrix Legend

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

Field Filtered - Metals, Hg, CrVI

0. Reg 153
Metals and Inorganics (Excl. EC&S)
☐ All Metals ☐ 153 Metals (excl. Hydrides)
☐ Hydride Metals ☐ 153 Metals (incl. Hydrides)
ORPs: ☐ B-HWS ☐ Cl ☐ CN
☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ Hg
☒ pH ☐ SAR

Full Metals Scan

Regulation/Custom Metals

Nutrients: ☐ TP ☐ NH₃ ☐ TKN
☐ NO₃ ☐ NO₂ ☐ NO₂+NO₃

Volatiles: ☒ VOC ☐ BTEX ☐ THM

PHCs F1-F4

ABNs

PAHs

PCBs: ☐ Total ☐ Aroclors

Organochlorine Pesticides

TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs

Sewer Use

VOC

Potentially Hazardous or High Concentration (Y/N)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/Special Instructions	Y/N	Metals and Inorganics (Excl. EC&S)	Full Metals Scan	Regulation/Custom Metals	Nutrients	Volatiles	PHCs F1-F4	ABNs	PAHs	PCBs	Organochlorine Pesticides	TCLP	Sewer Use	VOC	Potentially Hazardous or High Concentration (Y/N)
BH 14/SS 3	March 3/20		1	S	Exclude EC&S															
BH 14/SS 7	March 3/20		2	S	from Metals and inorganics															
BH 15/SS 2	Feb 24/20		1	S																
BH 15/SS 3	Feb 24/20		3	S			X													
BH 15/SS 5	Feb 24/20		2	S																
DUP 1	Feb 26/20		1	S																
DUP 2	Feb 24/20		1	S			X													
DUP 3	Feb 26/20		2	S																
DUP 4	Feb 24/20		1	S																

Samples Relinquished By (Print Name and Sign): <u>Jawad Qureshi</u>	Date: <u>March 4/20</u> Time: <u>5:00 PM</u>	Samples Received By (Print Name and Sign): <u>[Signature]</u>	Date: <u>3/5/20</u> Time: <u>3:20</u>
Samples Relinquished By (Print Name and Sign): <u>[Signature]</u>	Date: <u>3/5/20</u> Time: <u>4:07</u>	Samples Received By (Print Name and Sign): <u>[Signature]</u>	Date: _____ Time: _____
Samples Relinquished By (Print Name and Sign): _____	Date: _____ Time: _____	Samples Received By (Print Name and Sign): _____	Date: _____ Time: _____

Page 2 of 2
Nº: **T095880**

CLIENT NAME: TERRAPROBE INC.
11 INDELL LANE
BRAMPTON, ON L6T3Y3
(905) 796-2650

ATTENTION TO: Muhammad Shahid

PROJECT: 1-19-0792-42

AGAT WORK ORDER: 20T583723

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Mar 18, 2020

PAGES (INCLUDING COVER): 9

VERSION*: 1

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

*Notes

Disclaimer:

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



Certificate of Analysis

AGAT WORK ORDER: 20T583723

PROJECT: 1-19-0792-42

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

CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE:

ATTENTION TO: Muhammad Shahid

SAMPLED BY:

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

DATE RECEIVED: 2020-03-11

DATE REPORTED: 2020-03-18

		SAMPLE DESCRIPTION:		BH6
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2020-03-10
Parameter	Unit	G / S	RDL	1014831
F1 (C6 - C10)	µg/L		25	<25
F1 (C6 to C10) minus BTEX	µg/L	420	25	<25
F2 (C10 to C16)	µg/L	150	100	<100
F3 (C16 to C34)	µg/L	500	100	<100
F4 (C34 to C50)	µg/L	500	100	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	500	NA
Surrogate	Unit	Acceptable Limits		
Terphenyl	%	60-140	68	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 8: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Ground Water - All Types of Property Uses
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

1014831 There was some sediment observed in the sample.
As per the client request water portion only has been analyzed.
The C6-C10 fraction is calculated using Toluene response factor.
C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 20T583723

PROJECT: 1-19-0792-42

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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CLIENT NAME: TERRAPROBE INC.

