

Phase Two Environmental Site Assessment

620 Lockhart Road
Innisfil, Ontario

Prepared For:

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DS Project No: 20-231-400

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Executive Summary

DS Consultants Ltd. (DS) was retained by Mattamy Homes (the “Client”) to conduct a Phase Two Environmental Site Assessment (ESA) of the Property located at 620 Lockhart Road, Innisfil, Ontario, herein referred to as the “Phase Two Property”. DS understands that this Phase Two ESA was requested for the purpose of pre-purchase due diligence and that the intent of the Client would be to develop the Phase Two Property into a residential subdivision.

The Phase Two ESA was completed to satisfy the intent of the requirements, methodology and practices for a Phase Two ESA as described in Ontario Regulation 153/04 (as amended). The objective of this Phase Two ESA is to confirm whether contaminants are present, and at what concentration are they present on the Phase Two Property, as related to the Areas of Potential Environmental Concern (APEC) identified in the Phase One ESA.

The Phase Two Property is a 28.05-hectares (69.32 acres) parcel of land situated within an agricultural and residential neighbourhood in the Town of Innisfil, Ontario. The Phase Two Property is located approximately 600 m west of the intersection of Lockhart Road and Yonge Street and was an agricultural field at the time of this investigation.

The Phase One ESA completed in October 2020 indicated that the Phase Two Property was first developed for residential and agricultural purposes in the late 1800s and has been used for agricultural purposes since the Property was first developed. A total of four (4) Potentially Contaminating Activities (PCAs) were identified in the Phase One ESA, which were considered to be contributing to three (3) APECs on the Phase Two Property. A summary of the APECs, associated PCAs, and contaminants of potential concern (COPC) identified is presented in the table below:

Table E-1: Summary of APECs

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Ground water, soil and/or sediment)
APEC-1	Entire Property	PCA-1: #40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On Site	Metals, As, Sb, Se, CN-, OC Pesticides	Soil

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Ground water, soil and/or sediment)
APEC-2	Area of the Previously Existing Structures	PCA-3: #30 – Importation of Fill Material of Unknown Quality	On Site	Metals As, Sb, Se, B-HWS, CN-, Cr(VI), Hg, low or high pH, SAR, EC, PAHs	Soil
APEC-3	Area of the Previously Existing Structures	PCA-4: #23 – Fire retardant Manufacturing, Processing and Bulk Storage	On Site	PAHs, VOCs, metals, As, Sb, Se, B-HWS, CN-, Cr(VI) low or high pH	Soil

Based on the findings of the Phase One ESA it was concluded that a Phase Two ESA is warranted in order to assess the soil and groundwater conditions on the Phase Two Property.

The Phase Two ESA involved the advancement of nineteen (19) boreholes, which was completed between September 9, 2020 and December 4, 2020. The boreholes were advanced to a maximum depth of 11.3 metres below ground surface (mbgs) under the supervision of DS personnel. Groundwater monitoring wells were installed in eight (8) of the boreholes as part of the hydrogeological investigation and to allow for the assessment of groundwater flow direction. The borehole locations were determined based on the findings of the Phase One ESA.

Soil samples were collected and submitted to a CALA accredited laboratory for analysis as follows:

- ◆ Three (3) samples for analysis of metals and other regulated parameters
- ◆ Three (3) samples for analysis of ICP metals and cyanide
- ◆ Three (3) samples for analysis of petroleum hydrocarbons (PHCs)
- ◆ Three (3) samples for analysis of volatile organic compounds (VOCs)
- ◆ Four (4) samples (including 1 QAQC duplicate) for analysis of polycyclic aromatic hydrocarbons (PAHs)
- ◆ Four (4) samples (including 1 QAQC duplicate) for analysis of organochlorine pesticides (OCPs)

The soil analytical results were compared to the “Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition” provided in the MECP document entitled, *“Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”* dated April 15, 2011 (Table 2 Standards) for coarse-textured soils and residential/parkland/institutional property use.

Based on the findings of the Phase Two ESA, DS presents the following findings:

- ◆ A surficial topsoil layer, ranging in thickness from 100 to 250mm was encountered at all borehole locations. Underlying the topsoil layer, compact to loose fill, consisting of sand and gravel was encountered in the vicinity of the former residential and agricultural buildings, suggesting possible infill has occurred within the area. The fill material extended to a depth of 2.3m. Sandy silt silty sand/till, silt and sand deposits extended below the topsoil to the maximum explored depth of all the boreholes. The cohesionless deposit contained clay, gravel and cobbles. Occasional cobbles/boulders were inferred within the till deposits during drilling.
- ◆ The depth to groundwater was measured in eight (8) monitoring wells installed during the course of this investigation. The monitoring wells were screened to intercept the groundwater water table. The groundwater levels were found to range between -0.31 (above ground surface) to 8.97 mbgs, with corresponding elevations of 253.41 to 263.13 metres above sea level (masl). Based on the groundwater elevations recorded, the groundwater flow direction appears to be north towards Lake Simcoe. It is possible that the groundwater levels may vary seasonally. The groundwater levels may also be impacted by other factors such as historical infilling activities, subsurface utility trenches, and similar subsurface anomalies. The groundwater flow direction can only be confirmed through long term monitoring.
- ◆ The results of the soil chemical analyses conducted indicated that all samples analyzed met the applicable Site Condition Standards.

Based on a review of the findings of this Phase Two ESA, DS presents the following conclusions and recommendations:

- ◆ The results of the chemical analyses conducted on soil samples indicate that the applicable Site Condition Standards have been met;
- ◆ Based on the findings of this Phase Two ESA, no further environmental site assessment is recommended at this time;
- ◆ All monitoring wells should be decommissioned in accordance with O.Reg. 903 when no longer required.

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1.0 Introduction

DS Consultants Ltd. (DS) was retained by Mattamy Homes (the “Client”) to conduct a Phase Two Environmental Site Assessment (ESA) of the Property located at 620 Lockhart Road, Innisfil, Ontario, herein referred to as the “Phase Two Property”. DS understands that this Phase Two ESA was requested for the purpose of pre-purchase due diligence and that the intent of the Client would be to develop the Phase Two Property into a residential subdivision.

The intended future property use (residential) is not considered to be a more sensitive property use as defined under O.Reg. 153/04 (as amended); therefore the filing of a Record of Site Condition (RSC) with the Ontario Ministry of Environment, Conservation and Parks (MECP) is not mandated under O.Reg. 153/04.

The Phase Two ESA was completed to satisfy the intent of the requirements, methodology and practices for a Phase One ESA as described in Ontario Regulation 153/04 (as amended). The objective of this Phase Two ESA is to confirm whether contaminants are present, and at what concentration are they present on the Phase Two Property, as related to the Areas of Potential Environmental Concern (APEC) identified in the Phase One ESA.

1.1 Site Description

The Phase Two Property is a 28.05-hectares (69.32 acres) parcel of land situated within an agricultural and residential neighbourhood in the Town of Innisfil, Ontario. The Phase Two Property is located approximately 600 m west of the intersection of Lockhart Road and Yonge Street and was an agricultural field at the time of this investigation. A Site Location Plan is provided in Figure 1.

For the purposes of this report, Lockhart Road is assumed to be aligned in an east-west orientation, and Yonge Street in a north-south orientation. A Plan of Survey for the Phase Two Property dated 1975 and prepared by W.N. Wildman, an Ontario Land Surveyor, has been provided under Appendix A.

The Property is currently used as an agricultural field and does not contain any structures. A Site Plan is provided in Figure 2.

Additional details regarding the Phase Two Property are provided in the table below.

Table 1-1: Phase Two Property Information

Criteria	Information	Source
Legal Description	Part of Lot 14, Concession 11, City of Barrie	Legal Survey
Assessment Roll No.	4342-090-032-02700-0000	Questionnaire
Site Area	28.05-hectares (69.32 acres)	Google Earth

1.2 Property Ownership

The ownership details for the Phase Two Property are provided in the table below.

Table 1-2: Phase Two Property Ownership

Property Owner	Contact
Tom Irving	Phone: 705-436-1186

1.3 Current and Proposed Future Use

The Phase Two Property is currently occupied by an agricultural field which is considered to be agricultural Property Use under O.Reg. 153/04 (as amended). It is DS's understanding that the Client intends to redevelop the Site for residential use.

1.4 Applicable Site Condition Standards

The applicable Site Condition Standards (SCS) for the Phase Two Property are considered by the Qualified Person (QP) to be the Table 2 SCS: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Residential/Parkland/Institutional Use with coarse-textured soils as contained in the April 15, 2011 Ontario Ministry of Environment, Conservation and Parks (MECP) document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", herein referred to as the "Table 2 SCS".

The selection of the Table 2 SCS is considered appropriate based on the following rationale:

- ◆ Properties within the Phase One Study Area obtain their potable water from domestic supply wells and rely on groundwater as a potable water source;
- ◆ The Site is not considered to be environmentally sensitive, as defined under O.Reg. 153/04 (as amended);
- ◆ The proposed future use of the Phase Two Property will be residential;
- ◆ The Site is not located within 30 m of a water body;
- ◆ The pH of the soils analyzed during this Phase Two ESA are within the accepted range specified under O.Reg. 153/04 (as amended); and
- ◆ Bedrock was not encountered within 2 metres of the ground surface

2.0 Background Information

2.1 Physical Setting

2.1.1 Water Bodies and Areas of Natural Significance

Lovers Creek is the closest body of water to the Phase Two Property, located approximately 330 m west of the Phase Two Property.

The Natural Heritage Areas database published by the Ministry of Natural Resources and Forestry (MNRF) was reviewed in order to identify the presence/absence of areas of natural significance including provincial parks, conservation reserves, areas of natural and scientific interest, wetlands, environmentally significant areas, habitats of threatened or endangered species, and wilderness areas. The Barrie and County of Simcoe Official Plan were also reviewed as part of this assessment.

A review of these databases indicated the Snapping Turtle as a species of special concern and the Lovers Creek swamp as a natural area within 1 km of the Site. According to the MNRF, the Snapping Turtle is commonly found in shallow waters near streams, swamps, dams and aggregate pits. As the nearest waterbody is greater than 200 m away from the Site, and visual reconnaissance indicated no ponds or other surface water within 30 m of the Site, it is not anticipated that this species would be found on the Phase One Property. A provincially significant wetland was identified on the MRNF mapping system located to the south adjacent property, which is within 30m from the Phase One Property.

2.1.2 Topography and Surface Water Draining Features

The Phase Two Property is located in an rural setting, at an elevation of 274 metres above sea level (masl) in the northeastern portion of the Property to 253 masl in the southwestern portion of the Property. The topography of the Phase Two Property is generally sloped to the southwest. The neighbouring property are generally at a similar elevation, and the topography in the vicinity of the Phase Two Property generally slopes to the north towards Lake Simcoe. Surface water flow associated with precipitation events is anticipated to run overland and drain into the ditches along the boundary of the Phase Two Property.

2.2 Past Investigations

No previous environmental reports were provided for DS to review. However, DS previously completed a Phase One ESA, the findings of which were presented in the report entitled “Phase One Environmental Site Assessment, 620 Lockhart Road, Innisfil, Ontario”, dated

October 20, 2020. The Phase One Conceptual Site Model (CSM) can be found under Section 3.3.

3.0 Scope of the Investigation

The scope of the Phase Two ESA was designed to investigate the portions of the Site determined in the Phase One ESA to be Areas of Potential Environmental Concern. This Phase Two ESA was conducted in general accordance with O.Reg. 153/04 (as amended). The scope of the investigation including the subsurface investigation, sampling, and laboratory analysis was based on the findings of the Phase One ESA and was limited to the portions of the site which were accessible.

3.1 Overview of Site Investigation

The following tasks were completed as part of the Phase Two ESA:

- ◆ Preparation of a Health and Safety Plan to ensure that all work was executed safely;
- ◆ Clearance of public private underground utility services prior to commencement of subsurface investigative operations;
- ◆ Preparation of a Sampling and Analysis Plan (SAP);
- ◆ Retained a MECP licenced driller to advance a total of nineteen (19) boreholes on the Phase Two Property, to depths ranging between 3.7 to 11.3 mbgs. Eight (8) of the boreholes were instrumented with groundwater monitoring wells upon completion. The soil lithology was logged during drilling, and representative soil samples were collected at regular intervals. The soil samples were screened for organic vapours using an RKI Eagle 2 MultiGas Detector, and examined for visual and olfactory indications of soil impacts;
- ◆ Submitted “worst case” soil samples collected from the boreholes for laboratory analysis of relevant contaminants of potential concern (COPCs) as identified in the Phase One ESA;
- ◆ Conducted groundwater level measurements in the monitoring wells in order to determine the groundwater elevation, and to establish the local groundwater flow direction;
- ◆ Surveyed all monitoring wells to a geodetic benchmark;
- ◆ Developed and purged all monitoring wells prior to sampling. Groundwater samples were collected for all COPCs identified in the Phase One ESA;
- ◆ Compared all soil and groundwater analytical data to the applicable MECP SCS; and
- ◆ Prepared a Phase Two ESA Report in general accordance with O.Reg. 153/04 (as amended).

3.2 Media Investigated

3.2.1 Rationale for Inclusion or Exclusion of Media

Table 3-1: Rationale of Sampling Media

Media	Included or Excluded	Rationale
Soil	Included	Soil was identified as a media of potential impact in the Phase One ESA, based on the historical operations conducted on-Site.
Groundwater	Excluded	Groundwater was not identified as a media of potential impact in the Phase One ESA.
Sediment	Excluded	Sediment is not present on the Phase Two Property.
Surface Water	Excluded	Surface water is not present on the Phase Two Property.

3.2.2 Overview of Field Investigation of Media

Table 3-2: Field Investigation of Media

Media	Methodology of Investigation
Soil	A total of nineteen (19) boreholes were advanced on the Phase Two Property, to a maximum depth of 11.3 mbgs. Soil samples were collected and submitted for analysis of all relevant COPCs.
Groundwater	A total of eight (8) monitoring wells were present on the Phase Two Property at the time of the investigation. Representative groundwater samples were collected from each monitoring well and submitted for analysis of all relevant COPCs.

3.3 Phase One Conceptual Site Model

A Conceptual Site Model was developed for the Phase One Property, located at 620 Lockhart Road, Innisfil, Ontario. The Phase One Conceptual Site Model is presented in Drawings 2 to 5 and visually depict the following:

- ◆ Any existing buildings and structures
- ◆ Water bodies located in whole, or in part, on the Phase One Study Area
- ◆ Areas of natural significance located in whole, or in part, on the Phase One Study Area
- ◆ Water wells at the Phase One Property or within the Phase One Study Area
- ◆ Roads, including names, within the Phase One Study Area
- ◆ Uses of properties adjacent to the Phase One Property
- ◆ Areas where any PCAs have occurred, including location of any tanks
- ◆ Areas of Potential Environmental Concern

3.3.1 Potentially Contaminating Activity Affecting the Phase One Property

All PCAs identified within the Phase One Study Area are presented on Figure 4. PCAs which are considered to contribute to APECs on, in or under the Phase One Property are summarized in the table below:

Table 3-3: Summary of PCAs Contributing to APECs

PCA Item.	PCA Description (Per. Table 2, Schedule D of O.Reg. 153/04)	Description	Rationale
1	#40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	The Phase One Property is used for agricultural purposes. The application of pesticides is inferred to have occurred on the Property.	PCA is located on the Phase One Property.
2	#30 – Importation of Fill Material of Unknown Quality	Based on a review of the aerial photographs it is inferred that fill material of unknown quality was used to backfill the former structures On-Site.	PCA is located on the Phase One Property.
4	#23 – Fire retardant Manufacturing, Processing and Bulk Storage	Controlled burnings historically occurred on the Property, and fire retardants may have been used to control the fires.	PCA is located on the Phase One Property.

N/S - not specified in Table 2, Schedule D, of O.Reg. 153/04

3.3.2 Contaminants of Potential Concern

A summary of the contaminants of potential concern identified for each respective APEC is presented in Table 3-3 above. The following contaminants of potential concern were identified for the Phase One Property: Metals, As, Sb, Se, CN-, OC Pesticides, Cr (VI), B-HWS, Hg, low or high pH, SAR, EC, VOCs, and PAHs.

3.3.3 Underground Utilities and Contaminant Distribution and Transport

Underground utilities can affect contaminant distribution and transport. Trenches excavated to install utility services, and the associated granular backfill may provide preferential pathways for horizontal contaminant migration in the shallow subsurface. No structures are currently present on the Phase One Property and therefore it is inferred that underground utilities are not located on the Property. Additionally, the previously existing structure was reportedly not connected to any underground utilities.

3.3.4 Geological and Hydrogeological Information

The topography of the Phase One Property is generally sloped to the southwest with a surface elevation of 274 metres above sea level (masl) in the northeastern portion of the Property to 253 masl in the southwestern portion of the Property. The topography within the Phase One Study Area generally slopes to the north towards Lake Simcoe located

approximately 3.9 km north of the Phase One Property. The nearest body of water is Lovers Creek, located approximately 330 m west of the Phase One Property. Based on a review of the MECP well records, the depth to groundwater in the vicinity of the Phase One Property is approximately 9.8 m. The shallow groundwater flow direction within the Phase One Study Area is inferred to be northeast towards Lake Simcoe.

The Site is situated within a drumlinized till plain physiographic region. The surficial geology within the Phase One Study area is described as “fine-textured glaciolacustrine deposits consisting of silt and clay with minor sand and gravel” in the southwestern corner, “stone-poor sandy silt to silt sand-textured till on Paleozoic terrain” in the central portion and “ice-contact stratified deposits consisting of sand and gravel with minor silt, clay and till” in the northeastern corner of the Property. The bedrock is described as “limestone, dolostone, shale, arkose, sandstone of the Simcoe Group, Shadow Lake formation”. Based on a review of MECP well records, the bedrock in the Phase One Study Area is anticipated to be encountered at a depth greater than 100 metres below ground surface (mbgs).

3.3.5 Uncertainty and Absence of Information

DS has relied upon information obtained from federal, provincial, municipal, and private databases, in addition to records and summaries provided by EcoLog ERIS. All information obtained was reviewed and assessed for consistency, however the conclusions drawn by DS are subject to the nature and accuracy of the records reviewed.

All reasonable inquiries were made to obtain reasonably accessible information, as mandated by O.Reg.153/04 (as amended). All responses to database requests were received prior to completion of this report, with the exception of the MECP FOI request. If the MECP FOI request produces information which may alter the conclusions of this report, an addendum will be provided to the Client. This report reflects the best judgement of DS based on the information available at the time of the investigation.

Information used in this report was evaluated based on proximity to the Phase One Property, anticipated direction of local groundwater flow, and the potential environmental impact on the Phase One Property as a result of potentially contaminating activities.

The QP has determined that the uncertainty does not affect the validity of the Phase One ESA Conceptual Site Model or the conclusions of this report.

3.4 Deviations from Sampling and Analysis Plan

The Phase Two ESA was completed in accordance with the SAP.

3.5 Impediments

DS was granted complete access to the Phase Two Property throughout the course of the investigation. No impediments were encountered.

4.0 Investigation Method

4.1 General

The Phase Two ESA followed the methodology outlined in the following documents:

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

The methods used in the Phase Two ESA investigation did not differ from the associated standard operating procedures.

4.2 Drilling and Excavating

A site visit was conducted prior to drilling in order to identify the borehole locations based on the APECs identified in the Phase One ESA. The selected borehole locations are presented on Figure 5. The borehole locations were cleared of underground public and private utility services prior to commencement of drilling. A summary of the drilling activities is provided in the table below.

Table 4-1: Summary of Drilling Activities

Parameter	Details
Drilling Contractor	Walker Drilling Ltd.
Drilling Dates	September 9-11, 2020 December 2-4, 2020
Drilling Equipment Used	Track-mounted D-58
Measures taken to minimize the potential for cross contamination	◆ Soil sampling was conducted using a 50 mm stainless steel split spoon sampler. The split spoon sampler was brushed clean of soil, washed in municipal water containing phosphate free detergent, rinsed in municipal water, and then rinsed with distilled water for each sampling interval in order to reduce the potential for cross contamination;

Parameter	Details
	◆ Soil samples were extracted from the interior of the sampler rather than from areas in contact with the sampler sidewalls; ◆ Use of dedicated and disposable nitrile gloves for the handling of soil samples. A new set of gloves was used for each sample.
Sample collection frequency	Samples were collected at a frequency of every 0.6 m per 0.8 m from the ground surface to 3.1 mbgs, followed by one sample per 1.5 m to borehole termination depth.

4.3 Soil Sampling

Soil samples were collected using a 50 mm stainless steel split spoon sampler. Discrete soil samples were collected from the split-spoon samplers by DS personnel using dedicated nitrile gloves.

