Revised FINAL

Phase Two Environmental Site Assessment

131 Eglinton Avenue East
Mississauga, Ontario

Prepared for:

91 Eglinton Limited Partnership
1 Steelcase Road West, Unit 8
Markham, ON L3R 0T3

Attn: Mark Liddy, P.Eng.

July 19, 2019

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Issued To:	**91 Eglinton Limited Partnership**
Contact:	**Mark Liddy, P.Eng.**
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Issuing Office:	**Mississauga, ON**
Primary Pinchin Contact:	**Michael Birch, Project Manager** **905.363.1304** **Mbirch@pinchin.com**

Author:
William Martyniw, B.Sc.Hons.
Project Technologist
289.971.5043.
wmartyniw@pinchin.com

Author:
Natalia Voloshchuk, M.Env.Sc.
Project Coordinator
905.363.1303.
nvoloshchuk@pinchin.com

Reviewer:
Michael Birch, B.Sc., P.Geo.
Project Manager
905.363.1304.
mbirch@pinchin.com

Craig Kelly

Reviewer:
Craig Kelly, B.Sc. (Hons), P.Geo., QP-ESA
Senior Geoscientist
905.363.1352.
ckelly@pinchin.com

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EXECUTIVE SUMMARY

Pinchin Ltd. (Pinchin) was retained by 91 Eglinton Limited Partnership (Client), to complete a Phase Two Environmental Site Assessment (Phase Two ESA) of the property located at 131 Eglinton Avenue East in Mississauga, Ontario (hereafter referred to as the Site or Phase Two Property). The Phase One Property consists of a vacant 1.4-acre parcel of land formerly developed with a residential property and a garden supply centre.

This Phase Two ESA was conducted at the request of the Client in order to support the acquisition of the Site, financing and in support of the Client's application for zoning and other approvals being requested from the City of Mississauga. The Phase Two ESA was conducted in accordance with the Province of Ontario's *Ontario Regulation 153/04: Records of Site Condition – Part XV.1 of the Act*, which was last amended by Ontario Regulation 312/17 on July 28, 2017 (O. Reg. 153/04), should the filing of a Record of Site Condition (RSC) with the Ontario Ministry of the Environment, Conservation and Parks (MECP) be deemed required, and in accordance with the City of Mississauga's requirements.

The objectives of this Phase Two ESA were to assess the soil and groundwater quality in relation to 4 areas of potential environmental concern (APECs) and related potentially contaminating activities (PCAs) and contaminants of potential concern (COPCs) identified in a Phase One ESA completed by Pinchin in accordance with O. Reg. 153/04. The identified APECs, PCAs and COPCs are summarized in the following table:

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 (Groundwater, Soil and/or Sediment)
APEC #1 (Historical heating oil AST associated with the historical farm house formerly utilized as a car parking garage)	West exterior wall of the historical farm house that was converted to a car parking garage located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater

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 (Groundwater, Soil and/or Sediment)**
APEC #2 (Unknown heating source for the historical farm house)	In the vicinity of the historical farm house located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #3 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil
APEC #4 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 22 – Fertilizer Manufacturing, Processing and Bulk Storage	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil and Groundwater

Notes:

NA – Not applicable

BTEX – benzene, toluene, ethylbenzene and xylenes

PHCs – petroleum hydrocarbon fractions F1-F4

PAHs – polycyclic aromatic hydrocarbons

A plan showing the locations of the identified APECs and PCAs with respect to the Phase Two Property and surrounding properties is attached as Figure 4.

The Phase Two ESA was completed by Pinchin between March 27, 2019 and April 5th 2019, and included the advancement of 8 boreholes at the Phase Two Property, 5 of which were completed as groundwater monitoring wells to facilitate the sampling of groundwater and the assessment of groundwater flow. The boreholes were advanced to depths ranging from 3.35 to 3.96 metres below

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ground surface (mbgs). Select soil samples collected from each of the borehole locations were submitted for laboratory analysis of volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs) fractions 1 through 4 (F1-F4), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs, metals and/or inorganic parameters, sodium, and organochlorine (OC) pesticides. In addition, groundwater samples were collected from each of the newly-installed monitoring wells and submitted for laboratory analysis of VOCs, PHCs, PAHs, PCBs metals and/or inorganic parameters, OC pesticides, ammonium, sodium, and chloride.

Based on Site-specific information, the applicable regulatory standards for the Phase Two Property were determined to be 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 medium and fine-textured soils, and residential/parkland/institutional property.

The laboratory results for the submitted soil and groundwater samples indicated that all reported concentrations for the parameters analyzed met the corresponding *Table 2 Standards*. The maximum reported soil and groundwater concentrations for the parameters analyzed are summarized in Tables 6 and 7, respectively.

It is the opinion of the QP who supervised the Phase Two ESA that the applicable *Table 2 Standards* for soil and groundwater at the Phase Two Property have been met as of the Certification Date of April 5th, 2019 and that no further subsurface investigation is required in relation to assessing the environmental quality of soil and groundwater at the Phase Two Property.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

1.0 INTRODUCTION

A Phase Two ESA is defined as an "assessment of property conducted in accordance with the regulations by or under the supervision of a QP to determine the location and concentration of one or more contaminants in the land or water on, in or under the property". Under O. Reg. 153/04, the purpose of a Phase Two ESA is as follows:

- To determine the location and concentration of contaminants in the land or water on, in or under the Phase Two Property;
- To obtain information about environmental conditions in the land or water on, in or under the Phase Two Property necessary to undertake a Risk Assessment, in accordance with O. Reg. 153/04, with respect to one or more contaminants of concern; and
- To determine if applicable Site Condition Standards and standards specified in a Risk Assessment for contaminants on, in or under the Phase Two Property were met as of the certification date by developing an understanding of the geological and hydrogeological conditions at the Phase Two Property and conducting one or more rounds of field sampling for all contaminants associated with any APEC identified in the Phase Two ESA sampling and analysis plan (SAP) and for any such contaminants identified during subsequent Phase Two ESA activities and analyses of environmental conditions at the Phase Two Property.

This Phase Two ESA was conducted at the request of the Client in order to support the acquisition of the Site, financing and of the Client's application for zoning and other approvals being requested from the City of Mississauga. The Phase Two ESA was completed in accordance with Ontario Regulation (O.Reg.) 153/04 should the filing of a Record of Site Condition (RSC) with the Ontario Ministry of the Environment, Conservation and Parks (MECP) be deemed required, and in accordance with the City of Mississauga's requirements.

The overall objectives of this Phase Two ESA were to assess the soil and groundwater quality in relation to APECs and related COPCs identified in a Phase One ESA completed by Pinchin, the findings of which were summarized in the report entitled "*Phase One Environmental Site Assessment*, *131 Eglinton Avenue East, Mississauga, Ontario*", completed by Pinchin for the Client and dated April 18, 2019. The property assessed by the Pinchin Phase One ESA is referred to herein as the Phase One Property. The Phase Two ESA was conducted on the entire Phase One Property, at specific APECs identified during the Phase One ESA.

1.1 Site Description

This Phase Two ESA was completed for all of CON 1 EHS PT LOT 1, located at the municipal address of 131 Eglinton Avenue East, Mississauga, Ontario. The Phase Two Property is 0.95 acres (0.38 hectares) in size and is located approximately 375 metres (m) northeast of the intersection of Hurontario Street and Eglinton Avenue East. A Key Map showing the Phase Two Property location is provided on Figure 1 and a detailed plan of the Phase Two Property and surrounding lands is provided on Figure 2 (all Figures are provided within Section 9.0).

The Phase Two Property is a vacant lot which was formerly developed with a residential property and a garden supply centre.

A summary of the pertinent details of the Phase Two Property is provided in the following table:

Detail	Source / Reference	Information
Legal Description	City of Mississauga Plan & Build eServices	CON 1 EHS PT LOT 1
Municipal Address	City of Mississauga Interactive Online Mapping	131 Eglinton Avenue East, L4Z 1B2
Parcel Identification Number (PIN)	ServiceOntario Parcel Register	13289-0298 (LT)
Current Owner	Site Representatives	2190777 Ontario Inc.
Owner Contact Information	Mr. John Torchia	3222 Credit Height Drive, Mississauga, ON, L5C 2L7 Phone: 416-518-8326
Current Occupant(s)	Client	Unoccupied
Occupant Contact Information	Client	Not applicable
Client	Authorization to Proceed Form for Pinchin Proposal	91 Eglinton Limited Partnership
Client Contact Information	Authorization to Proceed Form for Pinchin Proposal	Michael Uster c/o 91 Eglinton Limited Partnership 1 Steelcase Road West, Unit 8 Markham, ON L3R 0T3 Phone: 905.731.8687 Michael@libertydevelopment.ca
Site Area	City of Mississauga Plan & Build eServices	0.38 ha. (3,799 m^2, 0.95 acres)

Detail	Source / Reference	Information
Current Zoning	City of Mississauga Plan & Build eServices	D – Development
Centroid UTM Co-ordinates	Google Earth™	608896 Easting
		4829473 Northing
		Zone 17T

A legal survey showing the Phase Two Property will be included in Appendix A upon receipt from the Client (all Appendices are provided in Section 10.0).

1.2 Property Ownership

The entirety of the Phase Two Property is currently owned by 2190777 Ontario Inc. Contact information for the Phase Two Property owner is provided in the preceding section.

Pinchin was retained by Mr. Michael Uster of the Client to conduct the Phase Two ESA of the Site. Contact information for Mr. Uster is provided in the preceding section.

1.3 Current and Proposed Future Uses

The Phase Two Property is presently vacant, however was historically used for agricultural and residential purposes. The proposed future use of the Site is residential.

1.4 Applicable Site Condition Standards

The Phase Two Property is currently a vacant lot located within the City of Mississauga and the proposed future land use is residential. It is Pinchin's understanding that drinking water for the Phase Two Property and surrounding properties within 250 metres of the Phase Two Property is supplied by the City of Mississauga. Source water is obtained by the City of Mississauga from Lake Ontario.

The depth to bedrock at the boreholes completed at the Phase Two Property during the Phase Two ESA ranged from 2.13 to 3.66 mbgs. Based on the available information, the depth to bedrock is interpreted to be greater than two mbgs over more than two-thirds of the Phase Two Property and, as such, the Phase Two Property is not a shallow soil property as defined in Section 43.1 of O. Reg. 153/04.

The Phase Two Property does not contain a water body nor is it located within 30 metres of a water body and the use of standards for properties situated within 30 metres of a water body is not required.

Section 41 of O. Reg. 153/04 states that a property is classified as an “environmentally sensitive area” if the pH of the surface soil (less than 1.5 mbgs) is less than 5 or greater than 9, if the pH of the subsurface soil (greater than 1.5 mbgs) is less than 5 or greater than 11, or if the property is an area of natural significance or is adjacent to or contains land within 30 metres of an area of natural significance. A total of ten representative soil samples (including one field duplicate sample) collected from the boreholes advanced at the Phase Two Property were submitted for pH analysis. The pH analytical results are summarized in Table 1 (all Tables are provided in Section 9.0). The pH values measured in the submitted soil samples were within the limits for non-sensitive sites. The Phase Two Property is also not an area of natural significance and it is not adjacent to, nor does it contain land within 30 metres of, an area of natural significance. As such, the Phase Two Property is not an environmentally sensitive area.

As discussed further in Section 6.4, based on the results of grain size analysis completed on representative soil samples collected during the Phase Two ESA and the observed stratigraphy at the borehole locations at the Phase Two Property, it is the QP’s opinion that over two-thirds of the overburden at the Phase Two Property is medium and fine-textured as defined by O. Reg. 153/04. Therefore, the soil at the Phase Two Property has been considered medium and fine-textured for the purpose of establishing the applicable MECP Site Condition Standards.

Based on the above, the appropriate Site Condition Standards for the Phase Two Property are the Table 2 Standards for:

- Medium and fine-textured soils; and
- Residential/parkland/institutional property use.

As such, all analytical results have been compared to these *Table 2 Standards*.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase Two Property is located in the north/central portion of the City of Mississauga at an elevation of approximately 170 metres above mean sea level (mamsl). The topography of the Phase Two Property is generally flat with a slight grade downwards in elevation to the south. The properties surrounding the Phase Two Property are at an equivalent grade with a gradual decrease in elevation towards the south. There are no drainage features (e.g., open ditches or swales) present on-Site. Surface water (e.g., storm runoff) is inferred to run overland and drain into the off-Site municipal storm sewer catch basins, south of the property.

There are no open water bodies or areas of natural significance located on-Site or within the area assessed by the Pinchin Phase One ESA (the Phase One Study Area). A plan showing the Phase One Study Area is presented on Figure 3. The nearest surface water body to the Phase Two Property is Cooksville Creek located approximately 690 m southwest of the Phase Two Property.

2.2 Past Investigations

2.2.1 Summary of Previous Environmental Investigations by Others

The Client informed Pinchin that no previous environmental reports were available for review for the Site as part of the Phase One or Two Environmental Site Assessment.

2.2.2 Pinchin Phase One ESA Summary

From January 22, 2019 through April 15, 2019, Pinchin conducted a Phase One ESA in support of the future filing of an RSC for the Phase Two Property. The Phase One ESA consisted of a Site visit, interviews with Site personnel, records review, evaluation of information, and preparation of a written report which was completed under the supervision of a QP. A plan showing the Phase One Study Area is attached as Figure 3.

The Phase One ESA was completed recently (i.e., within three months of the start of the Phase Two ESA) and in accordance with the requirements of O. Reg. 153/04. Therefore, the information provided within the Phase One ESA Report is considered adequate such that it can be relied upon for the purpose of this Phase Two ESA and future filing of an RSC.

Based on information obtained during the Phase One ESA, a total of four APECs and corresponding potentially contaminating activities (PCAs) and COPCs were identified that could potentially affect the environmental condition of the subsurface media on, in or under the Phase Two Property. The COPCs associated with each APEC were determined based on a review of the PCAs and substances associated with the related activities, and on several sources of information, including but not limited to, Pinchin's experience with environmental contamination and hazardous substances, common industry practices for analysis of such contaminants and point sources, literature reviews of COPCs and associated hazardous substances, and evaluations of contaminant mobility and susceptibility for migration in the subsurface.

The following table presents the APECs and their associated PCAs and COPCs:

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 (Groundwater, Soil and/or Sediment)
APEC #1 (Historical heating oil AST associated with the historical farm house formerly utilized as a car parking garage)	West exterior wall of the historical farm house that was converted to a car parking garage located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #2 (Unknown heating source for the historical farm house)	In the vicinity of the historical farm house located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #3 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site	Metals and Inorganics Pesticides and Herbicides	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 (Groundwater, Soil and/or Sediment)**
APEC #4 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 22 – Fertilizer Manufacturing, Processing and Bulk Storage	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil and Groundwater

Notes:

NA – Not applicable

BTEX – benzene, toluene, ethylbenzene and xylenes

PHCs – petroleum hydrocarbon fractions F1-F4

PAHs – polycyclic aromatic hydrocarbons

A plan showing the locations of the identified APECs and PCAs with respect to the Phase Two Property and surrounding properties is attached as Figure 4.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The scope of work for this Phase Two ESA was prepared to address the APECs identified at the Phase Two Property and consisted of the following:

- Prepared a health and safety plan and arranged for the completion of underground utility locates prior to the commencement of drilling activities;
- Developed a detailed SAP prior to the advancement of the boreholes and the installation of the monitoring wells. The SAP was outlined in the document entitled "*Proposal for Phase Two Environmental Site Assessment, 131 Eglinton Avenue East, Mississauga, Ontario*". Based on Pinchin's knowledge of the surrounding properties and known hydrogeological conditions, boreholes were advanced at the Phase Two Property to maximum depths ranging between approximately 2.13 and 3.96 mbgs;
- Retained Strata Drilling Group Inc. (Strata) to advance boreholes and complete monitoring well installations using a Geoprobe 7822 DT drill rig. Strata is licensed by the MECP in accordance with O. Reg. 903 (as amended) to undertake borehole drilling/well installation activities. Strata advanced 8 boreholes at the Phase Two Property to

investigate the potential for soil contaminants associated with the APECs identified in the Phase One ESA. Five of the advanced boreholes were instrumented with a monitoring well in accordance with O. Reg. 903 for the purpose of monitoring hydrogeological conditions and groundwater quality on-Site;

- Collected soil samples at regular intervals within each borehole;
- Field screened soil samples for petroleum-derived vapours in soil headspace using a combustible gas indicator (CGI) calibrated to hexane and VOC-derived vapours in soil headspace using a photoionization detector (PID), in addition to visual and olfactory considerations;
- Submitted a minimum of one “worst case” soil sample from each borehole for chemical analysis of one or more of the following parameters:
    - BTEX;
    - PHCs F1-F4;
    - PAHs;
    - O. Reg. 153/08 metals;
    - Hydrides;
    - Inorganic parameters including cyanide, electrical conductivity and sodium adsorption ratio (SAR);
    - Organochlorinated pesticides; and
    - Polychlorinated biphenyls (PCBs).
- Developed each of the newly-installed monitoring wells prior to the collection of groundwater samples;
- Submitted one representative groundwater sample from each of the newly-installed monitoring wells for chemical analysis of one or more of the following parameters:
    - BTEX;
    - PHCs F1-F4;
    - PAHs;
    - O. Reg. 153/08 metals;
    - Inorganic parameters including chloride, cyanide, ammonia, nitrate and nitrates;

  - Organochlorinated pesticides; and
  - Polychlorinated biphenyls (PCBs).
- Submitted 5 duplicate soil samples and 2 duplicate groundwater samples for chemical analysis of the above-noted parameters for quality assurance/quality control (QA/QC) purposes;
- Submitted 2 trip blanks for the groundwater sampling program for the chemical analysis of BTEX and VOCs for QA/QC purposes;
- Submitted 2 representative soil samples for the laboratory analysis of grain size and 9 representative soil samples (including 1 field duplicate soil sample) for the laboratory analysis of pH in order to confirm the appropriate MECP Site Condition Standards;
- Conducted groundwater monitoring at each of the newly-installed groundwater monitoring wells by measuring depth to groundwater from both the top of casing and ground surface reference points, and assessing the presence/absence of non-aqueous phase liquid (NAPL) using an oil/water interface probe;
- Surveyed the location and elevations of the boreholes and newly-installed monitoring wells;
- Compared the soil and groundwater analytical results to the applicable criteria stipulated in the *Table 2 Standards*; and
- Prepared a report (this Phase Two Report) documenting the findings of the Phase Two ESA which meets the reporting requirements listed in *Schedule E* and *Table 1 – Mandatory Requirements for Phase Two Environmental Site Assessment Reports* of O. Reg. 153/04.

3.2 Media Investigated

The scope of work for this Phase Two ESA was prepared to address the APECs and corresponding media at the Phase Two Property as identified through completion of the Phase One ESA.

The media of concern for the Phase Two ESA were soil and groundwater. Pinchin included the assessment of groundwater as part of the Phase Two ESA to investigate groundwater quality in relation to a former on-Site heating oil AST used for the historical farm house (APEC #1), unknown historical on-Site heating infrastructure for the historical farmhouse (APEC #2) and potential subsurface contamination from the historical garden centre operations which included the storage and sale of fertilizers. (APEC #4).

For assessing the soil at the Phase Two Property for the presence of COPCs, a total of eight boreholes were advanced at locations across the Phase Two Property for the purpose of collecting soil samples. A total of 15 soil samples, comprising select "worst case" samples collected from each of the boreholes, were submitted for laboratory analysis of the COPCs.

For assessing the groundwater at the Phase Two Property for the presence of COPCs, groundwater monitoring wells were installed in 5 of the 8 boreholes completed at the Phase Two Property to permit the collection of groundwater samples. A total of 5 groundwater samples, comprising samples collected from each of the newly installed monitoring wells (MW19-01, MW19-02. MW19-03, MW19-04 and MW19-05) were submitted to the analytical laboratory for analysis of the COPCs.

3.3 Phase One Conceptual Site Model

A conceptual site model (CSM) was created to provide a summary of the findings of the Phase One ESA. The Phase One CSM is summarized in Figures 1 through 4 (of the Phase One Report), which illustrate the following features within the Phase One Study Area, where present:

- Existing buildings and structures;
- Water bodies located in whole or in part within the Phase One Study Area;
- Areas of natural significance located in whole or in part within the Phase One Study Area;
- Drinking water wells located at the Phase One Property;
- Land use of adjacent properties;
- Roads within the Phase One Study Area;
- PCAs within the Phase One Study Area, including the locations of tanks; and
- APECs at the Phase One Property.

The following provides a narrative summary of the Phase One CSM:

- The Phase One Property is a rectangular-shaped parcel of land approximately 0.38 ha (0.95 acres) in size, located approximately 375 m northeast of the intersection of Hurontario Street and Eglinton Avenue East. The Phase One Property was formerly developed with a residential property and a garden supply centre. The Phase One Property was developed with a farm house constructed prior to 1954, was converted to a car parking garage sometime before 2007, and was demolished in 2015. The Phase One Property was utilized for agricultural and residential uses. There is no record of industrial use or of a commercial use (e.g., garage, bulk liquid dispensing facility or dry cleaner) that would require classifying the Phase One Property as an enhanced investigation property;

- No water bodies were identified within the Phase One Study Area. The nearest water body is Cooksville Creek located approximately 690 m southwest of the Phase One Property;
- No areas of natural significance were identified within the Phase One Study Area;
- No drinking water wells were located on the Phase One Property;
- The adjacent properties to the west, north and east of the Phase One Property consist of residential lands. The Phase One Property is bounded by Eglinton Avenue East to the south. The historical information shows no record of any previous use of the adjacent properties other than for possible agricultural and residential purposes;
- A total of 12 PCAs were identified within the Phase One Study Area, consisting of four PCAs at the Phase One Property and 12 PCAs within the Phase One study, outside of the Phase One Property. As shown on Figure 4, two of the APECs are related to the on-Site historical heating sources for the former car parking garage and farm house located at the southeast end of the Phase One Property. The other two APECs are related to the historical operations conducted at the Phase One Property by Frank's Garden Centre, a garden supply centre. Groundwater flow within the Phase One Study Area is interpreted to be to the southeast and the off-Site PCAs are not considered to represent APECs for the Phase One Property due to the distance from the Phase One Property and/or the downgradient/transgradient location of the PCAs relative to the Phase One Property. Figures 4 and 5 provide a detailed summary of the APECs and associated PCAs and COPCs;
- There are currently no active underground utilities on the Phase One Property. According to the Site Representatives, a water service line was capped at Eglinton Avenue East at the time of the demolition of the former car parking garage. Plans were not available to confirm the depth of this utility but it is estimated to be located approximately 2 to 3 mbgs. The depth to groundwater at the Phase One Property is 3.42 mbgs. As such, it is unlikely that the utility corridors may act as preferential pathways for contaminant distribution and transport in the event that shallow subsurface contaminants exist at the Phase One Property;

- The Phase One Property and the surrounding properties located within the Phase One Study Area are located within drumlinized till plains as the dominant landform with the primary native material consisting of clay loam. Bedrock is expected to consist of shale, limestone, dolostone, and siltstone at a depth greater than 4.57 mbgs. The topography is considered to be mainly flat. According to the information presented in the Water Well Information System database stratigraphy was observed to consist of sandy silt to approximately 3.6 mbgs and sand to approximately 5.5 mbgs overlying grey shale to the maximum exploration depth of 30 mbgs; and
- The Phase One Property is relatively flat with little relief. The area surrounding the Phase One Property slopes gradually to the southeast towards the Cooksville Creek. Local groundwater flow is inferred to be to the east, based on the topography of the area surrounding the Phase One Property and the location of the Cooksville Creek. Regional groundwater flow is inferred to be to the southeast towards Lake Ontario.

There were no deviations from the Phase One ESA requirements specified in O. Reg. 153/04 or absence of information that have resulted in uncertainty that would affect the validity of the Phase One CSM.

3.4 Deviations from Sampling and Analysis Plan

The following deviations from the SAP occurred during the completion of the Phase Two ESA investigation activities:

- Boreholes and monitoring wells were advanced to a maximum depth of 2.13 to 3.96 mbgs compared to a proposed maximum depth of 5.0 mbgs due to the presence of bedrock at shallower depths than anticipated during the development of the Phase Two scope of work;
- The groundwater sample collected from monitoring well MW19-05 was not analyzed for ammonia or pH as originally proposed due to the low groundwater yield of the monitoring well;
- More than one soil sample was submitted at the following locations: MW19-01, MW19-03, MW19-04, BH19-06 and BH19-08; and
- No other notable constraints and limitations with respect to the SAP were documented during the field activities, and as such Pinchin has conducted the Phase Two ESA in a manner generally consistent with the SAP provided in Appendix B.

It is the QP’s opinion that the above-noted deviations from the SAP did not affect the investigation of the APECs for COPCs and had no impact on the overall findings and conclusions of the Phase Two ESA.

3.5 Impediments

Pinchin had full access to the Phase Two Property throughout the completion of the Phase Two ESA.

4.0 INVESTIGATION METHOD

4.1 General

The Phase Two ESA field work was conducted in accordance with Pinchin's standard operating procedures (SOPs) as provided in the SAP, which have been developed in accordance with the procedures and protocols provided in the MECP document entitled "*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*", dated December 1996, in the Association of Professional Geoscientists of Ontario document entitled *"Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)"*, dated April 2011, and in O. Reg. 153/04.

In addition, Pinchin's SOP for groundwater sampling using low-flow purging and sampling procedures is based upon the United States Environmental Protection Agency Region I document entitled *"Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells"* dated January 19, 2010 (Low Flow Sampling Protocol).

Deviations from Pinchin's SOPs, and the rationale for the deviations, are summarized as follows:

- Groundwater purging and sampling at monitoring well MW19-05 could not be completed in strict accordance with the Low Flow Sampling Protocol as stabilization was not achieved prior to purging dry due to the low hydraulic yield of the formation in which the wells were installed. At these locations, the monitoring wells were purged until dry then grab sampled with a Geotech^{TM} bladder pump upon recovery to minimize well disturbance and potential VOC losses.
- Water quality parameters were measured during pre-sampling purging completed on March 28, 2019 at monitoring well MW19-02. Low flow purging and sampling methods could not be employed at wells (MW19-01, MW19-03, MW19-03 and MW19-05) due to the low yield of the formation in which the wells were installed.

4.2 Drilling

Pinchin retained Strata to advance a total of eight boreholes (MW19-01 through BH19-08) at the Phase Two Property on March 27, 2019 to investigate the potential presence of COPCs associated with the APECs identified in the Phase One ESA. Five of the eight advanced boreholes (MW19-01 through MW19-05) were completed as monitoring wells in accordance with O. Reg. 903 for the purpose of monitoring hydrogeological conditions and groundwater quality on-Site. The boreholes were drilled to a maximum depth of 3.96 mbgs using a Geoprobe 7822DT™. Upon completion of the drilling and monitoring well installations, Strata completed and filed a Water Well Record with the MECP for the well cluster in accordance with O. Reg. 903.

The locations of the boreholes and monitoring wells were selected using the following rationale:

- MW19-01 – Completed in the north portion of the Phase Two Property, in order to investigate soil and groundwater quality in relation to APECs #3 and 4;
- MW19-02 – Completed adjacent to the west boundary of the former shed, in order to investigate soil and groundwater quality in relation to APECs #1;
- MW19-03 and BH19-07 – Completed on the south-central portion of the Phase Two Property, adjacent to the former farm house in order to investigate soil and groundwater quality in relation to APECs #2;
- MW19-04, MW19-05 and BH19-06 – Completed along the southern boundary of the Phase Two Property, in order to investigate soil and groundwater quality in relation to APECs #3 and 4; and
- BH19-08 – Completed in the central portion of the Phase Two Property, in order to assess the soil quality in relation to APECs #3 and 4.

The locations of the boreholes and monitoring wells are provided on Figure 5. A description of the subsurface stratigraphy encountered during the drilling program is documented in the borehole logs included in Appendix C. Well completion details and elevation data are provided in Table 2 and on the borehole logs provided in Appendix C.

Measures taken to minimize the potential for cross-contamination during the borehole drilling program included:

- The use of dedicated, disposable PVC soil sample liners for soil sample collection during direct-push drilling;
- The use of dedicated, pre-cleaned augers for each borehole location;
- The extraction of soil samples from the interior of the sampling device (where possible), rather than from areas in contact with the sampler walls;
- The cleaning of all non-dedicated drilling and soil sampling equipment (i.e., auger flights) before initial use and between sample and borehole locations; and
- The use of dedicated and disposable nitrile gloves for all soil sample handling.

Soil samples were collected at continuous intervals during direct-push drilling at a general frequency of one soil sample for every 0.75 metres drilled.

No excavating activities (e.g., test pitting) were completed as part of the Phase Two ESA.

4.3 Soil Sampling

Soil samples were collected in the boreholes at continuous 0.76 m intervals using 10.1 centimetre (cm) inner diameter (ID) direct push soil samplers with dedicated single-use sample liners.

Discrete soil samples were collected from the dedicated sample liners by Pinchin personnel. Dedicated and disposable nitrile gloves were worn during the collection of each soil sample. A portion of each sample was placed in a resealable plastic bag for field screening and a portion was containerized in laboratory-supplied glass sampling jars. Following sample collection, the sample jars were placed into dedicated coolers with ice for storage pending transport to Maxxam Analytics Inc. (Maxxam) in Mississauga, Ontario. Formal chain of custody records were maintained between Pinchin and the staff at Maxxam.