SAMPLING SITE:

ATTENTION TO: Muhammad Shahid

SAMPLED BY:

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

DATE RECEIVED: 2020-03-11

DATE REPORTED: 2020-03-18

Parameter	Unit	SAMPLE DESCRIPTION:		BH6	Trip Blank
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2020-03-10	2020-03-10
		G / S	RDL	1014831	1014832
Dichlorodifluoromethane	µg/L	590	0.20	<0.20	<0.20
Vinyl Chloride	µg/L	0.5	0.17	<0.17	<0.17
Bromomethane	µg/L	0.89	0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	150	0.40	<0.40	<0.40
Acetone	µg/L	2700	1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	1.6	0.30	<0.30	<0.30
Methylene Chloride	µg/L	50	0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	15	0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	5	0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	1800	1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20
Chloroform	µg/L	2.4	0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	1.6	0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	200	0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.79	0.20	<0.20	<0.20
Benzene	µg/L	5	0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	5	0.20	<0.20	<0.20
Trichloroethylene	µg/L	1.6	0.20	<0.20	<0.20
Bromodichloromethane	µg/L	16	0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	640	1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	4.7	0.20	<0.20	<0.20
Toluene	µg/L	22	0.20	0.57	<0.20
Dibromochloromethane	µg/L	25	0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.2	0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	1.6	0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	1.1	0.10	<0.10	<0.10
Chlorobenzene	µg/L	30	0.10	<0.10	<0.10
Ethylbenzene	µg/L	2.4	0.10	0.13	<0.10
m & p-Xylene	µg/L		0.20	0.25	<0.20

Certified By:



Certificate of Analysis

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CLIENT NAME: TERRAPROBE INC.

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

DATE RECEIVED: 2020-03-11

DATE REPORTED: 2020-03-18

		SAMPLE DESCRIPTION:		BH6	Trip Blank
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2020-03-10	2020-03-10
Parameter	Unit	G / S	RDL	1014831	1014832
Bromoform	µg/L	25	0.10	<0.10	<0.10
Styrene	µg/L	5.4	0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	1	0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	59	0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	1	0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	3	0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	0.5	0.30	<0.30	<0.30
Xylenes (Total)	µg/L	300	0.20	0.25	<0.20
n-Hexane	µg/L	51	0.20	0.55	<0.20
Surrogate	Unit	Acceptable Limits			
Toluene-d8	% Recovery	50-140		106	108
4-Bromofluorobenzene	% Recovery	50-140		93	87

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 8: Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition - Ground Water - All Types of Property Uses
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

1014831-1014832 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Quality Assurance

CLIENT NAME: TERRAPROBE INC.