A portion of each sample was placed in a resealable plastic bag for field screening, and the remaining portion was placed into laboratory supplied glass sampling jars. Samples intended for VOC and the F1 fraction of petroleum hydrocarbons analysis were collected using a laboratory-supplied soil core sampler, placed into the vials containing methanol for preservation purposes and sealed using Teflon lined septa lids. All sample jars were stored in dedicated coolers with ice for storage, pending transport to the analytical laboratory. A formal chain of custody was maintained for all samples submitted to the laboratory.

The subsurface soil conditions were logged by DS personnel at the time of drilling and recorded on field borehole logs. The borehole logs are presented under Appendix C. Additional detail regarding the lithology encountered in the boreholes is presented under Section 6.1.

4.4 Field Screening Measurements

All retrieved soil samples were screened in the field for visual and olfactory observations. No obvious visual or olfactory evidence of potential contamination were noted. No aesthetic impacts (e.g. cinders, slag, hydrocarbon odours) were encountered during this investigation. The soil sample headspace vapour concentrations for all soil samples recovered during the investigation were screened using portable organic vapour testing equipment in accordance with the procedure outlined in the MECP's *'Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario'*.

The soil samples were inspected and examined to assess soil type, ground water conditions, and possible chemical contamination by visual and olfactory observations or by organic

vapour screening. Samples submitted for chemical analysis were collected from locations judged by the assessor to be most likely to exhibit the highest concentrations of contaminants based on several factors including (i) visual or olfactory observations, (ii) sample location, depth, and soil type (iii) ground water conditions and headspace reading. A summary of the equipment used for field screening is provided below:

Table 4-2: Field Screening Equipment

Parameter	Details
Make and Model of Field Screening Instrument	RKI Eagle 2, Model 5101-P2 Serial Number: E2G721
Chemicals the equipment can detect and associated detection limits	VOCs with dynamic range of 0 parts per million (ppm) to 2,000 ppm PHCs with range of 0 to 50,000 ppm
Precision of the measurements	3 significant figures
Accuracy of the measurements	VOCs: $\pm 10\%$ display reading + one digit Hydrocarbons: $\pm 5\%$ display reading + one digit
Calibration reference standards	PID: Isobutylene CGD: Hexane
Procedures for checking calibration of equipment	In-field re-calibration of the CGI was conducted (using the gas standard in accordance with the operator's manual instructions) if the calibration check indicated that the calibration had drifted by more than $\pm 10\%$.

A summary of the soil headspace measurements are provided in the borehole logs, provided under Appendix C.

4.5 Groundwater Monitoring Well Installation

Monitoring wells were installed upon completion of eight (8) of the boreholes advanced on the Phase Two Property. The monitoring wells were constructed of 51-millimetre (2-inch) inner diameter (ID) flush-threaded schedule 40 polyvinyl chloride (PVC) risers, equipped with a 1.5 m length of No. 10 slot PVC screen. The well screens were sealed at the bottom using a threaded cap and at the top with a lockable J-plug.

Silica sand was placed around and up to 0.9 m above the well screen to act as a filter pack. Bentonite was placed from the ground surface to the top of the sand pack. The wells were completed with protective aboveground monument casings. Details regarding the monitoring well construction can be found in Table 1 (enclosed), and on the borehole logs provided in Appendix C.

Disposable nitrile gloves were used to minimize the potential for cross-contamination during well installation. Dedicated equipment was used for well development and sampling for further minimize the risk of cross contamination.

4.6 Groundwater Field Measurement of Water Quality Parameters

Groundwater was not identified as a media of potential concern in the Phase One ESA, and thus no measurements of water quality parameters was conducted during this investigation.

4.7 Groundwater Sampling

Groundwater was not identified as a media of potential concern in the Phase One ESA, and thus no groundwater sampling was conducted during this investigation.

4.8 Sediment Sampling

No sediment as defined under O.Reg. 153/04 (as amended) was present on the Phase Two Property at the time of this investigation. Sediment sampling was not conducted as a result.

4.9 Analytical Testing

The soil and groundwater samples collected were submitted to SGS Canada Inc. (SGS) under chain of custody protocols. SGS is an independent laboratory accredited by the Canadian Association for Laboratory Accreditation. SGS conducted the analyses in accordance with the MECP document “Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act” dated March 9, 2004 (revised on July 1, 2011).

4.10 Residue Management Procedures

4.10.1 Soil Cuttings From Drilling and Excavations

The soil cuttings generated by the borehole drilling program were stored in 205 L drums, and left on-site for disposal by a MECP approved waste-hauler for disposal at a MECP-approved waste management facility.

4.10.2 Water from Well Development and Purging

Excess water derived from well purging activities was stored in 20-L sealed plastic pails and temporarily stored on site for disposal by a MECP approved waste-hauler for disposal at a MECP-approved waste management facility.

4.10.3 Fluids from Equipment Cleaning

Excess equipment cleaning fluids were stored in 20-L sealed plastic pails and temporarily stored on site for disposal by a MECP approved waste-hauler for disposal at a MECP-approved waste management facility.

4.11 Elevation Surveying

The ground surface elevations of the boreholes were surveyed using a Sokkia GCX-2 GNSS RTK receiver, based on global positioning system satellites. Station number 03120110013 was used as a reference for the vertical elevation of the site. The ground surface elevations can be found on the borehole logs presented in Appendix C.

4.12 Quality Assurance and Quality Control Measures

4.12.1 Sample containers, preservation, labelling, handling and custody for samples submitted for laboratory analysis, including any deviations from the SAP

All soil and groundwater samples were stored in laboratory-supplied sample containers in accordance with the MECP Analytical Protocol. A summary of the preservatives supplied by the laboratory is provided in the table below.

Table 4-3: Summary of Sample Bottle Preservatives

Media	Parameter	Sample Container
Soil	PHCs F1 VOCs	40 mL methanol preserved glass vial with septum lid.
	PHCs F2-F4 metals and ORPs PAHs	120 mL or 250 mL unpreserved glass jar with Teflon™-lined lid.

Groundwater samples were collected using dedicated equipment for each well. Groundwater samples collected for analysis of dissolved metals, mercury and hexavalent chromium were filtered in the field using a dedicated 0.45-micron in-line filter. Each sample container was labelled with a unique sample identification, the project number, and the sampling date. All samples were placed in an ice-filled cooler upon completion of sampling, and kept under refrigerated conditions until the time of delivery to the analytical laboratory. A formal chain of custody was maintained for all samples submitted to the laboratory.

4.12.2 Description of equipment cleaning procedures followed during all sampling

Dedicated, disposable nitrile gloves were used for each sampling event to reduce the potential for cross-contamination.

The split spoon sampler was brushed clean of soil, washed in municipal water containing phosphate free detergent, rinsed in municipal water, and then rinsed with distilled water for each sampling interval in order to reduce the potential for cross contamination. Dedicated equipment was used for well development and sampling for further minimize the risk of cross contamination. Non-dedicated equipment (i.e. interface probe) was cleaned before initial use and between all measurement points with a solution of Alconox™ and distilled water. The Alconox™ solution was rinsed off using distilled water.

4.12.3 Description of how the field quality control measures referred to in subsection 3 (3) were carried out

Field duplicate samples were collected at the time of sampling. In accordance with O.Reg. 153/04, one duplicate sample was analyzed per ten samples submitted for analysis. A laboratory prepared trip blank accompanied the groundwater samples during each sampling event and was submitted for laboratory analysis of VOCs.

All field screening devices (i.e. RKI Eagle 2, YSI Water Quality Meter) were calibrated prior to use by the supplier. Calibration checks were completed, and re-calibrations were conducted as required.

4.12.4 Description of, and rational for, any deviations from the procedures set out in the quality assurance and quality control program set out in the SAP

There were no deviations from the QA/QC program described in the SAP.

5.0 Review and Evaluation

5.1 Geology

A summary of the subsurface conditions is presented below. Additional details may be found in the borehole logs appended in Appendix C.

Topsoil/Fill Material

A surficial topsoil layer, ranging in thickness from 100 to 250mm was encountered at all borehole locations. Underlying the topsoil layer, compact to loose fill, consisting of sand and gravel was encountered in the vicinity of the former residential and agricultural buildings, suggesting possible infill has occurred within the area either during the construction of the buildings, or for grading after demolition. The fill material extended to a depth of 1.5m. In BH20-6, the fill layer was encountered overlying the topsoil in the gravel driveway on the subject property.

Weathered/Disturbed Native Material

Native material exhibiting disturbed qualities associated with agricultural tilling was observed in BH20-1 through BH20-5, BH20-7 through BH20-9, MW2 and MW3 to depths ranging from 0.8 to 1.1 mbgs and consisted of silty sand, sandy silt and silt in a loose state.

Silt, Sand, Sandy Silt to Silty Sand Till

Sandy silt silty sand/till, silt and sand deposits extended below the topsoil and weathered/disturbed native material to the maximum explored depth of all the boreholes. The cohesionless deposit contained clay, gravel and cobbles. Occasional cobbles/boulders were inferred within the till deposits during drilling.

Table 5-1: Summary of Geologic Units Investigated

Geologic Unit	Inferred Thickness (m)	Top Elevation (masl)	Bottom Elevation (masl)	Properties
Fill Material	1.5m	272.1	251.1	Sand and Gravel
Weathered/Disturbed Material	0.8-1.1m	271.7	252.0	Cultivated Material
Silt, Sand, Sandy Silt	0.7-11.3m	271.9	250.1	Water Bearing Formation
Silty Sand Till	>5m	270.1	-	-

5.2 Ground Water Elevations and Flow Direction

5.2.1 Rationale for Monitoring Well Location and Well Screen Intervals

A total of eight (8) monitoring wells were installed on the Phase Two Property in order to assess the groundwater flow direction. The monitoring wells were screened to intersect the first water bearing formation encountered. The monitoring wells were screened within the silty sand/silty sand till unit which is considered to be an unconfined aquifer.

5.2.2 Results of Interface Probe Measurements

A summary of the groundwater level measurements is provided in Table 1. The groundwater level measurements were collected using a Solinst interface probe (Model 122). The depth to groundwater was found to range between -0.31 (0.31m above ground level) to 8.97 mbgs between September 30, 2020 and January 11, 2021. There was no indication of DNAPL or LNAPL in the monitoring wells at this time.

5.2.3 Product Thickness and Free Flowing Product

No evidence of product was observed in the monitoring wells at the time of the investigation.

5.2.4 Groundwater Elevation

The groundwater elevation was calculated by subtracting the depth to groundwater from the surface elevation determined by the surface elevation survey conducted as part of this investigation. A summary of the groundwater elevations calculated is presented in Table 1. Generally, the groundwater elevation was found to range from 263.89 to 253.27 masl in the upper aquifer investigated.

5.2.5 Groundwater Flow Direction

The groundwater flow direction was interpreted using the groundwater elevations calculated for the monitoring wells installed on the Phase Two Property. Based on the groundwater elevations calculated, the groundwater flow direction is interpreted to be west/southwest towards Lovers Creek. The groundwater elevation contours and flow direction are presented on Figure 6.

5.2.6 Assessment of Potential for Temporal Variability in Groundwater Flow Direction

The shallow aquifer investigated is inferred to be an unconfined aquifer, based on the soil stratigraphy observed in the boreholes advanced on the Phase Two Property. It is possible

that temporal variations in groundwater elevations may occur on the Phase Two Property in response to seasonal weather patterns.

Temporal variability in groundwater level has the ability to influence the groundwater flow direction. The degree of variation in groundwater levels on the Phase Two Property can only be confirmed with long-term monitoring.

5.2.7 Evaluation of Potential Interaction Between Buried Utilities and the Water Table

The Phase Two Property is currently undeveloped. The property has never been serviced with water or waste water, thus no buried services are present.

5.3 Ground Water Hydraulic Gradients

5.3.1 Horizontal Hydraulic Gradient

The horizontal hydraulic gradient was calculated based on the groundwater levels recorded on September 30, 2020

Table 5-2: Summary of Horizontal Hydraulic Gradient Calculations

Hydrogeological Unit	Calculated Horizontal Hydraulic Gradient
Overburden – Silty Sand Till	Minimum: 0.0084 Average: 0.0189 Maximum: 0.0295

5.4 Fine-Medium Soil Texture

Not Applicable – more than one-third of the soils encountered on the Phase Two Property are considered to be coarse textured. For the purposes of evaluating the SCS, all soils on the Phase Two Property are considered coarse textured.

5.5 Soil Field Screening

The soil samples were also screened for visual and olfactory indicators of impacts (e.g. staining, odours). No obvious visual or olfactory evidence of potential contamination were noted.

5.6 Soil Quality

The results of the chemical analyses conducted are presented in Tables 4 through 7. A visual summary of the location of the sample locations is provided in Figures 7A through 7D. The laboratory certificates of analysis have been provided under Appendix D.

5.6.1 Metals and ORPs

A total of three (3) samples were submitted for analysis of metals and ORPs and three (3) samples submitted for analysis of ICP Metals and Cyanide. The results of the analyses are tabulated in Table 4 (enclosed) and presented on Figure 7A. The results of the analyses indicated that all samples met the Table 2 SCS.

5.6.2 Petroleum Hydrocarbons

A total of three (3) samples were submitted for analysis of PHCs (incl. BTEX). The results of the analyses are tabulated in Table 5 (enclosed) and presented on Figure 7B. The results of the analyses indicated that all samples met the Table 2 SCS.

5.6.3 Volatile Organic Compounds

A total of three (3) samples were submitted for analysis of VOCs. The results of the analyses are tabulated in Table 6 (enclosed) and presented on Figure 7C. The results of the analyses indicated that all samples met the Table 2 SCS.

5.6.4 Polycyclic Aromatic Hydrocarbons

A total of four (4) samples, including one (1) field duplicate for QA/QC purposes were submitted for analysis of PAHs. The results of the analyses are tabulated in Table 7 (enclosed) and presented on Figure 7D. The results of the analyses indicated that all samples met the Table 2 SCS.

5.6.5 OC Pesticides

A total of four (4) samples, including one (1) field duplicate for QA/QC purposes were submitted for analysis of OC Pesticides. The results of the analyses are tabulated in Table 8 (enclosed) and presented on Figure 7E. The results of the analyses indicated that all samples met the Table 2 SCS.

5.6.6 Commentary on Soil Quality

The results of the chemical analyses completed indicated that all samples analyzed met the applicable MECP Table 2 SCS. The Site Condition Standards are considered to have been satisfied as of the Certification Date of December 4, 2020.

5.7 Ground Water Quality

Groundwater was not identified as a media of potential concern in the Phase One ESA.

5.8 Sediment Quality

No sediment was present on the Phase Two Property at the time of the investigation.

5.9 Quality Assurance and Quality Control Results

Collection of soil and groundwater samples was conducted in general accordance with the MECP *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*. As described in Section 5.12, dedicated equipment was used where possible, and all non-dedicated equipment was decontaminated before and between sampling events. All soil and groundwater samples were transferred directly into laboratory-supplied containers. The laboratory containers were prepared by the laboratory with suitable preservative, as required. All samples were stored and transported under refrigerated conditions. Chain of custody protocols were maintained from the time of sampling to delivery to the analytical laboratory.

The field QA/QC program involved the collection of field duplicate soil and groundwater samples, and the use of a trip blank for each groundwater sampling event (when suitable). In addition to the controls listed above, the analytical laboratory employed method blanks, internal laboratory duplicates, surrogate spike samples, matrix spike samples, and standard reference materials.

A summary of the field duplicate samples analyzed and an interpretation of the efficacy of the QA/QC program is provided in the table below.

Table 5-3: Summary of QA/QC Results

Sample ID	QA/QC duplicate	Medium	Parameter Analyzed	QA/QC Result
BH20-E3 SS2	BH20-E3 SS2 Dup	Soil	PAHs	All results were within the analytical protocol criteria for RPD
BH20-E5 SS2	BH20-E5 SS2 Dup	Soil	OC Pesticides	All results were within the analytical protocol criteria for RPD

Based on the interpretation of the laboratory results and the QA/QC program, it is the opinion of the QP that the laboratory analytical data can be relied upon.

All samples were handled in accordance with the MECP Analytical Protocol regarding sample holding time, preservation methods, storage requirements, and type of container.

SGS routinely conducts internal QA/QC analyses in order to satisfy regulatory QA/QC requirements. The results of the SGS QA/QC analyses for the submitted soil samples are summarized in the laboratory Certificates of Analyses provided in Appendix D.

With respect to subsection 47(3) of O.Reg 153/04 (as amended), all certificates of analysis or analytical reports pursuant to clause 47(2) (b) of the regulation comply with subsection 47(3). A certificate of analysis has been received for each sample submitted for analysis and have been provided (in full) in Appendix D.

A review of the QA/QC sample results indicated that no issues were identified with respect to both the field collection methodology and the laboratory reporting. It is the opinion of the QP that the analytical data obtained are representative of the soil and groundwater conditions at the Phase Two Property for the purpose of assessing whether the soil and groundwater at the Phase Property meets the applicable MECP SCS.

5.10 Phase Two Conceptual Site Model

The Phase Two Conceptual Site Model will be prepared to support the filing a Record of Site Condition, if required.

6.0 Conclusions

This Phase Two ESA involved that advancement of nineteen (19) boreholes, the installation of eight (8) monitoring wells on the Phase, and the collection of soil and groundwater samples for analysis of the potential contaminants of concern, including: Metals, As, Sb, Se, CN-, OC Pesticides, Cr (VI), B-HWS, Hg, low or high pH, SAR, EC, and PAHs.

It is the opinion of the QP_{ESA} that the applicable SCS for the soil and groundwater at the Phase Two Property have been met as of the Certification Date of December 4, 2020. No further sub-surface investigation is required regarding the environmental quality of the soil and groundwater at the Phase Two Property.

6.1 Qualifications of the Assessors

Tanner Leonhardt, B.Eng., EIT

Mr. Leonhardt is an environmental EIT with DS Consultants Ltd. Tanner holds a Bachelor of Engineering Degree from the University of Guelph and has several years of experience working in the environmental industry. Tanner has experience in conducting Phase One and Phase Two Environmental Site Assessments, soil and groundwater remediation, and has supported several risk assessment projects.

Drew Doak, B.Sc.E., P.Eng., QP_{ESA}

Mr. Doak is an Environmental Project Manager with DS Consultants Limited. Drew holds a Bachelor of Science in Engineering from Queen's University, and is a practicing member of the Professional Engineers of Ontario (PEO). Drew has five years of environmental consulting experience and has conducted and/or managed a multitude of projects in his professional experience. Drew has extensive experience conducting Phase One and Phase Two Environmental Site Assessments in support of brownfields redevelopment in urban settings, and been involved in numerous remediation projects, and supported many risk assessments and Records of Site Conditions with the Ministry of Environment, Conservation and Parks. He has also conducted a variety of Hydrogeological investigations within the GTA. Drew is considered a Qualified Person to conduct Environmental Site Assessments as defined by Ontario Regulation 153/04 (as amended).

Mr. Patrick (Rick) Fioravanti, B.Sc., P.Geo., QP_{ESA}

Mr. Fioravanti is the Manager of Environmental Services with DS Consultants Limited. Patrick holds a Honours Bachelor of Science with distinction in Toxicology from the University of Guelph, and is a practicing member of the Association of Professional Geoscientists of Ontario (APGO). Patrick has over ten years of environmental consulting experience and has conducted and/or managed hundreds of projects in his professional experience. Patrick has extensive experience conducting Phase One and Phase Two Environmental Site Assessments in support of brownfields redevelopment in urban settings, and been involved in numerous remediation projects, supported many risk assessments, and successfully filed Records of Site Condition with the Ministry of Environment and Climate Change. He has conducted work across southern and eastern Ontario, and Quebec in his professional experience. Patrick is considered a Qualified Person to conduct Environmental Site Assessments as defined by Ontario Regulation 153/04 (as amended).

6.2 Signatures

This Phase Two ESA was conducted under the supervision of Mr. Patrick (Rick) Fioravanti, B.Sc., P.Geo., QP_{ESA} in accordance with the requirements of O.Reg. 153/04 (as amended). The findings and conclusions presented have been determined based on the information obtained at the time of the investigation, and on an assessment of the conditions of the Site at this time.

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,

DS Consultants Ltd



Tanner Leonhardt, B.Eng., EIT
Environmental EIT



Drew Doak, B.Sc.E., P.Eng., QP_{ESA}
Environmental Project Manager



Patrick Fioravanti, B.Sc., P.Geo., QP_{ESA}
Manager – Environmental Services



6.3 Limitations

This report was prepared for the sole use of Mattamy Homes and is intended to provide an assessment of the environmental condition on the property located at 620 Lockhart Road, Innisfil, Ontario. The information presented in this report is based on information collected during the completion of the Phase Two Environmental Site Assessment by DS Consultants Ltd. The material in this report reflects DS' judgment in light of the information available at the time of report preparation. This report may not be relied upon by any other person or entity without the written authorization of DS Consultants Ltd. The scope of services performed in the execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or reuse of this documents or findings, conclusions and recommendations represented herein, is at the sole risk of said users.

The conclusions drawn from the Phase Two ESA were based on information at selected observation and sampling locations. Conditions between and beyond these locations may become apparent during future investigations or on-site work, which could not be detected or anticipated at the time of this investigation. The sampling locations were chosen based upon a cursory historical search, visual observations and limited information provided by persons knowledgeable about past and current activities on this site during the Phase Two ESA activities. As such, DS Consultants Ltd. cannot be held responsible for environmental conditions at the site that was not apparent from the available information.

7.0 References

- ◆ Armstrong, D.K. and Dodge, J.E.P. *Paleozoic Geology Map of Southern Ontario*. Ontario Geological Survey, Miscellaneous Release--Data 219.
- ◆ Chapman, L.J. and Putnam, D.F. 2007. *The Physiography of Southern Ontario*. Ontario Geological Survey, Miscellaneous Release--Data 228.
- ◆ Freeze, R. Allen and Cherry, John A., 1979. *Ground water*. Page 29.
- ◆ Ontario Ministry of the Environment, December 1996. *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*.
- ◆ Ontario Ministry of Environment, 15 April 2011. *Soil, Ground Water and Sediment Standards for use under part XV.1 of the Environmental Protection Act*.
- ◆ Ontario Ministry of the Environment, June 2011. *Guide for Completing Phase Two Environmental Site Assessments under Ontario regulation 153/04*.
- ◆ Ontario Ministry of the Environment, July 2011. *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*.
- ◆ The Ontario Geological Survey. 2003. *Surficial Geology of Southern Ontario*.



Figures



Legend

 Approx Site Boundary



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Client:

MATTAMY HOMES

Project:

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
620 Lockhart Road, Innisfil, ON

Title:

SITE LOCATION PLAN



Size:
8.5 x 11

Approved By:

D.D

Drawn By:

S.Y

Date:

February 2021

Rev:
0

Scale:

As Shown

Project No.:

20-231-400

Figure No.:

1

Image/Map Source: Google Street Map



Legend

Approx Site Boundary



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PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
620 Lockhart Road, Innisfil, ON

Title:

PHASE TWO PROPERTY SITE PLAN



Size:
8.5 x 11

Approved By:

D.D

Drawn By:

S.Y

Date:

February 2021

Rev:
0

Scale:

As Shown

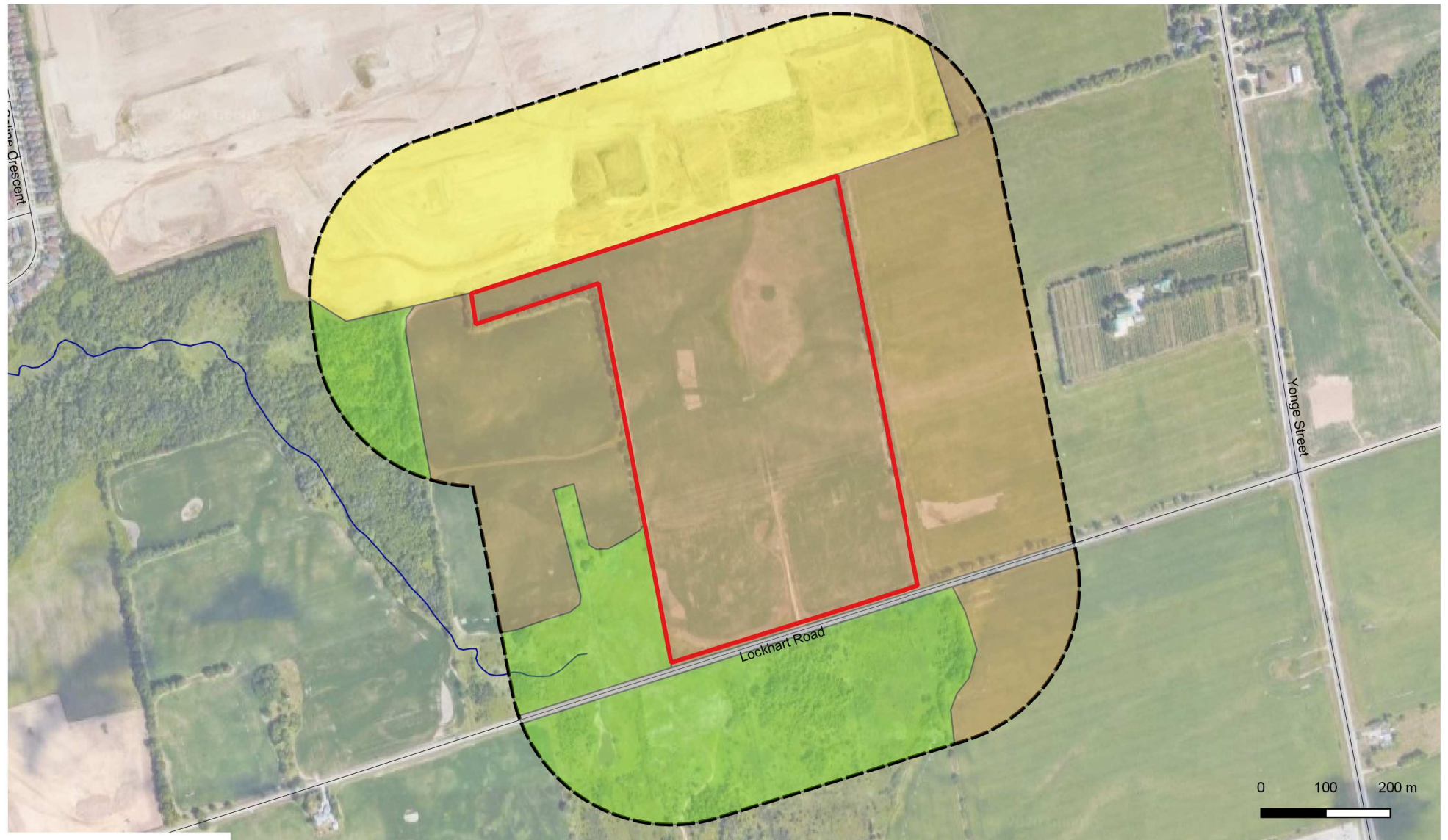
Project No.:

20-231-400

Figure No.:

2

Image/Map Source: Google Satellite image



Legend

- Approx Site Boundary
- 250m Buffer
- Residential
- Agricultural
- Open Space



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Project:

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
620 Lockhart Road, Innisfil, ON

Title:

PHASE ONE STUDY AREA

Size:
8.5 x 11

Approved By:

D.D

Drawn By:

S.Y

Date:

February 2021

Rev:
0

Scale:

As Shown

Project No.:

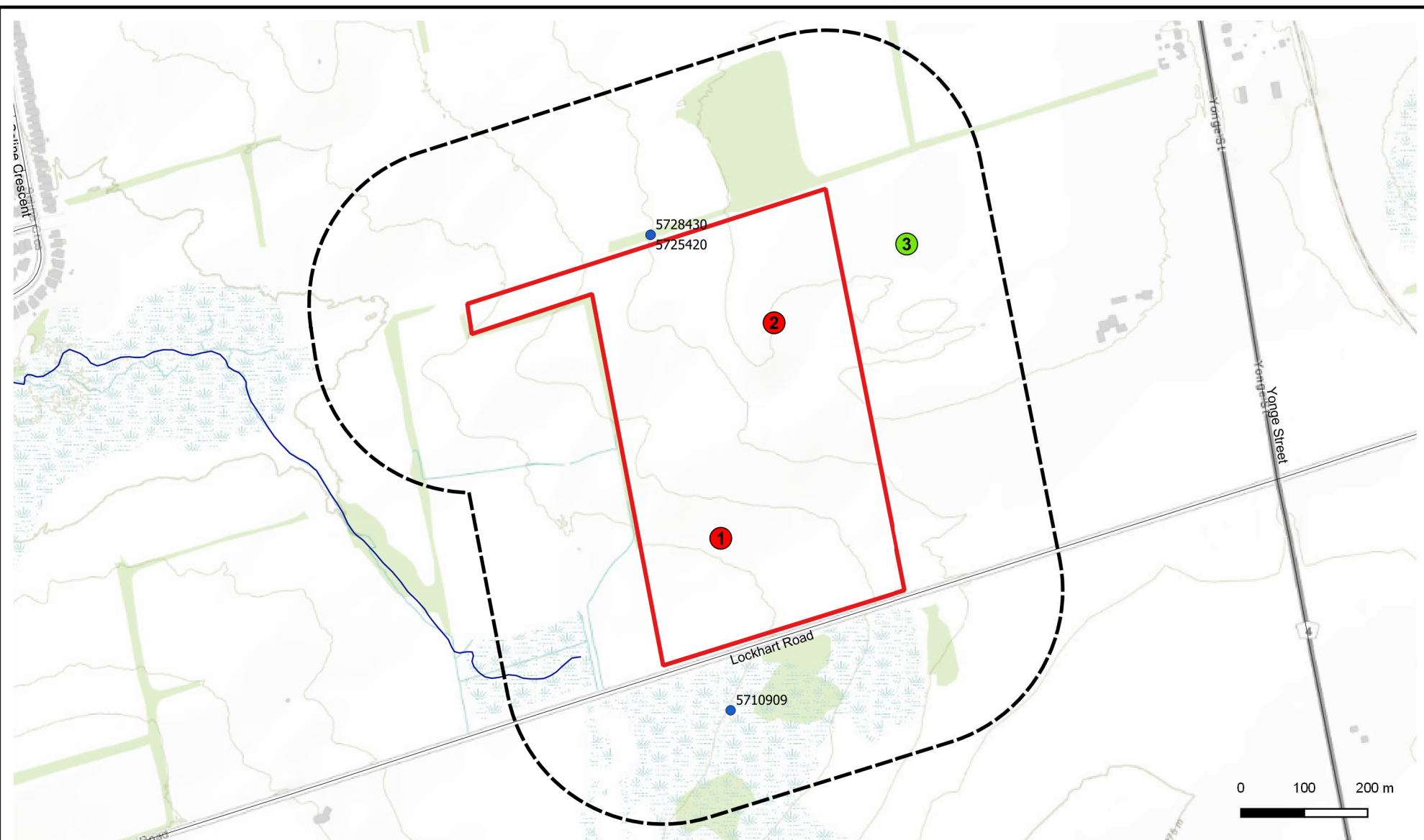
20-231-400

Figure No.:

3

Image/Map Source: Google Satellite image





Legend

- Approx Site Boundary
- 250m Buffer
- Registered Water Well (MECP WWR)
- PCA not contributing to APEC
- PCA contributing to APEC



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PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
620 Lockhart Road, Innisfil, ON

Title:

PCA WITHIN PHASE ONE STUDY AREA

Size:
8.5 x 11

Rev:
0

Approved By: D.D

Scale: As Shown

Image/Map Source: Esri Topo Map

Drawn By: S.Y

Project No.: 20-231-400

Date: February 2021

Figure No.: 4





Legend

- Approx Site Boundary
- ✕ Borehole
- ⊗ Monitoring Well
- APEC 1
- APEC 2 & 3



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Project:

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
620 Lockhart Road, Innisfil, ON

Title:

BOREHOLE LOCATION PLAN WITH APECs

Size:
8.5 x 11

Rev:
0

Approved By:

D.D

Drawn By:

S.Y

Date:

February 2021

Scale:

As Shown

Project No.:

20-231-400

Figure No.:

5

Image/Map Source: Google Satellite image





Legend

- Approx Site Boundary
- ⊕ Borehole
- ⊕ Monitoring Well
- Groundwater Elevation Contour
- ➔ Groundwater Flow Direction



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Client:

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Project:

**PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
620 Lockhart Road, Innisfil, ON**

Title:

GROUNDWATER ELEVATION CONTOURS AND FLOW DIRECTION



Size:
8.5 x 11

Approved By: **D.D**

Drawn By: **S.Y**

Date: **February 2021**

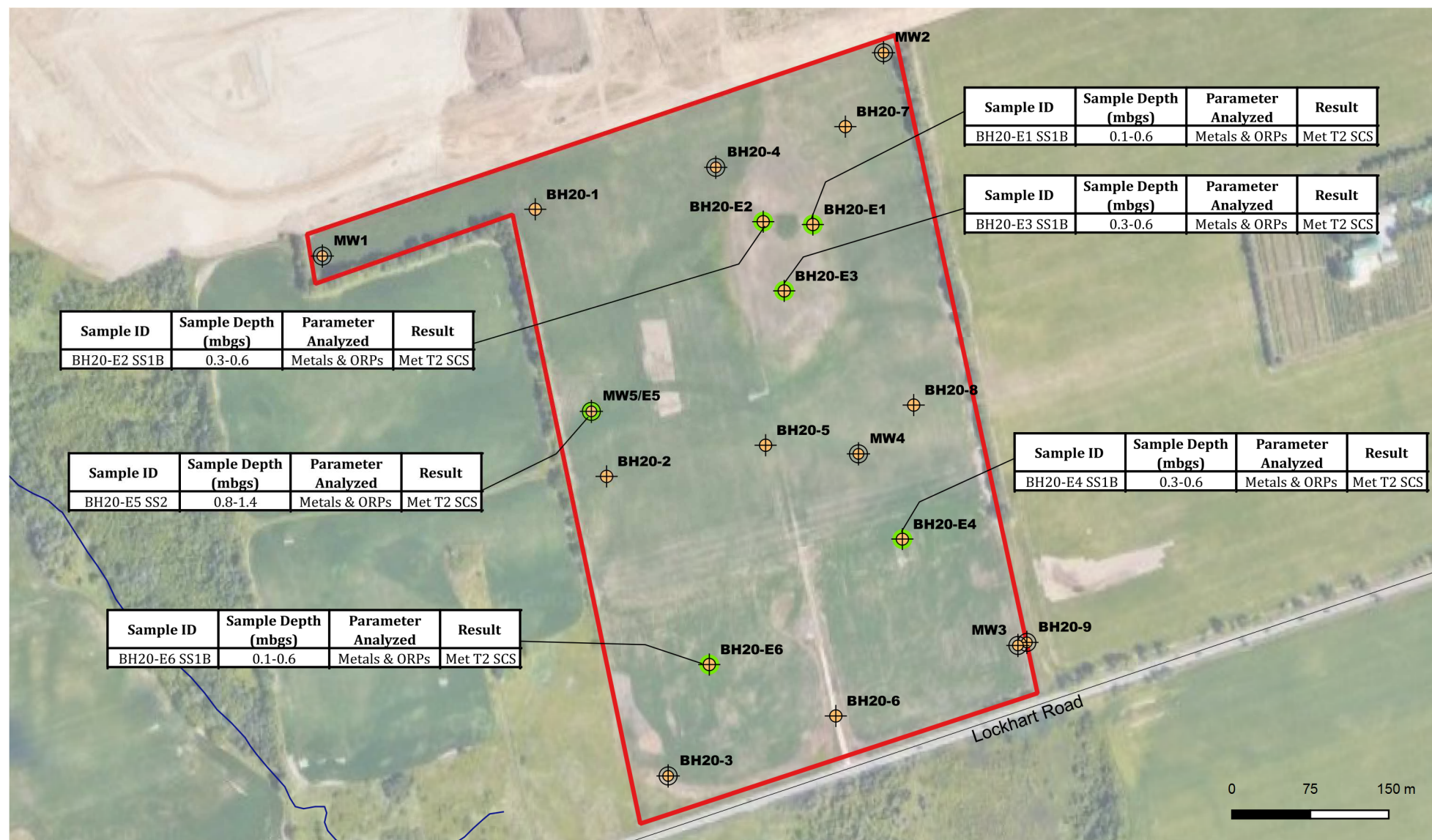
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Scale: **As Shown**

Project No.: **20-231-400**

Figure No.: **6**

Image/Map Source: *Google Satellite image*



Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E2 SS1B	0.3-0.6	Metals & ORPs	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E1 SS1B	0.1-0.6	Metals & ORPs	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E3 SS1B	0.3-0.6	Metals & ORPs	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E5 SS2	0.8-1.4	Metals & ORPs	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E4 SS1B	0.3-0.6	Metals & ORPs	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E6 SS1B	0.1-0.6	Metals & ORPs	Met T2 SCS

Legend

- Approx Site Boundary
- ⊕ Borehole
- ⊗ Monitoring Well
- Sample Met Applicable Standards



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PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
620 Lockhart Road, Innisfil, ON

Title:

SOIL CHARACTERIZATION – METALS AND ORPs



Size:
8.5 x 11

Approved By: D.D

Drawn By: S.Y

Date: February 2021

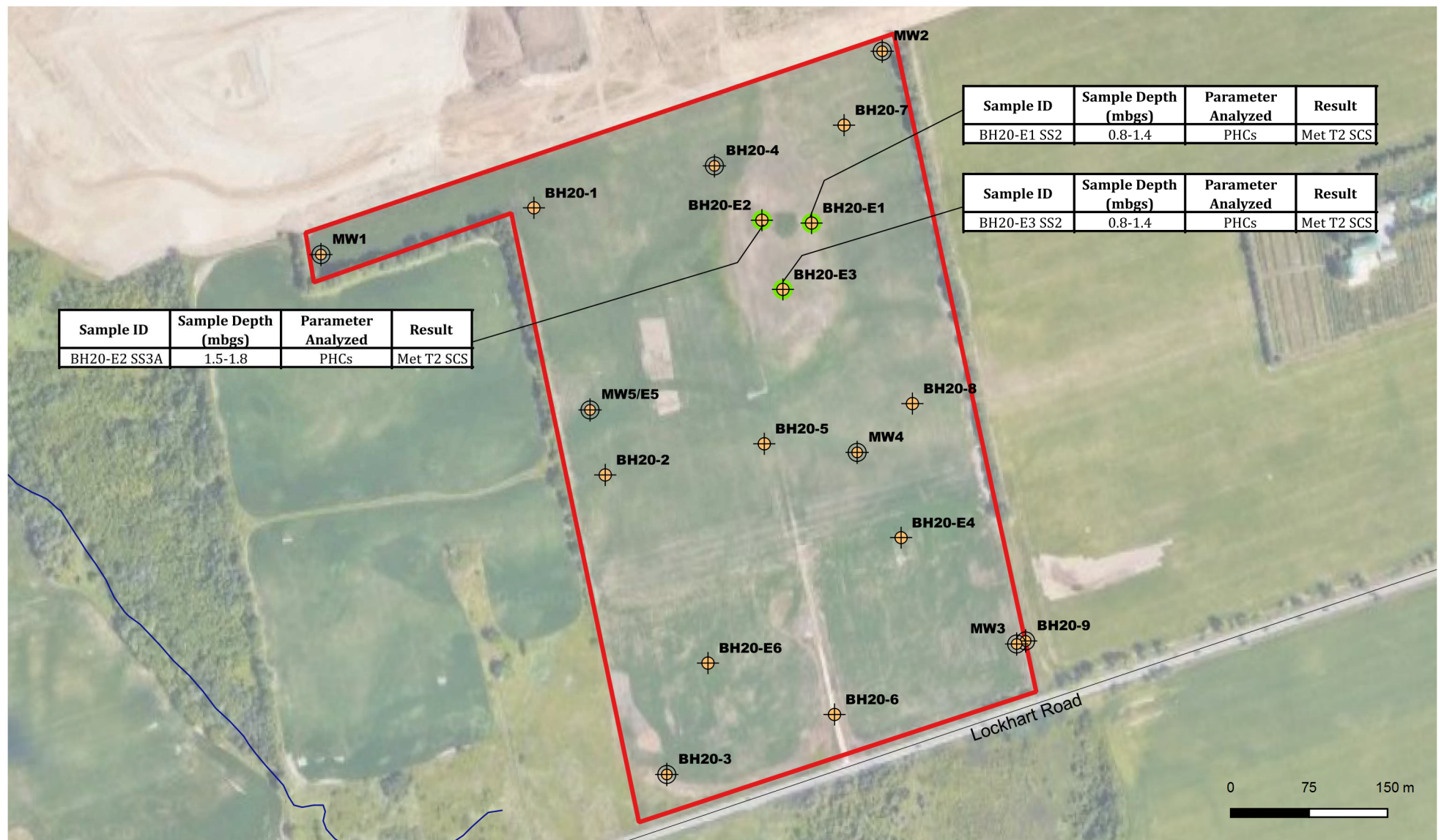
Rev:
0

Scale: As Shown

Project No.: 20-231-400

Figure No.: **7A**

Image/Map Source: Google Satellite image



Legend

- Approx Site Boundary
- ⊕ Borehole
- ⊕ Monitoring Well
- Sample Met Applicable Standards



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620 Lockhart Road, Innisfil, ON

Title:

SOIL CHARACTERIZATION – PHCs

Size:
8.5 x 11

Rev:
0

Approved By:

D.D

Drawn By:

S.Y

Date:

February 2021

Scale:

As Shown

Project No.:

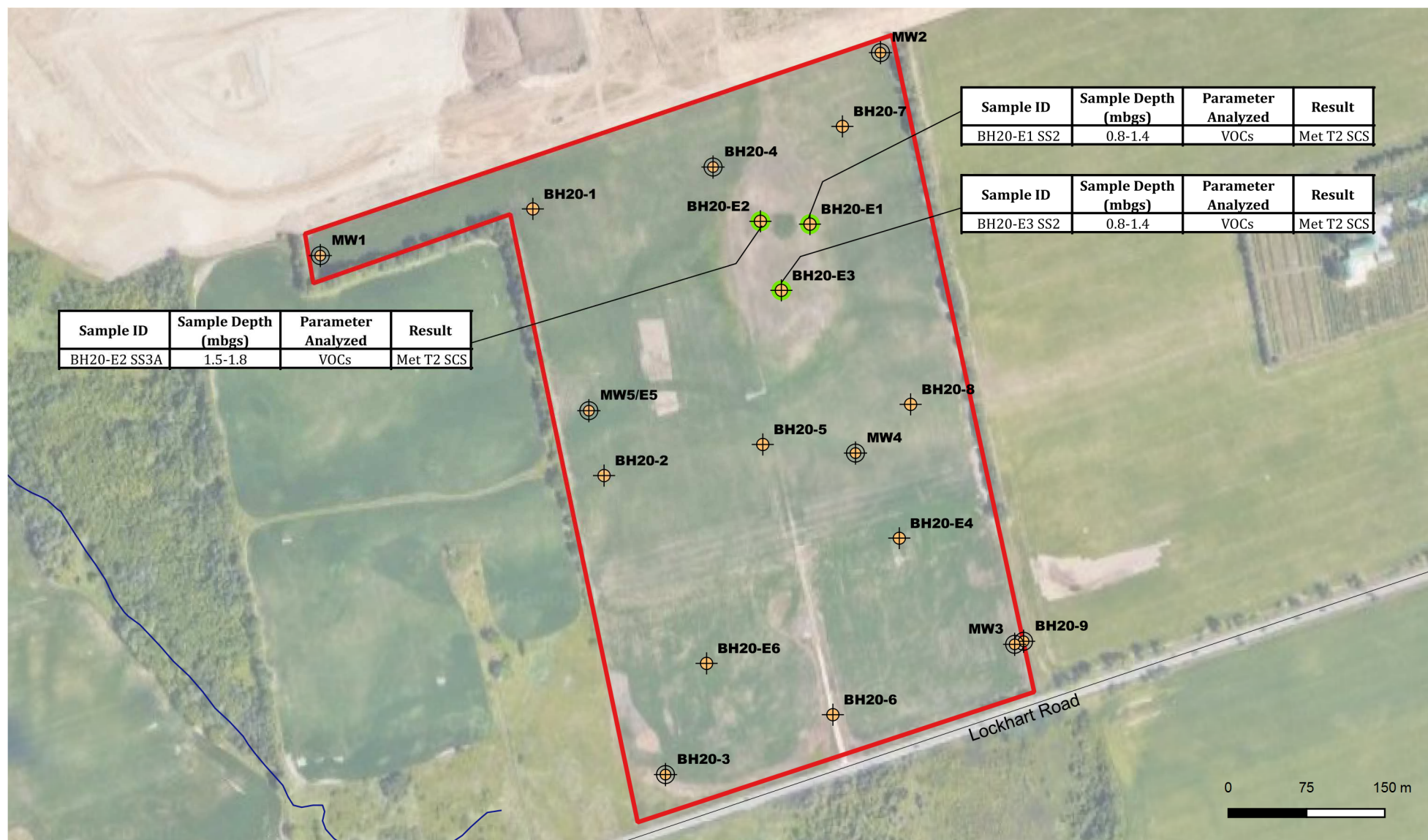
20-231-400

Figure No.:

7B

Image/Map Source: Google Satellite image





Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E2 SS3A	1.5-1.8	VOCs	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E1 SS2	0.8-1.4	VOCs	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E3 SS2	0.8-1.4	VOCs	Met T2 SCS

Legend

- Approx Site Boundary
- ⊕ Borehole
- ⊕ Monitoring Well
- Sample Met Applicable Standards



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PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
620 Lockhart Road, Innisfil, ON

Title:

SOIL CHARACTERIZATION – VOCs



Size:
8.5 x 11

Rev:
0

Approved By: D.D

Scale: As Shown

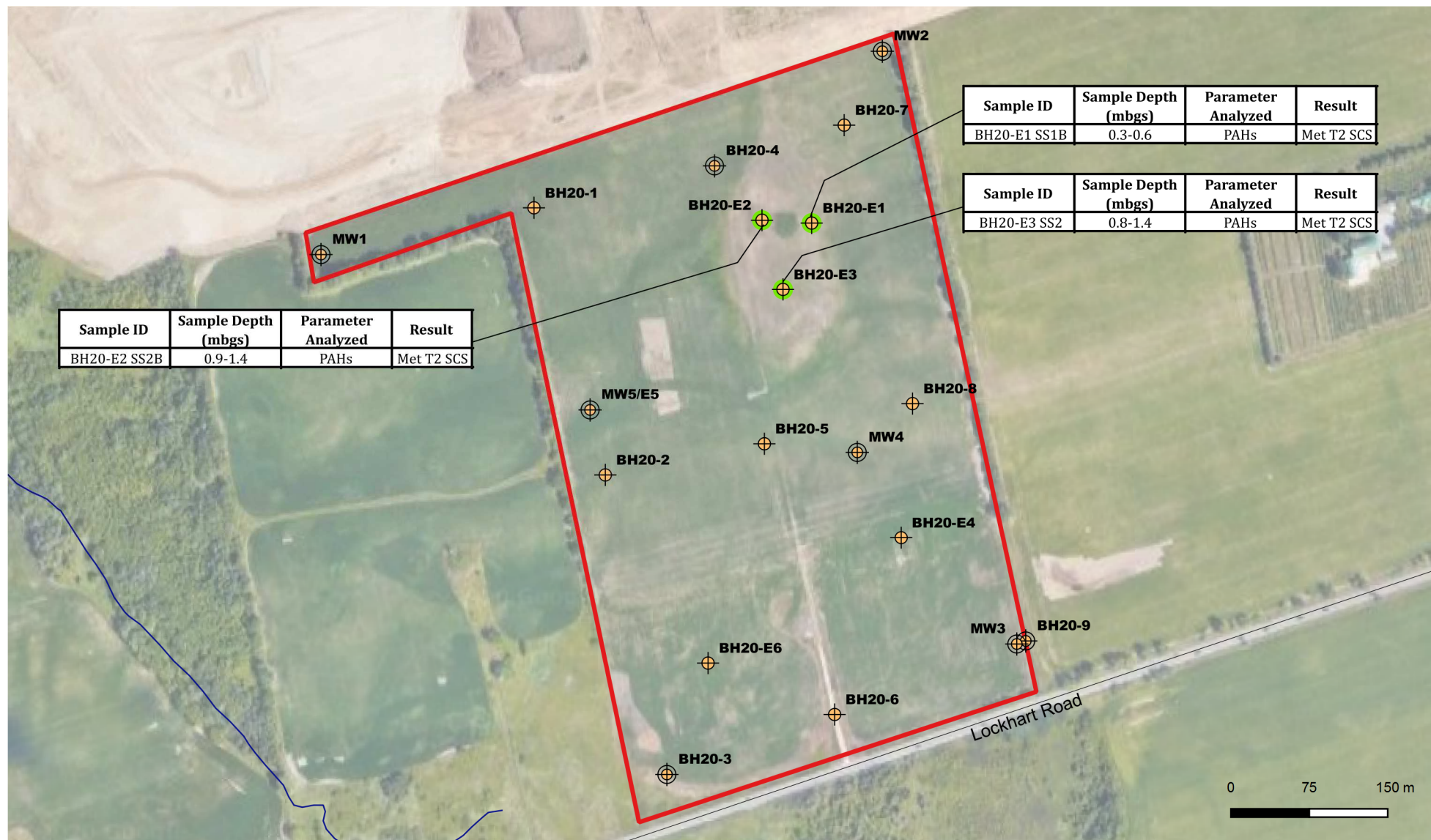
Image/Map Source: Google Satellite image

Drawn By: S.Y

Project No.: 20-231-400

Date: February 2021

Figure No.: **7C**



Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E2 SS2B	0.9-1.4	PAHs	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E1 SS1B	0.3-0.6	PAHs	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E3 SS2	0.8-1.4	PAHs	Met T2 SCS

Legend

- Approx Site Boundary
- ⊕ Borehole
- ⊕ Monitoring Well
- Sample Met Applicable Standards



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Title:

SOIL CHARACTERIZATION – PAHs



Size:
8.5 x 11

Rev:
0

Approved By: D.D

Scale: As Shown

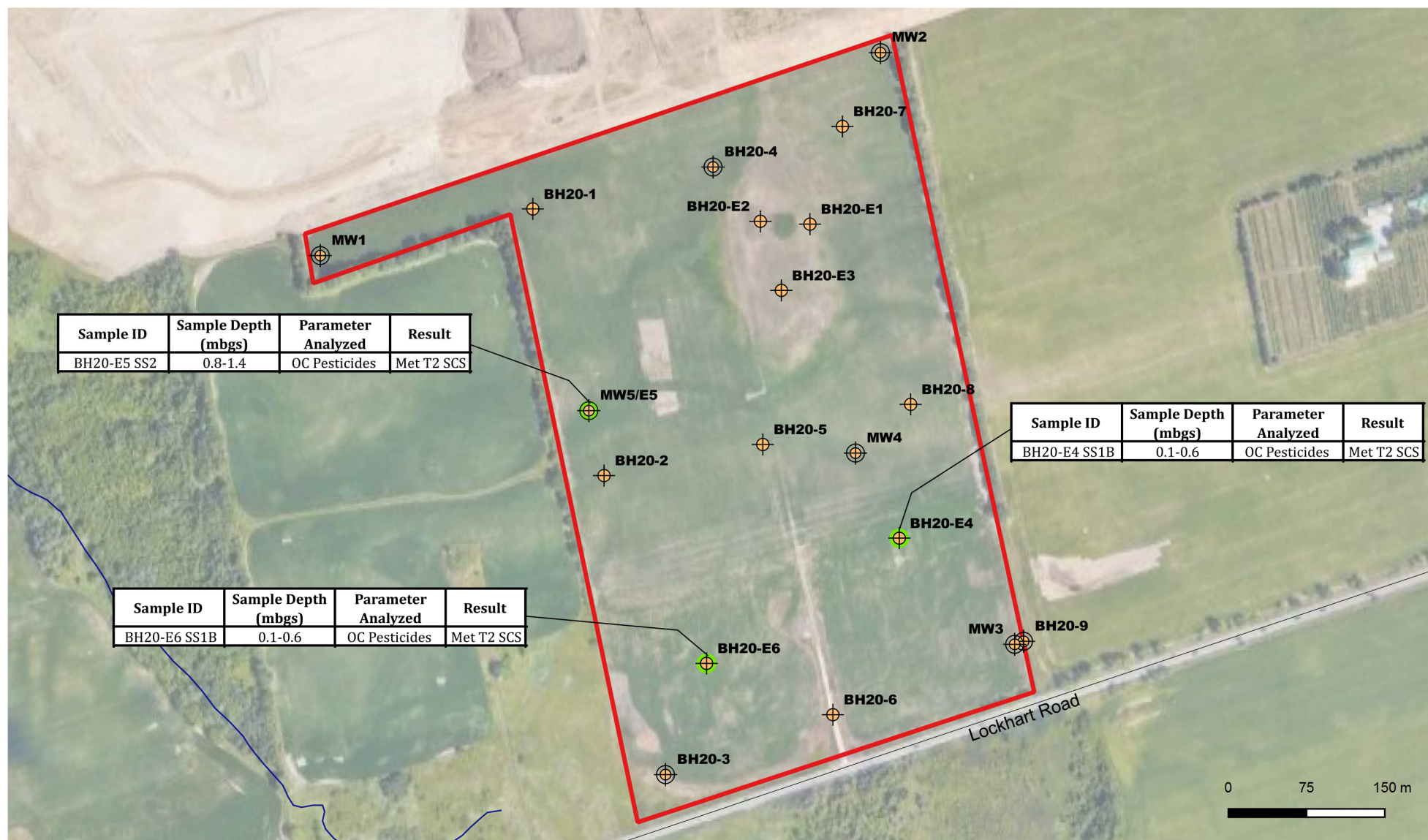
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Drawn By: S.Y

Project No.: 20-231-400

Date: February 2021

Figure No.: **7D**



Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E5 SS2	0.8-1.4	OC Pesticides	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E4 SS1B	0.1-0.6	OC Pesticides	Met T2 SCS

Sample ID	Sample Depth (mbgs)	Parameter Analyzed	Result
BH20-E6 SS1B	0.1-0.6	OC Pesticides	Met T2 SCS

Legend

- Approx Site Boundary
- ⊕ Borehole
- ⊕ Monitoring Well
- Sample Met Applicable Standards



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620 Lockhart Road, Innisfil, ON

Title:

SOIL CHARACTERIZATION – OCPs

Size:
8.5 x 11

Rev:
0

Approved By: D.D

Scale: As Shown

Image/Map Source: Google Satellite image

Drawn By: S.Y

Project No.: 20-231-400

Date: February 2021

Figure No.: **7E**





Tables



Table 1: Summary of Monitoring Well Installation and Groundwater Data

Well ID			BH20-3	BH20-4	BH20-9	MW1	MW2	MW3	MW4	MW5
Installed By:			DS	DS	DS	DS	DS	DS	DS	DS
Installation Date:			10-Sep-20	09-Sep-20	11-Sep-20	02-Dec-20	03-Dec-20	04-Dec-20	04-Dec-20	03-Dec-20
Well Status:			Active	Active	Active	Active	Active	Active	Active	Active
Inner Diameter	(mm)		50	50	50	50	50	50	50	50
Surface Elevation	(masl)		253.10	269.00	263.00	254.10	272.10	263.00	266.30	260.00
Bottom of Concrete Seal/Top of Bentonite Seal	mbgs		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	masl		252.80	268.70	262.70	253.80	271.80	262.70	266.00	259.70
Bottom of Bentonite Seal/Top of Sand Pack	mbgs		4.60	5.50	5.50	4.90	7.70	2.50	3.30	5.50
	masl		248.50	263.50	257.50	249.20	264.40	260.50	263.00	254.50
Top of Well Screen	mbgs		5.50	6.10	6.10	6.10	8.30	3.10	6.10	6.10
	masl		247.60	262.90	256.90	248.00	263.80	259.90	260.20	253.90
Well Screen Length	m		1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Bottom of Well Screen	mbgs		7.00	7.60	7.60	7.60	9.80	4.60	7.60	7.60
	masl		246.10	261.40	255.10	246.50	262.30	258.10	258.70	252.40
GW Monitoring										
30-Sep-20	Depth to GW	mbgs	-0.17	5.69	0.73	NM	NM	NM	NM	NM
	GW Elevation	masl	253.27	263.31	262.27	NA	NA	NA	NA	NA
11-Jan-21	Depth to GW	mbgs	-0.31	5.11	0.63	0.49	8.97	0.83	2.57	0.55
	GW Elevation	masl	253.41	263.89	262.37	253.61	263.13	262.17	263.73	259.45

For Table Notes see **Notes for Soil and Groundwater Summary Tables**, included at the end of this Section.



Table 2: Summary of Soil Samples Submitted for Chemical Analysis

Borehole ID	Sample No.	Sample Depth (mbgs)	Soil Description	Parameter Analyzed	APEC Investigated
BH20-E1	SS1B	0.1-0.6	Sand Fill	Metals & ORPs, PAHs	APEC-1, APEC-2, APEC-3
	SS2	0.8-1.4	Sand Fill	PHCs, VOCs	APEC-2
BH20-E2	SS1B	0.1-0.6	Sand Fill	Metals & ORPs	APEC-1, APEC-2
	SS2B	0.9-1.4	Clayey Silt	PAHs	APEC-2, APEC-3
	SS3A	1.5-1.8	Clayey Silt	PHCs, VOCs	APEC-2
BH20-E3	SS1B	0.3-0.6	Sand Fill	Metals & ORPs	APEC-1, APEC-2
	SS2	0.8-1.4	Sand	PHCs, VOCs, PAHs	APEC-2, APEC-3
BH20-E4	SS1B	0.1-0.6	Sandy Silt	ICP Metals, Pesticides, Cyanide	APEC-1
BH20-E5	SS2	0.8-1.4	Sandy Silt	ICP Metals, Pesticides, Cyanide	APEC-1
BH20-E6	SS1B	0.1-0.6	Sandy Silt	ICP Metals, Pesticides, Cyanide	APEC-1

For Table Notes see **Notes for Soil and Groundwater Summary Tables**, included at the end of this Section.



Table 3: Summary of APECs Investigated

APEC	Description	PCOCs	Media	Boreholes Within APEC	Samples Analysed	Parameter Analyzed
APEC-1	Historic Pesticide Use	Metals, As, Sb, Se, CN-, OC Pesticides	Soil	BH20-E1	SS1B	Metals & ORPs, PAHs
				BH20-E2	SS1B	Metals & ORPs
				BH20-E3	SS1B	Metals & ORPs
				BH20-E4	SS1B	ICP Metals, Pesticides, Cyanide
				BH20-E5	SS2	ICP Metals, Pesticides, Cyanide
				BH20-E6	SS1B	ICP Metals, Pesticides, Cyanide
APEC-2	Fill material of unknown quality was used to backfill the former structures On-Site.	Metals As, Sb, Se, B-HWS, CN-, Cr(VI), Hg, low or high pH, SAR, EC, PAHs	Soil	BH20-E1	SS1B	Metals & ORPs, PAHs
					SS2	PHCs, VOCs
				BH20-E2	SS1B	Metals & ORPs
					SS2B	PAHs
					SS3A	PHCs, VOCs
				BH20-E3	SS1B	Metals & ORPs
					SS2	PHCs, VOCs, PAHs
APEC-3	Controlled burns historically occurred on the Property	PAHs	Soil	BH20-E1	SS1B	PAHs
				BH20-E2	SS2B	PAHs
				BH20-E3	SS2	PAHs



Table 4: Summary of Metals and ORPs in Soil

Parameter	MECP Table 2 SCS	BH20-E1 SS1B	BH20-E2 SS1B	BH20-E3 SS1B
Date of Collection		03-Dec-20	03-Dec-20	03-Dec-20
Date Reported		16-Dec-20	16-Dec-20	16-Dec-20
Sampling Depth (mbgs)		0.1-0.6	0.3-0.6	0.3-0.6
Analytical Report Reference No.		CA14233-DEC20 9	CA14233-DEC20 11	CA14233-DEC20 14
Antimony	7.5	< 0.8	< 0.8	< 0.8
Arsenic	18	0.8	0.8	0.6
Barium	390	24	26	9.4
Beryllium	4	0.2	0.15	0.11
Boron (total)	120	2	3	2
Boron (Hot Water Soluble)	1.5	< 0.5	< 0.5	< 0.5
Cadmium	1.2	0.11	0.09	0.06
Chromium Total	160	6.6	5.5	3.3
Chromium VI	8	< 0.2	< 0.2	< 0.2
Cobalt	22	2.3	2.1	1.3
Copper	140	9.3	6.6	3.2
Cyanide (CN-)	0.051	< 0.05	< 0.05	< 0.05
Electrical Conductivity (mS/cm)	0.7	0.21	0.14	0.1
Lead	120	3.3	4.6	1.7
Mercury	0.27	< 0.05	< 0.05	< 0.05
Molybdenum	6.9	0.2	0.1	< 0.1
Nickel	100	4.2	3.8	2.9
Selenium	2.4	< 0.7	< 0.7	< 0.7
Silver	20	< 0.05	< 0.05	< 0.05
Sodium Adsorption Ratio	5	< 0.2	< 0.2	< 0.2
Thallium	1	0.04	0.04	< 0.02
Uranium	23	0.22	0.22	0.15
Vanadium	86	12	11	6
Zinc	340	16	19	8.5
pH	NV	7.84	7.77	7.76

For Table Notes see **Notes for Soil and Groundwater Summary Tables**, included at the end of this Section.



Table 4: Summary of Metals and ORPs in Soil

Parameter	MECP Table 2 SCS	BH20-E4 SS1B	BH20-E5 SS2	BH20-E6 SS1B
Date of Collection		04-Dec-20	04-Dec-20	04-Dec-20
Date Reported		16-Dec-20	16-Dec-20	16-Dec-20
Sampling Depth (mbgs)		0.3-0.6	0.8-1.4	0.1-0.6
Analytical Report Reference No.		CA14233-DEC20 17	CA14233-DEC20 18	CA14233-DEC20 20
Antimony	7.5	< 0.8	< 0.8	< 0.8
Arsenic	18	1.1	0.9	0.8
Barium	390	77	48	57
Beryllium	4	0.26	0.2	0.21
Boron (total)	120	4	3	3
Boron (Hot Water Soluble)	1.5	-	-	-
Cadmium	1.2	0.03	0.03	< 0.02
Chromium Total	160	14	10	9.8
Chromium VI	8	-	-	-
Cobalt	22	4.6	3.8	3
Copper	140	10	8.7	4.9
Cyanide (CN-)	0.051	< 0.05	< 0.05	< 0.05
Electrical Conductivity (mS/cm)	0.7	-	-	-
Lead	120	3.3	2.7	2.7
Mercury	0.27	-	-	-
Molybdenum	6.9	0.1	0.2	0.1
Nickel	100	9	8.2	6
Selenium	2.4	< 0.7	< 0.7	< 0.7
Silver	20	< 0.05	< 0.05	< 0.05
Sodium Adsorption Ratio	5	-	-	-
Thallium	1	0.08	0.07	0.06
Uranium	23	0.3	0.27	0.29
Vanadium	86	26	20	18
Zinc	340	22	17	16
pH	NV	-	-	-

For Table Notes see **Notes for Soil and Groundwater Summary Tables**, included at the end of this Section.



Table 5: Summary of PHCs in Soil

Parameter	MECP Table 2 SCS	BH20-E1 SS2	BH20-E2 SS3A	BH20-E3 SS2
Date of Collection		03-Dec-20	03-Dec-20	03-Dec-20
Date Reported		16-Dec-20	16-Dec-20	16-Dec-20
Sampling Depth (mbgs)		0.8-1.4	1.5-1.8	0.8-1.4
Analytical Report Reference No.		CA14233-DEC20 10	CA14233-DEC20 13	CA14233-DEC20 15
Benzene	0.21	< 0.02	< 0.02	< 0.02
Ethylbenzene	1.1	< 0.05	< 0.05	< 0.05
Toluene	2.3	< 0.05	< 0.05	< 0.05
Xylenes (Total)	3.1	< 0.05	< 0.05	< 0.05
F1-BTEX	55	< 10	< 10	< 10
F2 (C10-C16)	98	< 10	< 10	< 10
F3 (C16-C34)	300	< 50	< 50	< 50
F4 (C34-C50)	2800	< 50	< 50	< 50

For Table Notes see **Notes for Soil and Groundwater Summary Tables**, included at the end of this Section.



Table 6: Summary of VOCs in Soil

Parameter	MECP Table 2 SCS	BH20-E1 SS2	BH20-E2 SS3A	BH20-E3 SS2
Date of Collection		03-Dec-20	03-Dec-20	03-Dec-20
Date Reported		16-Dec-20	16-Dec-20	16-Dec-20
Sampling Depth (mbgs)		0.8-1.4	1.5-1.8	0.8-1.4
Analytical Report Reference No.		CA14233-DEC20 10	CA14233-DEC20 13	CA14233-DEC20 15
Tetrachloroethane, 1,1,1,2-	0.058	< 0.05	< 0.05	< 0.05
Trichloroethane, 1,1,1-	0.38	< 0.05	< 0.05	< 0.05
Tetrachloroethane, 1,1,2,2-	0.05	< 0.05	< 0.05	< 0.05
Trichloroethane, 1,1,2-	0.05	< 0.05	< 0.05	< 0.05
Dichloroethane, 1,1-	0.47	< 0.05	< 0.05	< 0.05
Dichloroethylene, 1,1-	0.05	< 0.05	< 0.05	< 0.05
Dichlorobenzene, 1,2-	1.2	< 0.05	< 0.05	< 0.05
Dichloroethane, 1,2-	0.05	< 0.05	< 0.05	< 0.05
Dichloropropane, 1,2-	0.05	< 0.05	< 0.05	< 0.05
Dichlorobenzene, 1,3-	4.8	< 0.05	< 0.05	< 0.05
Dichloropropene, 1,3-	0.05	< 0.05	< 0.05	< 0.05
Dichlorobenzene, 1,4-	0.083	< 0.05	< 0.05	< 0.05
Acetone	16	< 0.5	< 0.5	< 0.5
Bromomethane	0.05	< 0.05	< 0.05	< 0.05
Carbon Tetrachloride	0.05	< 0.05	< 0.05	< 0.05
Chlorobenzene	2.4	< 0.05	< 0.05	< 0.05
Chloroform	0.05	< 0.05	< 0.05	< 0.05
Dichloroethylene, 1,2-cis-	1.9	< 0.05	< 0.05	< 0.05
Dichloroethylene, 1,2-trans-	0.084	< 0.05	< 0.05	< 0.05
Dichlorodifluoromethane	16	< 0.05	< 0.05	< 0.05
Ethylene dibromide	0.05	< 0.05	< 0.05	< 0.05
Methyl Ethyl Ketone	16	< 0.5	< 0.5	< 0.5
Methyl Isobutyl Ketone	1.7	< 0.5	< 0.5	< 0.5
Methyl tert-Butyl Ether (MTBE)	0.75	< 0.05	< 0.05	< 0.05
Methylene Chloride	0.1	< 0.05	< 0.05	< 0.05
Hexane (n)	2.8	< 0.05	< 0.05	< 0.05
Styrene	0.7	< 0.05	< 0.05	< 0.05
Tetrachloroethylene	0.28	< 0.05	< 0.05	< 0.05
Trichloroethylene	0.061	< 0.05	< 0.05	< 0.05
Trichlorofluoromethane	4	< 0.05	< 0.05	< 0.05
Vinyl Chloride	0.02	< 0.02	< 0.02	< 0.02

For Table Notes see **Notes for Soil and Groundwater Summary Tables**, included at the end of this Section.



Table 7: Summary of PAHs in Soil

Parameter	MECP Table 2 SCS	BH20-E1 SS1B	BH20-E2 SS2B	BH20-E3 SS2	BH20-E3 SS2 Dup
Date of Collection		03-Dec-20	03-Dec-20	03-Dec-20	03-Dec-20
Date Reported		16-Dec-20	16-Dec-20	16-Dec-20	16-Dec-20
Screen Interval (mbgs)		0.1-0.8	0.9-1.4	0.8-1.4	0.8-1.4
Analytical Report Reference No.		CA14233-DEC20 9	CA14233-DEC20 12	CA14233-DEC20 15	CA14233-DEC20 16
Methylnaphthalene, 2-(1-)	0.99	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	7.9	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	0.15	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	0.67	< 0.05	< 0.05	< 0.05	< 0.05
Benz(a)anthracene	0.5	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	0.3	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b+j)fluoranthene	0.78	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene	6.6	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	0.78	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	7	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	0.1	< 0.06	< 0.06	< 0.06	< 0.06
Fluoranthene	0.69	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	62	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	0.38	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	0.6	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	6.2	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	78	< 0.05	< 0.05	< 0.05	< 0.05

For Table Notes see **Notes for Soil and Groundwater Summary Tables**, included at the end of this Section.



Table 8: Summary of OC Pesticides in Soil

Parameter	MECP Table 2 SCS	BH20-E4 SS1B	BH20-E5 SS2	BH20-E5 SS2 Dup	BH20-E6 SS1B
Date of Collection		04-Dec-20	04-Dec-20	04-Dec-20	04-Dec-20
Date Reported		16-Dec-20	16-Dec-20	16-Dec-20	16-Dec-20
Sampling Depth (mbgs)		0.1-0.6	0.8-1.4	0.8-1.4	0.1-0.6
Analytical Report Reference No.		CA14233-DEC20 17	CA14233-DEC20 18	CA14233-DEC20 19	CA14233-DEC20 20
Aldrin	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordane	0.05	< 0.05	< 0.05	< 0.05	< 0.05
DDD	3.3	< 0.05	< 0.05	< 0.05	< 0.05
DDE	0.26	< 0.05	< 0.05	< 0.05	< 0.05
DDT	1.4	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan	0.04	< 0.04	< 0.04	< 0.04	< 0.04
Endrin	0.04	< 0.04	< 0.04	< 0.04	< 0.04
Hexachlorocyclohexane Gamma-	0.056	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.15	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor Epoxide	0.05	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.52	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	0.012	< 0.01	< 0.01	< 0.01	< 0.01
Hexachloroethane	0.089	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.13	< 0.05	< 0.05	< 0.05	< 0.05

For Table Notes see **Notes for Soil and Groundwater Summary Tables**, included at the end of this Section.



Table 9: Summary of Maximum Concentrations in Soil

	Parameter	Standard	Maximum Concentration	Location
Metals and ORPs	Antimony	7.5	< 0.8	All Samples
	Arsenic	18	1.1	BH20-E4 SS1B
	Barium	390	77	BH20-E4 SS1B
	Beryllium	4	0.26	BH20-E4 SS1B
	Boron (total)	120	4	BH20-E4 SS1B
	Boron (Hot Water Soluble)	1.5	< 0.5	All Samples
	Cadmium	1.2	0.11	BH20-E1 SS1B
	Chromium Total	160	14	BH20-E4 SS1B
	Chromium VI	8	< 0.2	All Samples
	Cobalt	22	4.6	BH20-E4 SS1B
	Copper	140	10	BH20-E4 SS1B
	Cyanide (CN-)	0.051	< 0.05	All Samples
	Electrical Conductivity (mS/cm)	0.7	0.21	BH20-E1 SS1B
	Lead	120	4.6	BH20-E2 SS1B
	Mercury	0.27	< 0.05	All Samples
	Molybdenum	6.9	0.2	BH20-E1 SS1B
	Nickel	100	9	BH20-E4 SS1B
	Selenium	2.4	< 0.7	All Samples
	Silver	20	< 0.05	All Samples
	Sodium Adsorption Ratio	5	< 0.2	All Samples
	Thallium	1	0.08	BH20-E4 SS1B
	Uranium	23	0.3	BH20-E4 SS1B
	Vanadium	86	26	BH20-E4 SS1B
PHCs	Benzene	0.21	< 0.02	All Samples
	Ethylbenzene	1.1	< 0.05	All Samples
	Toluene	2.3	< 0.05	All Samples
	Xylenes (Total)	3.1	< 0.05	All Samples
	F1-BTEX	55	< 10	All Samples
	F2 (C10-C16)	98	< 10	All Samples
	F3 (C16-C34)	300	< 50	All Samples
	F4 (C34-C50)	2800	< 50	All Samples
VOCs	Tetrachloroethane, 1,1,1,2-	0.058	< 0.05	All Samples
	Trichloroethane, 1,1,1-	0.38	< 0.05	All Samples
	Tetrachloroethane, 1,1,2,2-	0.05	< 0.05	All Samples
	Trichloroethane, 1,1,2-	0.05	< 0.05	All Samples
	Dichloroethane, 1,1-	0.47	< 0.05	All Samples
	Dichloroethylene, 1,1-	0.05	< 0.05	All Samples
	Dichlorobenzene, 1,2-	1.2	< 0.05	All Samples
	Dichloroethane, 1,2-	0.05	< 0.05	All Samples
	Dichloropropane, 1,2-	0.05	< 0.05	All Samples
	Dichlorobenzene, 1,3-	4.8	< 0.05	All Samples
	Dichloropropene, 1,3-	0.05	< 0.05	All Samples



Table 9: Summary of Maximum Concentrations in Soil

	Parameter	Standard	Maximum Concentration	Location
VOCs	Dichlorobenzene, 1,4-	0.083	< 0.05	All Samples
	Acetone	16	< 0.5	All Samples
	Bromomethane	0.05	< 0.05	All Samples
	Carbon Tetrachloride	0.05	< 0.05	All Samples
	Chlorobenzene	2.4	< 0.05	All Samples
	Chloroform	0.05	< 0.05	All Samples
	Dichloroethylene, 1,2-cis-	1.9	< 0.05	All Samples
	Dichloroethylene, 1,2-trans-	0.084	< 0.05	All Samples
	Dichlorodifluoromethane	16	< 0.05	All Samples
	Ethylene dibromide	0.05	< 0.05	All Samples
	Methyl Ethyl Ketone	16	< 0.5	All Samples
	Methyl Isobutyl Ketone	1.7	< 0.5	All Samples
	Methyl tert-Butyl Ether (MTBE)	0.75	< 0.05	All Samples
	Methylene Chloride	0.1	< 0.05	All Samples
	Hexane (n)	2.8	< 0.05	All Samples
	Styrene	0.7	< 0.05	All Samples
	Tetrachloroethylene	0.28	< 0.05	All Samples
	Trichloroethylene	0.061	< 0.05	All Samples
	Trichlorofluoromethane	4	< 0.05	All Samples
	Vinyl Chloride	0.02	< 0.02	All Samples
PAHs	Methylnaphthalene, 2-(1-)	0.99	< 0.05	All Samples
	Acenaphthene	7.9	< 0.05	All Samples
	Acenaphthylene	0.15	< 0.05	All Samples
	Anthracene	0.67	< 0.05	All Samples
	Benz(a)anthracene	0.5	< 0.05	All Samples
	Benzo(a)pyrene	0.3	< 0.05	All Samples
	Benzo(b+j)fluoranthene	0.78	< 0.05	All Samples
	Benzo(g,h,i)perylene	6.6	< 0.1	All Samples
	Benzo(k)fluoranthene	0.78	< 0.05	All Samples
	Chrysene	7	< 0.05	All Samples
	Dibenz(a,h)anthracene	0.1	< 0.06	All Samples
	Fluoranthene	0.69	< 0.05	All Samples
	Fluorene	62	< 0.05	All Samples
	Indeno(1,2,3-cd)pyrene	0.38	< 0.1	All Samples
	Naphthalene	0.6	< 0.05	All Samples
	Phenanthrene	6.2	< 0.05	All Samples
	Pyrene	78	< 0.05	All Samples
OC Pesticides	Aldrin	0.05	< 0.05	All Samples
	Chlordane	0.05	< 0.05	All Samples
	DDD	3.3	< 0.05	All Samples
	DDE	0.26	< 0.05	All Samples
	DDT	1.4	< 0.05	All Samples
	Dieldrin	0.05	< 0.05	All Samples
	Endosulfan	0.04	< 0.04	All Samples
	Endrin	0.04	< 0.04	All Samples
	Hexachlorocyclohexane Gamma-	0.056	< 0.01	All Samples
	Heptachlor	0.15	< 0.01	All Samples
	Heptachlor Epoxide	0.05	< 0.01	All Samples
	Hexachlorobenzene	0.52	< 0.01	All Samples
	Hexachlorobutadiene	0.012	< 0.01	All Samples
	Hexachloroethane	0.089	< 0.01	All Samples
	Methoxychlor	0.13	< 0.05	All Samples



Notes for Soil and Groundwater Summary Tables

	For soil and groundwater analytical results, concentration exceeds the applicable Standards.
	For soil and groundwater analytical results, laboratory detection limits exceed the applicable Standards.
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
masl	Meters above sea level
MECP Table 2 SCS	Generic Condition Standards in a Potable Groundwater Condition as contained in Table 2 of the "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", published by the MECP on April 15, 2011.
mbgs	Meters below ground surface
NM	Not Monitored
NA	Not Available
PAH	Polyaromatic Hydrocarbon
PHC	Petroleum Hydrocarbon
Units	Units for all soil analyses are in µg/g (ppm) unless otherwise indicated
Units	Units for all groundwater analyses are in µg/L (ppb) unless otherwise indicated



Appendix A

C-10441

PLAN 51R - 4319

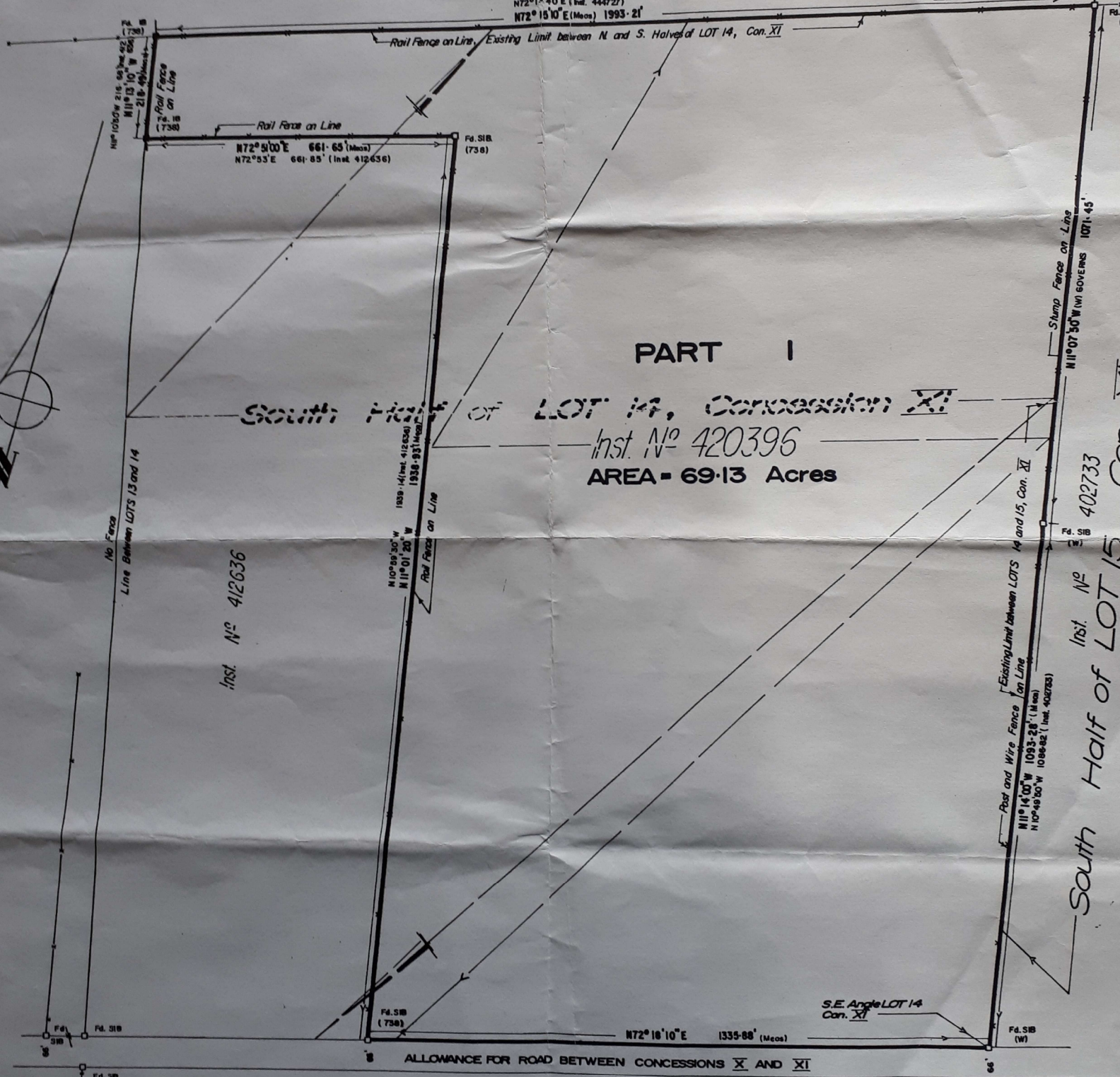
PLAN OF SURVEY OF PART OF SOUTH HALF OF LOT 14, CONCESSION XI TOWNSHIP OF INNISFIL, COUNTY OF SIMCOE

Scale 1" = 400'
W.N. WILDMAN-OLS.
1974

Inst. N° 444727

North Half of LOT 14, Con. XI

APPROVED: 9 Jan. 1975
Assistant Examiner of S.
PLAN 51R - 4319
RECORDED UNDER N° 0-6
REGISTERED: F.B.B. 12.197
Small
LAND REGISTRATION
PART I - All of Parcel 14-1, Sec. 51 - Inn



NOTE

BEARINGS SHOWN HEREON ARE REFERRED TO THE ASTRONOMIC
N 10° 07' 50" W OF THE WESTERLY LIMIT OF SOUTH HALF OF LOT 15,
CONCESSION X, ACCORDING TO A PLAN OF SURVEY BY W.N.
WILDMAN-OLS., ATTACHED TO INST. N° 402733

ALL HANGING LINES SHOWN HEREON HAVE BEEN VERIFIED:

• DENOTES STANDARD IRON BAR - 1" sq. x 48" long;

• DENOTES IRON BAR - 5/8" sq. x 24" long;

• DENOTES FOUND

SURVEYOR'S CERTIFICATE

1. I HEREBY CERTIFY:
2. THAT THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT,
AND THE LAND TITLES ACT AND THE REGULATIONS MADE THEREUNDER;
3. THAT I WAS PRESENT AT AND DID PERSONALLY SUPERVISE THE SURVEY REPRESENTED BY
THIS PLAN;
4. THAT THIS PLAN CONTAINS A TRUE COPY OF THE FIELD NOTES OF SURVEY;
5. THAT THE SURVEY WAS COMPLETED ON THE 30th DAY OF OCTOBER, 1974;

DATE: OCTOBER 4th., 1974

W.N. WILDMAN
ONTARIO LAND SURVEYOR

W.N. WILDMAN-ONTARIO LAND SURVEYOR
KLEINBURG - ONTARIO - 854-2785

PROJECT N°
5988



Appendix B



20-231-400

November 13, 2020

Mattamy Homes

7880 Keele Street, Suite 400

Vaughan, Ontario

L4K 4G7

via email: mitchell.minniti@mattamycorp.com

Attention: Mitchell Minniti

**Re: Sampling and Analysis Plan – Phase Two Environmental Site Assessment
620 Lockhart Road, Barrie, Ontario**

1. Introduction

DS Consultants Limited (DS) is pleased to present the Sampling and Analysis Plan (SAP) for the proposed Phase Two Environmental Site Assessment of 620 Lockhart Road, Barrie, Ontario, (the Site). The purpose of the proposed Phase Two ESA program is to assess the current subsurface environmental conditions in support of the proposed redevelopment of the Site.

The Phase Two ESA will involve intrusive investigation in the areas determined in the Site visit to be Areas of Potential Environmental Concern (APECs), and will be completed in general accordance with O.Reg 153/04. Based on the findings of the field and laboratory analyses, a Phase Two ESA report will be prepared.

2. Background

Based on the Phase One Environmental Site Assessment completed by DS in October 2020, it is DS's understanding that the Site is a 28.05-hectares (69.32 acres) parcel of land which is currently used for agricultural purposes. The first developed use of the Site is interpreted to be Agricultural based on the findings of the Phase One ESA. A total of four (4) potentially contaminating activities were identified on the Phase One Property or on neighbouring properties within the Phase One Study Area which are considered to be contributing to three (3) Areas of Potential Environmental Concern (APECs) on the Phase Two Property. A



summary of the APECs identified, the potential contaminants of concern, and the media potentially impacted is presented in Table 1 below:

Table 1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Ground water, soil and/or sediment)
APEC-1	Entire Property	PCA-1: #40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On Site	Metals, As, Sb, Se, CN-, OC Pesticides	Soil
APEC-2	Area of the Previously Existing Structures	PCA-3: #30 – Importation of Fill Material of Unknown Quality	On Site	Metals As, Sb, Se, B-HWS, CN-, Cr(VI), Hg, low or high pH, SAR, EC, PAHs	Soil
APEC-3	Area of the Previously Existing Structures	PCA-4: #23 – Fire retardant Manufacturing, Processing and Bulk Storage	On Site	PAHs, VOCs, metals, As, Sb, Se, B-HWS, CN-, Cr(VI) low or high pH	Soil

Notes:

1. N/S - not specified in Table 2, Schedule D, of O.Reg. 153/04
2. PHC (F1-F4) = Petroleum Hydrocarbons in the F1-F4 fraction ranges
3. VOCs = Volatile Organic Compounds
4. PAHs = Polycyclic Aromatic Hydrocarbons
5. PCBs = Polychlorinated Biphenyls

3. Site Investigation Program

The proposed field investigation will involve the advancement of boreholes, the installation of monitoring wells, and periodic monitoring of the installed wells. A total of nineteen (19) borehole locations have been identified. Details regarding the proposed boreholes/monitoring wells are provided in the following table:

Table 3-1: Summary of Proposed Investigation Program



ID	Proposed Depth	Well Installation (Y/N)	Well Install Depth	Purpose
BH20-1	8.2 mbgs	N	-	Investigate soil conditions.
BH20-2	8.2 mbgs	N	-	Investigate soil conditions.
BH20-3	7.0 mbgs	Y	7.0 mbgs	Investigate soil conditions and assess groundwater flow direction.
BH20-4	8.2 mbgs	Y	7.6 mbgs	Investigate soil conditions and assess groundwater flow direction.
BH20-5	8.2 mbgs	N	-	Investigate soil conditions.
BH20-6	9.8 mbgs	N	-	Investigate soil conditions.
BH20-7	8.2 mbgs	N	-	Investigate soil conditions.
BH20-8	8.2 mbgs	N	-	Investigate soil conditions.
BH20-9	8.2 mbgs	Y	7.6 mbgs	Investigate soil conditions and assess groundwater flow direction.
BH20-E1	3.7 mbgs	N	-	Investigate soil conditions.
BH20-E2	3.7 mbgs	N	-	Investigate soil conditions.
BH20-E3	3.7 mbgs	N	-	Investigate soil conditions.
BH20-E4	5.2 mbgs	N	-	Investigate soil conditions.
BH20-E5/MW5	8.2 mbgs	Y	7.6 mbgs	Investigate soil conditions and assess groundwater flow direction.
BH20-E6	8.2 mbgs	N	-	Investigate soil conditions.
MW1	8.2 mbgs	Y	7.6 mbgs	Investigate soil conditions and assess groundwater flow direction.
MW2	11.3 mbgs	Y	9.8 mbgs	Investigate soil conditions and assess groundwater flow direction.
MW3	5.2 mbgs	Y	4.6 mbgs	Investigate soil conditions and assess groundwater flow direction.
MW4	8.2 mbgs	Y	7.6 mbgs	Investigate soil conditions and assess groundwater flow direction.

Prior to mobilizing a drilling rig, we will lay out the proposed borehole and clear the buried utilities and services by using Ontario One Call System in addition to private utility locates.

The borings will be advanced to the indicated depths using a combination of a track mounted continuous flight auger machine and portable drilling equipment. Samples will be retrieved by means of a 50 mm O.D. split-spoon barrel sampler at 0.75 metre intervals in the upper 3 metres and at 1.5 metres intervals below this level. The monitoring wells will be constructed using 50 mm I.D. PVC pipe, equipped with 1.5 m slotted screens and finished at the ground



surface with flush mount well casings. A geodetic benchmark will be used to establish the elevation of each borehole. Drilling and sampling will conform to standard practice.

The Phase Two ESA involves the following principal tasks:

- Retain the services of public and private utility locaters to identify the locations of buried and overhead utility services prior to any excavation or demolition activities;
 - Certain underground utilities (such as those constructed or encased in plastic, fibreglass, clay, concrete pipe, untraceable cast iron, steel, and/or repaired services) cannot be traced by standard locating practices. DS will review all available Site Plans and/or “As Built” figures in an attempt to identify the locations of potential untraceable services. DS will not be held responsible for any damages to utility services that are not on the figures provided or cannot be located by standard utility locating practices;
- Advancement of boreholes as specified in Table 3-1. The proposed boreholes will be used to facilitate the collection of representative soil and groundwater samples, and to provide information regarding the Site-specific geological and hydrogeological conditions;
- All soil samples recovered during the proposed drilling activities will be field screened for visual and olfactory evidence of deleterious impacts and for the presence of petroleum hydrocarbon (PHC) and volatile organic compound (VOC) derived vapours using either a combustible gas detector (CGD) calibrated to hexane or a photo-ionization detector (PID) calibrated to isobutylene or equivalent;
- Measure the depth to groundwater levels in the monitoring wells installed, and monitor the wells for the presence/absence of non-aqueous phase liquid using an interface probe;
- Survey each of the monitoring wells to a geodetic datum;
- Develop and purge all of the monitoring wells installed;



A summary of the proposed soil analytical program is presented in the following table:

Table 3-2: Summary of Soil and Groundwater Analytical Program

Soil	Groundwater
• 6 Samples for analysis of metals and ORPs • 3 Samples for analysis of PHCs • 3 Samples for analysis of VOCs • 3 Samples for analysis of PAHs • 3 Samples for analysis of OCPs	Groundwater was not identified as a media of potential concern and thus is not proposed to be included in the investigation.

- A Quality Assurance and Quality Control (QAQC) program will be implemented, involving the collection and analysis of duplicate soil and groundwater samples and trip blanks at the frequency specified under O.Reg. 153/04 (as amended);
- A Phase Two ESA Report will be prepared upon receipt of all analytical results and groundwater monitoring data. The Phase Two ESA Report will be completed in general accordance with O.Reg. 153/04 (as amended).

It should be noted that drilling activities may result in some disturbance to the ground surface at the site. Precautions will be taken by the drilling contractor to minimize any damage. The Client will be notified should there be cause to extend the borehole termination depth based on field observations. It is assumed that the site can be accessed at our convenience, during regular business hours. Prior notice will be sent to the client and site representative

It is noted that if the Phase Two ESA reveals parameter concentrations greater than the applicable standards set out in *Ontario Regulation 153/04*, then additional work (i.e., supplemental delineation, additional drilling, sampling, analysis, and/or site remediation activities) will be deemed necessary prior to RSC filing, should an RSC be required. The costs for any additional work, if necessary, are beyond the current scope of work.

The SAP was created based on the request to complete a Phase Two ESA in support of the proposed redevelopment of the Site. The SAP was compiled to collect data to provide information on soil and/or groundwater quality in each APEC.

Additional delineation may be required following the implementation of this SAP to meet the requirements of O.Reg. 153/04 which requires delineation of all areas where concentrations are above the applicable SCS such as in the following conditions:

- Unexpected contamination not previously discovered, or not related to identified APECs, is discovered which will require further delineation to identify source(s); and



-
- If the sampling results indicate that the soil and/or groundwater impacts are deeper than initially expected.

4. Closure

We trust that this Sampling and Analysis Plan meets the objectives of the Client. If further assistance is required on this matter, please do not hesitate to contact the undersigned.

Yours Very Truly,

DS Consultants Ltd.

Rick Fioravanti, B.Sc., P.Geo., QP_{ESA}
Manager – Environmental Services



Appendix C

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BOREHOLE LOCATION: See Drawing 1 N 4910499.315 E 608729.072

DRILLING DATA

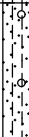
Method: Solid Stem Auger

Diameter: 150mm

Date: Sep/09/2020

REF. NO.: 20-231-400

ENCL NO.: 2

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			POCKET PEN (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE AND GRAIN SIZE DISTRIBUTION (%)			
(m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)				WATER CONTENT (%)					GR SA SI CL			
ELEV DEPTH							20	40	60	80	100	W _P	W	W _L						
262.7	TOPSOIL: 150mm SANDY SILT: trace clay, some organic, brown, moist, loose, disturbed material SANDY SILT: trace clay, trace gravel, brown, moist, compact		1	SS	6		262													
261.9			2	SS	11		261													
260.5			3	SS	18		260													
258.4	SILTY SAND TILL: with gravel, trace clay, grey, moist, compact		4	SS	39		259													
257.5			5	SS	32		258													
254.5			6	SS	40		257													
252.5	SAND: sand seam, some gravel, trace silt, saturated, dense		7	SS	80		256													
250.5			8	SS	>100		255													
248.5			END OF BOREHOLE:																	
246.5	Notes: 1) Water level at 3.2m below grade at the completion of drilling. 2) Cave-in to 4.6m upon completion																			

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BOREHOLE LOCATION: See Drawing 1 N 4910243.586 E 608797.335

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Sep/10/2020

REF. NO.: 20-231-400

ENCL NO.: 3

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE AND GRAIN SIZE DISTRIBUTION (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)							WATER CONTENT (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
								20 40 60 80 100		FIELD VANE & Sensitivity					W _p	W	W _L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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260.4	TOPSOIL: 150mm SANDY SILT: disturbed, some organic, brown, moist, loose		1	SS	7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH
NOTES+ 3, × 3: Numbers refer
to Sensitivity

○ = 3% Strain at Failure

BOREHOLE LOCATION: See Drawing 1 N 4909956.586 E 608856.231

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE AND GRAIN SIZE DISTRIBUTION (%)			
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m		ELEVATION	20	40	60	80	100	W _p	W			W _L	GR	SA	SI
253.1							W. L. 253.4 m													
252.9	TOPSOIL: 230mm		1	SS	9		W. L. 253.3 m Sep 30, 2020						○							
0.2	SILT: with fine sand, brown, moist to wet, loose, weathered																			
252.0			2	SS	6		252						○							
1.1	SILTY CLAY: trace sand, brown to grey, very moist, firm to stiff																			
251.1			3	SS	12		251							○				0	2	
2.0	SILT AND SAND: fine sand, trace gravel, trace clay, grey, wet, compact						Bentonite						○					32	66	
250.1			4	SS	13															
3.0	SANDY SILT TILL: with gravel, trace clay, grey, wet, loose to compact						250						○							
			5																	
							249													
			6	SS	9		248						○							
							Filter Pack													
							247													
			7	SS	29		Slotted Pipe						○							
246.1																				
7.0	END OF BOREHOLE: Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water level Reading: Date: Water Level (mbgl): Sept 30, 2020 -0.17 Jan 11, 2021 -0.31																		Grinding on boulder, Auger refusal	

GROUNDWATER ELEVATIONS

	1st	2nd	3rd	4th
Measurement				

GRAPH
NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ $\epsilon = 3\%$ Strain at Failure

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BOREHOLE LOCATION: See Drawing 1 N 4910539.485 E 608901.801

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Sep/09/2020

REF. NO.: 20-231-400

ENCL NO.: 5

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)										WATER CONTENT (%)		
○ UNCONFINED + FIELD VANE & Sensitivity								○												
● QUICK TRIAXIAL × LAB VANE																				
269.0							20	40	60	80	100	10	20	30						
268.9	TOPSOIL: 250mm		1	SS	6								○							
0.3	SILT: disturbed material, trace sand, some organic, brown, moist, loose																			
268.2																				
0.8	SILT: some sand, trace gravel, trace clay, brown, moist, loose		2	SS	7								○							
267.5																				
1.5	SILTY SAND TILL: some gravel, trace clay, grey, moist, dense to very dense		3	SS	32								○							
			4	SS	58								○							
			5	SS	68								○							
			6	SS	>100								○							

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BOREHOLE LOCATION: See Drawing 1 N 4910273.423 E 608949.757

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Sep/10/2020

REF. NO.: 20-231-400

ENCL NO.: 6

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE AND GRAIN SIZE DISTRIBUTION (%)							
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)									WATER CONTENT (%)				GR	SA	SI	CL
								20 40 60 80 100									20 40 60 80 100							
								○ UNCONFINED	+	FIELD VANE & Sensitivity	×						LAB VANE							
265.2																								
265.0							265																	
264.9																								
264.4							264																	
264.1																								
263.7							263																	
263.5																								
263.2							262																	
263.0																								
262.8							261																	
262.6																								
262.4							260																	
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238.6																								
238.4																								

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BOREHOLE LOCATION: See Drawing 1 N 4910014.013 E 609016.963

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Sep/11/2020

REF. NO.: 20-231-400

ENCL NO.: 7

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			POCKET PEN (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)				W _P W W _L					
256.5							20	40	60	80	100						GR SA SI CL
0.0	SAND AND GRAVEL FILL: brown, compact, moist		1	SS	11												3 49 37 11
255.3			2	SS	13												
255.2	TOPSOIL: 200mm, black, moist																
1.4	SILTY SAND TILL: trace gravel, trace clay, brown, moist to wet, loose		3	SS	8												
	Grey, with gravel, wet																
			4	SS	4												
			5	SS	6												
	compact below 3.8m																
			6	SS	13												
251.8																	
4.7	SANDY SILT: with gravel, some clay, grey, compact, wet		7	SS	21												
250.4																	
6.1	SILTY SAND: some to trace gravel, sand seams at 6.4m, brown, saturated, compact to very dense		8	SS	20												
	grey		9	SS	>100												
246.7			10	SS	>100												
9.8	END OF BOREHOLE: Notes: 1) Water level at 1.5m during drilling. 2) No cave-in upon completion.																

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3 , × 3 : Numbers refer to Sensitivity

○ = 3% Strain at Failure

DS SOIL LOG 20-231-400 MATTAMY, 620 LOCKHART GPJ DS GDT 21/1/13

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

REF. NO.: 20-231-400

Date: Sep/09/2020

ENCL NO.: 8

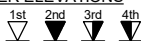
BOREHOLE LOCATION: See Drawing 1 N 4910578.452 E 609026.09

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			POCKET PEN (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE AND GRAIN SIZE DISTRIBUTION (%)			
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)				WATER CONTENT (%)					GR	SA	SI	CL
								○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE				W _P W W _L								
271.9																				
271.0	TOPSOIL: 150mm		1	SS	4															
271.0	SILTY SAND: disturbed, trace organics, trace gravel, brown, moist, loose		2	SS	6															
270.1	SILTY SAND: trace gravel, brown, moist, loose to compact		3	SS	18															
270.1			4	SS	39															
268.9	SILTY SAND TILL: with gravel, trace clay, grey, moist, compact to dense		5	SS	68															
268.9			6																	
268.9	SAND: trace gravel, trace cobbles, brown, moist, very dense		7	SS	79															
268.9			8	SS	>100															
263.7	END OF BOREHOLE:																			
8.2	Notes: 1) Borehole dry during drilling. 2) No cave-in upon completion.																			

DS SOIL LOG 20-231-400 MATTAMY, 620 LOCKHART.GPJ DS.GDT 21/1/13

GROUNDWATER ELEVATIONS

Measurement



GRAPH
NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ $\epsilon = 3\%$ Strain at Failure

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BOREHOLE LOCATION: See Drawing 1 N 4910311.883 E 609091.492

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Sep/10/2020

REF. NO.: 20-231-400

ENCL NO.: 9

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE AND GRAIN SIZE DISTRIBUTION (%)
(m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)									
ELEV DEPTH								○ UNCONFINED	+ FIELD VANE & Sensitivity	× LAB VANE	20						
268.5							20	40	60	80	100	10	20	30			GR SA SI CL
268.0	TOPSOIL: 200mm																
0.2	SANDY SILT: some organics, trace gravel, brown, moist, loose, weathered		1	SS	5								○				
267.6																	
0.9	SILTY SAND TILL: with gravel, trace clay, grey, moist, compact small seam of red sand at 1.2m dense		2	SS	16								○				
			3	SS	31								○				
			4	SS	41								○				
			5	SS	62								○				
	seam of red sand		6	SS	81								○				
	saturated		7	SS	>100									○			
260.9																	
7.6	SAND: some gravel, grey, saturated, dense		8	SS	35								○				
260.3																	
8.2	END OF BOREHOLE: Notes: 1) Water at depth of 4.6m at completion of drilling. 2) Cave-in at 6.6m upon completion																

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, X 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BOREHOLE LOCATION: See Drawing 1 N 4910084.417 E 609199.788

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Sep/11/2020

REF. NO.: 20-231-400

ENCL NO.: 10

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN. (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE AND GRAIN SIZE DISTRIBUTION (%)						
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)										WATER CONTENT (%)			GR	SA	SI	CL
								20	40	60	80	100						20	40	60				
263.0																								
262.9																								
262.1																								
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GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH
NOTES+ 3, × 3: Numbers refer
to Sensitivity

○ = 3% Strain at Failure

PROJECT: Geotechnical Investigation						DRILLING DATA									
CLIENT: Mattamy Homes						Method: Solid Stem Auger									
PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario						Diameter: 150mm									
DATUM: Geodetic						Date: Dec/03/2020									
BH LOCATION: N 4910484.333 E 608995.132						REF. NO.: 20-231-400									
						ENCL NO.: 11									
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			PID (ppm)	CGD (ppm)						
270.0															
269.9	TOPSOIL: 75mm		1	SS	7										
	SAND FILL: some organic, brown, moist, loose, disturbed material														
	some gravel, possible fill		2	SS	9										
268.5															
1.5	SANDY SILT: trace gravel, with sand seams, grey, wet, compact		3	SS	15										
			4	SS	13										
266.9															
3.1	SILTY SAND TILL: some gravel, moist, dense		5	SS	29										
266.3															
3.7	END OF BOREHOLE:														
	Notes: 1) Borehole remained open at the completion of drilling.														

PROJECT: Geotechnical Investigation						DRILLING DATA									
CLIENT: Mattamy Homes						Method: Solid Stem Auger									
PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario						Diameter: 150mm									
DATUM: Geodetic						Date: Dec/03/2020									
BH LOCATION: N 4910486.773 E 608945.472						REF. NO.: 20-231-400									
						ENCL NO.: 12									
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			PID (ppm)	CGD (ppm)						
270.6															
270.9	TOPSOIL: 300mm		1	SS	6										
0.3	SAND FILL: some gravel, some organic, dark brown, moist, loose, fill														
269.7															
0.9	CLAYEY SILT: with organics and wood, dark brown, wet, soft, fill		2	SS	5										
268.8															
2	SAND: trace gravel, grey, wet, dense		3	SS	5										
1.8															
267.6															
3.1	SANDY SILT TILL: trace gravel, trace cobble, grey, moist, dense		4	SS	29										
267.0															
3.7	END OF BOREHOLE:		5	SS	37										
	Notes: 1) Borehole remained open at the completion of drilling.														

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BH LOCATION: N 4910419.047 E 608969.214

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Dec/03/2020

REF. NO.: 20-231-400

ENCL NO.: 13

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors				POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kNm ³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			PID (ppm)	CGD (ppm)	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
270.6														
270.3	TOPSOIL: 300mm		1	SS	7		270							
269.7	SAND FILL: trace organic, brown, moist, loose, disturbed													
269.9	SAND: some gravel, trace cobble, brown, moist, compact to dense		2	SS	16		269							
	gravelly at 1.5m		3	SS	17		268							
			4	SS	23		267							
	layered		5	SS	30									
266.9	END OF BOREHOLE:													
3.7	Notes: 1) Borehole remained open upon completion of drilling.													