Subsurface soil conditions were logged on-Site by Pinchin personnel at the time of borehole drilling. Based on the soil samples recovered during the borehole drilling program, the soil stratigraphy at the drilling locations generally consists of fill material comprised of a brown clayey silt, with some sand and organic material and trace weathered rock, to a maximum depth of approximately 2.13 mbgs, followed by a grey silt till with weathered rock that extended to the maximum investigation depth of 3.96 mbgs. Moist to wet soil conditions were generally observed between 2.59 and 3.51 mbgs.

No odours or staining were observed in the soil samples collected during the borehole drilling program.

4.4 Field Screening Measurements

Soil samples were collected at each of the sampling intervals during the drilling activities and analyzed in the field for VOC-derived vapour concentrations and petroleum-derived vapour concentrations in soil headspace with an RKI Eagle II™ CGI operated in methane elimination mode. The soil samples collected for field-screening purposes were placed in resealable plastic bags. The plastic bags were stored in a vehicle for a minimum of five minutes and agitated in order to release organic vapours within the soil pore space prior to analysis with the PID and CGI.

Based on a review of the operator’s manual, the RKI Eagle II™ CGI has an accuracy/precision of up to +/- 25 ppm, or +/- 5% of the reading (whichever is greater). The CGI was calibrated prior to field use by Maxim according to Maxim’s standard operating procedures. A copy of Maxim’s calibration record for the CGI is provided in Appendix D.

In general, the soil samples with the highest measured vapour concentrations (i.e., “worst case”) from a given borehole were submitted for laboratory analysis. Sample depth and visual and olfactory observations of potential contaminants were also used in conjunction with the vapour concentrations in making the final selection of “worst case” soil samples for laboratory analysis.

Soil samples collected during the drilling activities completed on March 27, 2019, were field screened for petroleum-derived vapour concentrations using the RKI Eagle II™ CGI. The organic vapour concentrations measured in the soil samples were relatively low, ranging from less than 5 ppm by volume (ppm_v) to a maximum of 50 ppm_v, which are generally not indicative of soil PHC impacts. As such, the primary consideration in selecting soil samples for submission was sample depth, and samples collected from the near surface (including fill material) and near the water table were considered to represent “worst case” samples with respect to assessing impacts related to pesticide application, leaks from AST’s and fill material quality.

4.5 Groundwater Monitoring Well Installation

Following soil sampling, Strata installed a groundwater monitoring well in boreholes MW19-01, MW19-02, MW19-03, MW19-04 and MW19-05 under the full-time monitoring of a Pinchin field representative. To accommodate the well installations, each borehole was drilled using 15 cm (6-inch) diameter solid stem augers to a maximum depth of 3.96 mbgs using the Geoprobe 7822DT™ drill rig.

Each of the monitoring wells was constructed with 51-millimetre (2-inch) ID flush-threaded schedule 40 polyvinyl chloride (PVC) risers followed by a 3.05 metre length of No. 10 slot PVC screen. Each well screen was sealed at the bottom using a threaded cap and each riser was sealed at the top with a lockable J-plug cap. Silica sand was placed around and above the screened interval to form a filter pack around the well screen. A layer of bentonite was placed above the silica sand and was extended to just below the ground surface. A 7.62 cm ID Schedule 40 PVC outer casing, approximately 20 cm in length, was installed in each well around the top of the riser and into the top of the bentonite seal. A bentonite seal was then placed between the riser and outer casing. A protective flush-mount cover and aboveground monument casing was installed at the ground surface over each riser pipe and outer casing and cemented in place.

All monitoring wells were installed in accordance with O. Reg. 903. The monitoring well construction details are provided in Table 2 and on the borehole logs in Appendix C. Upon completion of the monitoring well installations, Strata completed and filed a Water Well Record with the MECP for the well cluster. A copy of the MECP Water Well Records is provided in Appendix E.

No additional soil sampling or groundwater sampling was completed during the well installations.

The monitoring wells were developed on March 27 and April 1, 2019 in general accordance with Pinchin's SOP for well development by removing a minimum of three to a maximum of five standing water column volumes using a dedicated inertial pump comprised of Waterra polyethylene tubing and foot valves. The well development activities were completed a minimum of 24 hours prior to the groundwater sampling activities.

Measures taken to minimize the potential for cross-contamination during well installation and well development included the following:

- The use of dedicated, pre-cleaned augers for drilling each borehole location;
- The use of dedicated and disposable nitrile gloves for handling well materials during well installation and during well development;
- The use of dedicated inertial pumps for each well; and
- The cleaning of the interface probe (IP) between monitoring well locations by rinsing with a solution of Alconox™ detergent and distilled water.

4.6 Groundwater Field Measurements of Water Quality Parameters

Water quality parameters were measured during the low-flow purging and sampling procedure completed on March 28, 2019 at monitoring well MW19-02.

Measurements of the water quality parameters oxidation-reduction potential, dissolved oxygen, temperature, specific conductance, pH and turbidity were made during purging using a flow-through cell and a Horiba U-52. The Horiba U-52 was calibrated prior to use by the equipment supplier (Maxim) in accordance with the manufacturer's specifications.

Field-measured parameters were recorded from the Horiba U-52 at regular intervals in order to determine stabilized groundwater geochemical conditions and hence representative groundwater sampling conditions, in general accordance with the criteria stipulated in the Low Flow Sampling Protocol.

The field parameter values measured over the course of the low flow sampling activities are provided in the field-measured parameters monitoring logs provided in Appendix F. It should be noted that representative groundwater sampling conditions were determined by Pinchin personnel utilizing the field parameter stabilization criteria noted within the Low Flow Sampling Protocol.

Water quality parameters were measured during pre-sampling purging completed on March 28, 2019 at monitoring well MW19-02. Low flow purging and sampling methods could not be employed at wells (MW19-01, MW19-03, MW19-03 and MW19-05) due to the low yield of the formation in which the wells were installed.

Measurements of the water quality parameters oxidation-reduction potential, dissolved oxygen, temperature, specific conductance, pH and turbidity were made during pre-sampling purging using a flow-through cell and Horiba U-52. The Horiba U-52 was calibrated prior to use by the equipment supplier (Maxim) in accordance with the manufacturer's specifications.

The field parameter values measured during pre-sampling purging activities are provided in the field-measured parameters monitoring logs provided in Appendix F.

4.7 Groundwater Sampling

The monitoring wells were sampled a minimum of 24 hours after the completion of well development activities (see Section 5.5). Monitoring well MW19-02 was sampled in accordance with the Low Flow Sampling Protocol as described below.

Well purging was completed using a Geotech™ submersible bladder pump and Geotech™ controller powered by a 12-Volt battery. Compressed air was delivered to the bladder pump unit via 47-millimetre (3/16-inch) ID polyethylene tubing. Groundwater was returned to the surface from the bladder pump via dedicated 0.64-cm (1/4-inch) ID polyethylene tubing. A Horiba U-52 connected to a flow-through cell was used to monitor water quality parameters during groundwater purging to assess whether water quality parameter stabilization (i.e., steady-state conditions) was achieved prior to sample collection. The flow rate of the bladder pump was adjusted to minimize drawdown of the water table and the introduction of sediment into the samples.

Once field parameter stabilization was achieved, groundwater samples were collected at each well using the bladder pump and dedicated polyethylene tubing by pumping groundwater directly into new laboratory-supplied sample bottles at a pumping rate of less than 0.5 litres per minute.

Monitoring wells MW19-01, MW19-03, MW19-04 and MW19-05 could not be sampled using the Low Flow Sampling Protocol because the wells did not yield enough water above the pump to create enough pressure for the Geotech bladder to fill even when pumping at the lowest possible pumping rate. Following recovery after purging these wells/this well to dryness, groundwater samples for volatile parameters (i.e., VOCs and PHCs F1), metals and inorganics analysis were collected using a dedicated inertial pump comprised of Waterra polyethylene tubing and a foot valve, and groundwater samples for PHCs (F2-F4) and PAHs analysis were collected using a spectra peristaltic pump and dedicated 0.64-cm (1/4-inch) ID polyethylene tubing.

Groundwater samples for metals analyses were field-filtered prior to preservation using dedicated 0.45 micron in-line filters. As appropriate, laboratory sample bottles were pre-filled by Maxxam with preservatives intended to preserve the collected groundwater samples prior to analysis.

Following sample collection, the sample bottles were placed into dedicated coolers with ice for storage pending transport to Maxxam. Formal chain of custody records were maintained between Pinchin and the staff at Maxxam.

4.8 Sediment Sampling

Sediment sampling was not completed as part of this Phase Two ESA.

4.9 Analytical Testing

All collected soil and groundwater samples were delivered to Maxxam for analysis. Maxxam is an independent laboratory accredited by the Canadian Association for Laboratory Accreditation. Formal chain of custody records of the sample submissions were maintained between Pinchin and the staff at Maxxam. Maxxam conducted the laboratory analysis in accordance with the MECP document entitled *"Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act"* dated March 9, 2004 and revised on July 1, 2011 (*Analytical Protocol)*.

4.10 Residue Management Procedures

Soil cuttings generated by the borehole drilling program were containerized in two 205-L drums and 10 20-L pails and were stored adjacent to the south boundary of the Phase Two Property.

One composite soil sample (representative of the excess soil cuttings generated by the borehole drilling program) collected from the boreholes was submitted for the laboratory analysis of the leachate concentrations of inorganics, VOCs, Polychlorinated Biphenyls (PCBs) and benzo(a)pyrene in accordance with the Toxicity Characteristic Leachate Procedure (TCLP) analysis as per O. Reg. 347/90 (O. Reg. 347/90) in order to characterize the soil cuttings for off-Site disposal purposes. The TCLP analytical results are provided in Appendix G, which illustrate that the excess soil cuttings are classified as non-hazardous waste in accordance with O. Reg. 347/90.

Excess water produced during well purging activities was containerized in 10 20-L clean, sealed plastic pails stored adjacent to the southwest boundary of the Phase Two Property.

Pinchin notes that at the time of writing, the drums of excess soil cuttings, purge water and equipment cleaning fluids have not been removed from the Phase Two Property. Pinchin will assist the Client in arranging for disposal of these materials by MECP-approved waste haulers at MECP-approved waste management facilities. Records of the removal of these excess soil cuttings, purge water and equipment cleaning fluids will be provided in Appendix G.

During the drilling and groundwater sampling activities, no evidence of NAPL or significant staining was observed in the subsurface. As such, the limited volumes of wash water utilized to clean the sampling equipment were discharged to the ground surface at the Phase Two Property.

4.11 Elevation Surveying

On April 18, 2019, Pinchin surveyed the vertical elevation of each of the on-Site monitoring wells and borehole locations with a hand held geodetic Global Navigation Satellite System (GNSS) unit.

A summary of the well elevation survey data is provided in Table 2.

4.12 Quality Assurance and Quality Control Measures

The QA/QC protocols that were followed during borehole drilling and soil and groundwater sampling so that representative samples were obtained are described in the following subsections.

4.12.1 Sample Containers, Preservation, Labelling, Handling and Custody of Samples

Soil and groundwater samples were containerized within laboratory-prepared sample containers in accordance with the *Analytical Protocol*.

The following soil sample containers and preservatives were used:

- VOCs and PHCs F1: 40 millilitre (mL) glass vials with septum-lids, pre-charged with methanol preservative; and
- PHCs F2-F4, PAHs, metals, inorganics, pH and grain size: 120 or 250 mL unpreserved clear glass wide-mouth jars with a Teflon^{TM}–lined lid.

The following groundwater sample containers and preservatives were used:

- VOCs and PHCs F1: 40 mL clear glass vials with septum-lids, pre-charged with sodium bisulphate preservative;
- PHCs F2-F4: 250 mL amber glass bottles with Teflon^{TM}–lined lids, pre-charged with sodium bisulphate preservative;
- PAHs: 250 mL unpreserved amber glass bottles with Teflon^{TM}–lined lids;
- Inorganics: 500 mL unpreserved high density polyethylene (HDPE) bottles;
- Metals (excluding hexavalent chromium and mercury): 125 mL acid-rinsed HDPE bottles, pre-charged with nitric acid preservative;
- Hexavalent chromium: 125 mL acid-rinsed HDPE bottles, pre-charged with ammonium sulphate/ammonium hydroxide preservative; and

- Mercury: 125 mL clear glass bottles with Teflon^{TM}–lined lids, pre-charged with hydrochloric acid preservative.

Groundwater samples submitted for metals analyses (including hexavalent chromium and mercury) were field-filtered using dedicated 0.45 micron filters.

Trip blank water samples for VOC parameter analysis were provided by Maxxam in 40 mL clear glass vials filled with VOC-free water.

Each soil, groundwater and QA/QC sample was labelled with a unique sample identifier along with the company name, sampling date, Pinchin project number and analysis required.

Each sample was placed in a cooler on ice immediately upon collection and prior to submission to Maxxam for analysis. Formal chain of custody records of the sample submissions were maintained between Pinchin and the staff at Maxxam.

4.12.2 Equipment Cleaning Procedures

Dedicated, single-use PVC sample liners were used for each soil sample collected, which precluded the need for drilling equipment cleaning during soil sample collection.

During auger drilling, the augers used to drill the boreholes were pre-cleaned by Strata prior to arrival at the Site.

During groundwater sampling activities, the Geotech™ bladder pump used for purging and sampling was cleaned before initial use and between well locations with a solution of Alconox™ detergent and potable water. During groundwater monitoring activities, the oil/water interface probe used to measure water levels and the Horiba U-52 used for groundwater field parameter measurements were cleaned with a solution of Alconox™ detergent and potable water prior to initial use and between well locations.

4.12.3 Field Quality Control Measures

A total of 5 field duplicate soil samples were collected by Pinchin during the Phase Two ESA for analysis of one or more of the COPCs. The frequency of field duplicate soil sample analysis complied with the requirement that one field duplicate soil sample is analyzed for every ten regular soil samples submitted for analysis of the COPCs. The soil sample field duplicate pairings and corresponding analytical schedules are summarized as follows:

- Soil sample “MW19-01 S3” and its corresponding field duplicate “DUP-19-01” were submitted for laboratory analysis of Metals;
- Soil sample “MW19-03 S3” and its corresponding field duplicate “DUP19-03” were submitted for laboratory analysis of BTEX, PHC and PAH;

- Soil sample “MW19-05 S1” and its corresponding field duplicate “DUP19-05” were submitted for laboratory analysis of pH;
- Soil sample “MW19-06 S1” and its corresponding field duplicate “DUP19-06” were submitted for laboratory analysis of Organochlorine Pesticides and PCBs; and
- Soil sample “MW19-07 S1” and its corresponding field duplicate “DUP19-07” were submitted for laboratory analysis of Electrical Conductivity and Sodium Adsorption Ratio.

A total of 2 field duplicate groundwater samples were collected by Pinchin during the Phase Two ESA for analysis of the COPCs. The frequency of field duplicate groundwater sample analysis complied with the requirement that one field duplicate groundwater sample is analyzed for every ten regular groundwater samples submitted for analysis of the COPCs. The groundwater sample field duplicate pairings and corresponding analytical schedules are summarized as follows:

- Groundwater sample “MW19-01” and its corresponding field duplicate “DUP-02” were submitted for laboratory analysis of metal, PCBs, Ammonia and pH;
- Groundwater sample “MW19-02” and its corresponding field duplicate “DUP-19-02 GW” were submitted for laboratory analysis of BTEX, VOCs, PHCs, PAHs, metals and inorganics, PCBs and Organochlorine Pesticides; and
- Groundwater sample “MW19-03” and its corresponding field duplicate “DUP-02” were submitted for laboratory analysis of BTEX, PHC and PAH.

2 laboratory-prepared trip blanks were analyzed for VOC/F1 parameters to comply with the requirement that one trip blank is analyzed for each submission of groundwater samples for VOC/F1 parameter analysis.

The calibrations of the RKI Eagle II™ CGI used for field screening and the Horiba U-52used for water quality parameter measurements were checked by the equipment supplier (Maxim) prior to use in the field by Pinchin.

Maxim completed the calibration checks in accordance with the equipment manufacturers’ specifications and/or Maxim’s SOPs. As described in Section 5.4, calibration checks and recalibration (if required) were completed daily for the RKI Eagle II™ CGI during the drilling program.

4.12.4 QA/QC Sampling Program Deviations

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

5.0 REVIEW AND EVALUATION

5.1 Geology

Based on the stratigraphic information obtained from the soil samples recovered during the drilling activities completed as part of the Phase Two ESA, the grass-covered ground surface at the Phase Two Property is underlain by fill material comprised of a reworked native brown clayey silt, with some sand and organic material and trace weathered rock, and minor debris (brick pieces, etc.) to a maximum depth of approximately 1.52 mbgs. The native soil underlying the surficial soil is generally a grey clayey silt to silt till with weathered rock material at depth, that extended to the bedrock surface ranging from 1.83 to 3.66 mbgs. The underlying weathered shale bedrock extended to the maximum investigation depth of 3.96 mbgs. The water table is located within the till soils, extending into the weathered bedrock unit at a depth of approximately 2.12 to 2.82 mbgs, and this uppermost water bearing unit represents an unconfined aquifer. The unconfined aquifer extends to the maximum investigation depth of 3.96 mbgs.

The following table provides a summary of the primary geologic units observed during borehole drilling at the Phase Two Property:

Geologic Unit	Estimated Thickness (metres)	Top Elevation (mamsl)	Bottom Elevation (mamsl)	Properties
Fill Material	0.0 to 1.52	169.1 to 171.10 (Ground Surface)	167.74 to 170.34	Unsaturated
Unconfined Aquifer – Till and Weathered Bedrock	2.17 to 3.35	167.74 to 170.34	165.14 to 167.04	Saturated below 2.1 to 2.2 mbgs (water table) to maximum depth of investigation (3.96 mbgs) Hydraulic conductivity ranges from approximately 5.5 x 10^{-7} metres/second to 5.0 x 10^{-6} metres/second

Lines of cross-section to aid in visualization of the subsurface conditions are presented in Figure 6A. Cross-sections summarizing the subsurface geological conditions have been provided as Figures 6B and 6C.

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The APECs investigated by the Phase Two ESA related to surface soil impacted with BTEX, PHCs, PAHs, metals and Organochlorinated Pesticides (OCP) parameters. Impacts on groundwater quality, if any, from these contaminants would be expected in the shallow groundwater zone and, as such, the water table groundwater quality (unconfined aquifer) was assessed during the Phase Two ESA.

5.2 Groundwater Elevations and Flow Direction

The wells screens in each monitoring well installed by Pinchin ranged in length from 1.52 m at MW19-02 to 3.05 m ay MW19-01 and MW19-03, and was based on the depth where bedrock was encountered and observations of moisture content in the soils. All monitoring wells were installed at depth intervals intended to investigate groundwater quality in the shallow groundwater zone within the unconfined aquifer. Given that PHCs were a COPC for groundwater at the Phase Two Property, the monitoring wells were installed at the Phase Two Property such that the well screens intersected the suspected water table.

The following summarizes the findings of the groundwater monitoring event completed on April 1 to 2, 2019 and April 18, 2019:

- The depths to groundwater measured within the on-Site monitoring wells on April 1 to 2, 2019 installed within the unconfined aquifer ranged from 2.12 mbgs at monitoring well MW19-04 to 2.82 mbgs at monitoring well MW19-05.
- The calculated groundwater elevations within the groundwater monitoring wells on April 18, 2019 installed within the unconfined aquifer ranged from 2.20 mbgs at monitoring well MW19-02 to 2.80 mbgs at monitoring well MW19-05.
- No NAPL thicknesses were measured with the oil/water interface probe or observed in the dedicated bailers in any of the groundwater monitoring wells.

The surveyed top of well riser pipe elevations were utilized in conjunction with the measured depths to groundwater to calculate the groundwater level elevation data. The measured depths to groundwater and calculated groundwater elevation measurements, and the results of NAPL monitoring for both monitoring events are summarized in Tables 3 and 4, respectively. Groundwater levels measured at MW19-02 on March 28, 2019 are not considered to have stabilized, and do not comprise a groundwater level monitoring event.

The inferred groundwater flow vectors and calculated groundwater elevation contour intervals at the Phase Two Property based on depth to groundwater measurements on April 18, 2019, are shown on Figure 7. The groundwater elevation contours were created using Golden Software Incorporated's 'Surfer' contouring software version 10.7.972 (updated March 5, 2012) by applying a 'triangulation with linear interpolation' gridding method with 0.2 metre contour spacing.

All depth to groundwater measurements in each of the on-Site groundwater monitoring wells were used to calculate the groundwater elevation contours. As shown on Figure 7, the calculated groundwater surface elevation contours indicate that groundwater flow across the Phase Two Property is generally to the southeast in the unconfined aquifer.

The groundwater depth data collected over the course of both monitoring events indicate that the temporal fluctuations in the unconfined water table appear to be minimal over the short time interval between monitoring rounds (16 days). However, there is insufficient information available for Pinchin to assess the potential for seasonal variability in groundwater depths at the Phase Two Property due to the short time interval between monitoring events.

Interaction of the groundwater at the Phase Two Property with buried utilities is possible given that the water table at the Phase Two Property is located at approximate depths of between 2.12 and 2.80 mbgs and the utilities may be located at depths ranging from approximately 2 to 3 mbgs. However, there were no underground utilities on the Site at the time of the Phase Two ESA. In addition, given that no groundwater impacts were identified at the Phase Two Property, preferential migration of contaminants along utilities is not considered to be a concern.

5.3 Groundwater Hydraulic Gradients

5.3.1 Groundwater Horizontal Hydraulic Gradients

The plotted groundwater surface elevation contours (as shown on Figure 7) was utilized to estimate horizontal hydraulic gradient values for the unconfined aquifer at the Phase Two Property. The horizontal hydraulic gradient can be estimated by dividing the difference between two groundwater contour values by the distance between the two plotted groundwater contours. The distance between select groundwater contours can be determined by drawing a straight line which transects each contour in a perpendicular fashion on the plotted groundwater contour figure.

By utilizing groundwater contours which are closely spaced, the estimated maximum horizontal hydraulic gradient for the unconfined aquifer at the Phase Two Property is approximately 0.04.

By utilizing groundwater contours which are more distantly spaced, the estimated minimum horizontal gradient for the unconfined aquifer at the Phase Two Property is approximately 0.02.

By utilizing the two most distant (highest and lowest) groundwater elevation contours plotted at the Phase Two Property, a normalized horizontal hydraulic gradient value for the unconfined aquifer at the Phase Two Property using groundwater surface elevations measured on April 18, 2019, was estimated to be approximately 0.02.

5.3.2 Groundwater Vertical Hydraulic Gradients

Nested monitoring wells were not installed at the Phase Two Property as part of the Phase Two ESA. As such, vertical hydraulic gradients were not determined.

5.4 Fine-Medium Soil Texture

Two soil samples collected from the boreholes advanced at the Phase Two Property were submitted for 75 micron single-sieve grain size analysis. The soil samples selected for analysis were considered to be representative of the stratigraphic units most likely to be impacted based on the stratigraphy observed during borehole drilling. As indicated in Table 1, two soil samples (MW19-01 S1 and BH19-06 S2) that were representative of the clayey silt material present beneath the grass surface at the Site were classified as fine-grained (69.8% and 81.5% fine-grained soil).

Based on these grain size analysis results and the observed stratigraphy at the borehole locations at the Phase Two Property, it is the QP’s opinion that over two-thirds of the overburden at the Phase Two Property is medium and fine-textured as defined by O. Reg. 153/04. Therefore, the soil at the Phase Two Property was interpreted to be medium and fine-textured for the purpose of determining the MECP Site Condition Standards applicable to the Phase Two Property.

5.5 Soil Field Screening

Soil vapour headspace concentrations measured in the soil samples collected as part of this Phase Two ESA are presented in the borehole logs. Soil vapour headspace values measured with the PID in methane elimination mode ranged from 0 ppm by volume (ppm_v) in several of the collected soil samples to a maximum of 50 ppm_v in soil sample MW19-01 S3 collected from borehole MW19-01 at a depth of approximately 1.52 to 2.13 mbgs.

Up to two most apparent “worst case” soil sample, based on vapour concentrations as well as visual and/or olfactory considerations preferred pathway migration, groundwater depths and contaminant characteristics and previous historical PCAs recovered from each borehole was submitted for laboratory analysis of BTEX, PHCs (F1-F4), PAHs, metals and inorganics, PCBs and organochlorinated pesticides.

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5.6 Soil Quality

A total of eight boreholes were advanced at the Phase Two Property at the locations shown on Figure 5 in order to assess for the presence of subsurface impacts resulting from the APECs identified in the Pinchin Phase One ESA. Select soil samples were collected from each of the advanced boreholes and submitted for laboratory analysis of the COPCs. The depth intervals of the soil samples submitted for analysis ranged between 0.00 TO 0.76 mbgs and 2.29 to 3.05 mbgs. The soil sample locations, depths and laboratory analyses are summarized in Table 1 and in the borehole logs.

The soil sample analytical results were compared to the *Table 2 Standards* and the following subsections provide a discussion of the findings.

5.6.1 VOCs

The soil sample analytical results for VOCs, along with the corresponding *Table 2 Standards*, are presented in Table 1. As indicated in Table 1, all reported concentrations of VOCs in the soil samples submitted for analysis were below the *Table 2 Standards*.

5.6.2 PHCs F1-F4

The soil sample analytical results for PHCs F1-F4, along with the corresponding *Table 2 Standards*, are presented in Table 1. As indicated in Table 1, all reported concentrations of PHCs F1- F4 in the soil samples submitted for analysis were below the *Table 2 Standards*.

5.6.3 PAHs

The soil sample analytical results for PAHs, along with the corresponding *Table 2 Standards*, are presented in Table 1. As indicated in Table 1, all reported concentrations of PAHs in the soil samples submitted for analysis were below the *Table 2 Standards*.

5.6.4 Metals and Inorganics

The soil sample analytical results for metals and inorganics parameters, along with the corresponding *Table 2 Standards*, are presented in Table 1. As indicated in Table 1, all reported concentrations of metals and inorganics in the soil samples submitted for analysis were below the *Table 2 Standards*, except for the following:

- The concentration of barium reported for soil sample BH19-07 S1 (410 µg/g vs. the *Table 2 Standard* of 390 µg/g), collected at borehole BH19-07 S1 from a depth of 0.0 to 0.76 mbgs, exceeded the *Table 2 Standards*.

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It is the opinion of the QP that the primary cause of the elevated barium concentration in the soil sample is related to the heterogeneity in the matrix of the soil materials from which the sample was collected. Pinchin notes that the concentration of barium reported for two additional soil samples BH19-07 S1 A (23 µg/g vs. the *Table 2 Standard* of 390 µg/g) and BH19-07 S1 B (20 µg/g vs. the *Table 2 Standard* of 390 µg/g) collected at BH19-07 from a depth of 0.0 to 0.76 mbgs met the *Table 2 Standard*. Further, the average concentration of the three soil samples meets the *Table 2 Standard.* As such, it is the QP's opinion that the elevated barium concentration in the soil sample BH19-07 S1 does not represent an issue of concern and does not relate to the APECs.

5.6.5 *Organochlorinated Pesticides and PCBs*

The soil sample analytical results for Organocholorinated Pesticides and PCBs, along with the corresponding *Table 2 Standards*, are presented in Table 1. As indicated in Table 1, all reported concentrations of Organocholorinated Pesticides and PCBs in the soil samples submitted for analysis were below the *Table 2 Standards*.

5.6.6 *General Comments on Soil Quality*

The soil sample results show no evidence of chemical or biological transformations of chemical parameters in the subsurface.

The soil sample analytical results also show no evidence of NAPLs in the subsurface at the Site. In addition, no evidence of NAPL was observed during borehole drilling.

5.7 Groundwater Quality

Groundwater samples were collected from monitoring wells MW19-01, MW19-02, MW19-03, MW19-04, MW19-05 and submitted for analysis of the COPCs to assess for the presence of subsurface impacts within the APECs identified in the Pinchin Phase One ESA. The locations of the monitoring wells are shown on Figure 5. The groundwater sample collection depths and laboratory analysis are summarized in Table 5. All groundwater samples collected for metals analysis were filtered in the field using dedicated, disposable 0.45 micron in-line filters prior to preservation in accordance with the *Analytical Protocol.*

The groundwater sample analytical results were compared to the *Table 2 Standards* and the following subsections provide a discussion of the findings.

5.7.1 *VOCs*

The groundwater analytical results for VOCs, along with the corresponding *Table 2 Standards*, are presented in Table 5. As indicated in Table 5, all reported concentrations of VOCs in the groundwater samples submitted for analysis were below the *Table 2 Standards.*

5.7.2 PHCs F1-F4

The groundwater analytical results for PHCs F1-F4, along with the corresponding *Table 2 Standards*, are presented in Table 5. As indicated in Table 5, all reported concentrations of PHCs F1-F4 in the groundwater samples submitted for analysis met the *Table 2 Standards.*

5.7.3 PAHs

The groundwater analytical results for PAHs, along with the corresponding *Table 2 Standards*, are presented in Table 5. As indicated in Table 5, all reported concentrations of PAHs in the groundwater samples submitted for analysis met the *Table 2 Standards*.

5.7.4 Metals and Inorganics

The groundwater analytical results for metals and inorganic parameters, along with the corresponding *Table 2 Standards*, are presented in Table 5. As indicated in Table 5, all reported concentrations of metals and inorganics parameters in the groundwater samples submitted for analysis met the *Table 2 Standards*.

5.7.5 Organochlorinated Pesticides and PCBs

The groundwater analytical results for Organochlorinated Pesticides and PCBs, along with the corresponding *Table 2 Standards*, are presented in Table 5. As indicated in Table 5, all reported concentrations of Organochlorinated Pesticides and PCBs parameters in the groundwater samples submitted for analysis met the *Table 2 Standards*.

5.7.6 General Comments on Groundwater Quality

The groundwater sample results show no evidence of chemical or biological transformations of chemical parameters in the subsurface.

The groundwater sample analytical results also show no evidence of NAPLs in the subsurface at the Site.

5.8 Sediment Quality

Sediment sampling was not completed as part of this Phase Two ESA.

5.9 Quality Assurance and Quality Control Results

QA/QC comprises technical activities that are used to measure or assess the effect of errors or variability in sampling and analysis. It may also include specification of acceptance criteria for the data and corrective actions to be taken when they are exceeded. QA/QC also includes checks performed to evaluate laboratory analytical quality, checks designed to assess the combined influence of field sampling and laboratory analysis, and checks to specifically evaluate the potential for cross contamination during sampling and sample handling.

The QA/QC samples collected and submitted for analysis by Pinchin during the Phase Two ESA consisted of the following:

- Field duplicate soil and groundwater samples to assess the suitability of field sampling methods and laboratory performance; and
- Trip blank water samples to assess whether ambient conditions during transport of groundwater sample containers from the analytical laboratory to the Phase Two Property and back to the analytical laboratory may have biased the groundwater sample results with respect to volatile constituents.

In addition to the above, laboratory quality control activities and sample checks employed by Maxxam included:

- Method blanks - where a clean sample is processed simultaneously with and under the same conditions (i.e., using the same reagents and solvents) as the samples being analyzed. These are used to confirm whether the instrument, reagents and solvents used are contaminant free;
- Laboratory duplicates - where two samples obtained from the sample container are analyzed. These are used to evaluate laboratory precision;
- Surrogate spike samples - where a known mass of compound not found in nature (e.g., deuterated compounds such as toluene-d8) but that has similar characteristics to the analyzed compounds is added to a sample at a known concentration. These are used to assess the recovery efficiency;
- Matrix spike samples - where a known mass of target analyte is added to a matrix sample with known concentrations. These are used to evaluate the influence of the matrix on a method’s recovery efficiency; and
- Use of standard or certified reference materials - a reference material where the content or concentration has been established to a very high level of certainty (usually by a national regulatory agency). These are used to assess accuracy.

The results of the field QA/QC samples are discussed in the following subsections.

5.9.1 Soil Duplicate Results

During borehole soil sampling activities, a total of five separate soil duplicate sample pairs were submitted for laboratory analysis. The field duplicate samples were collected by vertically splitting the soil cores into two halves, with one half collected as the regular sample and the other half collected as the field duplicate sample. The sample pairings and corresponding laboratory analyses are as follows:

- Soil sample "MW19-01 S3" and its corresponding field duplicate "DUP-19-01" were submitted for laboratory analysis of Metals;
- Soil sample "MW19-03 S3" and its corresponding field duplicate "DUP19-03" were submitted for laboratory analysis of BTEX, PHC and PAH;
- Soil sample "MW19-05 S1" and its corresponding field duplicate "DUP19-05" were submitted for laboratory analysis of pH;
- Soil sample "MW19-06 S1" and its corresponding field duplicate "DUP19-06" were submitted for laboratory analysis of Organochlorine Pesticides and PCBs; and
- Soil sample "MW19-07 S1" and its corresponding field duplicate "DUP19-07" were submitted for laboratory analysis of Electrical Conductivity and Sodium Adsorption Ratio.

The quality of the analytical results was evaluated by calculating relative percent differences (RPDs) for the parameters analyzed for the original and field duplicate samples. The RPD for each parameter was calculated using the following equation:

$$\text{RPD} = \frac{(\text{Original Concentration} - \text{Duplicate Concentration}) \text{ X } 100}{(\text{Original Concentration} + \text{Duplicate Concentration})/2}$$

An RPD was not calculated unless the parameter concentration in both the original and duplicate sample had detectable concentrations above the corresponding practical quantitation limit for the parameter, which is equal to five times the lowest laboratory reportable detection limit (RDL).

The calculated RPDs for the original and field duplicate soil samples have been compared to performance standards provided in the *Analytical Protocol.* Pinchin notes that although these performance standards only strictly apply to laboratory duplicate samples, they have been considered suitable for comparison to the field duplicate soil sample results as well.

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The calculated RPDs values met the performance standards with the exception of the following:

- The RPD values for soil sample pairing MW19-01 S3/DUP19-01, collected from borehole MW19-01 at a depth of 1.52 – 2.29 mbgs, exceeded the corresponding performance standard of 30% for the analytical results reported for arsenic (RPD of 58%) and the performance standard of 30% for the analytical results reported for copper.

The primary cause of the elevated RPD values and discrepancies observed in the analytical results for soil sample pairings MW19-01 S3/DUP19-01 is inferred to be heterogeneity in the matrix of the soil material from which the samples were collected. As such, the observed variance in RPDs for this sample pairing is not expected to reflect deficiencies in sampling or analytical methods. Furthermore, the parameter concentrations in the soil sample pairing is below the corresponding *Table 2 Standards* so the apparent lack of precision is not considered a concern. Based on Pinchin's review of the calculated RPD values for the remainder of the collected soil duplicate sample pairings, the level of observed variance in the reported analytical results is considered acceptable for the purpose of meeting the data quality objectives of this Phase Two ESA.

5.9.2 Groundwater Sample Duplicate Results

During groundwater sampling activities, a total of 3 separate groundwater duplicate sample pairs were submitted for laboratory analysis. The sample pairings and corresponding laboratory analyses are as follows:

- Groundwater sample "MW19-01" and its corresponding field duplicate "DUP-02" were submitted for laboratory analysis of metal, PCBs, Ammonia and pH;
- Groundwater sample "MW19-02" and its corresponding field duplicate "DUP-19-02 GW" were submitted for laboratory analysis of BTEX, VOCs, PHCs, PAHs, metals and inorganics, PCBs and Organochlorine Pesticides; and
- Groundwater sample "MW19-03" and its corresponding field duplicate "DUP-02" were submitted for laboratory analysis of BTEX, PHC and PAH.

The calculated RPDs for the original and field duplicate groundwater samples have been compared to performance standards provided in the *Analytical Protocol.* Pinchin notes that although these performance standards only strictly apply to laboratory duplicate samples, they have been considered suitable for comparison to the field duplicate groundwater sample results as well.

Each of the calculated RPDs met the corresponding performance standard.

5.9.3 Groundwater Trip Blank Results

Trip blank samples, consisting of VOC-free water contained within a set of BTEX/F1 sample vials, were prepared by Maxxam and accompanied the BTEX/F1 groundwater sample containers during transportation to the Phase Two Property and were stored in the coolers with the BTEX/F1 groundwater samples in the field and during transportation back to Maxxam. One trip blank sample was submitted to Maxxam for chemical analysis of BTEX during the groundwater sampling activities completed as part of this Phase Two ESA.

5.9.4 Deviations from Analytical Protocol

There were no deviations from the holding times, preservation methods, storage requirements and container types specified in the *Analytical Protocol* during the completion of the Phase Two ESA, with the following exception:

- Soil sample BH19-07 S1 A and BH19-07 S1 B were collected on March 27, 2019 from borehole BH19-07 at a depth of 0.0 to 2.5 mbgs and submitted to Maxxam on April 16, 2019 for barium. The purpose of the metals analysis was to confirm the barium concentration in that depth interval at this borehole location. The sample was stored in a plastic Ziplock bag in a cooler on ice. Although this sample was not handled in accordance with the *Analytical Protoco*l, the reported barium results are considered generally accurate based on the physical/chemical properties of this analyte (i.e., non-volatile properties).

5.9.5 Laboratory Certificates of Analysis

Pinchin has reviewed the laboratory Certificates of Analysis provided by Maxxam for the samples submitted during the Phase Two ESA and confirms the following:

- All laboratory Certificates of Analysis contain a complete record of the sample submission and analysis and meet the requirements of Section 47(3) of O. Reg. 153/04;
- A laboratory Certificate of Analysis has been received for each sample submitted for analysis during the Phase Two ESA;
- All laboratory Certificates of Analysis have been included in full in Appendix H; and
- All of the analytical data reported in the Certificates of Analysis have been summarized, in full, in Tables 1 and 5.

5.9.6 Laboratory Comments Regarding Sample Analysis

Maxxam routinely conducts internal QA/QC analyses in order to satisfy regulatory QA/QC requirements. The results of the Maxxam QA/QC analyses for the submitted soil samples are summarized in the laboratory Certificates of Analyses provided in Appendix H. Also included in Appendix H are all correspondences between the laboratory and staff at Pinchin.

The following summarizes comments noted by Maxxam on the laboratory Certificates of Analysis for the submitted soil samples:

- Laboratory Certificate B980920 - The RDLs for Organochlorinated Pesticides in some soil samples were adjusted due to the fact that some samples required dilution due to matrix interferences. Given that the concentrations of Organochlorinated Pesticides in the soil sample were below the RDLs and that the RDLs were below the corresponding *Table 2 Standards*, the adjusted RDLs have no impact on the conclusion that the Organochlorinated Pesticides are below the corresponding *Table 2 Standards*; and
- Laboratory Certificate B980920 - BTEX and F1 Analysis: samples were extracted on “2019-04-05”. Pinchin notes that the amount of time elapsed between the sampling date (March 27, 2019) and extraction date (April 5, 2019) does not exceed the preserved holding time of 14 days. This does not have impact on the conclusion that the BTEX and F1 parameters are below the corresponding *Table 2 Standards*.

The following summarizes comments noted by Maxxam on the laboratory Certificates of Analysis for the submitted groundwater samples:

- Laboratory Certificate B986440 - Maxxam indicated that containers submitted for groundwater sample MW19-04 and its duplicate sample DUP-02 for analysis of metals and inorganics, organochlorinated pesticides and PCBs contained visible to trace sediment that was included in the laboratory extraction. Based on Pinchin’s field observations, the volume of sediment in the submitted groundwater sample containers was a trace to minor amount. Some of these parameters have a tendency to sorb to soil particles. As such, the reported concentrations of metals and inorganics, organochlorinated pesticides and PCBs in the submitted groundwater samples may be positively biased. However, Pinchin notes that all reported concentrations of metals and inorganics, organochlorinated pesticides and PCBs for the submitted groundwater samples were below the corresponding *Table 2 Standards*. As such, the presence of sediment does not alter the conclusion that the concentrations of metals and inorganics, organochlorinated pesticides and PCBs in the submitted groundwater samples are below the *Table 2 Standards*.

The results of the QA/QC analyses were reviewed by the project staff at Maxxam and observed to be within the laboratory's internal requirements. Pinchin has also reviewed the laboratory Certificates of Analysis and has confirmed that the results of the analyses are acceptable for the purpose of meeting the data quality objectives of this Phase Two ESA.

The following general comments apply to the laboratory Certificates of Analysis received from Maxxam as part of this Phase Two ESA:

- The temperatures of the submitted soil and groundwater samples upon receipt met the sample preservation requirements of the *Analytical Protocol* of 5 ± 3ºC (i.e., between 2 and 8ºC); and
- The custody seal was present and intact on all submissions.

5.9.7 QA/QC Sample Summary

The overall evaluation of the QA/QC sample results indicates no issues with respect to field collection methods and laboratory performance, and no apparent bias due to ambient conditions at the Phase Two Property and during transportation of the sample containers/samples to and from the analytical laboratory.

As such, it is the QP's opinion that the soil and groundwater analytical data obtained during the Phase Two ESA are representative of actual Site conditions and are appropriate for meeting the objective of assessing whether the soil and groundwater at the Phase Two Property meets the applicable MECP Site Condition Standards.

5.10 Phase Two Conceptual Site Model

The Phase Two Property is comprised of a vacant plot of land located approximately 375 metres (m) northeast of the intersection of Hurontario Street and Eglinton Avenue East. The Phase Two Property is located on the north side of Eglinton Avenue East and is bound by Forum Drive on the north boundary of the Property and residential land uses on the east and west property boundaries. A key map showing the Phase Two Property location is provided as Figure 1.

A Phase One CSM was created during the Pinchin Phase One ESA in order to provide a detailed visualization of the APECs which could occur on, in, under, or affecting the Phase Two Property. The Phase One CSM is summarized in Figures 1 through 4, which illustrate the following features within the Phase One Study Area, where present:

- Existing buildings and structures;
- Water bodies located in whole or in part within the Phase One Study Area;
- Areas of natural significance located in whole or in part within the Phase One Study Area;
- Drinking water wells located at the Phase One Property;
- Land use of adjacent properties;
- Roads within the Phase One Study Area;
- PCAs within the Phase One Study Area, including the locations of tanks; and
- APECs at the Phase One Property.

The following subsections expand on the Phase One CSM with the information collected during the completion of the Phase Two ESA.

5.10.1 Potentially Contaminating Activities

The Phase One ESA identified a total of 12 PCAs within the Phase One Study Area that could potentially affect the environmental condition of the subsurface media on, in or under the Phase Two Property. Four of the 12 these PCAs were located on the Phase Two Property. As noted in the Phase One ESA, 8 of the PCAs located outside of the Phase Two Property were not considered to result in APECs at the Phase Two Property. The PCAs and their corresponding APECs at the Phase Two Property are summarized in the following table:

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 (Groundwater, Soil and/or Sediment)
APEC #1 (Historical heating oil AST associated with the historical farm house formerly utilized	West exterior wall of the historical farm house that was converted to a car parking garage located	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater

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 (Groundwater, Soil and/or Sediment)
as a car parking garage)	at the southeast end of the Phase One Property.				
APEC #2 (Unknown heating source for the historical farm house)	In the vicinity of the historical farm house located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #3 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil
APEC #4 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 22 – Fertilizer Manufacturing, Processing and Bulk Storage	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil and Groundwater

Figure 4 shows the locations of the on-Site PCAs/APECs.

5.10.2 Areas of Potential Environmental Concern

The Phase Two ESA included an assessment of soil and groundwater quality within each of the APECs. A summary of the findings for each of the APECs is provided below.

APEC #1

A former AST of unknown capacity was historically associated with the heating infrastructure for the farm house that was historically located on the Phase Two Property. The AST was located along the west exterior wall of the farm house, which was converted to a parking garage, located at the southeast end of the Phase Two Property. APEC #1 was assessed for soil and groundwater impacts at borehole and monitoring well locations adjacent to and downgradient of the former farmhouse location.

APEC #2

The historical farm house also housed an unknown heating source. The location of this unknown source was within the vicinity of the historical farm house located at the southeast end of the Phase Two Property. APEC #2 was assessed for soil and groundwater impacts at borehole and monitoring well locations adjacent to and downgradient of the former farmhouse location.

APEC #3

Historical operations on the Phase Two Property, aside from the farmhouse, included a garden centre, which was located in the central and southeast portions of the Property. The media in question was soil and boreholes were advanced to assess the presence of Metals, Inorganic parameters and Pesticides, related to the bulk storage and sale of pesticides, as well as the use of pesticides during the agricultural land use of the property.

APEC #4

Similar to APEC#3, historical operation of the garden centre and precious agricultural activities also made use of fertilizers. Soil and groundwater was assessed throughout the Phase Two Property in order to assess the soil the presence of Metals and Inorganics and Pesticides.

The following table summarizes the boreholes and monitoring wells completed to investigate each of the APECs:

APEC	Investigation Location
APEC #1	MW19-02, MW19-03, BH19-07*
APEC #2	MW19-03, MW19-04, BH19-06* and BH19-07*
APEC #3	MW19-01, MW19-03, MW19-04, MW19-05, BH19-06* and BH19-08*
APEC #4	MW19-01, MW19-03, MW19-04, MW19-05, BH19-06* and BH19-08*

* Soil sampling only

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5.10.3 Subsurface Utilities

No underground utilities are known to be present at the Phase Two Property. Therefore, preferential migration of contaminants along utilities is not considered to be a concern.

5.10.4 Physical Setting

Based on the work completed as part of this Phase Two ESA, the following subsections provide a summary of the physical setting of the Phase Two Property.

Stratigraphy

The observed stratigraphy at the borehole locations completed for the Phase Two ESA generally consisted of grass-covered ground surface underlain by fill material comprised of a reworked native brown clayey silt, with some sand and organic material and trace weathered rock, and minor debris (brick pieces, etc.) to a maximum depth of approximately 1.52 mbgs. The native soil underlying the surficial soil is generally a grey clayey silt to silt till with weathered rock material at depth, that extended to the bedrock surface ranging from 1.83 to 3.66 mbgs. The underlying weathered shale bedrock extended to the maximum investigation depth of 3.96 mbgs. The water table is located within the till soils, extending into the weathered bedrock unit at a depth of approximately 2.12 to 2.82 mbgs, and this uppermost water bearing unit represents an unconfined aquifer. The unconfined aquifer extends to the maximum investigation depth of 3.96 mbgs.

The borehole locations are shown on Figure 5. A figure showing the lines of cross-section is provided as Figure 6A. Cross-sections summarizing the subsurface geological conditions at the time of the Phase Two ESA have been provided as Figures 6B and 6C.

Hydrogeological Characteristics

The groundwater flow direction in the unconfined aquifer at the Phase Two Property is inferred to be towards the southeast (see Figure 7).

The horizontal hydraulic gradient within the unconfined aquifer at the Phase Two Property was estimated to be 0.02 across the Site, with a steeper horizontal hydraulic gradient of 0.04 at the southeastern end of the property, near the Eglinton Avenue road allowance. As nested wells were not installed on the Site, vertical hydraulic gradients were not calculated.

Depth to Bedrock and Shallow Soil Property Assessment

Bedrock was encountered at each of the borehole locations at depths ranging from 1.83 mbgs at borehole MW19-04 to 3.66 mbgs at borehole MW19-02 (i.e., greater than 2.0 mbgs at all borehole locations). As such, the Phase Two Property is not a shallow soil property as defined by Section 43.1 of O. Reg. 153/04.

Depth to Water Table

The water table at the Phase Two Property is located within the shallow clayey silt to silt unit, located above the weathered shale bedrock that has been interpreted to be an unconfined aquifer. The depth to the water table across the Phase Two Property ranges from approximately 2.12 to 2.80 mbgs.

Site Sensitivity

The pH values measured in the submitted soil samples were within the limits for non-sensitive sites. The Phase Two Property is also not an area of natural significance and it is not adjacent to, nor does it contain land within 30 metres of, an area of natural significance. As such, the Phase Two Property is not an environmentally sensitive area as defined by Section 41 of O. Reg. 153/04.

Soil Imported to Phase Two Property

No soil was imported to the Phase Two Property during completion of the Phase Two ESA.

Proposed Buildings and Other Structures

Pinchin understands that the redevelopment of the Phase Two Property will include the construction of 3-storey town homes and part of a residential tower with one level of underground parking. The remainder of the tower extends to the property to the west (91 Eglinton Avenue West).

5.10.5 Applicable Site Condition Standards

Based on the grain size analysis of representative soil samples collected during the Phase Two ESA and the observed stratigraphy at the borehole locations, Pinchin concluded that over two-thirds of the overburden at the Phase Two Property is medium and fine-textured as defined by O. Reg. 153/04 and Site Condition Standards for coarse-textured soil were not applied.

Based on the information obtained from the Phase One and Two ESAs, the appropriate Site Condition Standards for the Phase Two Property are:

- *"Table 2: Full Depth Generic Site Condition Standards for Use in a Potable Ground Water Condition"*, provided in the Ontario Ministry of the Environment, Conservation and Parks (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:
    - Medium to fine-textured soils; and
    - Residential/parkland/institutional property use.

5.10.6 Contaminants Exceeding Applicable Site Condition Standards in Soil

All soil samples collected during the Phase Two ESA met the applicable *Table 2 Standards* for the parameters analyzed.

5.10.7 Contaminants Exceeding Applicable Site Condition Standards in Groundwater

All groundwater samples collected during the Phase Two ESA met the applicable *Table 2 Standards* for the parameters analyzed.

5.10.8 Meteorological and Climatic Conditions

The groundwater depth data collected over the course of both monitoring events indicate that the temporal fluctuations in the unconfined water table appear to be minimal over the short time interval between monitoring rounds (16 days). However, there is insufficient information available for Pinchin to assess the potential for seasonal variability in groundwater depths at the Phase Two Property, due to the short time interval between monitoring events.

Interaction of the groundwater at the Phase Two Property with buried utilities is possible given that the water table at the Phase Two Property is located at approximate depths of between 2.12 and 2.80 mbgs and the utilities may be located at depths ranging from approximately 2 to 3 mbgs. However, there were no underground utilities on the Site at the time of the Phase Two ESA. In addition, given that no groundwater impacts were identified at the Phase Two Property, preferential migration of contaminants along utilities is not considered to be a concern. As such, it is the QP's opinion that meteorological or climatic conditions have not influenced the distribution or migration of the contaminants at the Phase Two Property.

5.10.9 Soil Vapour Intrusion

No volatile parameters were identified at concentrations exceeding the *Table 2 Standards*. As such, soil vapour intrusion into buildings at the Phase Two Property is not considered a concern.

5.10.10 Contaminant Exposure Assessment

Given that all soil and groundwater samples collected during the Phase Two ESA met the applicable *Table 2 Standards*, Pinchin considered that an evaluation of potential exposure pathways and receptors was unnecessary.

6.0 CONCLUSIONS

Pinchin completed a Phase Two ESA at the Phase Two Property at the request of the Client, in accordance with the requirements stipulated in O. Reg. 153/04, in order to support the acquisition of the Site, financing and in support of the Client's application for zoning and other approvals being requested from the City of Mississauga.

The Phase Two ESA completed by Pinchin included the advancement of 8 boreholes at the Phase Two Property, 5 of which were completed as groundwater monitoring wells to facilitate the sampling of groundwater.

Based on Site-specific information, the applicable regulatory standards for the Phase Two Property were determined to be the *Table 2 Standards* for residential land use and medium and fine-textured soils. Soil samples were collected from each of the borehole locations and submitted for laboratory analysis of PHCs, PAHs, PCBs, metals and/or inorganic parameters, sodium. and OC pesticides. In addition, groundwater samples were collected from the 5 newly-installed monitoring wells and submitted for laboratory analysis of PHCs, PAHs, PCBs, metals and/or inorganic parameters, OC pesticides, sodium, chloride, and ammonia.

The laboratory results for the submitted soil and groundwater samples indicated that all reported concentrations for the parameters analyzed met the corresponding *Table 2 Standards*. The maximum reported soil and groundwater concentrations for the parameters analyzed are summarized in Tables 6 and 7, respectively.

It is the opinion of the QP who supervised the Phase Two ESA that the applicable *Table 2 Standards* for soil and groundwater at the Phase Two Property have been met as of the Certification Date of April 5th, 2019 and that no further subsurface investigation is required in relation to assessing the environmental quality of soil and groundwater at the Phase Two Property.

6.1 Signatures

This Phase Two ESA was undertaken under the supervision of Craig Kelly, B.Sc., P.Geo., QP$_{ESA}$ in accordance with the requirements of O. Reg. 153/04, as per the requirements of the City of Mississauga.

6.2 Terms and Limitations

This Phase Two ESA was performed for 91 Eglinton limited Partnership (Client) in order to investigate potential environmental impacts at 131 Eglinton Avenue East in Mississauga, Ontario (Site). The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property. This Phase Two ESA does not quantify the extent of the current and/or recognized environmental condition or the cost of any remediation.

Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples have been analyzed for a limited number of contaminants that are expected to be present at the Site, and the absence of information relating to a specific contaminant does not indicate that it is not present.

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions on a property. Performance of this Phase Two ESA to the standards established by Pinchin is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions on the Site, and recognizes reasonable limits on time and cost.

This Phase Two ESA was performed in general compliance with currently acceptable practices for environmental site investigations, and specific Client requests, as applicable to this Site.

This report was prepared for the exclusive use of the Client, subject to the terms, conditions and limitations contained within the duly authorized proposal for this project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

If additional parties require reliance on this report, written authorization from Pinchin will be required. Pinchin disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this report should not be construed as legal advice. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law.

Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

7.0 REFERENCES

The following documents provided information used in this report:

- Association of Professional Geoscientists of Ontario. Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended). April 2011.
- 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. Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. March 9, 2004 amended July 1, 2011.
- Ontario Ministry of the Environment. Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15, 2011.
- Pinchin Ltd. Phase One Environmental Site Assessment, 131 Eglinton Avenue East, Mississauga, Ontario. Prepared for 91 Eglinton Limited Partnership, April 18, 2019.
- Province of Ontario. Environmental Protection Act, R.S.O 1990, Chapter E.19.
- Province of Ontario. R.R.O. 1990, Regulation 347, General – Waste Management, as amended by Ontario Regulation 234/11.
- Province of Ontario. Ontario Regulation 153/04: Records of Site Condition – Part XV.1 of the Act. Last amended by Ontario Regulation 312/17 on July 28, 2017.
- U.S. Environmental Protection Agency - Region 1. Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. Revised January 19, 2010.
- U.S. Environmental Protection Agency - Region 1. Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. Revised January 19, 2010.