AGAT WORK ORDER: 20T583723

PROJECT: 1-19-0792-42

ATTENTION TO: Muhammad Shahid

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Mar 18, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	1015993		< 0.20	< 0.20	NA	< 0.20	83%	50%	140%	85%	50%	140%	83%	50%	140%
Vinyl Chloride	1015993		< 0.17	< 0.17	NA	< 0.17	77%	50%	140%	81%	50%	140%	73%	50%	140%
Bromomethane	1015993		< 0.20	< 0.20	NA	< 0.20	73%	50%	140%	73%	50%	140%	93%	50%	140%
Trichlorofluoromethane	1015993		< 0.40	< 0.40	NA	< 0.40	75%	50%	140%	83%	50%	140%	78%	50%	140%
Acetone	1015993		< 1.0	< 1.0	NA	< 1.0	102%	50%	140%	89%	50%	140%	97%	50%	140%
1,1-Dichloroethylene	1015993		< 0.30	< 0.30	NA	< 0.30	87%	50%	140%	80%	60%	130%	78%	50%	140%
Methylene Chloride	1015993		< 0.30	< 0.30	NA	< 0.30	93%	50%	140%	92%	60%	130%	111%	50%	140%
trans- 1,2-Dichloroethylene	1015993		< 0.20	< 0.20	NA	< 0.20	83%	50%	140%	83%	60%	130%	111%	50%	140%
Methyl tert-butyl ether	1015993		< 0.20	< 0.20	NA	< 0.20	96%	50%	140%	106%	60%	130%	86%	50%	140%
1,1-Dichloroethane	1015993		< 0.30	< 0.30	NA	< 0.30	89%	50%	140%	87%	60%	130%	106%	50%	140%
Methyl Ethyl Ketone	1015993		< 1.0	< 1.0	NA	< 1.0	70%	50%	140%	72%	50%	140%	94%	50%	140%
cis- 1,2-Dichloroethylene	1015993		< 0.20	< 0.20	NA	< 0.20	101%	50%	140%	85%	60%	130%	83%	50%	140%
Chloroform	1015993		< 0.20	< 0.20	NA	< 0.20	105%	50%	140%	92%	60%	130%	88%	50%	140%
1,2-Dichloroethane	1015993		< 0.20	< 0.20	NA	< 0.20	98%	50%	140%	91%	60%	130%	94%	50%	140%
1,1,1-Trichloroethane	1015993		< 0.30	< 0.30	NA	< 0.30	100%	50%	140%	102%	60%	130%	70%	50%	140%
Carbon Tetrachloride	1015993		< 0.20	< 0.20	NA	< 0.20	75%	50%	140%	89%	60%	130%	106%	50%	140%
Benzene	1015993		< 0.20	< 0.20	NA	< 0.20	96%	50%	140%	75%	60%	130%	79%	50%	140%
1,2-Dichloropropane	1015993		< 0.20	< 0.20	NA	< 0.20	107%	50%	140%	73%	60%	130%	76%	50%	140%
Trichloroethylene	1015993		< 0.20	< 0.20	NA	< 0.20	81%	50%	140%	85%	60%	140%	82%	50%	140%
Bromodichloromethane	1015993		< 0.20	< 0.20	NA	< 0.20	83%	50%	140%	95%	60%	130%	78%	50%	140%
Methyl Isobutyl Ketone	1015993		< 1.0	< 1.0	NA	< 1.0	101%	50%	140%	85%	50%	140%	85%	50%	140%
1,1,2-Trichloroethane	1015993		< 0.20	< 0.20	NA	< 0.20	93%	50%	140%	94%	60%	130%	103%	50%	140%
Toluene	1015993		< 0.20	< 0.20	NA	< 0.20	90%	50%	140%	93%	60%	130%	93%	50%	140%
Dibromochloromethane	1015993		< 0.10	< 0.10	NA	< 0.10	103%	50%	140%	108%	60%	130%	76%	50%	140%
Ethylene Dibromide	1015993		< 0.10	< 0.10	NA	< 0.10	89%	50%	140%	89%	60%	130%	91%	50%	140%
Tetrachloroethylene	1015993		< 0.20	< 0.20	NA	< 0.20	102%	50%	140%	105%	60%	130%	95%	50%	140%
1,1,1,2-Tetrachloroethane	1015993		< 0.10	< 0.10	NA	< 0.10	105%	50%	140%	109%	60%	130%	92%	50%	140%
Chlorobenzene	1015993		< 0.10	< 0.10	NA	< 0.10	96%	50%	140%	95%	60%	130%	96%	50%	140%
Ethylbenzene	1015993		< 0.10	< 0.10	NA	< 0.10	87%	50%	140%	87%	60%	130%	85%	50%	140%
m & p-Xylene	1015993		< 0.20	< 0.20	NA	< 0.20	90%	50%	140%	89%	60%	130%	89%	50%	140%
Bromoform	1015993		< 0.10	< 0.10	NA	< 0.10	107%	50%	140%	113%	60%	130%	89%	50%	140%
Styrene	1015993		< 0.10	< 0.10	NA	< 0.10	83%	50%	140%	79%	60%	130%	84%	50%	140%
1,1,2,2-Tetrachloroethane	1015993		< 0.10	< 0.10	NA	< 0.10	93%	50%	140%	86%	60%	130%	101%	50%	140%
o-Xylene	1015993		< 0.10	< 0.10	NA	< 0.10	93%	50%	140%	91%	60%	130%	94%	50%	140%
1,3-Dichlorobenzene	1015993		< 0.10	< 0.10	NA	< 0.10	96%	50%	140%	92%	60%	130%	101%	50%	140%
1,4-Dichlorobenzene	1015993		< 0.10	< 0.10	NA	< 0.10	91%	50%	140%	87%	60%	130%	100%	50%	140%
1,2-Dichlorobenzene	1015993		< 0.10	< 0.10	NA	< 0.10	86%	50%	140%	82%	60%	130%	99%	50%	140%
1,3-Dichloropropene	1015993		< 0.30	< 0.30	NA	< 0.30	74%	50%	140%	82%	60%	130%	89%	50%	140%
n-Hexane	1015993		< 0.20	< 0.20	NA	< 0.20	84%	50%	140%	96%	60%	130%	93%	50%	140%

Quality Assurance

CLIENT NAME: TERRAPROBE INC.

PROJECT: 1-19-0792-42

SAMPLING SITE:

AGAT WORK ORDER: 20T583723

ATTENTION TO: Muhammad Shahid

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Mar 18, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper

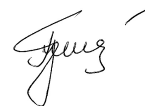
O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)

F1 (C6 - C10)	1014831	1014831	< 25	< 25	NA	< 25	97%	60%	140%	111%	60%	140%	104%	60%	140%
F2 (C10 to C16)		TW	< 100	< 100	NA	< 100	88%	60%	140%	110%	60%	140%	84%	60%	140%
F3 (C16 to C34)		TW	< 100	< 100	NA	< 100	90%	60%	140%	99%	60%	140%	102%	60%	140%
F4 (C34 to C50)		TW	< 100	< 100	NA	< 100	91%	60%	140%	95%	60%	140%	106%	60%	140%

Comments: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.

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

Certified By:



Method Summary

CLIENT NAME: TERRAPROBE INC.

PROJECT: 1-19-0792-42

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

Method Summary

CLIENT NAME: TERRAPROBE INC.

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dibromochloromethane	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Bromoform	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Styrene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS