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+³, ×³: Numbers refer to Sensitivity

○ ●=3% Strain at Failure

PROJECT: Geotechnical Investigation						DRILLING DATA									
CLIENT: Mattamy Homes						Method: Solid Stem Auger									
PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario						Diameter: 150mm									
DATUM: Geodetic						Date: Dec/04/2020									
BH LOCATION: N 4910180.413 E 609083.344						REF. NO.: 20-231-400									
						ENCL NO.: 14									
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			PID (ppm)	CGD (ppm)						
261.6															
261.3	TOPSOIL: 300mm		1	SS	6										
0.3	SANDY SILT: trace gravel, trace clay, brown, wet, loose		2	SS	7										
			3	SS	11										
			4	SS	6										
	compact below 3m		5	SS	12										
257.0															
4.6	SILTY SAND TILL: tracee gravel, grey, wet, very dense		6	SS	50										
256.5															
5.2	END OF BOREHOLE:														

DS ENVIRO 0-50 PPM-2016 20-231-400 MATTAMY, 620 LOCKHART ENVIRO.GPJ DS.GDT 2/26/21

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BH LOCATION: N 4910057.43 E 608896.02

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Dec/04/2020

REF. NO.: 20-231-400

ENCL NO.: 16

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors			POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kNm ³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			PID (ppm)	CGD (ppm)	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
254.0	TOPSOIL: 100mm												
253.9	SANDY SILT: brown to grey, wet, compact		1	SS	6								
253.0			2	SS	12								
252.5	SILTY CLAY: grey, wet, soft		3	SS	7								
251.0	sand seams below 2.3m		4	SS	8								
250.0	SILTY SAND: trace gravel, grey, saturated, loose		5	SS	11								
249.0			6	SS	6								
248.0			7	SS	6								
247.0													
246.0	some gravel below 7.6m		8	SS	9								
245.8	END OF BOREHOLE:												

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ ●=3% Strain at Failure

DS ENVIRO 0-50 PPM-2016 20-231-400 MATTAMY, 620 LOCKHART ENVIRO.GPJ DS.GDT 2/26/21

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BH LOCATION: N 4910454.565 E 608519.325

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Dec/02/2020

REF. NO.: 20-231-400

ENCL NO.: 17

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors				POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kNm ³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			PID (ppm)	CGD (ppm)	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
254.1														
253.8	TOPSOIL: 300mm						254							
0.3	CLAYEY SILT: some sand, trace gravel, brown, moist to wet, soft		1	SS	6		W. L. 253.6 masl Jan 11, 2021							
			2	SS	3		253							
252.6	SANDY SILT: trace gravel, trace clay, brown, wet, loose		3	SS	10		252							
251.8	SILTY SAND TILL: trace gravel, brown to grey, wet, dense to very dense		4	SS	31		251							
2.3			5	SS	>100		250							
			6	SS	>100		249							
			7	SS	>100		248							
			8	SS	>100		247							
246.5	SAND: trace gravel, grey, wet, very dense						246							
7.6														
245.9	END OF BOREHOLE: Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water level Reading: Date: Jan 11, 2021 Water Level (mbgl): 0.49													
8.2														

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

DS ENVIRO 0-50 PPM-2016 20-231-400 MATTAMY, 620 LOCKHART ENVIRO.GPJ DS.GDT 2/26/21

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

REF. NO.: 20-231-400

Date: Dec/03/2020

ENCL NO.: 18

BH LOCATION: N 4910651.555 E 609062.995

[illegible]

GROUNDWATER ELEVATIONS

	1st	2nd	3rd	4th
Measurement				

GRAPH
NOTES

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

○ **$\epsilon=3\%$** Strain at Failure

PROJECT: Geotechnical Investigation				DRILLING DATA										
CLIENT: Mattamy Homes				Method: Solid Stem Auger										
PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario				Diameter: 150mm										
DATUM: Geodetic				Date: Dec/04/2020										
BH LOCATION: N 4910081.23 E 609200.298				REF. NO.: 20-231-400										
				ENCL NO.: 19										
SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE "N" BLOWS 0.3 m			PID (ppm)	CGD (ppm)						
263.0														
262.2	TOPSOIL: 50mm SILT: some sand, some org, trace gravel, brown, moist, loose, disturbed		1	SS	4									
261.5	SILT: some sand, trace clay, trace gravel, brown, wet, compact		2	SS	13									
261.5	SANDY SILT: Brown, trace gravel, wet, compact		3	SS	12									
261.5	clayey and soft below 2.5m		4	SS	12									
261.5			5	SS	7									
261.5			6	SS	73									
259.0	SAND: trace gravel, grey, wet, very dense													
258.1	SILTY SAND TILL: Grey, trace gravel, wet, very dense													
257.8	END OF BOREHOLE: Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water level Reading: Date: Jan 11, 2021 Water Level (mbgl): 0.83													

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BH LOCATION: N 4910262.152 E 609040.767

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Dec/04/2020

REF. NO.: 20-231-400

ENCL NO.: 20

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors				POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			PID (ppm)	CGD (ppm)	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
266.3														
266.0	TOPSOIL: 300mm		1	SS	7		266							
0.3	SILTY CLAY: trace sand, redish brown, moist, soft													
265.5														
0.8	SANDY SILT: trace gravel, trace clay, brown, moist to wet, loose to compact		2	SS	7		265							
			3	SS	21									
264.0							264							
2.3	SILTY SAND TILL: trace gravel, grey, moist to wet, very dense		4	SS	62		263.7 masl Jan 11, 2021							
			5	SS	50		263							
							262							
			6	SS	>100		261							
							260							
			7	SS	>100		259							
			8	SS	80									
8.2	END OF BOREHOLE: Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water level Reading: Date: Jan 11, 2021 Water Level (mbgl): 2.57													

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+³, ×³: Numbers refer to Sensitivity

○ s=3% Strain at Failure

DS ENVIRO 0-50 PPM-2016 20-231-400 MATTAMY, 620 LOCKHART ENVIRO.GPJ DS.GDT 2/26/21

PROJECT: Geotechnical Investigation

CLIENT: Mattamy Homes

PROJECT LOCATION: 620 Lockhart Road, Barrie, Ontario

DATUM: Geodetic

BH LOCATION: N 4910301.466 E 608781.543

DRILLING DATA

Method: Solid Stem Auger

Diameter: 150mm

Date: Dec/03/2020

REF. NO.: 20-231-400

ENCL NO.: 15

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	METHANE (ppm) AND GRAIN SIZE DISTRIBUTION (%)			
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			PID (ppm)	CGD (ppm)	W _p	W	W _L			GR	SA	SI	CL
260.0																		
0.0	TOPSOIL: 600mm		1	SS	4													
259.4																		
0.6	SANDY SILT: trace to some gravel, brown and grey, wet, loose to dense		2	SS	7													
258.0			3	SS	30													
257.7	SILTY CLAY: trace sand, grey, wet, stiff																	
2.3	SILTY SAND TILL: trace gravel, trace clay, grey, wet, compact to very dense		4	SS	14													
			5	SS	20													
	very dense below 3.7m																	
			6	SS	>100													
			7	SS	>100													
			8	SS	>100													
251.8	END OF BOREHOLE: Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water level Reading: Date: Jan 11, 2021 Water Level (mbgl): 0.55																	

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure

DS ENVIRO 0-50 PPM-2016 20-231-400 MATTAMY, 620 LOCKHART ENVIRO.GPJ DS.GDT 2/26/21



Appendix D



FINAL REPORT

CA14233-DEC20 R

20-231-100, Barrie, ON

Prepared for

DS Consultants

First Page

CLIENT DETAILS

Client DS Consultants

Address 6221 Highway 7
Vaughan, Ontario
L4H 0K8, Canada

Contact Drew Doak

Telephone 905-264-9393

Facsimile 905-264-2685

Email drew.doak@dsconsultants.ca

Project 20-231-100, Barrie, ON

Order Number

Samples Soil (12)

LABORATORY DETAILS

Project Specialist Jill Campbell, B.Sc.,GISAS

Laboratory SGS Canada Inc.

Address 185 Concession St., Lakefield ON, K0L 2H0

Telephone 2165

Facsimile 705-652-6365

Email jill.campbell@sgs.com

SGS Reference CA14233-DEC20

Received 12/09/2020

Approved 12/16/2020

Report Number CA14233-DEC20 R

Date Reported 12/16/2020

COMMENTS

CCME Method Compliance: Analyses were conducted using analytical procedures that comply with the Reference Method for the CWS for Petroleum Hydrocarbons in Soil and have been validated for use at the SGS laboratory, Lakefield, ON site.

Quality Compliance: Instrument performance / calibration quality criteria were met and extraction and analysis limits for holding times were met.

nC6 and nC10 response factors within 30% of response factor for toluene: YES

nC10, nC16 and nC34 response factors within 10% of the average response for the

three compounds: YES

C50 response factors within 70% of nC10 + nC16 + nC34 average: YES

Linearity is within 15%: YES

F4G - gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

The results for F4 and F4G are both reported and the greater of the two values is to be used in application to the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

Benzo(b)fluoranthene results for comparison to the standard are reported as benzo(b+j)fluoranthene. Benzo(b)fluoranthene and benzo(j)fluoranthene co-elute and cannot be reported individually by the analytical method used.

Temperature of Sample upon Receipt: 6 degrees C

Cooling Agent Present:Yes

Custody Seal Present:Yes

Chain of Custody Number:010841

SIGNATORIES

Jill Campbell, B.Sc.,GISAS





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FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: REG153 - BTEX (SOIL)

Sample Number	10	13	15
Sample Name	BH20-E1, SS2	BH20-E2, SS3A	BH20-E3, SS2
Sample Matrix	Soil	Soil	Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result
BTEX						
Benzene	µg/g	0.02	0.21	< 0.02	< 0.02	< 0.02
Ethylbenzene	µg/g	0.05	1.1	< 0.05	< 0.05	< 0.05
Toluene	µg/g	0.05	2.3	< 0.05	< 0.05	< 0.05
Xylene (total)	µg/g	0.05	3.1	< 0.05	< 0.05	< 0.05
m/p-xylene	µg/g	0.05		< 0.05	< 0.05	< 0.05
o-xylene	µg/g	0.05		< 0.05	< 0.05	< 0.05

PACKAGE: REG153 - Hydrides (SOIL)

Sample Number	9	11	14	17	18	20
Sample Name	BH20-E1, SS1B	BH20-E2, SS1B	BH20-E3, SS1B	BH20-E4, SS1B	BH20-E5, SS2	BH20-E6, SS1B
Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020	04/12/2020	04/12/2020	04/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result	Result	Result	Result
Hydrides									
Antimony	µg/g	0.8	7.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Arsenic	µg/g	0.5	18	0.8	0.8	0.6	1.1	0.9	0.8
Selenium	µg/g	0.7	2.4	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7



FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: REG153 - Metals and Inorganics
(SOIL)

			Sample Number	9	10	11	12	13	14	15	16
			Sample Name	BH20-E1, SS1B	BH20-E1, SS2	BH20-E2, SS1B	BH20-E2, SS2B	BH20-E2, SS3A	BH20-E3, SS1B	BH20-E3, SS2	BH20-E3, SS2 Dup
			Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Sample Date	03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics											
Moisture Content	%	0.1		7.7	5.6	9.6	25.5	18.0	6.7	5.6	5.3
Barium	µg/g	0.1	390	24		26			9.4		
Beryllium	µg/g	0.02	4	0.20		0.15			0.11		
Boron	µg/g	1	120	2		3			2		
Cadmium	µg/g	0.02	1.2	0.11		0.09			0.06		
Chromium	µg/g	0.5	160	6.6		5.5			3.3		
Cobalt	µg/g	0.01	22	2.3		2.1			1.3		
Copper	µg/g	0.1	140	9.3		6.6			3.2		
Lead	µg/g	0.1	120	3.3		4.6			1.7		
Molybdenum	µg/g	0.1	6.9	0.2		0.1			< 0.1		
Nickel	µg/g	0.5	100	4.2		3.8			2.9		
Silver	µg/g	0.05	20	< 0.05		< 0.05			< 0.05		
Thallium	µg/g	0.02	1	0.04		0.04			< 0.02		
Uranium	µg/g	0.002	23	0.22		0.22			0.15		
Vanadium	µg/g	3	86	12		11			6		
Zinc	µg/g	0.7	340	16		19			8.5		
Water Soluble Boron	µg/g	0.5	1.5	< 0.5		< 0.5			< 0.5		



FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: REG153 - Metals and Inorganics

(SOIL)

Sample Number	17	18	19	20
Sample Name	BH20-E4, SS1B	BH20-E5, SS2	BH20-E5, SS2 Dup	BH20-E6, SS1B
Sample Matrix	Soil	Soil	Soil	Soil
Sample Date	04/12/2020	03/12/2020	03/12/2020	04/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result	Result
Metals and Inorganics							
Moisture Content	%	0.1		11.4	12.0	10.8	15.1
Barium	µg/g	0.1	390	77	48		57
Beryllium	µg/g	0.02	4	0.26	0.20		0.21
Boron	µg/g	1	120	4	3		3
Cadmium	µg/g	0.02	1.2	0.03	0.03		< 0.02
Chromium	µg/g	0.5	160	14	10		9.8
Cobalt	µg/g	0.01	22	4.6	3.8		3.0
Copper	µg/g	0.1	140	10	8.7		4.9
Lead	µg/g	0.1	120	3.3	2.7		2.7
Molybdenum	µg/g	0.1	6.9	0.1	0.2		0.1
Nickel	µg/g	0.5	100	9.0	8.2		6.0
Silver	µg/g	0.05	20	< 0.05	< 0.05		< 0.05
Thallium	µg/g	0.02	1	0.08	0.07		0.06
Uranium	µg/g	0.002	23	0.30	0.27		0.29
Vanadium	µg/g	3	86	26	20		18
Zinc	µg/g	0.7	340	22	17		16



FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: REG153 - Organochlorine Pests

(OCs) (SOIL)

Sample Number	17	18	19	20
Sample Name	BH20-E4, SS1B	BH20-E5, SS2	BH20-E5, SS2 Dup	BH20-E6, SS1B
Sample Matrix	Soil	Soil	Soil	Soil
Sample Date	04/12/2020	03/12/2020	03/12/2020	04/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result	Result
Organochlorine Pests (OCs)							
Aldrin	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05
alpha-Chlordane	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
gamma-Chlordane	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
Chlordane (total)	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05
o,p-DDD	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
pp-DDD	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
DDD (total)	µg/g	0.05	3.3	< 0.05	< 0.05	< 0.05	< 0.05
o,p-DDE	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
pp-DDE	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
DDE (total)	µg/g	0.05	0.26	< 0.05	< 0.05	< 0.05	< 0.05
op-DDT	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
pp-DDT	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
DDT (total)	µg/g	0.05	1.4	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05
gamma-BHC	µg/g	0.01	0.056	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
Endosulfan II	µg/g	0.02		< 0.02	< 0.02	< 0.02	< 0.02
Endosulfan (total)	µg/g	0.04	0.04	< 0.04	< 0.04	< 0.04	< 0.04
Endrin	µg/g	0.04	0.04	< 0.04	< 0.04	< 0.04	< 0.04
Heptachlor	µg/g	0.01	0.15	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	µg/g	0.01	0.05	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	µg/g	0.01	0.52	< 0.01	< 0.01	< 0.01	< 0.01



FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: REG153 - Organochlorine Pests

(OCs) (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Sample Number	17	18	19	20
Sample Name	BH20-E4, SS1B	BH20-E5, SS2	BH20-E5, SS2 Dup	BH20-E6, SS1B
Sample Matrix	Soil	Soil	Soil	Soil
Sample Date	04/12/2020	03/12/2020	03/12/2020	04/12/2020

Parameter	Units	RL	L1	Result	Result	Result	Result
Organochlorine Pests (OCs) (continued)							
Hexachlorobutadiene	µg/g	0.01	0.012	< 0.01	< 0.01	< 0.01	< 0.01
Hexachloroethane	µg/g	0.01	0.089	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	µg/g	0.05	0.13	< 0.05	< 0.05	< 0.05	< 0.05

PACKAGE: REG153 - Other (ORP) (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Sample Number	9	11	14	17	18	20
Sample Name	BH20-E1, SS1B	BH20-E2, SS1B	BH20-E3, SS1B	BH20-E4, SS1B	BH20-E5, SS2	BH20-E6, SS1B
Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020	04/12/2020	04/12/2020	04/12/2020

Parameter	Units	RL	L1	Result	Result	Result	Result	Result	Result
Other (ORP)									
Mercury	ug/g	0.05	0.27	< 0.05	< 0.05	< 0.05			
Sodium Adsorption Ratio	No unit	0.2	5	< 0.2	< 0.2	< 0.2			
SAR Calcium	mg/L	0.09		26.3	26.7	25.7			
SAR Magnesium	mg/L	0.02		1.1	0.95	1.6			
SAR Sodium	mg/L	0.15		0.87	0.96	0.64			
Conductivity	mS/cm	0.002	0.7	0.21	0.14	0.10			
pH	pH Units	0.05		7.84	7.77	7.76			
Chromium VI	µg/g	0.2	8	< 0.2	< 0.2	< 0.2			
Free Cyanide	µg/g	0.05	0.051	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05



FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: REG153 - PAHs (SOIL)

Sample Number	9	12	15	16
Sample Name	BH20-E1, SS1B	BH20-E2, SS2B	BH20-E3, SS2	BH20-E3, SS2 Dup
Sample Matrix	Soil	Soil	Soil	Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020	03/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result	Result
PAHs							
Acenaphthene	µg/g	0.05	7.9	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	µg/g	0.05	0.15	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	µg/g	0.05	0.67	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	µg/g	0.05	0.5	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	µg/g	0.05	0.3	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b+j)fluoranthene	µg/g	0.05	0.78	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	µg/g	0.1	6.6	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	µg/g	0.05	0.78	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	µg/g	0.05	7	< 0.05	< 0.05	< 0.05	< 0.05
Dibenzo(a,h)anthracene	µg/g	0.06	0.1	< 0.06	< 0.06	< 0.06	< 0.06
Fluoranthene	µg/g	0.05	0.69	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	µg/g	0.05	62	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.1	0.38	< 0.1	< 0.1	< 0.1	< 0.1
1-Methylnaphthalene	µg/g	0.05		< 0.05	< 0.05	< 0.05	< 0.05
2-Methylnaphthalene	µg/g	0.05		< 0.05	< 0.05	< 0.05	< 0.05
Methylnaphthalene, 2-(1-)	µg/g	0.05	0.99	< 0.05	< 0.05	< 0.05	< 0.05
Naphthalene	µg/g	0.05	0.6	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/g	0.05	6.2	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	µg/g	0.05	78	< 0.05	< 0.05	< 0.05	< 0.05



FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: REG153 - Pesticides Surrogate (SOIL)

Sample Number	17	18	19	20
Sample Name	BH20-E4, SS1B	BH20-E5, SS2	BH20-E5, SS2 Dup	BH20-E6, SS1B
Sample Matrix	Soil	Soil	Soil	Soil
Sample Date	04/12/2020	03/12/2020	03/12/2020	04/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result	Result
Pesticides Surrogate							
Surr Decachlorobiphenyl	Surr Rec %	-		99	100	104	101

PACKAGE: REG153 - PHCs (SOIL)

Sample Number	10	13	15
Sample Name	BH20-E1, SS2	BH20-E2, SS3A	BH20-E3, SS2
Sample Matrix	Soil	Soil	Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result
PHCs						
F1 (C6-C10)	µg/g	10	55	< 10	< 10	< 10
F1-BTEX (C6-C10)	µg/g	10		< 10	< 10	< 10
F2 (C10-C16)	µg/g	10	98	< 10	< 10	< 10
F3 (C16-C34)	µg/g	50	300	< 50	< 50	< 50
F4 (C34-C50)	µg/g	50	2800	< 50	< 50	< 50
Chromatogram returned to baseline at nC50	Yes / No	-		YES	YES	YES



FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: **REG153 - SVOC Surrogates (SOIL)**

Sample Number	9	12	15	16
Sample Name	BH20-E1, SS1B	BH20-E2, SS2B	BH20-E3, SS2	BH20-E3, SS2
Sample Matrix	Soil	Soil	Soil	Dup Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020	03/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result	Result
SVOC Surrogates							
Surr Nitrobenzene-d5	Surr Rec %	-		104	101	96	98
Surr 2-Fluorobiphenyl	Surr Rec %	-		96	83	96	100
Surr 4-Terphenyl-d14	Surr Rec %	-		98	95	96	96
Surr 2-Fluorophenol	Surr Rec %	-		87	88	93	88
Surr Phenol-d6	Surr Rec %	-		98	96	99	96
Surr 2,4,6-Tribromophenol	Surr Rec %	-		88	95	86	75