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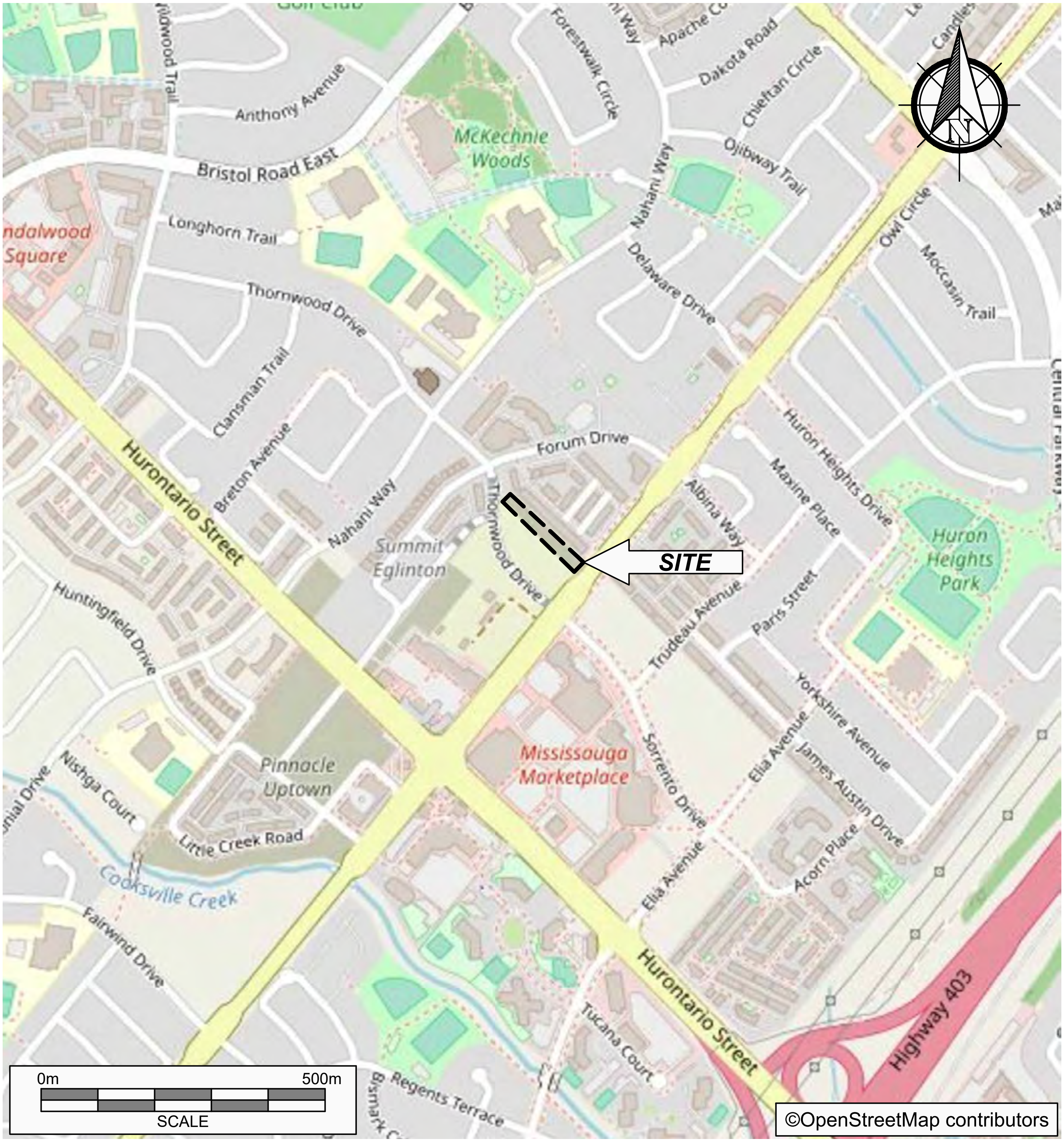
Template: Master Report for RSC Phase Two ESA Report – Unimpacted Site, EDR, September 25, 2018

8.0 FIGURES AND TABLES



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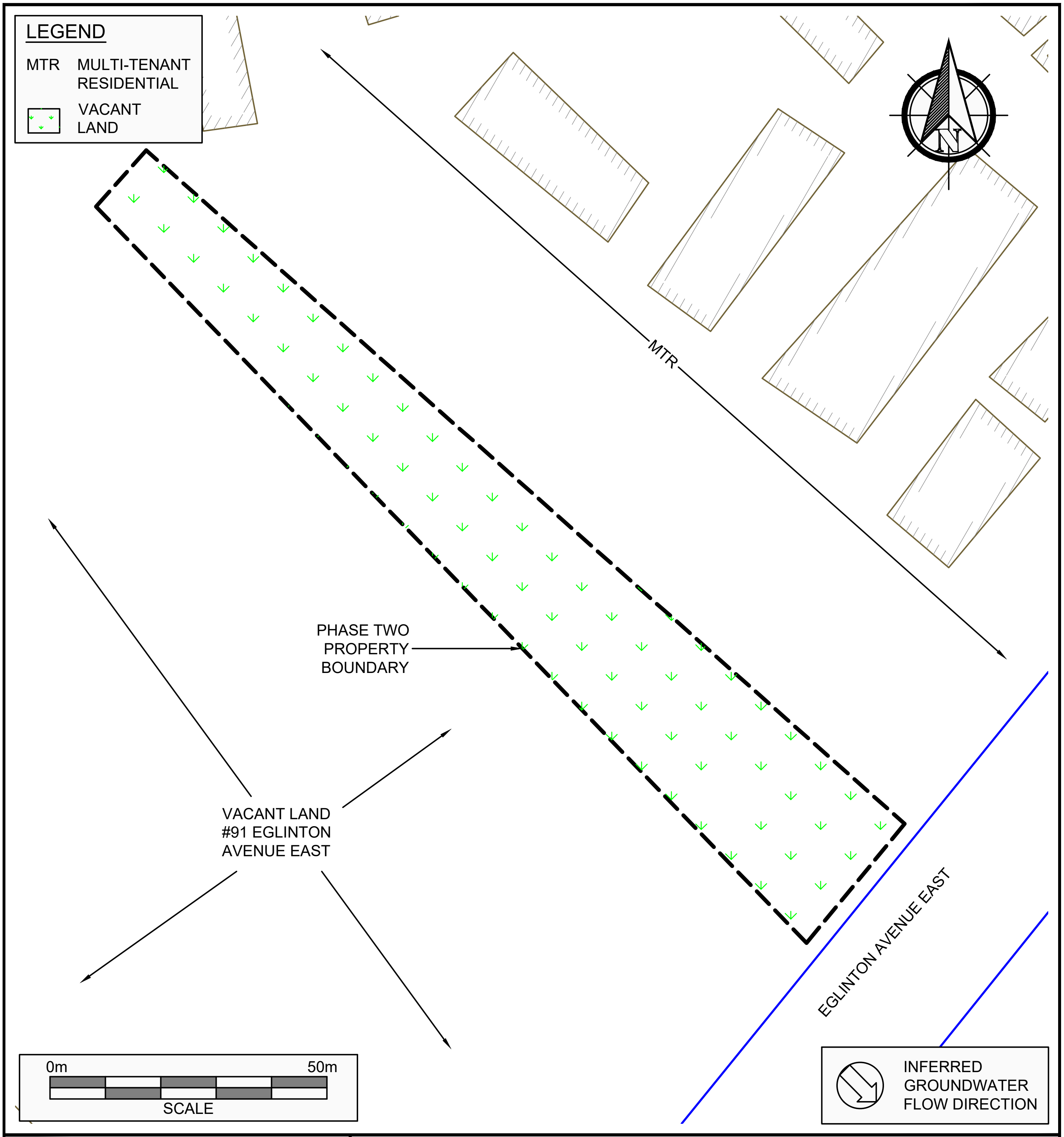
PINCHIN

PROJECT NAME	PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
CLIENT NAME	91 EGLINTON LIMITED PARTNERSHIP
PROJECT LOCATION	131 EGLINTON AVENUE EAST, MISSISSAUGA, ONTARIO
FIGURE NAME	KEY MAP
FIGURE NO.	1
SCALE	AS SHOWN
PROJECT NO.	230989.001
DATE	JULY 2019



PROJECT NAME
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

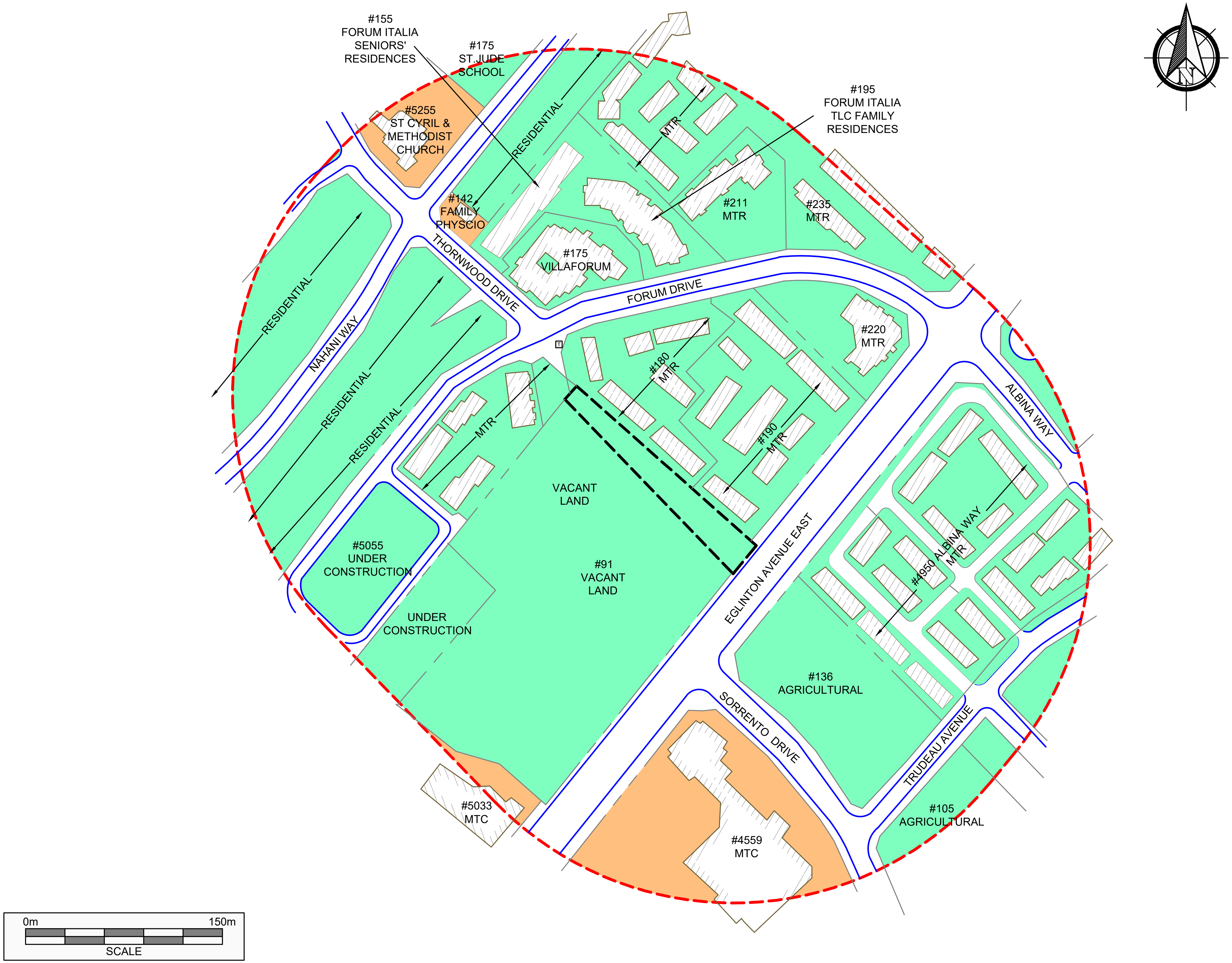
CLIENT NAME
91 EGLINTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST, MISSISSAUGA, ONTARIO

FIGURE NAME
PHASE TWO PROPERTY

FIGURE NO.
2

SCALE	PROJECT NO.	DATE
AS SHOWN	230989.001	JULY 2019



LEGEND

🟧	COMMUNITY/COMMERCIAL/ INDUSTRIAL LAND USE
🟩	INSTITUTIONAL/PARK/ RESIDENTIAL LAND USE
- - -	PHASE TWO PROPERTY BOUNDARY
- - -	PHASE ONE STUDY AREA BOUNDARY
MTC	MULTI-TENANT COMMERCIAL
MTR	MULTI-TENANT RESIDENTIAL
T	TRANSFORMER

PINCHIN

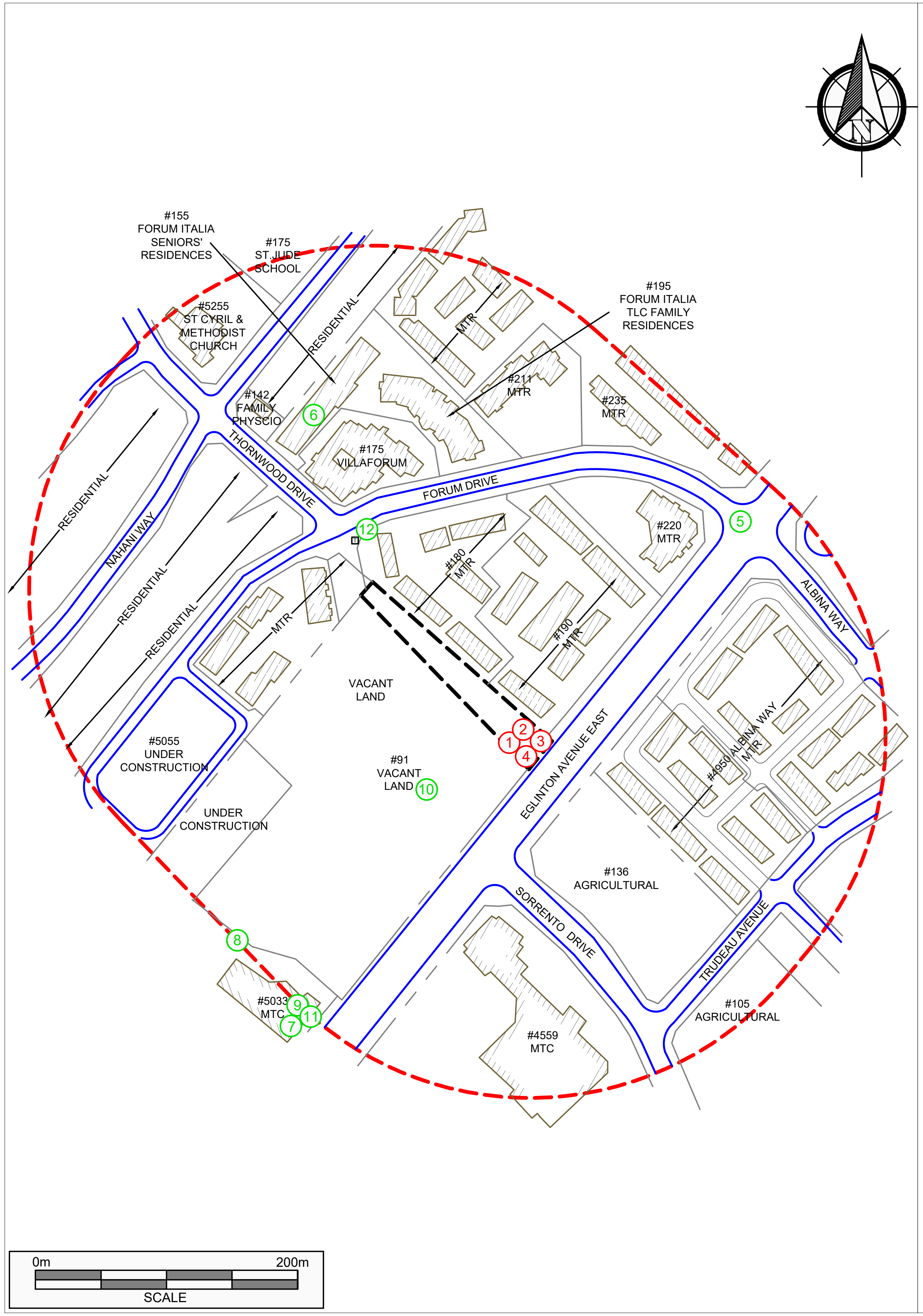
PROJECT NAME
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME
91 EGLINTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST,
MISSISSAUGA, ONTARIO

FIGURE NAME
PHASE ONE STUDY AREA

SCALE	PROJECT NO.
AS SHOWN	230989.001
DATE	FIGURE NO.
JULY 2019	3



PCA Designation	Location of Potential Environmental Concerns (PCAs) within the Phase One Study Area	Potentially Contaminating Activity	Location of PCA (On-Site or Off-Site)
1	Heating for the former parking garage located at the southeast end of the Phase One Property was provided by a fuel oil-fired furnace since 2002. Furnace oil was supplied from a 227-litre (50-gallon) capacity AST located at the west exterior wall prior to its removal in 2006.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site
2	Historical heating source for the former farm house located at the southeast end of the Phase One Property could not be determined. The former farm house was constructed prior to 1954 and demolished in 2015/2016.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site
3	Frank's Garden Centre, located at the Phase One Property, was listed in the Pesticide Register database as a limited vendor of pesticides (year unknown).	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site
4	Frank's Garden Supply was listed in the city directories at the Phase One Property in 1991. Pinchin infers that the historical operations conducted by the garden supply center could involve bulk storage of fertilizers.	Item 22 – Fertilizer Manufacturing, Processing and Bulk Storage	On-Site
5	On September 21, 1996, an undisclosed quantity of diesel fuel was released from a cargo truck at the intersection of Forum Drive and Eglinton Avenue, located approximately 200 metres (m) northeast and inferred to be hydraulically transgradient of the Phase One Property.	Other – Spills	Off-Site
6	Hazardous waste generation at 155 Forum Drive. This property is located approximately 100 m north, and is inferred to be hydraulically upgradient of the Phase One Property.	Other - Hazardous Waste Generation	Off-Site
7	Hazardous waste generation at 5033 Hurontario Street. This property is located approximately 230 m southwest, and is inferred to be hydraulically transgradient of the Phase One Property.	Other - Hazardous Waste Generation	Off-Site
8	Hazardous waste generation at 5035 Hurontario Street. This property is located approximately 250 m southwest, and is inferred to be hydraulically transgradient of the Phase One Property.	Other - Hazardous Waste Generation	Off-Site
9	The property located at 5033 Hurontario Street was listed in the Pesticide Register database as a vendor. This property is located approximately 230 m southwest, and is inferred to be hydraulically transgradient of the Phase One Property.	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	Off-Site
10	An inferred apple orchard was located at 91 Eglinton Avenue East, as indicated on the 1954 through 1985 aerial photographs. Pinchin notes that the application of pesticides and herbicides was a generally acceptable practice. The apple orchard was located approximately 60 m southwest and inferred to be hydraulically transgradient relative to the Phase One Property.	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	Off-Site
11	Speedy Auto Service and Speedy Muffler King were listed in the city directories at 5033 Hurontario Street from 1997 to 2001. This property is located approximately 230 m southwest of the Phase One Property, and is inferred to be hydraulically transgradient relative to the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	Off-Site
12	A pad-mounted oil-cooled transformer was observed to the northwest of the Phase One Property during the Site reconnaissance. The transformer is located approximately 15 m northwest of the Phase One Property, and is inferred to be hydraulically upgradient relative to the Phase One Property.	Item 55 – Transformer Manufacturing, Processing and Use	Off-Site

LEGEND

▬ ▬ ▬	PHASE TWO PROPERTY BOUNDARY
▬ ▬ ▬	PHASE ONE STUDY AREA BOUNDARY
MTC	MULTI-TENANT COMMERCIAL
MTR	MULTI-TENANT RESIDENTIAL
T	TRANSFORMER
(#)	PCA NUMBER CONTRIBUTES TO AN APEC
(#)	PCA NUMBER DOES NOT CONTRIBUTE TO AN APEC
APEC	AREA OF ENVIRONMENTAL CONCERN
PCA	POTENTIALLY CONTAMINATING ACTIVITY

PINCHIN

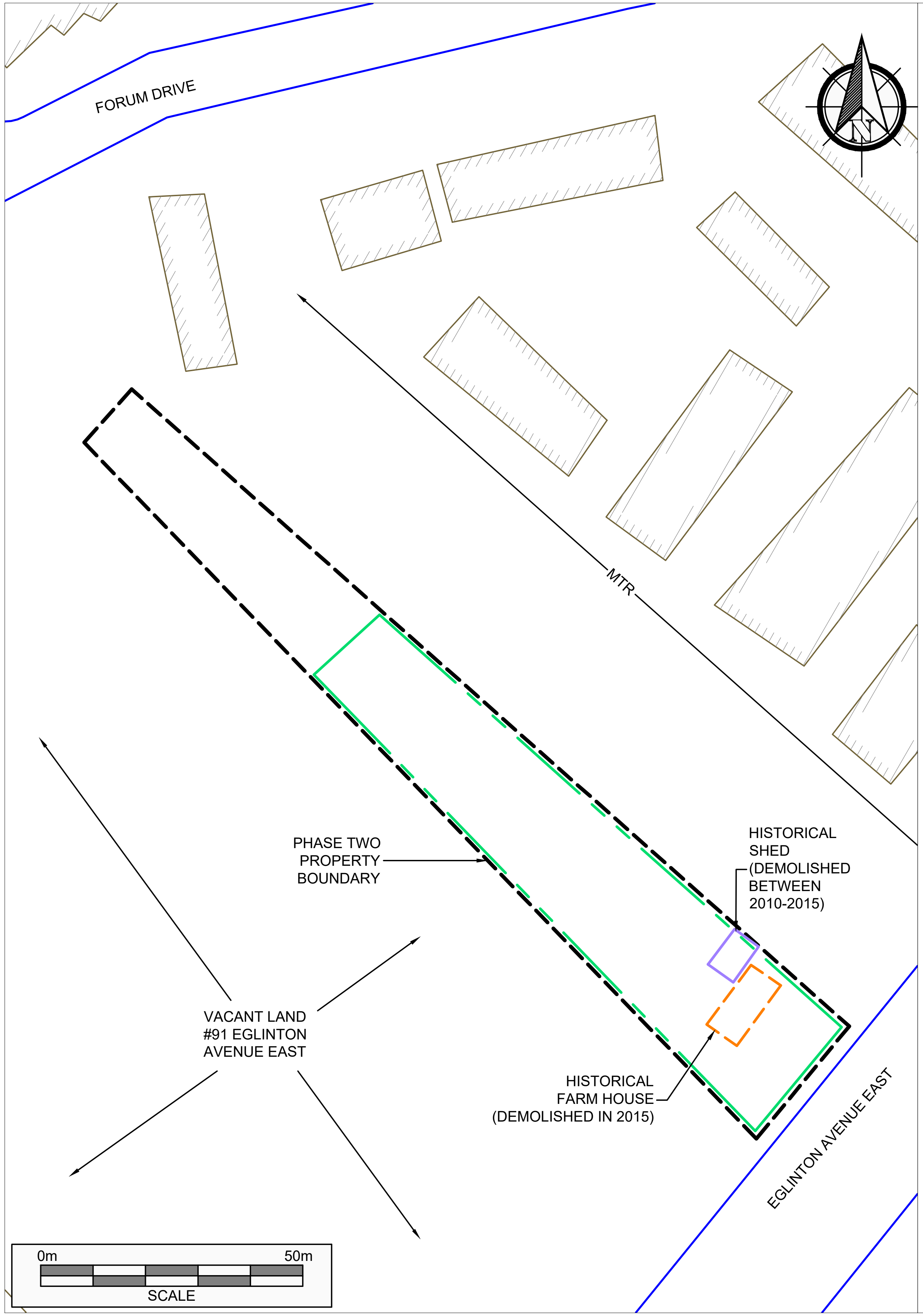
PROJECT NAME
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME
91 EGLINTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST,
MISSISSAUGA, ONTARIO

FIGURE NAME
POTENTIALLY CONTAMINATING ACTIVITIES

SCALE	PROJECT NO.
AS SHOWN	230989.001
DATE	FIGURE NO.
JULY 2019	4A



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 (Groundwater, Soil and/or Sediment)
APEC #1 (Historical heating oil AST associated with the historical farm house formerly utilized as a car parking garage)	West exterior wall of the historical farm house that was converted to a car parking garage located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #2 (Unknown heating source for the historical farm house)	In the vicinity of the historical farm house located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #3 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil
APEC #4 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 22 – Fertilizer Manufacturing, Processing and Bulk Storage	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil

LEGEND

MTR MULTI-TENANT RESIDENTIAL
APEC AREA OF ENVIRONMENTAL CONCERN
BTEX BENZENE, TOLUENE, ETHYLBENZENE AND TOTAL XYLENES
PHCs PETROLEUM HYDROCARBON FRACTIONS F1-F4
PAHs POLYCYCLIC AROMATIC HYDROCARBONS
NA NOT APPLICABLE

☐ APEC1
☐ APEC2
☐ APEC3&4

PINCHIN

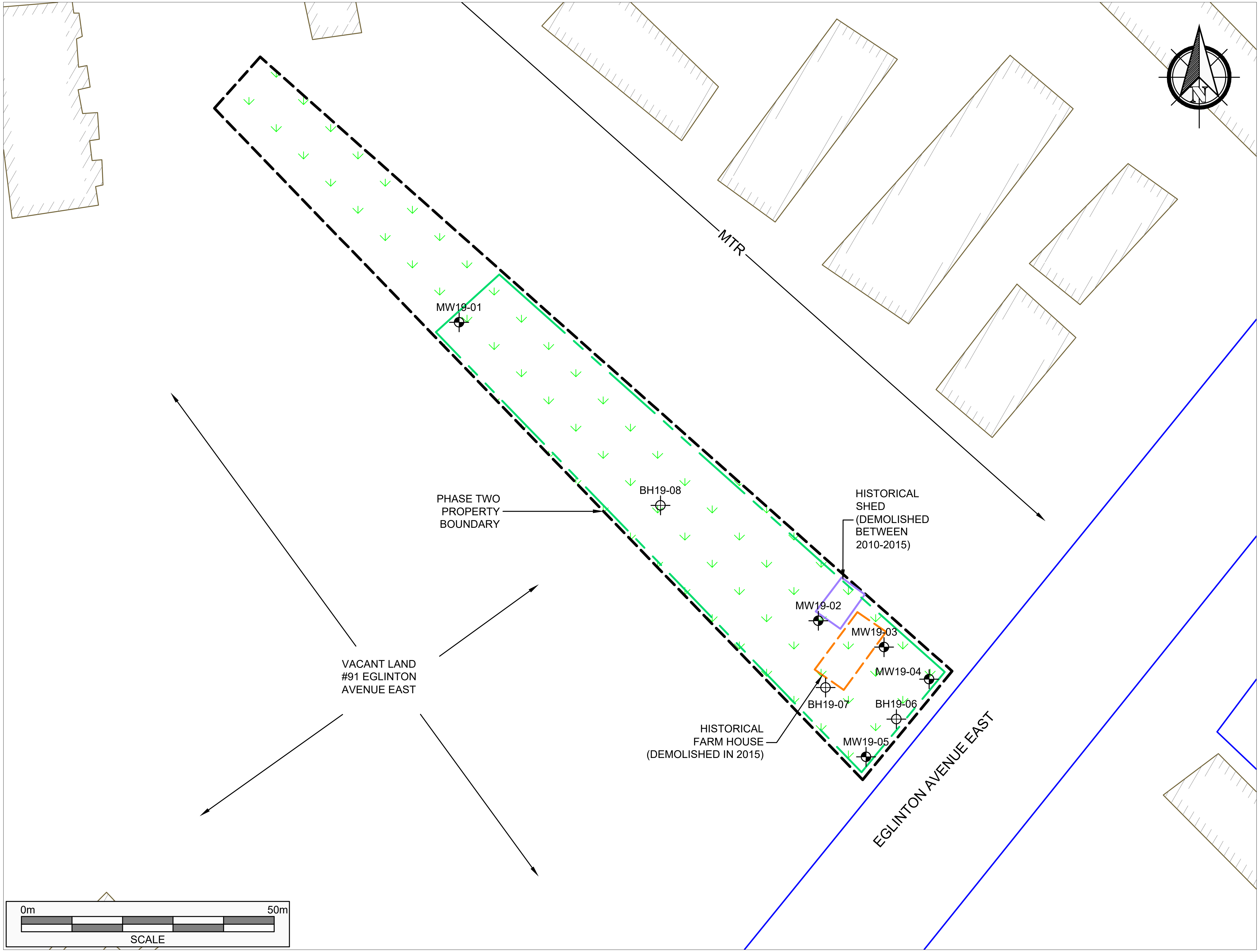
PROJECT NAME
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME
91 EGLINTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST,
MISSISSAUGA, ONTARIO

FIGURE NAME
AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

SCALE AS SHOWN	PROJECT NO. 230989.001
DATE JULY 2019	FIGURE NO. 4B



LEGEND

MTR MULTI-TENANT RESIDENTIAL
APEC AREA OF ENVIRONMENTAL CONCERN
▭ APEC1
▭ APEC2
▭ APEC3&4
⌖ BOREHOLE (PINCHIN, 2019)
⌖ MONITORING WELL (PINCHIN, 2019)

PINCHIN

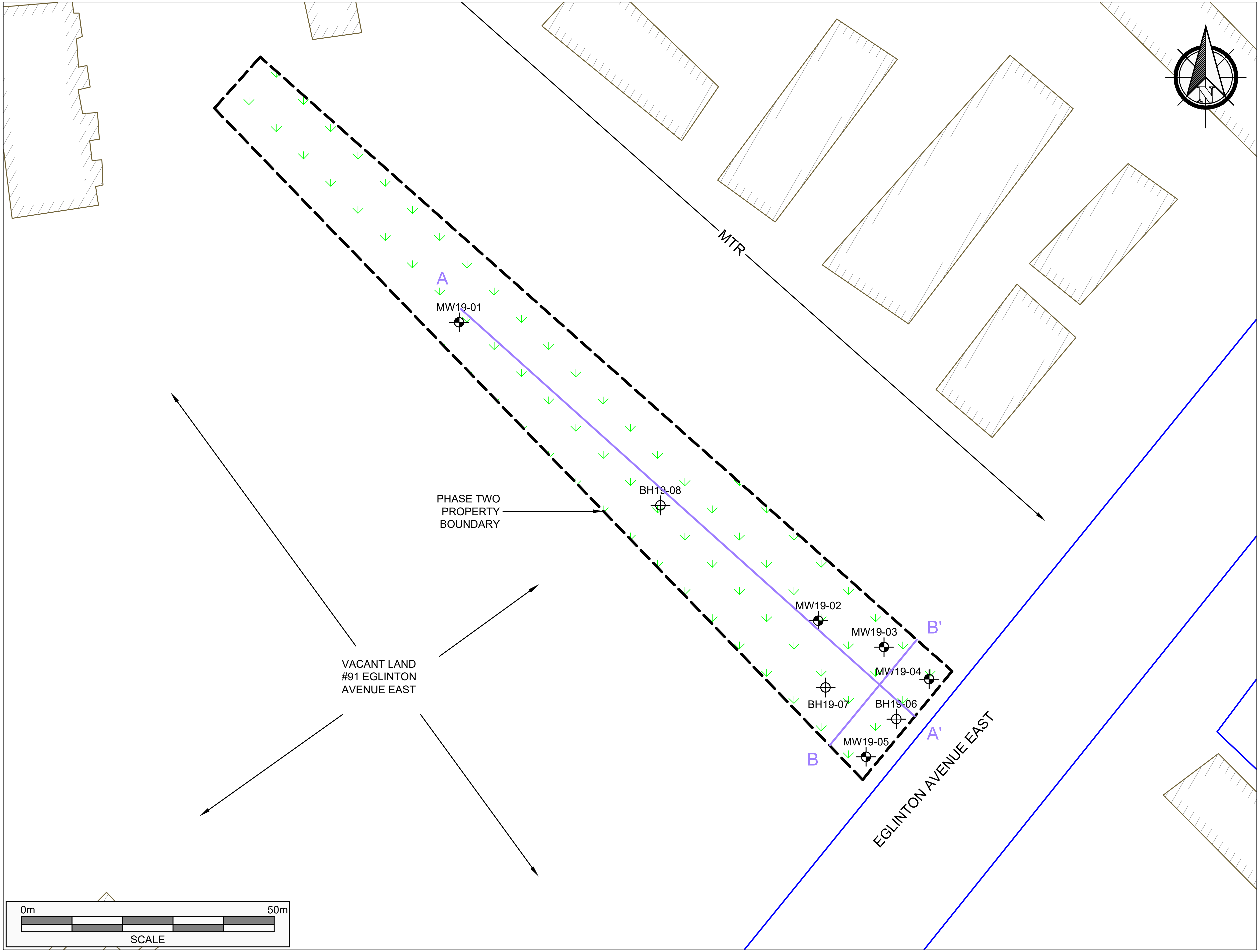
PROJECT NAME
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME
91 EGLINTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST,
MISSISSAUGA, ONTARIO

FIGURE NAME
BOREHOLE AND MONITORING WELL LOCATION PLAN

SCALE	PROJECT NO.
AS SHOWN	230989.001
DATE	FIGURE NO.
JULY 2019	5



LEGEND

MTR MULTI-TENANT RESIDENTIAL

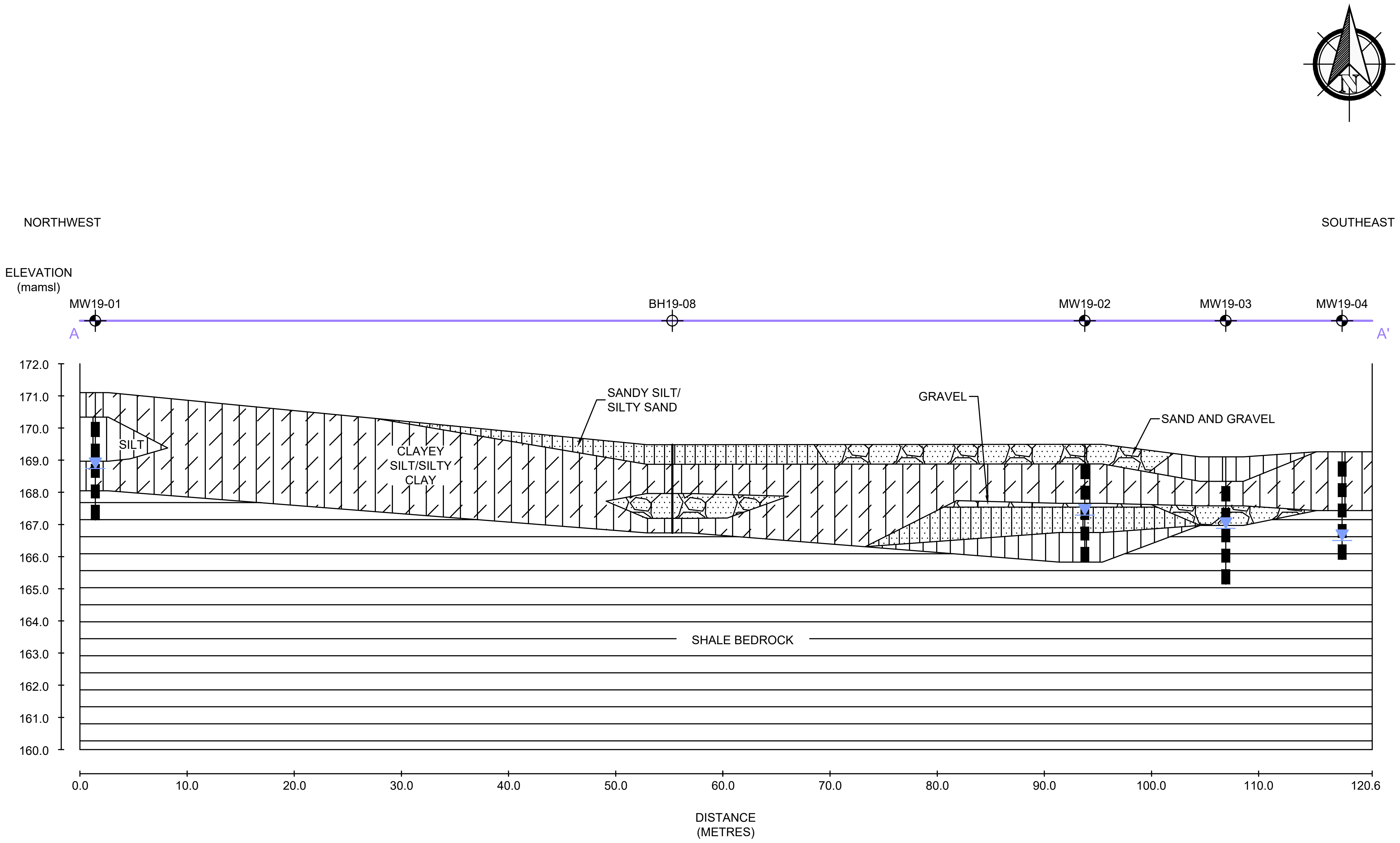
⌖ BOREHOLE (PINCHIN, 2019)

⊕ MONITORING WELL (PINCHIN, 2019)

A — A' CROSS SECTION LINE

PINCHIN

PROJECT NAME PHASE TWO ENVIRONMENTAL SITE ASSESSMENT	
CLIENT NAME 91 EGLINTON LIMITED PARTNERSHIP	
PROJECT LOCATION 131 EGLINTON AVENUE EAST, MISSISSAUGA, ONTARIO	
FIGURE NAME CROSS-SECTION LINES	
SCALE AS SHOWN	PROJECT NO. 230989.001
DATE JULY 2019	FIGURE NO. 6A



HORIZONTAL SCALE 1:400
VERTICAL SCALE 1:150

LEGEND

- MTR MULTI-TENANT RESIDENTIAL
- ⌖ BOREHOLE (PINCHIN, 2019)
- ⊕ MONITORING WELL (PINCHIN, 2019)
- A A' CROSS SECTION
- ▨ CLAYEY SILT/SILTY CLAY
- ▦ SANDY SILT/SILTY SAND
- ▩ SAND AND GRAVEL
- ▥ SILT
- ▩ GRAVEL
- ▤ SHALE BEDROCK
- WELL CASING/ BENTONITE
- ▼ STATIC WATER LEVEL (APRIL 18, 2019)
- ■ WELL SCREEN

PINCHIN

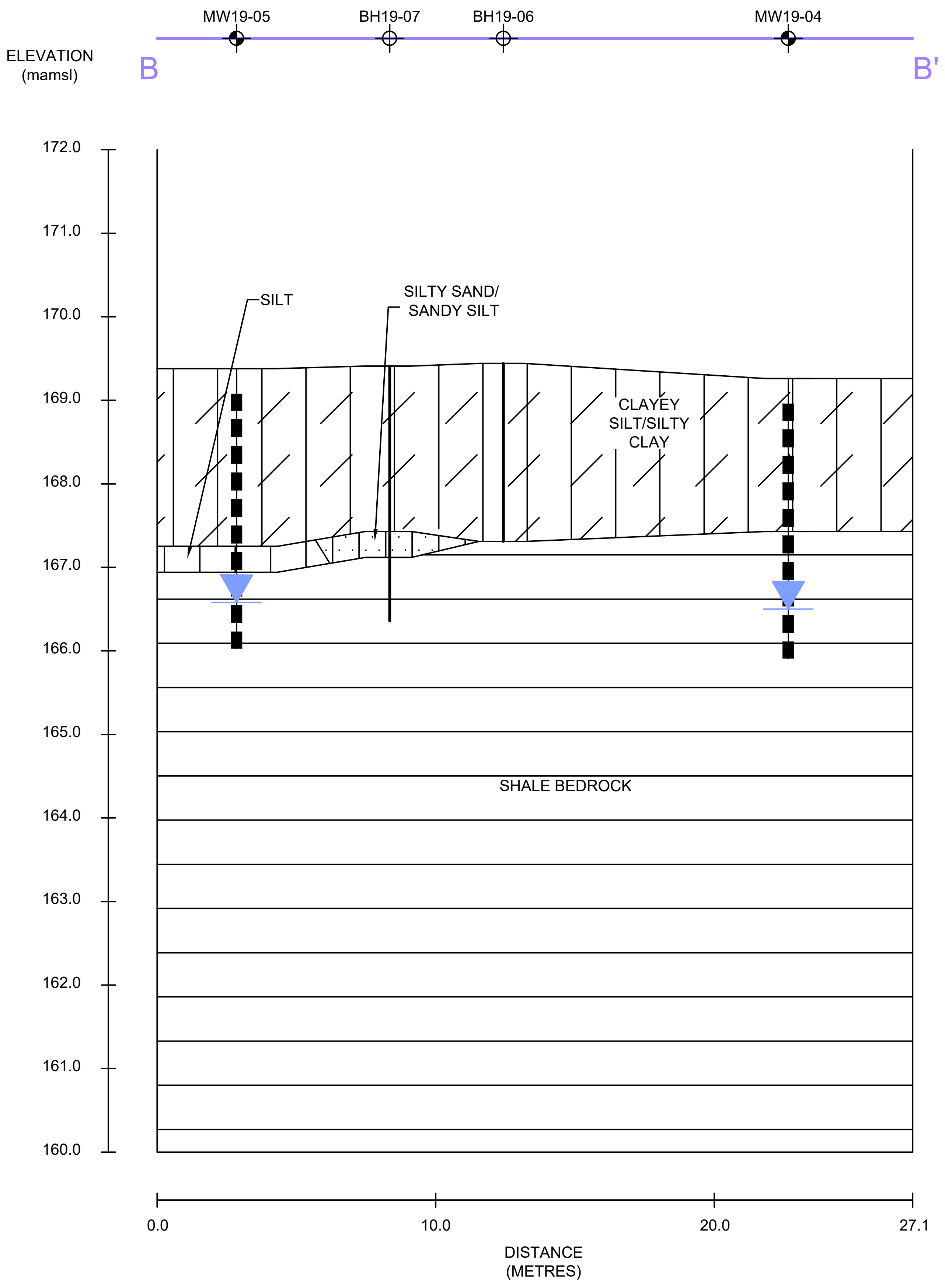
PROJECT NAME
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME
91 EGLINTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST,
MISSISSAUGA, ONTARIO

FIGURE NAME
CROSS SECTION DETAIL
A-A'

SCALE	PROJECT NO.
AS SHOWN	230989.001
DATE	FIGURE NO.
JULY 2019	6B



HORIZONTAL SCALE 1:200
VERTICAL SCALE 1:150

LEGEND

MTR MULTI-TENANT RESIDENTIAL
⌖ BOREHOLE (PINCHIN, 2019)
⌖ MONITORING WELL (PINCHIN, 2019)
A A' CROSS SECTION
▨ CLAYEY SILT/SILTY CLAY
▨ SANDY SILT/SILTY SAND
▨ SAND AND GRAVEL
▥ SILT
▨ GRAVEL
▤ SHALE BEDROCK
WELL CASING/ BENTONITE
▼ STATIC WATER LEVEL (APRIL 18, 2019)
■ WELL SCREEN

PINCHIN

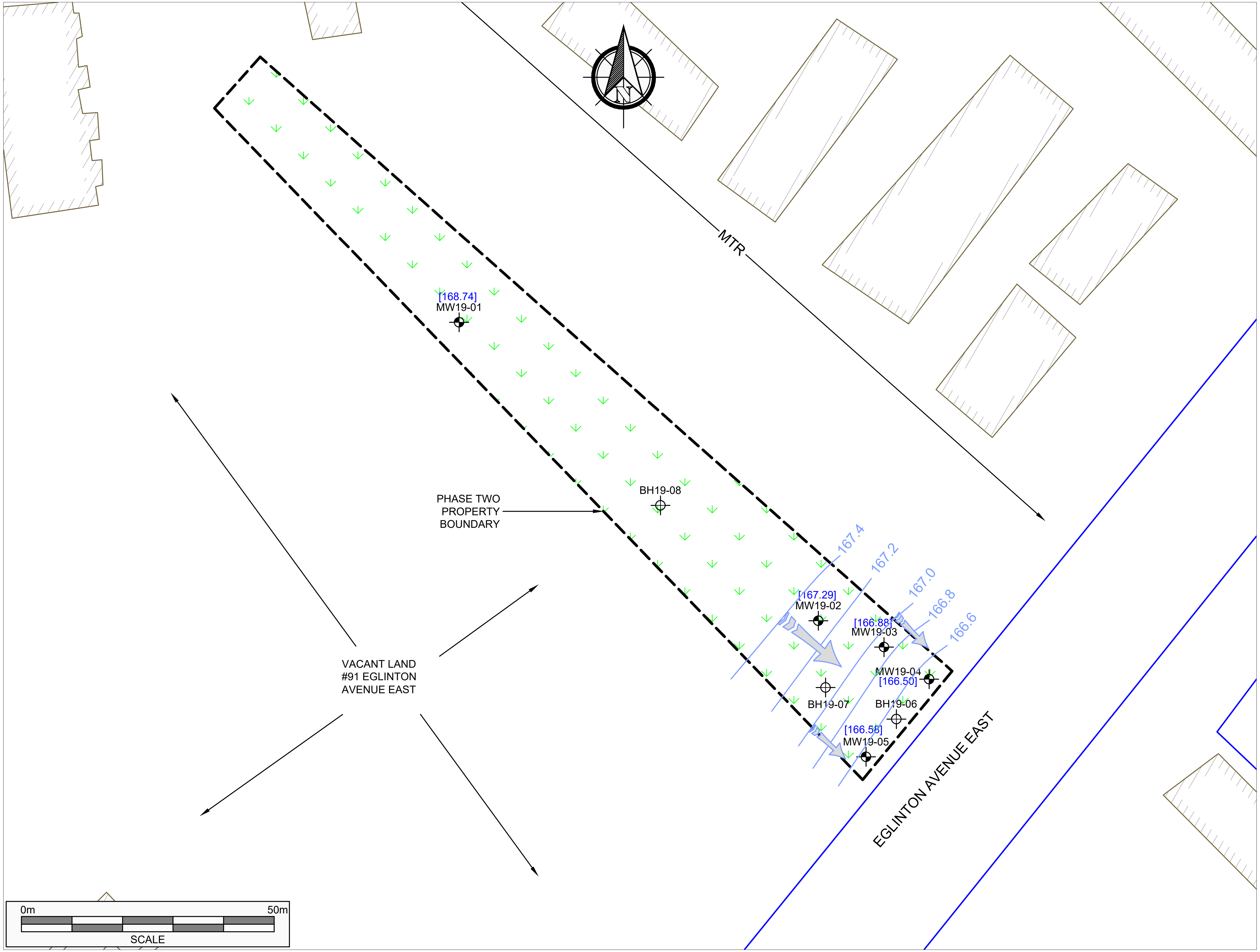
PROJECT NAME
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME
91 EGLINTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST,
MISSISSAUGA, ONTARIO

FIGURE NAME
CROSS SECTION DETAIL
B-B'

SCALE AS SHOWN	PROJECT NO. 230989.001
DATE JULY 2019	FIGURE NO. 6C



LEGEND

MTR MULTI-TENANT RESIDENTIAL

⌖ BOREHOLE (PINCHIN, 2019)

● MONITORING WELL (PINCHIN, 2019)

[#] GROUNDWATER ELEVATION

167.4 GROUNDWATER CONTOUR ELEVATION

⇐ INFERRED GROUNDWATER FLOW DIRECTION

PINCHIN

PROJECT NAME PHASE TWO ENVIRONMENTAL SITE ASSESSMENT	
CLIENT NAME 91 EGLINTON LIMITED PARTNERSHIP	
PROJECT LOCATION 131 EGLINTON AVENUE EAST, MISSISSAUGA, ONTARIO	
FIGURE NAME GROUNDWATER ELEVATIONS AND INFERRED GROUNDWATER FLOW DIRECTION (APRIL 18, 2019)	
SCALE AS SHOWN	PROJECT NO. 230989.001
DATE JULY 2019	FIGURE NO. 7

TABLE 1
SOIL ANALYTICAL RESULTS
91 Egltinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

Sample Designation	*MW19-01 S1*	*MW19-01 S3*	*DUP19-01*	*MW19-02 S1*	*MW19-03 S1*	*MW19-03 S2*	***MECP Table 2 Standards****
Sample Collection Date (dd/mm/yyyy)	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	
Sample Depth (mbgs)	*0.00 - 0.76*	*1.52 - 2.29*	*1.52 - 2.29*	*0.00 - 0.76*	*0.00 - 0.76*	*0.76 - 1.52*	
Sample Location	*MW19-01*	*MW19-01*	*MW19-01*	*MW19-02*	*MW19-03*	*MW19-03*	
Laboratory Certificate of Analysis No.	*B980920*	*B980920*	*B980920*	*B980920*	*B980920*	*B980920*	
Date of Analysis (dd/mm/yyyy)	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	
Miscellaneous Parameters							
pH (pH Units)	7.49	-	-	7.67	-	7.68	NV
Sieve #200 <0.075 mm (%)	69.8	-	-	-	-	-	NV
Sieve #200 >0.075 mm (%)	30.2	-	-	-	-	-	NV
Soil Texture	Fine	-	-	-	-	-	NV
Volatile Organic Compounds							
Benzene	-	-	-	<0.020 (<0.020)	-	-	0.17
Ethylbenzene	-	-	-	<0.020 (<0.020)	-	-	6.0
Toluene	-	-	-	<0.020 (<0.020)	-	-	1.6
Xylenes (Total)	-	-	-	<0.040 (<0.040)	-	-	25
Petroleum Hydrocarbons (PHCs)							
PHCs F1 (C_6 - C_{10})	-	-	-	<10 (<10)	-	-	65
PHCs F2 (>C_{10} - C_{16})	-	-	-	<10	-	-	150
PHCs F3 (>C_{16} - C_{34})	-	-	-	<50	-	-	1300
PHCs F4 (>C_{34} - C_{50})	-	-	-	<50	-	-	5600
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	-	-	-	<0.0050	-	-	29
Acenaphthylene	-	-	-	<0.0050	-	-	0.17
Anthracene	-	-	-	<0.0050	-	-	0.74
Benzo(a)anthracene	-	-	-	<0.0050	-	-	0.63
Benzo(a)pyrene	-	-	-	<0.0050	-	-	0.3
Benzo(b)fluoranthene	-	-	-	<0.0050	-	-	0.78
Benzo(ghi)perylene	-	-	-	<0.0050	-	-	7.8
Benzo(k)fluoranthene	-	-	-	<0.0050	-	-	0.78
Chrysene	-	-	-	<0.0050	-	-	7.8
Dibenzo(a,h)anthracene	-	-	-	<0.0050	-	-	0.1
Fluoranthene	-	-	-	<0.0050	-	-	0.69
Fluorene	-	-	-	<0.0050	-	-	69
Indeno(1,2,3-cd)pyrene	-	-	-	<0.0050	-	-	0.48
Methylnaphthalene 2-(1-)	-	-	-	<0.0071	-	-	3.4
Naphthalene	-	-	-	<0.0050	-	-	0.75
Phenanthrene	-	-	-	<0.0050	-	-	7.8
Pyrene	-	-	-	<0.0050	-	-	78
Metals							
Antimony	0.35	<0.20 (<0.20)	0.37	0.22	-	0.28	7.5
Arsenic	6.1	5.5 (5.6)	10	6.5	-	11	18
Barium	75	57 (56)	61	130	-	99	390
Beryllium	0.74	0.69 (0.71)	0.76	0.74	-	0.74	5
Boron (Total)	7.9	10 (9.9)	11	9	-	8.2	120
Boron (Hot Water Soluble)	-	-	-	-	-	-	1.5
Cadmium	0.36	<0.10 (0.10)	<0.10	0.77	-	0.19	1.2
Chromium (Total)	21	18 (19)	19	20	-	23	160
Chromium (Hexavalent)	<0.2	<0.2	<0.2	<0.2	-	<0.2	10
Cobalt	10	11 (11)	13	9.8	-	14	22
Copper	40	36 (35)	53	38	-	39	180
Lead	30	8.7 (8.8)	10	38	-	16	120
Mercury	<0.050	<0.050 (<0.050)	<0.050	<0.050	-	<0.050	1.8
Molybdenum	0.53	<0.50 (<0.50)	0.57	0.64	-	<0.50	6.9
Nickel	19	22 (23)	26	21	-	29	130
Selenium	<0.50	<0.50 (<0.50)	<0.50	<0.50	-	<0.50	2.4
Silver	<0.20	<0.20 (<0.20)	<0.20	<0.20	-	<0.20	25
Thallium	0.14	0.14 (0.14)	0.13	0.13	-	0.13	1
Uranium	0.59	0.46 (0.45)	0.52	0.61	-	0.5	23
Vanadium	30	26 (26)	27	30	-	34	86
Zinc	68	53 (53)	57	78	-	57	340
Inorganics							
Cyanide (Free)	0.03	-	-	0.02	-	<0.01	0.051
Electrical Conductivity (mS/cm)	0.25	-	-	0.43	-	-	0.7
Sodium Adsorption Ratio (No Units)	0.19	-	-	0.32	-	-	5
Organochlorinated Pesticides & PCBs							
Chlordane (Total)	<0.0020			<0.0020	<0.020		0.05
o,p-DDD + p,p-DDD	<0.0020			<0.0020	<0.020		3.3
o,p-DDE + p,p-DDE	0.0071			<0.0020	<0.020		0.33
o,p-DDT + p,p-DDT	0.0028			<0.0020	<0.020		1.4
Total Endosulfan	<0.0020			<0.0020	<0.020		0.04
Total PCB	<0.015			<0.015	<0.15		0.35
Aldrin	<0.0020			<0.0020	<0.020		0.05
a-Chlordane	<0.0020			<0.0020	<0.020		NV
g-Chlordane	<0.0020			<0.0020	<0.020		NV
o,p-DDD	<0.0020			<0.0020	<0.020		NV
p,p-DDD	<0.0020			<0.0020	<0.020		NV
o,p-DDE	<0.0020			<0.0020	<0.020		NV
p,p-DDE	0.0071			<0.0020	<0.020		NV
o,p-DDT	<0.0020			<0.0020	<0.020		NV
p,p-DDT	0.0028			<0.0020	<0.020		NV
Dieldrin	<0.0020			<0.0020	<0.020		0.05
Lindane	<0.0020			<0.0020	<0.020		0.063
Endosulfan I (alpha)	<0.0020			<0.0020	<0.020		NV
Endosulfan II (beta)	<0.0020			<0.0020	<0.020		NV
Endrin	<0.0020			<0.0020	<0.020		0.04
Heptachlor	<0.0020			<0.0020	<0.020		0.15
Heptachlor epoxide	<0.0020			<0.0020	<0.020		0.05
Hexachlorobenzene	<0.0020			<0.0020	<0.020		0.52
Hexachlorobutadiene	<0.0020			<0.0020	**<0.020**		0.014
Hexachloroethane	<0.0020			<0.0020	<0.020		0.071
Methoxychlor	<0.0050			<0.0050	<0.050		0.13

MECP Table 2 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 2 Standards, Medium/Fine-Textured Soils, Potable Groundwater Condition, for Residential/Parkland/Institutional Property Use.

Notes:

BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units In Micrograms Per Gram, Unless Otherwise Noted
(##)	Bracketed Values Indicate Laboratory Duplicate Results
mbgs	Metres Below Ground Surface
mS/cm	MilliSiemens Per Centimetre
NV	No Value

TABLE 1
SOIL ANALYTICAL RESULTS
91 Egltinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

Sample Designation	*MW19-03 S3*	*DUP19-03*	*MW19-04 S1*	*MW19-04 S2*	*MW19-04 S3*	*MW19-05 S1*	***MECP Table 2 Standards****
Sample Collection Date (dd/mm/yyyy)	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	
Sample Depth (mbgs)	*1.52 - 2.29*	*1.52 - 2.29*	*0.00 - 0.76*	*0.76 - 1.52*	*1.52 - 2.13*	*0.00 - 0.76*	
Sample Location	*MW19-03*	*MW19-03*	*MW19-04*	*MW19-04*	*MW19-04*	*MW19-05*	
Laboratory Certificate of Analysis No.	*B980920*	*B980920*	*B980920*	*B980920*	*B980920*	*B980920*	
Date of Analysis (dd/mm/yyyy)	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	
Miscellaneous Parameters							
pH (pH Units)	-	-	7.29	-	7.77	7.22	NV
Sieve #200 <0.075 mm (%)	-	-	-	-	-	-	NV
Sieve #200 >0.075 mm (%)	-	-	-	-	-	-	NV
Soil Texture	-	-	-	-	-	-	NV
Volatile Organic Compounds							
Benzene	<0.020	<0.020	-	-	<0.020	<0.020	0.17
Ethylbenzene	<0.020	<0.020	-	-	<0.020	<0.020	6.0
Toluene	<0.020	<0.020	-	-	<0.020	<0.020	1.6
Xylenes (Total)	<0.040	<0.040	-	-	<0.040	<0.040	25
Petroleum Hydrocarbons (PHCs)							
PHCs F1 (C_6 - C_{10})	<10	<10	-	-	<10	<10	65
PHCs F2 (>C_{10} - C_{16})	17	<10	-	-	<10	<10	150
PHCs F3 (>C_{16} - C_{34})	<50	<50	-	-	<50	<50	1300
PHCs F4 (>C_{34} - C_{50})	<50	<50	-	-	<50	<50	5600
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	29
Acenaphthylene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.17
Anthracene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.74
Benzo(a)anthracene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.63
Benzo(a)pyrene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.3
Benzo(b)fluoranthene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.78
Benzo(ghi)perylene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	7.8
Benzo(k)fluoranthene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.78
Chrysene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	7.8
Dibenzo(a,h)anthracene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.1
Fluoranthene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.69
Fluorene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	69
Indeno(1,2,3-cd)pyrene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.48
Methylnaphthalene 2-(1-)	<0.0071	<0.0071	-	-	<0.0071	<0.0071	3.4
Naphthalene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	0.75
Phenanthrene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	7.8
Pyrene	<0.0050	<0.0050	-	-	<0.0050	<0.0050	78
Metals							
Antimony	-	-	-	<0.20	-	0.28	7.5
Arsenic	-	-	-	4.1	-	8.5	18
Barium	-	-	-	130	-	150	390
Beryllium	-	-	-	0.8	-	0.92	5
Boron (Total)	-	-	-	8.2	-	8.4	120
Boron (Hot Water Soluble)	-	-	-	-	-	1.3	1.5
Cadmium	-	-	-	0.21	-	0.26	1.2
Chromium (Total)	-	-	-	26	-	23	160
Chromium (Hexavalent)	-	-	-	<0.2	-	<0.2	10
Cobalt	-	-	-	11	-	11	22
Copper	-	-	-	23	-	32	180
Lead	-	-	-	9.7	-	18	120
Mercury	-	-	-	<0.050	-	0.056	1.8
Molybdenum	-	-	-	<0.50	-	0.77	6.9
Nickel	-	-	-	19	-	20	130
Selenium	-	-	-	<0.50	-	0.58	2.4
Silver	-	-	-	<0.20	-	<0.20	25
Thallium	-	-	-	0.15	-	0.15	1
Uraninum	-	-	-	0.75	-	1.1	23
Vanadium	-	-	-	35	-	36	86
Zinc	-	-	-	100	-	71	340
Inorganics							
Cyanide (Free)	-	-	0.05	-	-	0.02	0.051
Electrical Conductivity (mS/cm)	-	-	0.25	-	-	0.51	0.7
Sodium Adsorption Ratio (No Units)	-	-	0.95	-	-	2.2	5
Organochlorinated Pesticides & PCBs							
Chlordane (Total)		-	<0.020	-	-	<0.0020	0.05
o,p-DDD + p,p-DDD		-	<0.020	-	-	0.0022	3.3
o,p-DDE + p,p-DDE		-	<0.020	-	-	0.053	0.33
o,p-DDT + p,p-DDT		-	<0.020	-	-	<0.0020	1.4
Total Endosulfan		-	<0.020	-	-	<0.0020	0.04
Total PCB		-	<0.15	-	-	<0.020	0.35
Aldrin		-	<0.020	-	-	<0.0020	0.05
a-Chlordane		-	<0.020	-	-	<0.0020	NV
g-Chlordane		-	<0.020	-	-	<0.0020	NV
o,p-DDD		-	<0.020	-	-	<0.0020	NV
p,p-DDD		-	<0.020	-	-	0.0022	NV
o,p-DDE		-	<0.020	-	-	<0.0020	NV
p,p-DDE		-	<0.020	-	-	0.053	NV
o,p-DDT		-	<0.020	-	-	<0.0020	NV
p,p-DDT		-	<0.020	-	-	<0.0020	NV
Dieldrin		-	<0.020	-	-	<0.0020	0.05
Lindane		-	<0.020	-	-	<0.0020	0.063
Endosulfan I (alpha)		-	<0.020	-	-	<0.0020	NV
Endosulfan II (beta)		-	<0.020	-	-	<0.0020	NV
Endrin		-	<0.020	-	-	<0.0020	0.04
Heptachlor		-	<0.020	-	-	<0.0020	0.15
Heptachlor epoxide		-	<0.020	-	-	<0.0020	0.05
Hexachlorobenzene		-	<0.020	-	-	<0.0020	0.52
Hexachlorobutadiene		-	**<0.020**	-	-	<0.0020	0.014
Hexachloroethane		-	<0.020	-	-	<0.0020	0.071
Methoxychlor		-	<0.050	-	-	<0.0050	0.13

MECP Table 2 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 2 Standards, Medium/Fine-Textured Soils, Potable Groundwater Condition, for Residential/Parkland/Institutional Property Use.