PACKAGE: **REG153 - THMs (VOC) (SOIL)**

Sample Number	10	13	15
Sample Name	BH20-E1, SS2	BH20-E2, SS3A	BH20-E3, SS2
Sample Matrix	Soil	Soil	Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result
THMs (VOC)						
Bromodichloromethane	µg/g	0.05	1.5	< 0.05	< 0.05	< 0.05
Bromoform	µg/g	0.05	0.27	< 0.05	< 0.05	< 0.05
Dibromochloromethane	µg/g	0.05	2.3	< 0.05	< 0.05	< 0.05



FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: REG153 - VOC Surrogates (SOIL)

Sample Number	10	13	15	17	18	19	20
Sample Name	BH20-E1, SS2	BH20-E2, SS3A	BH20-E3, SS2	BH20-E4, SS1B	BH20-E5, SS2	BH20-E5, SS2 Dup	BH20-E6, SS1B
Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020	04/12/2020	04/12/2020	03/12/2020	04/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result	Result	Result	Result	Result
VOC Surrogates										
Surr 1,2-Dichloroethane-d4	Surr Rec %	-		101	100	100				
Surr 4-Bromofluorobenzene	Surr Rec %	-		94	89	92				
Surr 2-Bromo-1-Chloropropane	Surr Rec %	-		90	89	89				
Surr TCMX	Surr Rec %	-					93	93	98	68

PACKAGE: REG153 - VOCs (SOIL)

Sample Number	10	13	15
Sample Name	BH20-E1, SS2	BH20-E2, SS3A	BH20-E3, SS2
Sample Matrix	Soil	Soil	Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result
VOCs						
Acetone	µg/g	0.5	16	< 0.5	< 0.5	< 0.5
Bromomethane	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05
Carbon tetrachloride	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05
Chlorobenzene	µg/g	0.05	2.4	< 0.05	< 0.05	< 0.05
Chloroform	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/g	0.05	1.2	< 0.05	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/g	0.05	4.8	< 0.05	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/g	0.05	0.083	< 0.05	< 0.05	< 0.05
Dichlorodifluoromethane	µg/g	0.05	16	< 0.05	< 0.05	< 0.05
1,1-Dichloroethane	µg/g	0.05	0.47	< 0.05	< 0.05	< 0.05
1,2-Dichloroethane	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05
1,1-Dichloroethylene	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05



FINAL REPORT

CA14233-DEC20 R

Client: DS Consultants

Project: 20-231-100, Barrie, ON

Project Manager: Drew Doak

Samplers: Matt Zammit

PACKAGE: **REG153 - VOCs (SOIL)**

Sample Number	10	13	15
Sample Name	BH20-E1, SS2	BH20-E2, SS3A	BH20-E3, SS2
Sample Matrix	Soil	Soil	Soil
Sample Date	03/12/2020	03/12/2020	03/12/2020

L1 = REG153 / SOIL / COARSE - TABLE 2 - Residential/Parkland - UNDEFINED

Parameter	Units	RL	L1	Result	Result	Result
VOCs (continued)						
trans-1,2-Dichloroethylene	µg/g	0.05	0.084	< 0.05	< 0.05	< 0.05
cis-1,2-Dichloroethylene	µg/g	0.05	1.9	< 0.05	< 0.05	< 0.05
1,2-Dichloropropane	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05
cis-1,3-dichloropropene	µg/g	0.03		< 0.03	< 0.03	< 0.03
trans-1,3-dichloropropene	µg/g	0.03		< 0.03	< 0.03	< 0.03
1,3-dichloropropene (total)	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05
Ethylenedibromide	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05
n-Hexane	µg/g	0.05	2.8	< 0.05	< 0.05	< 0.05
Methyl ethyl ketone	µg/g	0.5	16	< 0.5	< 0.5	< 0.5
Methyl isobutyl ketone	µg/g	0.5	1.7	< 0.5	< 0.5	< 0.5
Methyl-t-butyl Ether	µg/g	0.05	0.75	< 0.05	< 0.05	< 0.05
Methylene Chloride	µg/g	0.05	0.1	< 0.05	< 0.05	< 0.05
Styrene	µg/g	0.05	0.7	< 0.05	< 0.05	< 0.05
Tetrachloroethylene	µg/g	0.05	0.28	< 0.05	< 0.05	< 0.05
1,1,1,2-Tetrachloroethane	µg/g	0.05	0.058	< 0.05	< 0.05	< 0.05
1,1,2,2-Tetrachloroethane	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05
1,1,1-Trichloroethane	µg/g	0.05	0.38	< 0.05	< 0.05	< 0.05
1,1,2-Trichloroethane	µg/g	0.05	0.05	< 0.05	< 0.05	< 0.05
Trichloroethylene	µg/g	0.05	0.061	< 0.05	< 0.05	< 0.05
Trichlorofluoromethane	µg/g	0.05	4	< 0.05	< 0.05	< 0.05
Vinyl Chloride	µg/g	0.02	0.02	< 0.02	< 0.02	< 0.02

EXCEEDANCE SUMMARY

No exceedances are present above the regulatory limit(s) indicated



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QC SUMMARY

Conductivity

Method: EPA 6010/SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0198-DEC20	mS/cm	0.002	<0.002	NV	10	100	90	110	NA		

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-IENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Free Cyanide	SKA5044-DEC20	µg/g	0.05	<0.05	ND	20	98	80	120	90	75	125

Hexavalent Chromium by SFA

Method: EPA218.6/EPA3060A | Internal ref.: ME-CA-IENVISKA-LAK-AN-012

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chromium VI	SKA5054-DEC20	ug/g	0.2	<0.2	ND	20	86	80	120	92	75	125



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QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/EPA 245 | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury	EMS0061-DEC20	ug/g	0.05	<0.05	ND	20	109	80	120	97	70	130

Metals in aqueous samples - ICP-OES

Method: MOE 4696e01/EPA 6010 | Internal ref.: ME-CA-IENVISPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
SAR Calcium	ESG0036-DEC20	mg/L	0.09	<0.09	6	20	101	80	120	93	70	130
SAR Magnesium	ESG0036-DEC20	mg/L	0.02	<0.02	7	20	101	80	120	96	70	130
SAR Sodium	ESG0036-DEC20	mg/L	0.15	<0.15	10	20	100	80	120	98	70	130



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QC SUMMARY

Metals in Soil - Aqua-regia/ICP-MS

Method: EPA 3050/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver	EMS0061-DEC20	ug/g	0.05	<0.05	ND	20	102	70	130	104	70	130
Arsenic	EMS0061-DEC20	ug/g	0.5	<0.5	4	20	108	70	130	100	70	130
Barium	EMS0061-DEC20	ug/g	0.1	<0.1	4	20	107	70	130	100	70	130
Beryllium	EMS0061-DEC20	ug/g	0.02	<0.02	3	20	106	70	130	106	70	130
Boron	EMS0061-DEC20	ug/g	1	<1	3	20	109	70	130	104	70	130
Cadmium	EMS0061-DEC20	ug/g	0.02	<0.02	20	20	107	70	130	104	70	130
Cobalt	EMS0061-DEC20	ug/g	0.01	<0.01	5	20	105	70	130	105	70	130
Chromium	EMS0061-DEC20	ug/g	0.5	<0.5	4	20	106	70	130	105	70	130
Copper	EMS0061-DEC20	ug/g	0.1	<0.1	7	20	107	70	130	104	70	130
Molybdenum	EMS0061-DEC20	ug/g	0.1	<0.1	2	20	103	70	130	103	70	130
Nickel	EMS0061-DEC20	ug/g	0.5	<0.5	5	20	106	70	130	106	70	130
Lead	EMS0061-DEC20	ug/g	0.1	<0.1	2	20	106	70	130	104	70	130
Antimony	EMS0061-DEC20	ug/g	0.8	<0.8	ND	20	104	70	130	84	70	130
Selenium	EMS0061-DEC20	ug/g	0.7	<0.7	ND	20	104	70	130	102	70	130
Thallium	EMS0061-DEC20	ug/g	0.02	<0.02	0	20	108	70	130	101	70	130
Uranium	EMS0061-DEC20	ug/g	0.002	<0.002	4	20	106	70	130	121	70	130
Vanadium	EMS0061-DEC20	ug/g	3	<3	5	20	105	70	130	105	70	130
Zinc	EMS0061-DEC20	ug/g	0.7	<0.7	3	20	100	70	130	101	70	130



FINAL REPORT

CA14233-DEC20 R

QC SUMMARY

Pesticides

Method: EPA 3541/8270D | Internal ref.: ME-CA-IENVIGC-LAK-AN-018

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Methoxychlor	GCM0292-DEC20	µg/g	0.05	< 0.05	ND	40	98	50	140	100	50	140
Aldrin	GCM0292-DEC20	µg/g	0.05	< 0.05	ND	40	95	50	140	94	50	140
alpha-Chlordane	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	95	50	140	95	50	140
Dieldrin	GCM0292-DEC20	µg/g	0.05	< 0.05	ND	40	96	50	140	94	50	140
Endosulfan I	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	95	50	140	96	50	140
Endosulfan II	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	93	50	140	90	50	140
Endrin	GCM0292-DEC20	µg/g	0.04	< 0.04	ND	40	89	50	140	94	50	140
gamma-BHC	GCM0292-DEC20	µg/g	0.01	< 0.01	ND	40	96	50	140	95	50	140
gamma-Chlordane	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	93	50	140	93	50	140
Heptachlor epoxide	GCM0292-DEC20	µg/g	0.01	< 0.01	ND	40	94	50	140	93	50	140
Heptachlor	GCM0292-DEC20	µg/g	0.01	< 0.01	ND	40	92	50	140	91	50	140
Hexachlorobenzene	GCM0292-DEC20	µg/g	0.01	< 0.01	ND	40	96	50	140	95	50	140
Hexachlorobutadiene	GCM0292-DEC20	µg/g	0.01	< 0.01	ND	40	94	50	140	93	50	140
Hexachloroethane	GCM0292-DEC20	µg/g	0.01	< 0.01	ND	40	89	50	140	90	50	140
o,p-DDD	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	92	50	140	94	50	140
o,p-DDE	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	97	50	140	97	50	140
op-DDT	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	89	50	140	89	50	140
pp-DDD	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	90	50	140	90	50	140
pp-DDE	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	96	50	140	97	50	140
pp-DDT	GCM0292-DEC20	µg/g	0.02	< 0.02	ND	40	95	50	140	98	50	140



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CA14233-DEC20 R

QC SUMMARY

Petroleum Hydrocarbons (F1)

Method: CCME Tier 1 | Internal ref.: ME-CA-IENVIGC-LAK-AN-010

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
F1 (C6-C10)	GCM0225-DEC20	µg/g	10	<10	ND	30	84	80	120	103	60	140

Petroleum Hydrocarbons (F2-F4)

Method: CCME Tier 1 | Internal ref.: ME-CA-IENVIGC-LAK-AN-010

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
F2 (C10-C16)	GCM0258-DEC20	µg/g	10	<10	ND	30	116	80	120	106	60	140
F3 (C16-C34)	GCM0258-DEC20	µg/g	50	<50	ND	30	116	80	120	106	60	140
F4 (C34-C50)	GCM0258-DEC20	µg/g	50	<50	ND	30	116	80	120	106	60	140



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CA14233-DEC20 R

QC SUMMARY

pH
Method: SM 4500 | Internal ref.: ME-CA-ENVIEWL-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	ARD0043-DEC20	pH Units	0.05		0	20	100	80	120			



FINAL REPORT

CA14233-DEC20 R

QC SUMMARY

Semi-Volatile Organics

Method: EPA 3541/8270D | Internal ref.: ME-CA-IENVIGC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1-Methylnaphthalene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	87	50	140	84	50	140
2-Methylnaphthalene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	82	50	140	81	50	140
Acenaphthene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	88	50	140	93	50	140
Acenaphthylene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	78	50	140	84	50	140
Anthracene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	89	50	140	93	50	140
Benzo(a)anthracene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	86	50	140	93	50	140
Benzo(a)pyrene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	93	50	140	100	50	140
Benzo(b+j)fluoranthene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	86	50	140	90	50	140
Benzo(ghi)perylene	GCM0253-DEC20	µg/g	0.1	< 0.1	ND	40	86	50	140	98	50	140
Benzo(k)fluoranthene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	92	50	140	96	50	140
Chrysene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	90	50	140	93	50	140
Dibenzo(a,h)anthracene	GCM0253-DEC20	µg/g	0.06	< 0.06	ND	40	86	50	140	95	50	140
Fluoranthene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	94	50	140	100	50	140
Fluorene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	94	50	140	94	50	140
Indeno(1,2,3-cd)pyrene	GCM0253-DEC20	µg/g	0.1	< 0.1	ND	40	85	50	140	97	50	140
Naphthalene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	88	50	140	94	50	140
Phenanthrene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	91	50	140	95	50	140
Pyrene	GCM0253-DEC20	µg/g	0.05	< 0.05	ND	40	95	50	140	100	50	140



FINAL REPORT

CA14233-DEC20 R

QC SUMMARY

Volatile Organics

Method: EPA 5035A/5030B/8260C | Internal ref.: ME-CA-IENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,1,2-Tetrachloroethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	98	60	130	88	50	140
1,1,1-Trichloroethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	99	60	130	88	50	140
1,1,2,2-Tetrachloroethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	96	60	130	88	50	140
1,1,2-Trichloroethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	99	60	130	91	50	140
1,1-Dichloroethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	92	60	130	84	50	140
1,1-Dichloroethylene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	102	60	130	93	50	140
1,2-Dichlorobenzene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	97	60	130	87	50	140
1,2-Dichloroethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	96	60	130	90	50	140
1,2-Dichloropropane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	97	60	130	89	50	140
1,3-Dichlorobenzene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	97	60	130	86	50	140
1,4-Dichlorobenzene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	98	60	130	86	50	140
Acetone	GCM0224-DEC20	µg/g	0.5	< 0.5	ND	50	99	50	140	95	50	140
Benzene	GCM0224-DEC20	µg/g	0.02	< 0.02	ND	50	97	60	130	88	50	140
Bromodichloromethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	98	60	130	88	50	140
Bromoform	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	92	60	130	81	50	140
Bromomethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	74	50	140	55	50	140
Carbon tetrachloride	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	99	60	130	86	50	140
Chlorobenzene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	96	60	130	87	50	140
Chloroform	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	98	60	130	88	50	140
cis-1,2-Dichloroethylene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	99	60	130	89	50	140

QC SUMMARY

Volatile Organics (continued)

Method: EPA 5035A/5030B/8260C | Internal ref.: ME-CA-IENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
cis-1,3-dichloropropene	GCM0224-DEC20	µg/g	0.03	< 0.03	ND	50	98	60	130	84	50	140
Dibromochloromethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	99	60	130	87	50	140
Dichlorodifluoromethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	69	50	140	60	50	140
Ethylbenzene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	96	60	130	88	50	140
Ethylenedibromide	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	99	60	130	90	50	140
n-Hexane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	111	60	130	83	50	140
m/p-xylene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	96	60	130	86	50	140
Methyl ethyl ketone	GCM0224-DEC20	µg/g	0.5	< 0.5	ND	50	98	50	140	93	50	140
Methyl isobutyl ketone	GCM0224-DEC20	µg/g	0.5	< 0.5	ND	50	98	50	140	94	50	140
Methyl-t-butyl Ether	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	99	60	130	93	50	140
Methylene Chloride	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	98	60	130	91	50	140
o-xylene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	97	60	130	88	50	140
Styrene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	96	60	130	87	50	140
Tetrachloroethylene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	98	60	130	84	50	140
Toluene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	98	60	130	88	50	140
trans-1,2-Dichloroethylene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	99	60	130	90	50	140
trans-1,3-dichloropropene	GCM0224-DEC20	µg/g	0.03	< 0.03	ND	50	101	60	130	86	50	140
Trichloroethylene	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	97	60	130	88	50	140
Trichlorofluoromethane	GCM0224-DEC20	µg/g	0.05	< 0.05	ND	50	77	50	140	67	50	140
Vinyl Chloride	GCM0224-DEC20	µg/g	0.02	< 0.02	ND	50	73	50	140	66	50	140



FINAL REPORT

CA14233-DEC20 R

QC SUMMARY

Water Soluble Boron

Method: O.Reg. 15 3/04 | Internal ref.: ME-CA-IENVI SPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Water Soluble Boron	ESG0039-DEC20	µg/g	0.5	<0.5	ND	20	98	80	120	105	70	130

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.

RL Reporting Limit.

↑ Reporting limit raised.

↓ Reporting limit lowered.

NA The sample was not analysed for this analyte

ND Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

This report must not be reproduced, except in full. This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
 London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 010841

Page 1 of 1

Received By: Chris Meehan
 Received Date: 12/9/20 (mm/dd/yy)
 Received Time: 11:00 (hr:min)

Received By (signature):
 Custody Seal Present: Yes ☒ No ☐
 Custody Seal Intact: Yes ☒ No ☐

Company: DS Consultants
 Contact: Drew Doak
 Address: 6721 Hwy 7, Unit 16
Vaughan, ON L4H 0K8
 Phone: 905-715-4182
 Fax:

INVOICE INFORMATION
☐ (same as Report Information)
 Company: DS Consultants
 Contact: Patricia Lenz
 Address:
 Phone:

Quotation #: Standard
 Project #: 20-231-400
 P.O. #: Barr, ON

LAB LIMS #: CA-14233-Dec20Type: ice packCooling Agent Present: Yes ☒ No ☐
 Temperature Upon Receipt (°C): 6.6

TURNAROUND TIME (TAT) REQUIRED

TAT's are quoted in business days (exclude statutory holidays & weekends).
 Samples received after 6pm or on weekends: TAT begins next business day

Regular TAT (5-7days)

1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days ☐

RUSH TAT (Additional Charges May Apply):

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

Specify Due Date:

REGULATIONS

Regulation 153/04:
☐ Table 1 ☒ Res/Park ☐ Soil Texture:
☐ Table 2 ☐ Ind/Com ☒ Coarse
☐ Table 3 ☐ Agri/Other ☐ Medium
☐ Table ☐ Fine
 Other Regulations: ☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
 Sewer By-Law:
☐ Sanitary
☐ Storm
☐ Municipality:

RECORD OF SITE CONDITION (RSC)

YES ☐ NO ☐

SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX
1 BH 20-E1, SS1 B	Dec. 3 rd 20	pm	2	Soil
2 BH 20-E1, SS2	11	11	3	11
3 BH 20-E2, SS1 B	11	11	1	11
4 BH 20-E2, SS2 B	11	11	1	11
5 BH 20-E2, SS3 A	11	11	3	11
6 BH 20-E3, SS1 B	11	11	1	11
7 BH 20-E3, SS2	11	11	4	11
8 BH 20-E3, SS2 Dup	11	11	1	11
9 BH 20-E4, SS1 B	Dec. 4 th 20	11	2	11
10 BH 20-E5, SS2	Dec. 3 rd 20	11	2	11
11 BH 20-E5, SS2 Dup	11	11	1	11
12 BH 20-E6, SS1 B	Dec. 4 th 20	11	2	11

Observations/Comments/Special Instructions

ANALYSIS REQUESTED

M & I	SVOC	PCB	PHC	VOC	Pest	Other (please specify)	TCLP
Field Filtered (Y/N)	PAHs only	PCBs Total ☐ Aroclor ☐	F1-F4 + BTEX	all incl BTEX	Organophosphorus or specify other		Specify TCLP tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.
ICP Metals Suite (incl CrVI, CN, Hg, Pb, Cu, Cd, Cr, Co, Ni, Mn, Mo, V, Zn, Se, Ag, Ti, U, V, Zn)	ICP Metals only						
Full Metals Suite (incl CrVI, CN, Hg, Pb, Cu, Cd, Cr, Co, Ni, Mn, Mo, V, Zn, Se, Ag, Ti, U, V, Zn)							
ICP Metals plus B (HWS-soil only) Hg, CrVI							
ICP Metals Suite (incl CrVI, CN, Hg, Pb, Cu, Cd, Cr, Co, Ni, Mn, Mo, V, Zn, Se, Ag, Ti, U, V, Zn)							
PAHs only							
SVOCs							
PCBs							
F1-F4 + BTEX							
all incl BTEX							
BTEX only							
Pesticides							
Organophosphorus or specify other							
Cyanide							
Water Characterization Pkg							
General ☐ Extended ☐							
Sewer Use:							
Specify pkg:							

COMMENTS:

Sampled By (NAME): Matt ZarnitSignature: Patricia LenzDate: 12/09/20 (mm/dd/yy)

Pink Copy - Client

Relinquished by (NAME):

Signature:

Date: 12/09/20 (mm/dd/yy)

Yellow & White Copy - SGS

Revision #: 1.2

Date of Issue: 09 Sept, 2019

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). (3) Results may be sent by email to an unlimited number of addresses for no additional cost. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.