Notes:

BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units In Micrograms Per Gram, Unless Otherwise Noted
(##)	Bracketed Values Indicate Laboratory Duplicate Results
mbgs	Metres Below Ground Surface
mS/cm	MilliSiemens Per Centimetre
NV	No Value

TABLE 1
SOIL ANALYTICAL RESULTS
91 Egltinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

Sample Designation	*DUP19-05*	*BH19-06 S1*	*DUP 19-06*	*BH19-06 S2*	*BH19-07 S1*	*DUP19-07*	***MECP Table 2 Standards****
Sample Collection Date (dd/mm/yyyy)	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	
Sample Depth (mbgs)	*0.00 - 0.76*	*0.00 - 0.76*	*0.00 - 0.76*	*0.76 - 1.52*	*0.00 - 0.76*	*0.00 - 0.76*	
Sample Location	*MW19-05*	*BH19-06*	*BH19-06*	*BH19-06*	*BH19-07*	*BH19-07*	
Laboratory Certificate of Analysis No.	*B980920*	*B980920*	*B980920*	*B980920*	*B980920*	*B980920*	
Date of Analysis (dd/mm/yyyy)	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	*2019/04/03 - 2019/04/03*	
Miscellaneous Parameters							
pH (pH Units)	7.51	7.71	-	-	7.28	-	NV
Sieve #200 <0.075 mm (%)	-	-	-	81.5	-	-	NV
Sieve #200 >0.075 mm (%)	-	-	-	18.5	-	-	NV
Soil Texture	-	-	-	Fine	-	-	NV
Volatile Organic Compounds							
Benzene	-	-	-	<0.020	<0.020	-	0.17
Ethylbenzene	-	-	-	<0.020	<0.020	-	6.0
Toluene	-	-	-	<0.020	<0.020	-	1.6
Xylenes (Total)	-	-	-	<0.040	<0.040	-	25
Petroleum Hydrocarbons (PHCs)							
PHCs F1 (C_6 - C_{10})	-	-	-	<10	<10	-	65
PHCs F2 (>C_{10} - C_{16})	-	-	-	<10	<10	-	150
PHCs F3 (>C_{16} - C_{34})	-	-	-	<50	<50	-	1300
PHCs F4 (>C_{34} - C_{50})	-	-	-	<50	<50	-	5600
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	-	-	-	<0.0050	<0.0050	-	29
Acenaphthylene	-	-	-	<0.0050	<0.0050	-	0.17
Anthracene	-	-	-	<0.0050	<0.0050	-	0.74
Benzo(a)anthracene	-	-	-	<0.0050	0.0098	-	0.63
Benzo(a)pyrene	-	-	-	<0.0050	0.0130	-	0.3
Benzo(b)fluoranthene	-	-	-	<0.0050	0.0210	-	0.78
Benzo(ghi)perylene	-	-	-	<0.0050	0.0150	-	7.8
Benzo(k)fluoranthene	-	-	-	<0.0050	0.0066	-	0.78
Chrysene	-	-	-	<0.0050	0.0120	-	7.8
Dibenzo(a,h)anthracene	-	-	-	<0.0050	<0.0050	-	0.1
Fluoranthene	-	-	-	<0.0050	0.0240	-	0.69
Fluorene	-	-	-	<0.0050	<0.0050	-	69
Indeno(1,2,3-cd)pyrene	-	-	-	<0.0050	0.0120	-	0.48
Methylnaphthalene 2-(1-)	-	-	-	<0.0071	<0.0071	-	3.4
Naphthalene	-	-	-	<0.0050	<0.0050	-	0.75
Phenanthrene	-	-	-	<0.0050	0.0087	-	7.8
Pyrene	-	-	-	<0.0050	0.0250	-	78
Metals							
Antimony	-	<0.20	-	-	<0.20	-	7.5
Arsenic	-	5.5	-	-	11	-	18
Barium	-	120	-	-	**410**	-	390
Beryllium	-	0.88	-	-	1.2	-	5
Boron (Total)	-	9.5	-	-	8.3	-	120
Boron (Hot Water Soluble)	-	-	-	-	0.82	-	1.5
Cadmium	-	0.13	-	-	0.59	-	1.2
Chromium (Total)	-	27	-	-	33	-	160
Chromium (Hexavalent)	-	<0.2	-	-	<0.2	-	10
Cobalt	-	12	-	-	18	-	22
Copper	-	34	-	-	45	-	180
Lead	-	9.4	-	-	11	-	120
Mercury	-	<0.050	-	-	0.071	-	1.8
Molybdenum	-	0.51	-	-	0.74	-	6.9
Nickel	-	27	-	-	27	-	130
Selenium	-	<0.50	-	-	1	-	2.4
Silver	-	<0.20	-	-	<0.20	-	25
Thallium	-	0.17	-	-	0.21	-	1
Uraninum	-	0.87	-	-	1.0	-	23
Vanadium	-	39	-	-	46	-	86
Zinc	-	58	-	-	72	-	340
Inorganics							
Cyanide (Free)	-	<0.01	-	-	0.01	-	0.051
Electrical Conductivity (mS/cm)	-	0.46 (0.46)	-	-	0.34	0.37	0.7
Sodium Adsorption Ratio (No Units)	-	0.74	-	-	0.53	0.61	5
Organochlorinated Pesticides & PCBs							
Chlordane (Total)	-	<0.0020	<0.0020	-	<0.0020	-	0.05
o,p-DDD + p,p-DDD	-	<0.0020	<0.0020	-	0.0038	-	3.3
o,p-DDE + p,p-DDE	-	<0.0020	0.0038	-	0.034	-	0.33
o,p-DDT + p,p-DDT	-	<0.0020	<0.0020	-	0.0079	-	1.4
Total Endosulfan	-	<0.0020	<0.0020	-	<0.0020	-	0.04
Total PCB	-	<0.015	<0.015	-	<0.015	-	0.35
Aldrin	-	<0.0020	<0.0020	-	<0.0020	-	0.05
a-Chlordane	-	<0.0020	<0.0020	-	<0.0020	-	NV
g-Chlordane	-	<0.0020	<0.0020	-	<0.0020	-	NV
o,p-DDD	-	<0.0020	<0.0020	-	<0.0020	-	NV
p,p-DDD	-	<0.0020	<0.0020	-	0.0038	-	NV
o,p-DDE	-	<0.0020	<0.0020	-	<0.0020	-	NV
p,p-DDE	-	<0.0020	0.0038	-	0.034	-	NV
o,p-DDT	-	<0.0020	<0.0020	-	<0.0020	-	NV
p,p-DDT	-	<0.0020	<0.0020	-	0.0079	-	NV
Dieldrin	-	<0.0020	<0.0020	-	<0.0020	-	0.05
Lindane	-	<0.0020	<0.0020	-	<0.0020	-	0.063
Endosulfan I (alpha)	-	<0.0020	<0.0020	-	<0.0020	-	NV
Endosulfan II (beta)	-	<0.0020	<0.0020	-	<0.0020	-	NV
Endrin	-	<0.0020	<0.0020	-	<0.0020	-	0.04
Heptachlor	-	<0.0020	<0.0020	-	<0.0020	-	0.15
Heptachlor epoxide	-	<0.0020	<0.0020	-	<0.0020	-	0.05
Hexachlorobenzene	-	<0.0020	<0.0020	-	<0.0020	-	0.52
Hexachlorobutadiene	-	<0.0020	<0.0020	-	<0.0020	-	0.014
Hexachloroethane	-	<0.0020	<0.0020	-	<0.0020	-	0.071
Methoxychlor	-	<0.0050	<0.0050	-	<0.0050	-	0.13

MECP Table 2 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 2 Standards, Medium/Fine-Textured Soils, Potable Groundwater Condition, for Residential/Parkland/Institutional Property Use.

Notes:

BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units In Micrograms Per Gram, Unless Otherwise Noted
(##)	Bracketed Values Indicate Laboratory Duplicate Results
mbgs	Metres Below Ground Surface
mS/cm	MilliSiemens Per Centimetre
NV	No Value

TABLE 1
SOIL ANALYTICAL RESULTS
91 Egltinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

Sample Designation	*BH19-07 S1 A*	*BH19-07 S1 B*	*BH19-08 S1*	*BH19-08 S2*	***MECP Table 2 Standards****
Sample Collection Date (dd/mm/yyyy)	*27/03/2019*	*27/03/2019*	*27/03/2019*	*27/03/2019*	
Sample Depth (mbgs)	*0.00 - 0.76*	*0.00 - 0.76*	*0.00 - 0.76*	*0.76 - 1.52*	
Sample Location	*BH19-07*	*BH19-07*	*BH19-08*	*BH19-08*	
Laboratory Certificate of Analysis No.	*B999737*	*B999737*	*B980920*	*B980920*	
Date of Analysis (dd/mm/yyyy)	*2019/04/18*	*2019/04/18*	*2019/03/29 - 2019/04/03*	*2019/03/29 - 2019/04/03*	
Miscellaneous Parameters					
pH (pH Units)	-	-	7.67	-	NV
Sieve #200 <0.075 mm (%)	-	-	-	-	NV
Sieve #200 >0.075 mm (%)	-	-	-	-	NV
Soil Texture	-	-	-	-	NV
Volatile Organic Compounds					
Benzene	-	-	<0.020	-	0.17
Ethylbenzene	-	-	<0.020	-	6.0
Toluene	-	-	<0.020	-	1.6
Xylenes (Total)	-	-	<0.040	-	25
Petroleum Hydrocarbons (PHCs)					
PHCs F1 (C_6 - C_{10})	-	-	<10	-	65
PHCs F2 (>C_{10} - C_{16})	-	-	<10	-	150
PHCs F3 (>C_{16} - C_{34})	-	-	<50	-	1300
PHCs F4 (>C_{34} - C_{50})	-	-	<50	-	5600
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	-	-	<0.0050	-	29
Acenaphthylene	-	-	<0.0050	-	0.17
Anthracene	-	-	<0.0050	-	0.74
Benzo(a)anthracene	-	-	<0.0050	-	0.63
Benzo(a)pyrene	-	-	<0.0050	-	0.3
Benzo(b)fluoranthene	-	-	<0.0050	-	0.78
Benzo(ghi)perylene	-	-	<0.0050	-	7.8
Benzo(k)fluoranthene	-	-	<0.0050	-	0.78
Chrysene	-	-	<0.0050	-	7.8
Dibenzo(a,h)anthracene	-	-	<0.0050	-	0.1
Fluoranthene	-	-	<0.0050	-	0.69
Fluorene	-	-	<0.0050	-	69
Indeno(1,2,3-cd)pyrene	-	-	<0.0050	-	0.48
Methylnaphthalene 2-(1-)	-	-	<0.0071	-	3.4
Naphthalene	-	-	<0.0050	-	0.75
Phenanthrene	-	-	<0.0050	-	7.8
Pyrene	-	-	<0.0050	-	78
Metals					
Antimony	-	-	-	<0.20	7.5
Arsenic	-	-	-	3.7	18
Barium	23	20	-	64	390
Beryllium	-	-	-	0.61	5
Boron (Total)	-	-	-	9	120
Boron (Hot Water Soluble)	-	-	-	-	1.5
Cadmium	-	-	-	<0.10	1.2
Chromium (Total)	-	-	-	17	160
Chromium (Hexavalent)	-	-	-	<0.2	10
Cobalt	-	-	-	10	22
Copper	-	-	-	37	180
Lead	-	-	-	6.3	120
Mercury	-	-	-	<0.050	1.8
Molybdenum	-	-	-	<0.50	6.9
Nickel	-	-	-	21	130
Selenium	-	-	-	<0.50	2.4
Silver	-	-	-	<0.20	25
Thallium	-	-	-	0.14	1
Uraninum	-	-	-	0.48	23
Vanadium	-	-	-	25	86
Zinc	-	-	-	43	340
Inorganics					
Cyanide (Free)	-	-	-	<0.01	0.051
Electrical Conductivity (mS/cm)	-	-	0.14	-	0.7
Sodium Adsorption Ratio (No Units)	-	-	0.28	-	5
Organochlorinated Pesticides & PCBs					
Chlordane (Total)	-	-	<0.020	-	0.05
o,p-DDD + p,p-DDD	-	-	<0.020	-	3.3
o,p-DDE + p,p-DDE	-	-	<0.020	-	0.33
o,p-DDT + p,p-DDT	-	-	<0.020	-	1.4
Total Endosulfan	-	-	<0.020	-	0.04
Total PCB	-	-	<0.15	-	0.35
Aldrin	-	-	<0.020	-	0.05
a-Chlordane	-	-	<0.020	-	NV
g-Chlordane	-	-	<0.020	-	NV
o,p-DDD	-	-	<0.020	-	NV
p,p-DDD	-	-	<0.020	-	NV
o,p-DDE	-	-	<0.020	-	NV
p,p-DDE	-	-	<0.020	-	NV
o,p-DDT	-	-	<0.020	-	NV
p,p-DDT	-	-	<0.020	-	NV
Dieldrin	-	-	<0.020	-	0.05
Lindane	-	-	<0.020	-	0.063
Endosulfan I (alpha)	-	-	<0.020	-	NV
Endosulfan II (beta)	-	-	<0.020	-	NV
Endrin	-	-	<0.020	-	0.04
Heptachlor	-	-	<0.020	-	0.15
Heptachlor epoxide	-	-	<0.020	-	0.05
Hexachlorobenzene	-	-	<0.020	-	0.52
Hexachlorobutadiene	-	-	**<0.020**	-	0.014
Hexachloroethane	-	-	<0.020	-	0.071
Methoxychlor	-	-	<0.050	-	0.13

MECP Table 2 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 2 Standards, Medium/Fine-Textured Soils, Potable Groundwater Condition, for Residential/Parkland/Institutional Property Use.

Notes:

BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units In Micrograms Per Gram, Unless Otherwise Noted
(##)	Bracketed Values Indicate Laboratory Duplicate Results
mbgs	Metres Below Ground Surface
mS/cm	MilliSiemens Per Centimetre
NV	No Value

TABLE 2
GROUNDWATER MONITORING WELL ELEVATIONS AND CONSTRUCTION DETAILS
91 Egltinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

Monitoring Well	*Ground Surface Elevation (mamsl)*	*Top of Pipe Elevation (mamsl)*	*Well Construction Details*						
			Total Well Depth (mbgs)	*Stick-Up Height (metres)*	*Well Diameter (centimetres)*	*Screen Slot Size*	*Monitoring Well Screen Interval (mbgs)*	*Screen Length (metres)*	*Sealant Thickness (metres)*
MW19-01	171.10	171.94	3.96	0.84	5.08	010	0.91 - 3.36	3.05	0.61
MW19-02	169.49	170.37	3.66	0.89	5.08	010	2.13 - 3.66	1.52	1.83
MW19-03	169.10	169.92	3.96	0.83	5.08	010	0.91 - 3.96	3.05	0.61
MW19-04	169.26	170.12	3.35	0.86	5.08	010	1.11 - 3.35	2.44	0.61
MW19-05	169.38	170.37	3.35	0.99	5.08	010	1.11 - 3.35	2.44	0.61
MW19-05 (Shallow Dry Well)	NM	NM	3.35	-0.10	5.08	010	2.44 - 3.35	0.9	2.1

Notes:

mamsl	Metres Above Mean Sea Level
mbgs	Metres Below Ground Surface

TABLE 3
GROUNDWATER MONITORING - WATER LEVELS
91 Egltinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

Monitoring Well	Ground Surface Elevation (mamsl)	Top of Pipe Elevation (mamsl)	Stick-Up Height (metres)	Date of Monitoring (dd/mm/yyyy)	Calculated Depth to Groundwater from Surface (mbgs)	Measured Depth to Groundwater from Top of Pipe (metres)	Groundwater Elevation (mamsl)	Visual/Olfactory Observations
MW19-01	171.10	171.94	0.84	01/04/2019	2.21	3.05	168.89	No sheen or odours
				02/04/2019	2.35	3.17	168.77	No sheen or odours
				18/04/2019	2.37	3.21	168.74	No sheen or odours
MW19-02	169.49	170.37	0.89	28/3/2019	2.12	3.01	167.36	No sheen or odours
				28/3/2019	2.19	3.08	167.29	No sheen or odours
				18/04/2019	2.20	3.09	167.29	No sheen or odours
MW19-03	169.10	169.92	0.83	01/04/2019	2.18	3.01	166.91	No sheen or odours
				02/04/2019	2.24	3.07	166.85	No sheen or odours
				18/04/2019	2.22	3.05	166.88	No sheen or odours
MW19-04	169.26	170.12	0.86	01/04/2019	2.12	2.98	167.14	No sheen or odours
				02/04/2019	2.50	3.36	166.76	No sheen or odours
				18/04/2019	2.77	3.63	166.50	No sheen or odours
MW19-05	169.38	170.37	0.99	01/04/2019	2.77	3.76	166.61	No sheen or odours
				02/04/2019	2.82	3.81	166.56	No sheen or odours
				18/04/2019	2.80	3.79	166.58	No sheen or odours
MW19-05 (Shallow	NM	NM	-0.10	28/3/2019	NA	Dry	NA	No water yielded after 24 hours. Returned to Re Install well.

Notes:

mamsl	Metres Above Mean Sea Level
mbgs	Metres Below Ground Surface

TABLE 4
GROUNDWATER MONITORING - NON-AQUEOUS PHASE LIQUIDS
91 Eglinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

			LNAPL					DNAPL				
Monitoring Well	***Top of Pipe Elevation (mamsl)***	***Date of Monitoring (dd/mm/yyyy)***	***Measured Depth to Top of LNAPL from Top of Pipe (metres)***	***Measured Depth to Bottom of LNAPL from Top of Pipe (metres)***	***LNAPL Thickness (metres)***	***Top of LNAPL Elevation (mamsl)***	***Bottom of LNAPL Elevation (mamsl)***	***Measured Depth to Top of DNAPL from Top of Pipe (metres)***	***Measured Depth to Bottom of DNAPL from Top of Pipe (metres)***	***DNAPL Thickness (metres)***	***Top of DNAPL Elevation (mamsl)***	***Bottom of DNAPL Elevation (mamsl)***
MW19-01	NM	01/04/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		02/04/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW19-02	NM	28/3/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		28/3/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW19-03	NM	01/04/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		02/04/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW19-04	NM	01/04/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		02/04/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW19-05	NM	01/04/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		02/04/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

DNAPL	Dense Non-Aqueous Phase Liquid
LNAPL	Light Non-Aqueous Phase Liquid
mamsl	Metres Above Mean Sea Level
mbgs	Metres Below Ground Surface
ND	Not Detected

TABLE 5
GROUNDWATER ANALYTICAL RESULTS
91 Egltinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

Sample Designation	*MW19-01*	*DUP-02*	*MW19-02*	*DUP19-02 GW*	*MW19-03*	*DUP-02*	***MECP Table 2 Standards****
Sample Collection Date (dd/mm/yyyy)	*02/04/2019*	*02/04/2019*	*28/03/2019*	*28/03/2019*	*02/04/2019*	*02/04/2019*	
Sample Depth (mbgs)	*2.52*	*2.52*	*2.97*	*2.97*	*2.43*	*2.43*	
Sample Location	*MW19-01*	*MW19-01*	*MW19-02*	*MW19-02*	*MW19-03*	*MW19-03*	
Laboratory Certificate of Analysis No.	*B986440*	*B986440*	*B981984*	*B981984*	*B986440*	*B986440*	
Date of Analysis (dd/mm/yyyy)	*5/4/2019 - 8/4/2019*	*5/4/2019 - 8/4/2019*	*1/4/2019 - 4/4/2019*	*1/4/2019 - 4/4/2019*	*5/4/2019 - 8/4/2019*	*5/4/2019 - 8/4/2019*	
Volatile Organic Compounds							
Benzene	-	-	<0.20 (<0.20)	<0.20	<0.20	<0.20	5
Ethylbenzene	-	-	<0.20 (<0.20)	<0.20	<0.20	<0.20	2.4
Toluene	-	-	<0.20 (<0.20)	<0.20	<0.20	<0.20	24
Xylenes (Total)	-	-	<0.40 (<0.40)	<0.40	<0.40	<0.40	300
Petroleum Hydrocarbons (PHCs)							
PHCs F1 (C_6 - C_{10})	-	-	<25 (<25)	<25	<25	<25	750
PHCs F2 (>C_{10} - C_{16})	-	-	<100	<100	<100	<100	150
PHCs F3 (>C_{16} - C_{34})	-	-	<200	<200	<200	<200	500
PHCs F4 (>C_{34} - C_{50})	-	-	<200	<200	<200	<200	500
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	-	-	<0.050	<0.050	<0.050	<0.050	4.1
Acenaphthylene	-	-	<0.050	<0.050	<0.050	<0.050	1
Anthracene	-	-	<0.050	<0.050	<0.050	<0.050	2.4
Benzo(a)anthracene	-	-	<0.050	<0.050	<0.050	<0.050	1
Benzo(a)pyrene	-	-	<0.010	<0.010	<0.010	<0.010	0.01
Benzo(b)fluoranthene	-	-	<0.050	<0.050	<0.050	<0.050	0.1
Benzo(ghi)perylene	-	-	<0.050	<0.050	<0.050	<0.050	0.2
Benzo(k)fluoranthene	-	-	<0.050	<0.050	<0.050	<0.050	0.1
Chrysene	-	-	<0.050	<0.050	<0.050	<0.050	0.1
Dibenzo(a,h)anthracene	-	-	<0.050	<0.050	<0.050	<0.050	0.2
Fluoranthene	-	-	<0.050	<0.050	<0.050	<0.050	0.41
Fluorene	-	-	<0.050	<0.050	<0.050	<0.050	120
Indeno(1,2,3-cd)pyrene	-	-	<0.050	<0.050	<0.050	<0.050	0.2
Methylnaphthalene 2-(1-)	-	-	<0.071	<0.071	<0.071	<0.071	3.2
Naphthalene	-	-	<0.050	<0.050	<0.050	<0.050	11
Phenanthrene	-	-	<0.030	<0.030	<0.030	<0.030	1
Pyrene	-	-	<0.050	<0.050	<0.050	<0.050	4.1
Metals							
Antimony	<0.50 (<0.50)	<0.50	<0.50	<0.50	-	-	6
Arsenic	<1.0 (<1.0)	<1.0	<1.0	<1.0	-	-	25
Barium	65 (66)	67	45	45	-	-	1000
Beryllium	<0.50 (<0.50)	<0.50	<0.50	<0.50	-	-	4
Boron	130 (130)	140	19	19	-	-	5000
Cadmium	<0.10 (<0.10)	<0.10	<0.10	<0.10	-	-	2.7
Chromium (Total)	<5.0 (<5.0)	<5.0	<5.0	<5.0	-	-	50
Chromium (Hexavalent)	<0.50	<0.50	<0.50	<0.50	-	-	25
Cobalt	<0.50 (<0.50)	<0.50	<0.50	<0.50	-	-	3.8
Copper	<1.0 (<1.0)	<1.0	1.2	1.2	-	-	87
Lead	<0.50 (<0.50)	<0.50	<0.50	<0.50	-	-	10
Mercury	<0.1	<0.1	-	-	-	-	1
Molybdenum	<0.50 (<0.50)	<0.50	<0.50	<0.50	-	-	70
Nickel	<1.0 (<1.0)	<1.0	<1.0	<1.0	-	-	100
Selenium	<2.0 (<2.0)	<2.0	<2.0	<2.0	-	-	10
Silver	<0.10 (<0.10)	<0.10	<0.10	<0.10	-	-	1.5
Sodium	7700 (7700)	8100	17000	17000	-	-	490000
Thallium	<0.050 (<0.050)	<0.050	<0.050	<0.050	-	-	2
Uranium	1.4 (1.4)	1.3	1	0.99	-	-	20
Vanadium	<0.50 (<0.50)	<0.50	<0.50	<0.50	-	-	6.2
Zinc	<5.0 (<5.0)	<5.0	<5.0	<5.0	-	-	1100
Inorganics							
Chloride	10	10	36	35	-	-	790000
Cyanide (Free)	<1	<1	<1	<1	-	-	66
Total Ammonia-N	0.062	<0.050	<1	<1	0.084	-	NV
Nitrite (N)	<0.010	<0.010	-	-	-	-	NV
Nitrate (N)	4.73	4.63	-	-	-	-	NV
Nitrate + Nitrite (N)	4.73	4.63	-	-	-	-	NV
pH	7.4	7.39	7.39	7.33	7.64	-	NV
Organochlorinated Pesticides & PCBs							
Chlordane (Total)	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	7
o,p-DDD + p,p-DDD	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	10
o,p-DDE + p,p-DDE	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	10
o,p-DDT + p,p-DDT	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	2.8
Total Endosulfan	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	1.5
Total PCB	<0.05	<0.05 (<0.05)	<0.05	<0.05	-	-	3
Aldrin	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	0.35
Dieldrin	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	0.35
a-Chlordane	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
g-Chlordane	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
o,p-DDD	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
p,p-DDD	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
o,p-DDE	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
p,p-DDE	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
o,p-DDT	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
p,p-DDT	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
Lindane	<0.003	<0.003 (<0.003)	<0.003	<0.003	-	-	1.2
Endosulfan I (alpha)	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
Endosulfan II (beta)	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	NV
Endrin	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	0.48
Heptachlor	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	1.5
Heptachlor epoxide	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	0.048
Hexachlorobenzene	<0.005	<0.005 (<0.005)	<0.005	<0.005	-	-	1
Hexachlorobutadiene	<0.009	<0.009 (<0.009)	<0.009	<0.009	-	-	0.6
Hexachloroethane	<0.01	<0.01 (<0.01)	<0.01	<0.01	-	-	2.1
Methoxychlor	<0.01	<0.01 (<0.01)	<0.01	<0.01	-	-	6.5

Notes:

MECP Table 2 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 2 Standards, Medium/Fine-Textured Soils, Potable Groundwater Condition, for All Types of Property Use.
BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units In Micrograms Per Litre
(##)	Bracketed Values Indicate Laboratory Duplicate Results
mbgs	Metres Below Ground Surface
NA	Not Applicable
NV	No Value

TABLE 5
GROUNDWATER ANALYTICAL RESULTS
91 Egltinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

Sample Designation	*MW19-04*	*MW19-05*	*TRIP BLANK*	*F1 TRIP BLANK*	***MECP Table 2 Standards****
Sample Collection Date (dd/mm/yyyy)	*02/04/2019*	*05/04/2019*	*28/03/2019*	*02/04/2019*	
Sample Depth (mbgs)	*2.60*	*2.95*	*NA*	*NA*	
Sample Location	*MW19-04*	*MW19-05*	*NA*	*NA*	
Laboratory Certificate of Analysis No.	*B986440*	*86440 & B989*	*B981984*	*B986440*	
Date of Analysis (dd/mm/yyyy)	*5/4/2019 - 8/4/2019*	*5/4/2019 - 10/4/2019*	*1/4/2019 - 2/4/2019*	*2/4/2019 - 3/4/2019*	
Volatile Organic Compounds					
Benzene	<0.20	<0.20	<0.20	<0.20	5
Ethylbenzene	<0.20	<0.20	<0.20	<0.20	2.4
Toluene	<0.20	<0.20	<0.20	<0.20	24
Xylenes (Total)	<0.40	<0.40	<0.40	<0.20	300
Petroleum Hydrocarbons (PHCs)					
PHCs F1 (C_6 - C_{10})	<25	<25	<25	-	750
PHCs F2 (>C_{10} - C_{16})	<100	<100	-	-	150
PHCs F3 (>C_{16} - C_{34})	<200	<200	-	-	500
PHCs F4 (>C_{34} - C_{50})	<200	<200	-	-	500
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	<0.050	<0.050	-	-	4.1
Acenaphthylene	<0.050	<0.050	-	-	1
Anthracene	<0.050	<0.050	-	-	2.4
Benzo(a)anthracene	<0.050	<0.050	-	-	1
Benzo(a)pyrene	<0.010	<0.010	-	-	0.01
Benzo(b)fluoranthene	<0.050	<0.050	-	-	0.1
Benzo(ghi)perylene	<0.050	<0.050	-	-	0.2
Benzo(k)fluoranthene	<0.050	<0.050	-	-	0.1
Chrysene	<0.050	<0.050	-	-	0.1
Dibenzo(a,h)anthracene	<0.050	<0.050	-	-	0.2
Fluoranthene	<0.050	<0.050	-	-	0.41
Fluorene	<0.050	<0.050	-	-	120
Indeno(1,2,3-cd)pyrene	<0.050	<0.050	-	-	0.2
Methylnaphthalene 2-(1-)	<0.071	<0.071	-	-	3.2
Naphthalene	<0.050	<0.050	-	-	11
Phenanthrene	<0.030	<0.030	-	-	1
Pyrene	<0.050	<0.050	-	-	4.1
Metals					
Antimony	<0.50	1.7	-	-	6
Arsenic	1	1.4	-	-	25
Barium	55	110	-	-	1000
Beryllium	<0.50	<0.50	-	-	4
Boron	83	68	-	-	5000
Cadmium	<0.10	<0.10	-	-	2.7
Chromium (Total)	<5.0	<5.0	-	-	50
Chromium (Hexavalent)	<0.50	<0.50	-	-	25
Cobalt	<0.50	1.2	-	-	3.8
Copper	6.5	2.5	-	-	87
Lead	<0.50	<0.50	-	-	10
Mercury	<0.1	<0.1	-	-	1
Molybdenum	1.7	3.7	-	-	70
Nickel	<1.0	2	-	-	100
Selenium	<2.0	<2.0	-	-	10
Silver	<0.10	<0.10	-	-	1.5
Sodium	120000	170000	-	-	490000
Thallium	<0.050	<0.050	-	-	2
Uranium	7.9	6.4	-	-	20
Vanadium	1.5	0.63	-	-	6.2
Zinc	<5.0	6	-	-	1100
Inorganics					
Chloride	310	450	-	-	790000
Cyanide (Free)	<1	<1	-	-	66
Total Ammonia-N	0.073	-	-	-	NV
Nitrite (N)	-	-	-	-	NV
Nitrate (N)	-	-	-	-	NV
Nitrate + Nitrite (N)	-	-	-	-	NV
pH	7.56 (7.56)	-	-	-	NV
Organochlorinated Pesticides & PCBs					
Chlordane (Total)	<0.005	<0.005	-	-	7
o,p-DDD + p,p-DDD	<0.005	<0.005	-	-	10
o,p-DDE + p,p-DDE	<0.005	<0.005	-	-	10
o,p-DDT + p,p-DDT	<0.005	<0.005	-	-	2.8
Total Endosulfan	<0.005	<0.005	-	-	1.5
Total PCB	<0.05	<0.05	-	-	3
Aldrin	<0.005	<0.005	-	-	0.35
Dieldrin	<0.005	<0.005	-	-	0.35
a-Chlordane	<0.005	<0.005	-	-	NV
g-Chlordane	<0.005	<0.005	-	-	NV
o,p-DDD	<0.005	<0.005	-	-	NV
p,p-DDD	<0.005	<0.005	-	-	NV
o,p-DDE	<0.005	<0.005	-	-	NV
p,p-DDE	<0.005	<0.005	-	-	NV
o,p-DDT	<0.005	<0.005	-	-	NV
p,p-DDT	<0.005	<0.005	-	-	NV
Lindane	<0.003	<0.003	-	-	1.2
Endosulfan I (alpha)	<0.005	<0.005	-	-	NV
Endosulfan II (beta)	<0.005	<0.005	-	-	NV
Endrin	<0.005	<0.005	-	-	0.48
Heptachlor	<0.005	<0.005	-	-	1.5
Heptachlor epoxide	<0.005	<0.005	-	-	0.048
Hexachlorobenzene	<0.005	<0.005	-	-	1
Hexachlorobutadiene	<0.009	<0.009	-	-	0.6
Hexachloroethane	<0.01	<0.01	-	-	2.1
Methoxychlor	<0.01	<0.01	-	-	6.5

Notes:

MECP Table 2 Standards*	Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 2 Standards, Medium/Fine-Textured Soils, Potable Groundwater Condition, for All Types of Property Use.
BOLD	Exceeds Site Condition Standard
BOLD	Reportable Detection Limit Exceeds Site Condition Standard
Units	All Units In Micrograms Per Litre
(##)	Bracketed Values Indicate Laboratory Duplicate Results
mbgs	Metres Below Ground Surface
NA	Not Applicable
NV	No Value

TABLE 6

MAXIMUM CONCENTRATIONS IN SOIL

91 Egltinton Limited Partnership

131 Eglinton Avenue East, Mississauga, Ontario

Parameter	Maximum Concentration	Sample Designation	Sample Location	Sample Depth (mbgs)
Volatile Organic Compounds				
Acetone	-	-	-	-
Benzene	<0.020	All submitted samples.		
Bromodichloromethane	-	-	-	-
Bromoform	-	-	-	-
Bromomethane	-	-	-	-
Carbon Tetrachloride	-	-	-	-
Chlorobenzene	-	-	-	-
Chloroform	-	-	-	-
Dibromochloromethane	-	-	-	-
1,2-Dichlorobenzene	-	-	-	-
1,3-Dichlorobenzene	-	-	-	-
1,4-Dichlorobenzene	-	-	-	-
Dichlorodifluoromethane	-	-	-	-
1,1-Dichloroethane	-	-	-	-
1,2-Dichloroethane	-	-	-	-
1,1-Dichloroethylene	-	-	-	-
cis-1,2-Dichloroethylene	-	-	-	-
trans-1,2-Dichloroethylene	-	-	-	-
1,2-Dichloropropane	-	-	-	-
1,3-Dichloropropene (Total)	-	-	-	-
Ethylbenzene	<0.020	All submitted samples.		
Ethylene Dibromide	-	-	-	-
Hexane	-	-	-	-
Methyl Ethyl Ketone	-	-	-	-
Methyl Isobutyl Ketone	-	-	-	-
Methyl t-Butyl Ether (MTBE)	-	-	-	-
Methylene Chloride	-	-	-	-
Styrene	-	-	-	-
1,1,1,2-Tetrachloroethane	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-
Tetrachloroethylene	-	-	-	-
Toluene	<0.020	All submitted samples.		
1,1,1-Trichloroethane	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-
Trichloroethylene	-	-	-	-
Trichlorofluoromethane	-	-	-	-
Vinyl Chloride	-	-	-	-
Xylenes (Total)	<0.040	All submitted samples.		
Petroleum Hydrocarbons (PHCs)				
PHCs F1 (C_6 - C_{10})	<10	All submitted samples.		
PHCs F2 (>C_{10} - C_{16})	17	MW19-03 S3	MW19-03	1.52 - 2.29
PHCs F3 (>C_{16} - C_{34})	<50	All submitted samples.		
PHCs F4 (>C_{34} - C_{50})	<50			
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	<0.0050	All submitted samples.		
Acenaphthylene	<0.0050			
Anthracene	<0.0050			
Benzo(a)anthracene	0.0098	BH19-07 S1	BH19-07	0.00 - 0.76
Benzo(a)pyrene	0.013			
Benzo(b)fluoranthene	0.021			
Benzo(ghi)perylene	0.015			
Benzo(k)fluoranthene	0.0066			
Chrysene	0.012			
Dibenzo(a,h)anthracene	<0.0050	All submitted samples.		
Fluoranthene	0.024	BH19-07 S1	BH19-07	0.00 - 0.76
Fluorene	<0.0050	All submitted samples.		
Indeno(1,2,3-cd)pyrene	0.012	BH19-07 S1	BH19-07	0.00 - 0.76
Methylnaphthalene 2-(1-)	<0.0071	All submitted samples.		
Naphthalene	<0.0050			
Phenanthrene	0.0087	BH19-07 S1	BH19-07	0.00 - 0.76
Pyrene	0.025			
Metals				
Antimony	0.37	DUP19-01	MW19-01 S3	1.52 - 2.29
Arsenic	11	MW19-03 S2	MW19-03	0.76 - 1.52
Barium	410	BH19-07 S1	BH19-07	0.00 - 0.76
Beryllium	1.2			
Boron (Total)	11	DUP19-01	MW19-01 S3	1.52 - 2.29
Boron (Hot Water Soluble)	1.3	MW19-05 S1	MW19-05	0.00 - 0.76
Cadmium	0.77	MW19-02 S1	MW19-02	0.00 - 0.76
Chromium (Total)	33	BH19-07 S1	BH19-07	0.00 - 0.76
Chromium (Hexavalent)	<0.2	All submitted samples.		
Cobalt	18	BH19-07 S1	BH19-07	0.00 - 0.76
Copper	53	DUP19-01	MW19-01 S3	1.52 - 2.29
Lead	38	MW19-02 S1	MW19-02	0.00 - 0.76
Mercury	0.071	BH19-07 S1	BH19-07	0.00 - 0.76
Molybdenum	0.77	MW19-05 S1	MW19-05	0.00 - 0.76
Nickel	29	MW19-03 S2	MW19-03	0.76 - 1.52
Selenium	1	BH19-07 S1	BH19-07	0.00 - 0.76
Silver	<0.20	All submitted samples.		
Thallium	0.21	BH19-07 S1	BH19-07	0.00 - 0.76
Uraninum	1.1	MW19-05 S1	MW19-05	0.00 - 0.76
Vanadium	46	BH19-07 S1	BH19-07	0.00 - 0.76
Zinc	100	MW19-04 S2	MW19-04	0.76 - 1.52
Inorganics				
Cyanide (Free)	0.03	MW19-01 S1	MW19-01	0.00 - 0.76
Electrical Conductivity (mS/cm)	0.51	MW19-05 S1	MW19-05	0.00 - 0.76
Sodium Adsorption Ratio (No Units)	2.2			
Organochlorinated Pesticides & PCBs				
Chlordane (Total)	<0.0020	All submitted samples.		
o,p-DDD + p,p-DDD	0.0038	BH19-07 S1	BH19-07	0.00 - 0.76
o,p-DDE + p,p-DDE	0.053	MW19-05 S1	MW19-05	0.00 - 0.76
o,p-DDT + p,p-DDT	0.0079	BH19-07 S1	BH19-07	0.00 - 0.76
Total Endosulfan	<0.0020	All submitted samples.		
Total PCB	<0.015			
Aldrin	<0.0020			
a-Chlordane	<0.0020			
g-Chlordane	<0.0020			
o,p-DDD	<0.0020			
p,p-DDD	0.0038	BH19-07 S1	BH19-07	0.00 - 0.76
o,p-DDE	<0.0020	All submitted samples.		
p,p-DDE	0.053	MW19-05 S1	MW19-05	0.00 - 0.76
o,p-DDT	<0.0020	All submitted samples.		
p,p-DDT	0.0079	BH19-07 S1	BH19-07	0.00 - 0.76
Dieldrin	<0.0020	All submitted samples.		
Lindane	<0.0020			
Endosulfan I (alpha)	<0.0020			
Endosulfan II (beta)	<0.0020			
Endrin	<0.0020			
Heptachlor	<0.0020			
Heptachlor epoxide	<0.0020			
Hexachlorobenzene	<0.0020			
Hexachlorobutadiene	<0.0020			
Hexachloroethane	<0.0020			
Methoxychlor	<0.0050			

Notes:

Units	All Units In Micrograms Per Gram, Unless Otherwise Noted
mbgs	Metres Below Ground Surface
mS/cm	MilliSiemens Per Centimetre

TABLE 7
MAXIMUM CONCENTRATIONS IN GROUNDWATER
91 Egltinton Limited Partnership
131 Eglinton Avenue East, Mississauga, Ontario

Parameter	*Maximum Concentration*	*Sample Designation*	*Sample Location*	*Sample Depth (mbgs)*
Volatile Organic Compounds				
Acetone	<10	All submitted samples.		
Benzene	<0.20			
Bromodichloromethane	<0.50			
Bromoform	<1.0			
Bromomethane	<0.50			
Carbon Tetrachloride	<0.20			
Chlorobenzene	<0.20			
Chloroform	<0.20			
Dibromochloromethane	<0.50			
1,2-Dichlorobenzene	<0.50			
1,3-Dichlorobenzene	<0.50			
1,4-Dichlorobenzene	<0.50			
Dichlorodifluoromethane	<1.0			
1,1-Dichloroethane	<0.20			
1,2-Dichloroethane	<0.50			
1,1-Dichloroethylene	<0.20			
cis-1,2-Dichloroethylene	<0.50			
trans-1,2-Dichloroethylene	<0.50			
1,2-Dichloropropane	<0.20			
1,3-Dichloropropene (Total)	<0.50			
Ethylbenzene	<0.20			
Ethylene Dibromide	<0.20			
Hexane	<1.0			
Methyl Ethyl Ketone	<10			
Methyl Isobutyl Ketone	<5.0			
Methyl t-Butyl Ether (MTBE)	<0.50			
Methylene Chloride	<2.0			
Styrene	<0.50			
1,1,1,2-Tetrachloroethane	<0.50			
1,1,2,2-Tetrachloroethane	<0.50			
Tetrachloroethylene	<0.20			
Toluene	<0.20			
1,1,1-Trichloroethane	<0.20			
1,1,2-Trichloroethane	<0.50			
Trichloroethylene	<0.20			
Trichlorofluoromethane	<0.50			
Vinyl Chloride	<0.20			
Xylenes (Total)	<0.40			
Petroleum Hydrocarbons (PHCs)				
PHCs F1 (C_6 - C_{10})	<25	All submitted samples.		
PHCs F2 (>C_{10} - C_{16})	<100			
PHCs F3 (>C_{16} - C_{34})	<200			
PHCs F4 (>C_{34} - C_{50})	<200			
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	<0.050	All submitted samples.		
Acenaphthylene	<0.050			
Anthracene	<0.050			
Benzo(a)anthracene	<0.050			
Benzo(a)pyrene	<0.010			
Benzo(b)fluoranthene	<0.050			
Benzo(ghi)perylene	<0.050			
Benzo(k)fluoranthene	<0.050			
Chrysene	<0.050			
Dibenzo(a,h)anthracene	<0.050			
Fluoranthene	<0.050			
Fluorene	<0.050			
Indeno(1,2,3-cd)pyrene	<0.050			
Methylnaphthalene 2-(1-)	<0.071			
Naphthalene	<0.050			
Phenanthrene	<0.030			
Pyrene	<0.050			
Metals				
Antimony	1.7	MW19-05	MW19-05	2.95
Arsenic	1.4			
Barium	110			
Beryllium	<0.50	All submitted samples.		
Boron	140	DUP-02	MW19-01	2.52
Cadmium	<0.10	All submitted samples.		
Chromium (Total)	<5.0			
Chromium (Hexavalent)	<0.50			
Cobalt	1.2	MW19-05	MW19-05	2.95
Copper	6.5	MW19-04	MW19-04	2.60
Lead	<0.50	All submitted samples.		
Mercury	<0.1			
Molybdenum	3.7	MW19-05	MW19-05	2.95
Nickel	2			
Selenium	<2.0	All submitted samples.		
Silver	<0.10			
Sodium	170000	MW19-05	MW19-05	2.95
Thallium	<0.050	All submitted samples.		
Uranium	7.9	MW19-04	MW19-04	2.60
Vanadium	1.5			
Zinc	6	MW19-05	MW19-05	2.95
Inorganics				
Chloride	450	MW19-05	MW19-05	2.95
Cyanide (Free)	<1	All submitted samples.		
Total Ammonia-N	0.084	MW19-03	MW19-03	2.43
Nitrite (N)	<0.010	All submitted samples.		
Nitrate (N)	4.73	MW19-01	MW19-01	2.52
Nitrate + Nitrite (N)	4.73			
pH	7.64	MW19-03	MW19-03	2.43
Organochlorinated Pesticides & PCBs				
Chlordane (Total)	<0.005	All submitted samples.		
o,p-DDD + p,p-DDD	<0.005			
o,p-DDE + p,p-DDE	<0.005			
o,p-DDT + p,p-DDT	<0.005			
Total Endosulfan	<0.005			
Total PCB	<0.05			
Aldrin	<0.005			
Dieldrin	<0.005			
a-Chlordane	<0.005			
g-Chlordane	<0.005			
o,p-DDD	<0.005			
p,p-DDD	<0.005			
o,p-DDE	<0.005			
p,p-DDE	<0.005			
o,p-DDT	<0.005			
p,p-DDT	<0.005			
Lindane	<0.003			
Endosulfan I (alpha)	<0.005			
Endosulfan II (beta)	<0.005			
Endrin	<0.005			
Heptachlor	<0.005			
Heptachlor epoxide	<0.005			
Hexachlorobenzene	<0.005			
Hexachlorobutadiene	<0.009			
Hexachloroethane	<0.01			
Methoxychlor	<0.01			

Notes:

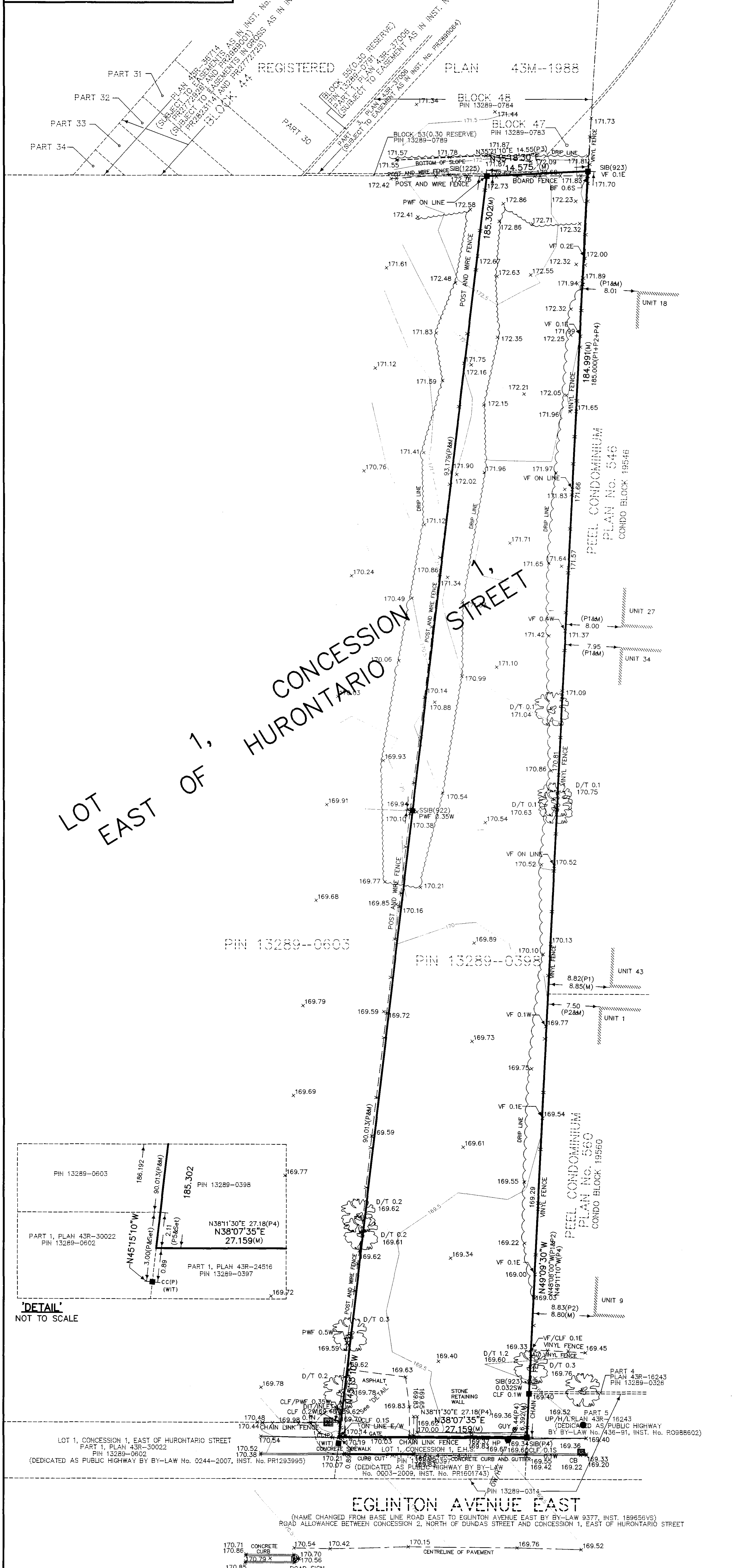
Units	All Units In Micrograms Per Litre
mbgs	Metres Below Ground Surface

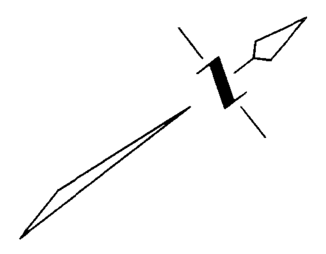
9.0 APPENDICES

APPENDIX A

Legal Survey and Survey Data

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





TOPOGRAPHIC PLAN OF SURVEY OF

PART OF LOT 1, CONCESSION 1 EAST OF HURONTARIO STREET

(GEOGRAPHIC TOWNSHIP OF TORONTO)

CITY OF MISSISSAUGA

REGIONAL MUNICIPALITY OF PEEL

SCALE 1:400

10 5 0 10 20 30 40 METRES

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NOTES

BEARINGS ARE GRID DERIVED FROM THE 6° UTM COORDINATE SYSTEM NAD 83(ORIG), ZONE 17, CENTRAL MERIDIAN 81° WEST LONGITUDE.

■	DENOTES	FOUND MONUMENT
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
P	"	SCHAEFFER DZALDOV BENNETT LTD., SURVEY DATED SEPTEMBER 28, 2018
P1	"	PEEL CONDOMINIUM PLAN No. 546
P2	"	PEEL CONDOMINIUM PLAN No. 560
P3	"	REGISTERED PLAN 43M-1988
P4	"	PLAN 43R-24516
P5	"	PLAN 43R-30022
M	"	MEASURED
922	"	SCHAEFFER DZALDOV BENNETT LTD.
923	"	TARASICK McMILLIAN KUBICKI LIMITED
1225	"	D.B. SEARLES, O.L.S.
CC	"	CUT CROSS
WIT	"	WITNESS
BF	"	BOARD FENCE
CLF	"	CHAIN LINK FENCE
PWF	"	POST AND WIRE FENCE
E.H.S.	"	EAST HURONTARIO STREET
VF	"	VINYL FENCE

TOPOGRAPHIC NOTES

CB	▣ DENOTES	CATCH BASIN
UP	● DENOTES	UTILITY POLE
L	DENOTES	LIGHT
H	DENOTES	HYDRO
OW	DENOTES	OVERHEAD WIRES
D/T 0.10	DENOTES	DECIDUOUS TREE 0.10m dia.
GUY	DENOTES	GUY WIRE/POLE

BENCHMARK

ELEVATIONS SHOWN HEREON ARE RELATED TO MISSISSAUGA DATUM AND ARE REFERRED TO CITY OF MISSISSAUGA BENCHMARK No. 1073, HAVING A PUBLISHED ELEVATION OF 171.721 METRES.

CONTOUR INTERVAL 0.50m

DURING THE SURVEY WE ATTEMPTED TO UNCOVER ALL SURFACE FEATURES, HOWEVER, WE ARE NOT LIABLE FOR ANY SUCH FEATURES THAT WERE COVERED BY SNOW OR ICE AT THE TIME OF THE SURVEY.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

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

2. THE SURVEY WAS COMPLETED ON THE 29TH DAY OF DECEMBER, 2018.

DATE : JANUARY 19, 2019.

OPHIR N. DZALDOV
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2071052
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29(3).

SCHAEFFER DZALDOV BENNETT LTD.
ONTARIO LAND SURVEYORS
64 JARDIN DRIVE CONCORD, ONTARIO L4K 3P3 TEL.(416)987-0101

CALC. WMF	DRAWN SAMI/LW	CHECKED WMF	SCALE 1:400	JOB NO. 17-450-04

JANUARY 19, 2019

APPENDIX B

Sampling and Analysis Plan

FINAL

Sampling and Analysis Plan for Phase Two Environmental Site Assessment

131 Eglinton Avenue East
Mississauga, Ontario

Prepared for:

91 Eglinton Limited Partnership
1 Steelcase Road West, Unit 8
Markham, ON L3R 0T3

Attn: Mark Liddy

April 29, 2019

Pinchin File: 230989.001

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Issued To:	**91 Eglinton Limited Partnership**
Contact:	**Mark Liddy**
	April 29, 2019
Pinchin File:	**230989.001**
Issuing Office:	**2470 Milltower Court, Mississauga, ON** **L5N 7W5**
Primary Pinchin Contact:	**Michael Birch, P.Geo.** **905.363.1304** **mbirch@pinchin.com**

Author:

Michael Birch, B.Sc., P.Geo.
Project Manager
905.363.1304
mbirch@pinchin.com

Reviewer:

Craig Kelly, B.Sc.H., P.Geo.,QP-ESA
Senior Geoscientist
905.363.1352
cxkelly@pinchin.com

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1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) has prepared this Sampling and Analysis Plan (SAP) for the Phase Two Environmental Site Assessment (ESA) to be performed at the property located at 131 Eglinton Avenue East in Mississauga, Ontario (hereafter referred to as the Site or Phase Two Property). The Phase Two Property is a vacant lot which was formerly developed with a residential property and a garden supply centre. A Key Map showing the Phase Two Property location is provided on Figure 1 (all Figures are located in Appendix I).

This Phase Two ESA was conducted at the request of 91 Eglinton Limited Partnership (Client) in order to support the acquisition of the Site and of the Client's application for a Site Plan Approval (SPA) with the City of Mississauga. It is Pinchin's understanding that a portion of the Site (the southern 4 to 5 metres) will be dedicated (conveyed) to the City of Mississauga. The Phase Two ESA was completed in accordance with Ontario Regulation (O.Reg.) 153/04 should the filing of a Record of Site Condition (RSC) with the Ontario Ministry of the Environment, Conservation and Parks (MECP) be deemed required.

The work completed for the Phase Two ESA will be performed in general accordance with standard environmental consulting practices and the following documents:

- MECP document entitled "*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*", revised December 1996;
- Association of Professional Geoscientists of Ontario document entitled *"Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)"*, dated April 2011; and
- O. Reg. 153/04.

This SAP provides the scope of work and procedures for completing the field investigation for the Phase Two ESA. The Phase Two ESA will be performed in accordance with the scope of work, and terms and conditions described in the proposal entitled *"Proposal for Phase Two Environmental Site Assessment"*, prepared for the Client, dated February 11, 2019.

2.0 AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

The objectives of the Phase Two ESA will be to assess soil and groundwater quality at the Phase Two Property in relation to four areas of potential environmental concern (APECs) and related potentially contaminating activities (PCAs) and contaminants of potential concern (COPCs) identified in a Phase One ESA completed by Pinchin in accordance with O. Reg. 153/04, the findings of which are provided in the report entitled "*Phase One Environmental Site Assessment, 131 Eglinton Avenue East, Mississauga, Ontario",* prepared for the Client. The APECs and corresponding PCAs and COPCs are summarized on Figure 2 and in the following table:

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 (Groundwater, Soil and/or Sediment)**
APEC #1 (Historical heating oil AST associated with the historical farm house formerly utilized as a car parking garage)	West exterior wall of the historical farm house that was converted to a car parking garage located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #2 (Unknown heating source for the historical farm house)	In the vicinity of the historical farm house located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #3 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil

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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 (Groundwater, Soil and/or Sediment)
APEC #4 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 22 – Fertilizer Manufacturing, Processing and Bulk Storage	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil and Groundwater

Notes:

BTEX – benzene, toluene, ethylbenzene and total xylenes

PHCs – petroleum hydrocarbon fractions F1-F4

PAHs – polycyclic aromatic hydrocarbons

NA – not applicable

3.0 SCOPE OF WORK

The information obtained from the Phase One ESA, in particular the Phase One Conceptual Site Model, was used to determine the environmental media requiring investigation during the Phase Two ESA (i.e., soil and groundwater), the locations and depths for sample collection, and the parameters to be analyzed for the samples submitted from each APEC. The Phase Two ESA scope of work will include the advancement of eight boreholes, five of which will be completed as groundwater monitoring wells. The proposed borehole and groundwater monitoring well locations are provided on Figure 3.

Table 1 in Appendix II provides a detailed summary of the Phase Two ESA scope of work, including:

- Boreholes and/or groundwater monitoring wells to be completed within each APEC and the COPCs to be analyzed for samples collected in each APEC.
- Media to be sampled at each sampling location, the sampling system (see Section 7.0), the soil sampling depth intervals, monitoring well screen intervals and the sampling frequency.
- Number of samples per borehole or groundwater monitoring well to be collected and submitted for laboratory analysis.

Note that the soil sampling depth intervals (i.e., borehole depths), monitoring well screen intervals and sampling frequency presented in Table 2 are based on the actual conditions as observed in the field during the drilling program. There were deviations from the original proposed scope of work in terms of borehole depths, soil sample intervals, and well screen intervals, due to the presence of bedrock at shallower depths than were anticipated during development of the Phase Two scope of work.

Additional scope of work items include the following:

- Submit up to three representative soil samples for hydrometer grain size analysis and eight soil samples for laboratory analysis of pH in order to confirm the appropriate standards identified 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 (MECP Standards). Under O. Reg. 153/04, a property is deemed to be a “sensitive site” if the pH is less than 5 or greater than 9 (surface soil), or less than 5 or greater than 11 (subsurface soil). If a property is determined to be a sensitive site based on these criteria, more stringent MECP Standards will apply. Grain size analysis is required to determine whether the predominant subsurface soil is either “coarse-grained” or “medium/fine-grained”.
- Submit one representative composite soil sample collected from the soil cuttings generated by the borehole drilling program for analysis of leachate concentrations of inorganics, VOCs, benzo(a)pyrene and polychlorinated biphenyls in accordance with the Toxicity Characteristic Leaching Procedure as per Ontario Regulation 347/90 (as amended) to characterize the soil cuttings for off-Site disposal purposes.
- Conduct elevation surveying of the ground surface elevations of all monitoring well locations, and the top of pipe elevations for all groundwater monitoring wells.
- Obtain depth to water measurements of all newly-installed monitoring wells, including assessment for non-aqueous phase liquid. Depth to water measurements will be made during well development and groundwater sampling.
- Complete groundwater sampling using low-flow purging and sampling methods as per SOP-EDR023 (see Section 6.0), unless well yields are too low to permit this method to be used. For well(s) where low flow sampling cannot be employed, groundwater sampling will be conducted using the well volume method described in SOP-EDR008.

4.0 DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) for the Phase Two ESA will be to obtain unbiased analytical data that are representative of actual soil and groundwater conditions at the Phase Two Property. This will be accomplished by implementing a quality assurance/quality control (QA/QC) program, as described in Section 5.0, and by completing the field work in accordance with Pinchin's standard operating procedures (SOPs), as described in Section 6.0. Pinchin's SOPs are based in part on the MECP's *"Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario"*, dated December 1996 and the Association of Professional Geoscientists of Ontario document entitled *"Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)"*, dated April 2011.

The DQOs are intended to minimize uncertainty in the analytical data set such that the data are considered reliable enough to not affect the conclusions and recommendations of the Phase Two ESA and to meet the overall objective of the Phase Two ESA, which is to assess the environmental quality of the Phase Two Property in relation to the identified APECs.

5.0 QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

5.1 Non-Dedicated Sampling and Monitoring Equipment Cleaning

Based on the proposed scope of work, the following non-dedicated sampling and monitoring equipment will be used during completion of the Phase Two ESA:

- Interface probe.

All of the above-listed equipment will be cleaned prior to initial use and between samples or sampling locations, as appropriate, following the equipment cleaning procedures described in SOP-EDR009. Any non-dedicated sampling or monitoring equipment not listed above that is used during the Phase Two ESA will also be cleaned in accordance with SOP-EDR009.

5.2 Trip Blanks

A groundwater trip blank is a set of VOC sample vials filled by the analytical laboratory with VOC-free distilled water and shipped with the groundwater sample containers. A soil trip blank is a set of VOC sample vials that are pre-charged with methanol preservative and shipped with the soil sample containers.

Trip blanks will be stored with the sample containers provided by the analytical laboratory during travel to the Phase Two Property, while on the Phase Two Property, and during travel from the Phase Two Property back to the analytical laboratory. The sample containers comprising a trip blank will not be opened in the field.

One trip blank will accompany each submission to the laboratory. Each trip blank will be submitted for analysis of PHCs F1 and VOCs. Based on the scope of work and anticipated field work schedule for the Phase Two ESA, it is estimated that analysis of one groundwater trip blank will be required. Additional trip blanks will be submitted if there are additional laboratory submissions.

As a further field quality control measure, one soil sampling trip blank will be analyzed for PHCs F1 and VOCs.

5.3 Field Duplicate Samples

Field duplicate soil and groundwater samples will be collected for laboratory analysis in accordance with SOP-EDR025 at a frequency of one sample for every ten samples submitted for laboratory analysis, with a minimum of one sample per media sampled per COPC.

5.4 Calibration Checks on Field Instruments

5.4.1 Field Screening Instruments

The photoionization detector (PID) and combustible gas indicator (CGI) used for the field screening of soil samples will be calibrated in accordance with the procedures described in SOP-EDR003. Calibration checks will also be made at the frequency specified in SOP-EDR003.

Records of the calibration and calibration checks of the PID and CGI, including any calibration sheets provided by the equipment supplier, will be kept for inclusion in the Phase Two ESA report.

5.4.2 Water Quality Measurement Instruments

Water quality instruments used to measure field parameters during groundwater sampling will be calibrated in accordance with the procedures described in SOP-EDR016. Calibration checks will also be made at the frequency specified in SOP-EDR016.

Records of the calibration and calibration checks of the probes/instruments used for water quality parameter measurements, including any calibration sheets provided by the equipment supplier, will be kept for inclusion in the Phase Two ESA report.

6.0 STANDARD OPERATING PROCEDURES

The proposed field investigation for the Phase Two ESA will require the following SOPs to be followed:

- Borehole drilling (SOP-EDR006).
- Soil sampling and logging (SOP-EDR013 and SOP-EDR019).
- Field screening of soil samples (SOP-EDR003).

- Monitoring well design and construction (SOP-EDR007).
- Monitoring well development (SOP-EDR017).
- Field measurement of water quality indicators (SOP-EDR016).
- Monitoring well sampling (SOP-EDR008 and/or SOP-EDR023).
- QA/QC sampling (SOP-EDR025).
- Field decontamination of non-dedicated monitoring and sampling equipment (SOP-EDR009).

The above-referenced SOPs are provided in Appendix III. Each SOP includes a section describing the specific requirements for Phase Two ESAs completed to support the filing of an RSC in accordance with O. Reg. 153/04.

Any deviations from the SOPs will be summarized in the Phase Two ESA report.

7.0 SAMPLING SYSTEM

The borehole and monitoring well locations in all APECs will be selected following a judgemental sampling system. Boreholes and monitoring wells will be placed at locations where the potential for COPCs to be present is considered the highest (i.e., “worst case”), as per the following:

- Boreholes and monitoring wells will be completed in the suspected former vicinity of the historical oil AST associated with the historical farm house formerly utilized as a car parking (APECs #1);
- Boreholes and monitoring wells will be completed in the vicinity of the former historical farm house (APEC #2); and
- Boreholes and monitoring wells will be completed throughout the location of the former garden centre (APECs #3 and 4).

In addition, the field screening results for soil samples collected from each borehole will be used to select “worst case” samples for laboratory analysis.

The sampling system that will be used for each APEC is summarized in Table 1.

8.0 PHYSICAL IMPEDIMENTS

Pinchin does not anticipate any physical impediments that will limit access to the Phase Two Property during completion of the Phase Two ESA.

9.0 TERMS AND LIMITATIONS

This Sampling and Analysis Plan (SAP) has been prepared to summarize the general scope of work and field procedures to be followed for the Phase Two ESA that will be performed for 91 Eglinton Limited Partnership (Client) in order to investigate potential environmental impacts at 131 Eglinton Avenue East, Mississauga, Ontario (Site). The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property. The Phase Two ESA will not quantify the extent of the current and/or recognized environmental condition or the cost of any remediation.

Conclusions derived from the Phase Two ESA will be specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples will be analyzed for a limited number of contaminants that are expected to be present at the Site, and the absence of information relating to a specific contaminant does not indicate that it is not present.

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions on a property. Performance of the Phase Two ESA to the standards established by Pinchin is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions on the Site, and recognizes reasonable limits on time and cost.

The Phase Two ESA will be performed in general compliance with currently acceptable practices for environmental site investigations, and specific Client requests, as applicable to this Site.

This SAP was prepared for the exclusive use of the Client, subject to the terms, conditions and limitations contained within the duly authorized proposal for this project. Any use which a third party makes of this SAP, or any reliance on or decisions to be made based on it, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

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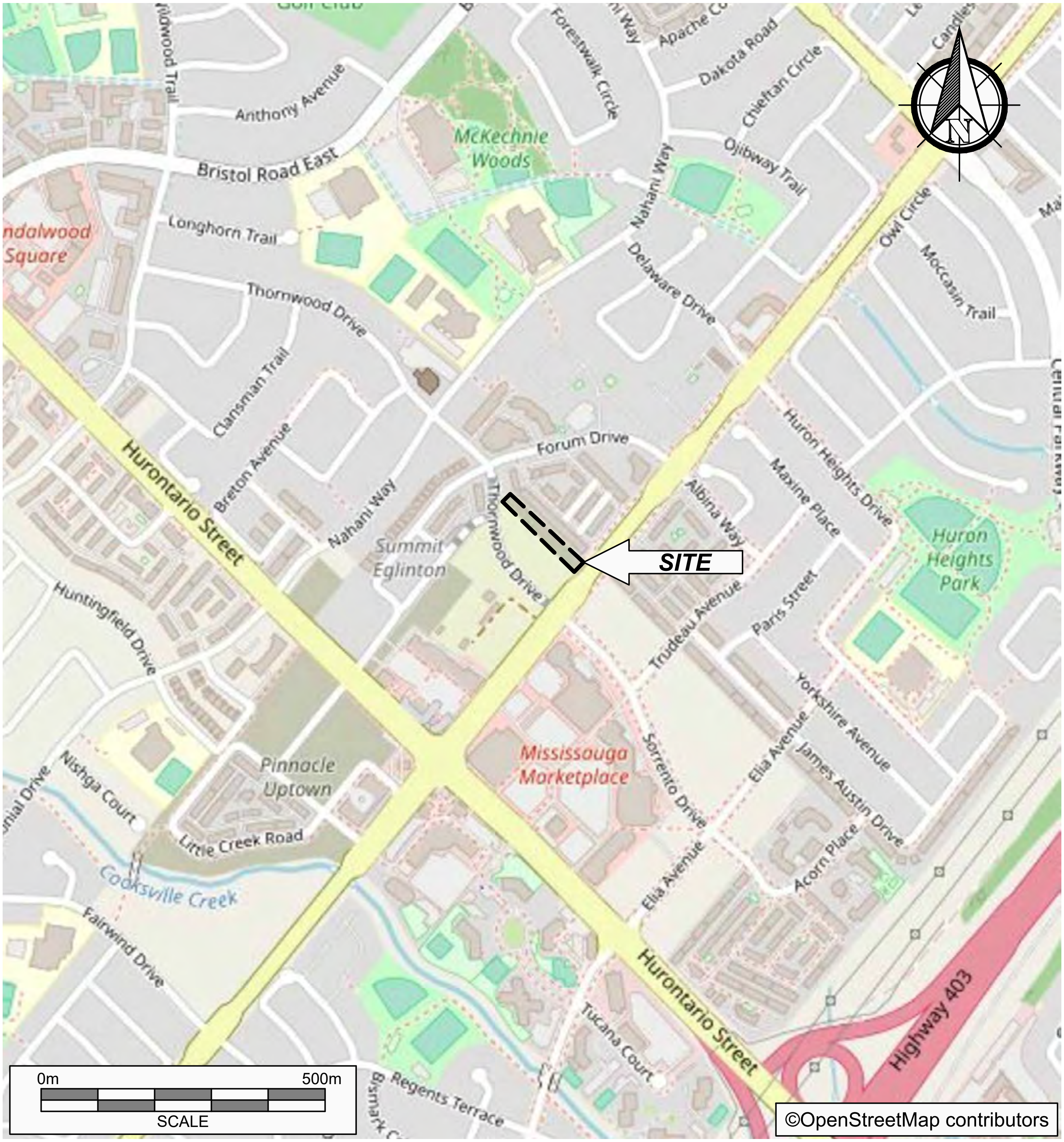
\\pinchin.com\Miss\Job\230000s\0230989.000 Liberty,131Eglinton,EDR,PhaseOneESA\0230989.001 Liberty,131Eglinton,EDR,PhaseTwo\Deliverables\Appendices\Appendix B - Sampling and Analysis Plan\230989.001 FINAL Phase Two ESA SAP Apr 29 2019.docx

Template: RSC Sampling and Analysis Plan, EDR, January 18, 2018

APPENDIX I

Figures



PINCHIN

PROJECT NAME
SAMPLING AND ANALYSIS PLAN FOR
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

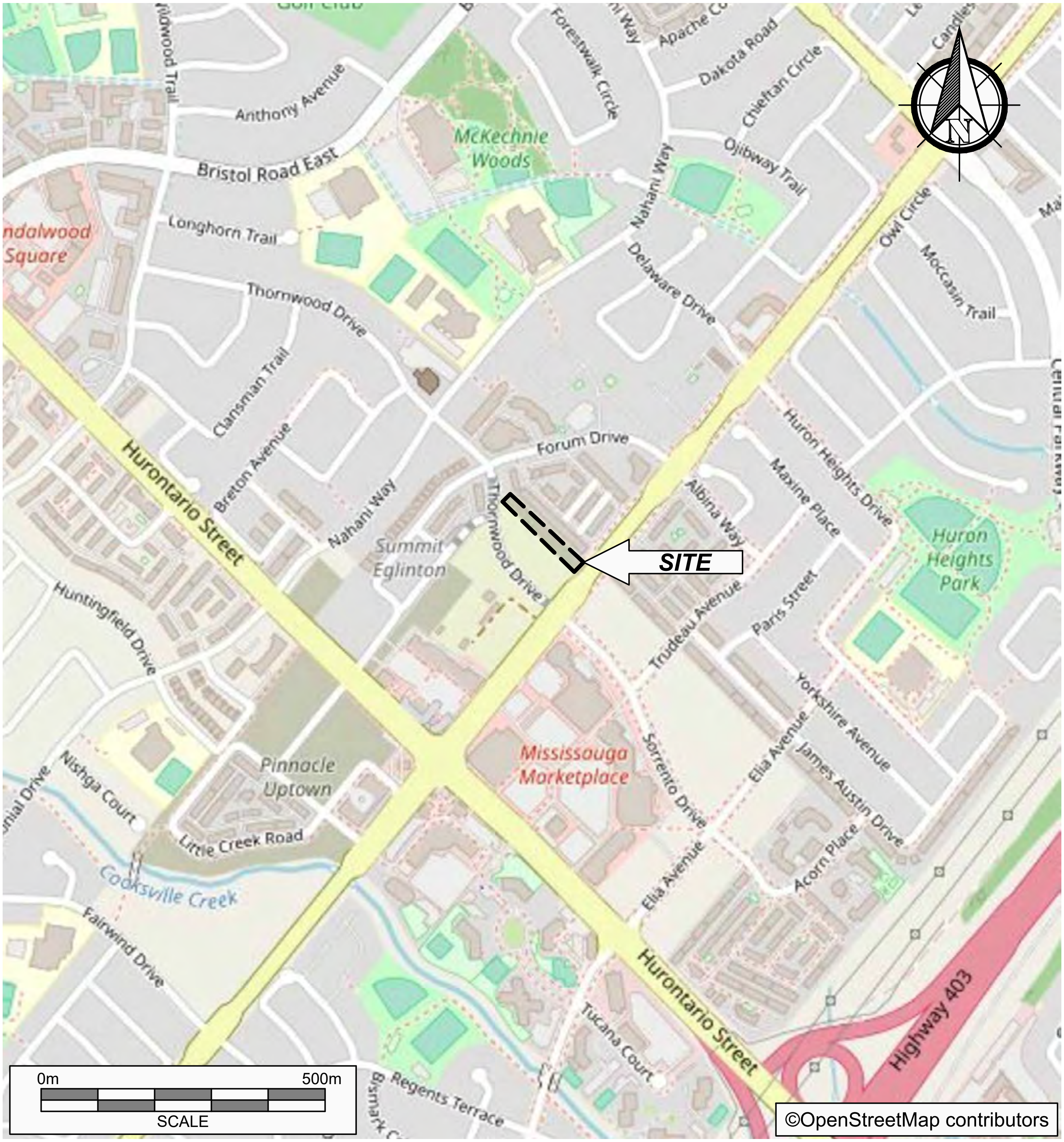
CLIENT NAME
91 EGLINGTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST, MISSISSAUGA, ONTARIO

FIGURE NAME
KEY MAP

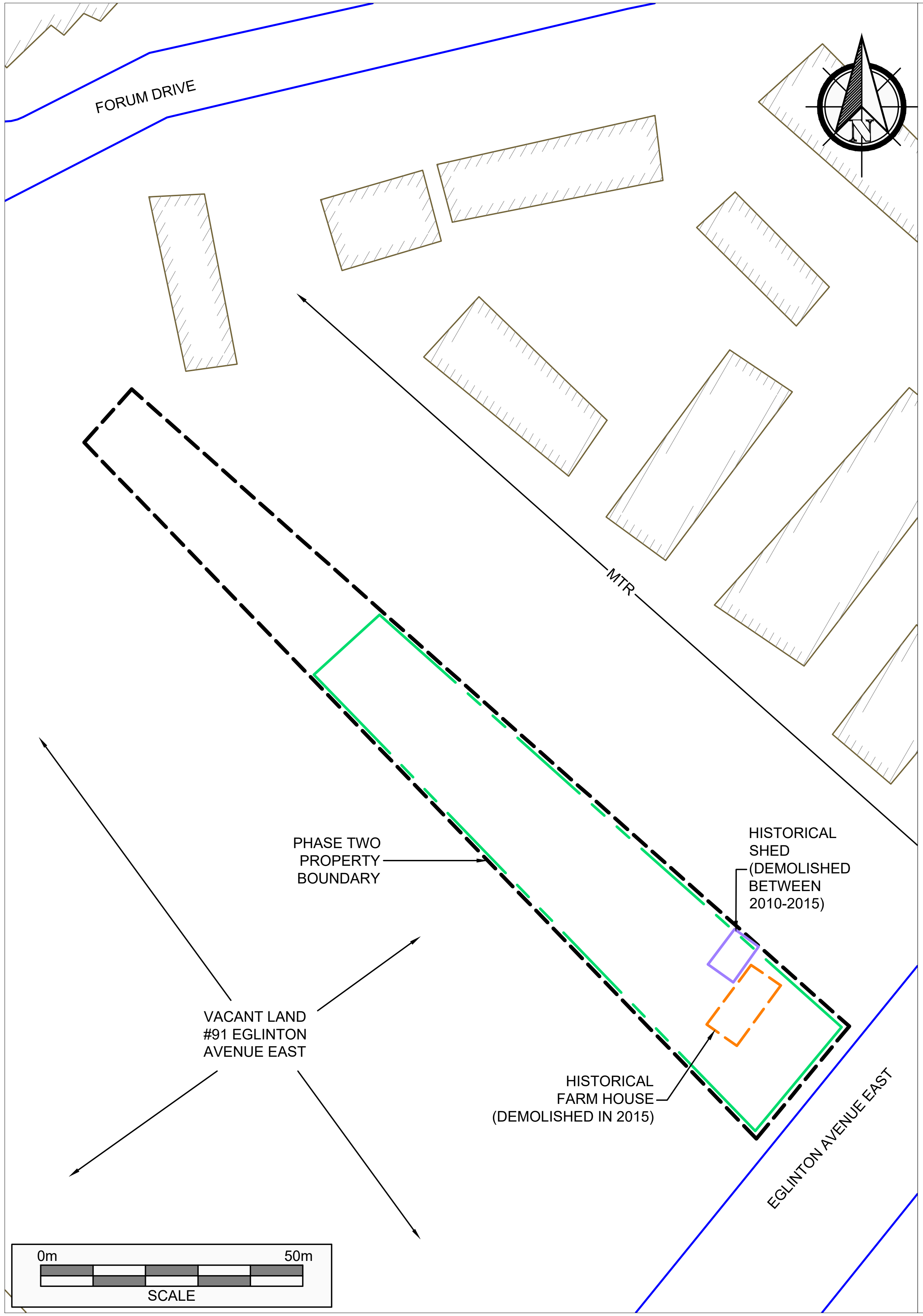
FIGURE NO.
1

SCALE	PROJECT NO.	DATE
AS SHOWN	230989.001	APRIL 2019



PINCHIN

PROJECT NAME	SAMPLING AND ANALYSIS PLAN FOR PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
CLIENT NAME	91 EGLINTON LIMITED PARTNERSHIP
PROJECT LOCATION	131 EGLINTON AVENUE EAST, MISSISSAUGA, ONTARIO
FIGURE NAME	KEY MAP
FIGURE NO.	1
SCALE	AS SHOWN
PROJECT NO.	230989.001
DATE	APRIL 2019



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 (Groundwater, Soil and/or Sediment)
APEC #1 (Historical heating oil AST associated with the historical farm house formerly utilized as a car parking garage)	West exterior wall of the historical farm house that was converted to a car parking garage located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #2 (Unknown heating source for the historical farm house)	In the vicinity of the historical farm house located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #3 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil
APEC #4 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 22 – Fertilizer Manufacturing, Processing and Bulk Storage	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil

LEGEND

MTR MULTI-TENANT RESIDENTIAL
APEC AREA OF ENVIRONMENTAL CONCERN
BTEX BENZENE, TOLUENE, ETHYLBENZENE AND TOTAL XYLENES
PHCs PETROLEUM HYDROCARBON FRACTIONS F1-F4
PAHs POLYCYCLIC AROMATIC HYDROCARBONS
NA NOT APPLICABLE

🟪 APEC1
🟧 APEC2
🟩 APEC3&4

PINCHIN

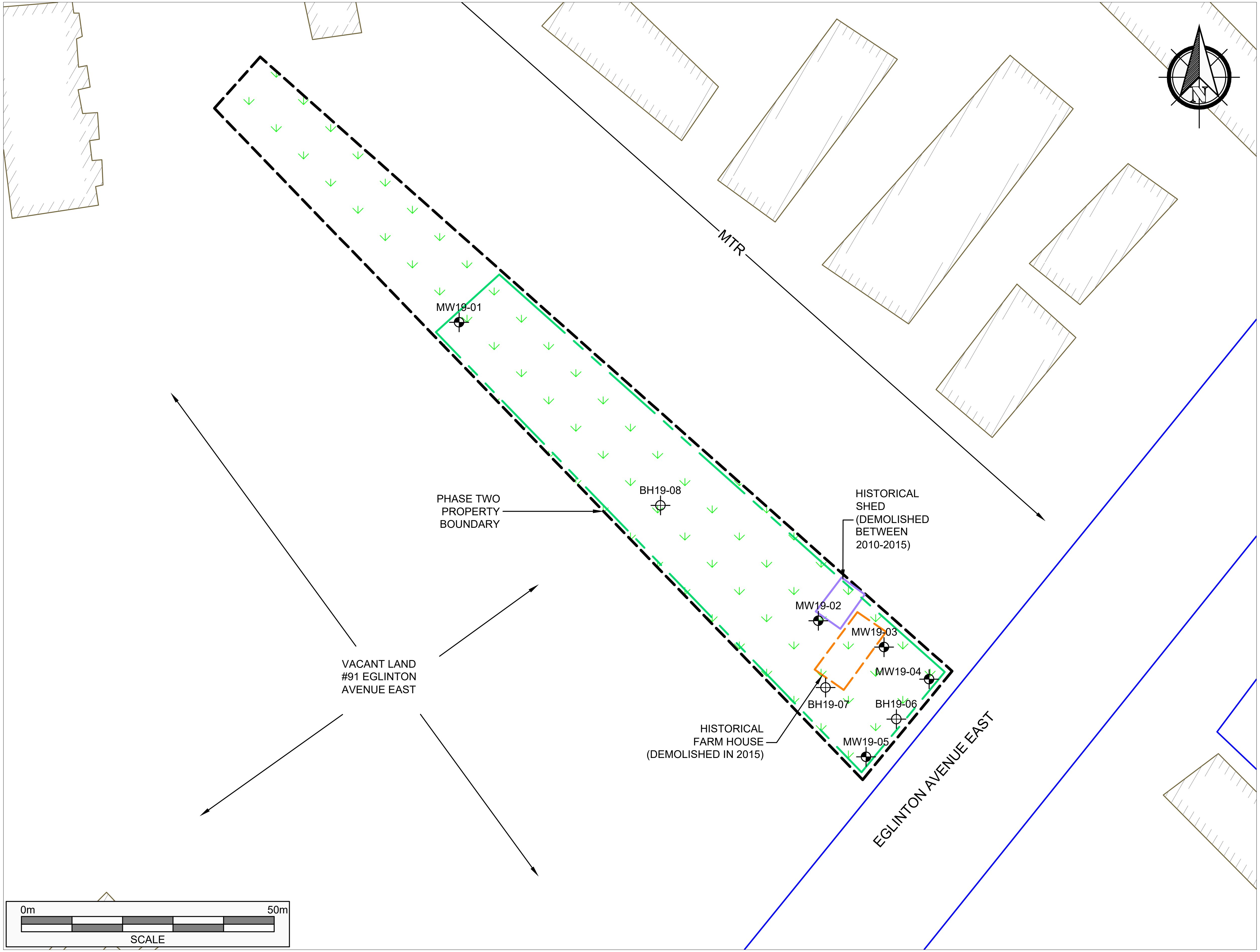
PROJECT NAME
SAMPLING AND ANALYSIS PLAN FOR PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME
91 EGLINTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST, MISSISSAUGA, ONTARIO

FIGURE NAME
AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

SCALE	PROJECT NO.
AS SHOWN	230989.001
DATE	FIGURE NO.
APRIL 2019	2



LEGEND

MTR MULTI-TENANT RESIDENTIAL
APEC AREA OF ENVIRONMENTAL CONCERN

🟪 APEC1
🟧 APEC2
🟩 APEC3&4
⊕ BOREHOLE (PINCHIN, 2019)
● MONITORING WELL (PINCHIN, 2019)

PINCHIN

PROJECT NAME
SAMPLING AND ANALYSIS PLAN FOR PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

CLIENT NAME
91 EGLINTON LIMITED PARTNERSHIP

PROJECT LOCATION
131 EGLINTON AVENUE EAST, MISSISSAUGA, ONTARIO

FIGURE NAME
BOREHOLE AND MONITORING WELL LOCATION PLAN

SCALE AS SHOWN	PROJECT NO. 230989.001
DATE APRIL 2019	FIGURE NO. 3

APPENDIX II

Tables

TABLE 1
PHASE TWO ESA SCOPE OF WORK SUMMARY
91 Eglinton Limited Partnership
131 Eglinton Avenue East, Mississauga, ON

APEC #	Sampling Location	Media Sampled	COPCs														Number of Samples Submitted for Analysis	Soil Sampling Depth Interval (mbgs)	Screen Interval (mbgs)	Sampling Frequency	Sampling System	Rationale/Notes
			BTEX & F1	PHC F2-F4	PAHs	PCBs	Organochlorines	Metals	Hydrides (As, Sb, Se)	Free Cyanide	Ammonia	Sodium	Chloride	EC	SAR	pH						
1	MW19-02	Soil	●	●	●	●	●	●	●	●		●		●	●	●	1	0.00 - 0.76	NA	Continous/Soil cores every 1.5 m	Judgemental	Assess soil and groundwater quality in relation to a historical oil AST associated with the historical farm house formerly utilized as a car parking garage (PCA # 1)
		Groundwater	●	●	●	●	●	●	●	●	●	●	●			●	1	NA	2.13 - 3.66	NA	Judgemental	
2	MW19-03	Soil	●	●	●	●	●	●	●	●		●			●	●	3	0.00 - 2.29	NA	Continous/Soil cores every 1.5 m	Judgemental	Assess soil and groundwater quality in relation to the unknown heating source for the historical farm house (PCA # 2)
		Groundwater	●	●	●						●					●	1	NA	0.91 - 3.96	NA	Judgemental	
	BH19-07	Soil	●	●	●	●	●	●	●	●		●		●	●	●	1	0.00 - 0.76	NA	Continous/Soil cores every 1.5 m	Judgemental	
3 & 4	MW19-01	Soil				●	●	●	●	●		●		●	●	●	2	0.00 - 2.29	NA	Continous/Soil cores every 1.5 m	Judgemental	Assess soil and groundwater quality in relation to former Site use as a garden centre which sold pesticides and fertilizers (PCA # 3 and 4)
		Groundwater				●	●	●	●	●	●	●	●			●	1	NA	0.91 - 3.36	NA	Judgemental	
	MW19-04	Soil	●	●	●	●	●	●	●	●		●		●	●	●	3	0.00 - 2.13	NA	Continous/Soil cores every 1.5 m	Judgemental	
		Groundwater	●	●	●	●	●	●	●	●	●	●	●			●	1	NA	1.11 - 3.35	NA	Judgemental	
	MW19-05	Soil	●	●	●	●	●	●	●	●		●		●	●	●	1	0.00 - 0.76	NA	Continous/Soil cores every 1.5 m	Judgemental	
		Groundwater	●	●	●	●	●	●	●	●		●	●				1	NA	1.11 - 3.35	NA	Judgemental	
	BH19-06	Soil	●	●	●	●	●	●	●	●		●		●	●	●	2	0.00 - 1.52	NA	Continous/Soil cores every 1.5 m	Judgemental	
	BH19-08	Soil	●	●		●	●	●	●	●		●		●	●	●	2	0.00 - 1.52	NA	Continous/Soil cores every 1.5 m	Judgemental	

PHCs	Petroleum Hydrocarbons (Fraction 1 to Fraction 4)
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
VOCs	Volatile Organic Compounds
PAHs	Polycyclic Aromatic Hydrocarbons
As, Sb, Se	Arsenic, Antimony, Selenium
Boron (HWS)	Hot Water Soluble Boron
Chromium VI	Hexavalent Chromium
EC	Electrical Conductivity

APEC	Area of Potential Environmental Concern
COPCs	Contaminants of Potential Concern
m	Metres
mbgs	Metres Below Ground Surface
NA	Not Applicable
PCA	Potentially Contaminating Activity
AST	Aboveground Storage Tank
SAR	Sodium Adsorption Ratio

APPENDIX III

Pinchin Standard Operating Procedures

SOP – EDR003 – REV004 – FIELD SCREENING OF SOIL SAMPLES

Title:	Field Screening of Soil Samples
Practice:	EDR
First Effective Date:	June 16, 2009
Version:	004
Version Date:	January 3, 2018
Author:	Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

TABLE OF CONTENTS

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	June 16, 2009	N/A	MEM
001	November 26, 2010	Update approval signature	FG
002	September 25, 2013	Revised SOP to reflect current practices/Added section on O.Reg. 153/04 compliance	RLM
003	April 29, 2016	Updated Section 4.0/Modified time between readings to 1 hour	RLM
004	April 28, 2017	Removed reference to Pinchin West/In Section 5.2, clarified that soil vapour measurements do not need to be made within one hour of sampling during winter conditions	RLM
004	January 3, 2018	Reviewed and confirmed current	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents the quantitative and qualitative methods to be used by Pinchin field personnel for field screening soil samples for potential impacts during field investigations.

The quantitative part of field screening consists of the measurement of vapour concentrations in soil sample headspace in order to assess the potential for volatile constituents to be present in the soil. The soil vapour readings obtained from these measurements are then used to assist in selecting potential "worst case" soil samples for submission to the laboratory for analysis. There are no regulatory standards for comparison with soil headspace vapour readings and we are using the general principle that the sample with the highest soil headspace vapour concentration from a group of samples is often the most likely to be impacted by volatile constituents.

The qualitative part of field screening includes assessing the soil for visual or olfactory indicators of potential contamination and is used in conjunction with the soil headspace vapour readings to select "worst case" soil samples to be submitted for laboratory analysis.

Note that soil vapour measurements have limited value when selecting "worst case" soil samples for laboratory analysis of non-volatile parameters such as metals. Visual observations of the presence of staining and debris (e.g., brick fragments and other building materials, coal ash, etc.), along with sample depth and likely migration pathways are to be factored into selecting the samples. The sample with the highest soil headspace vapour reading is not automatically selected under these circumstances.

Soil samples collected for soil vapour measurement must not be submitted for laboratory analysis except for analysis of non-volatile parameters (i.e., metals and inorganics) or grain size analysis.

This SOP also applies to the field screening of sediment samples but for simplicity, only soil samples are referred to below.

3.0 OVERVIEW

Not applicable.

4.0 DISTRIBUTION

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This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 Equipment and Supplies

- Resealable plastic bags (e.g., Ziploc®);

  (Note that small capacity bags (e.g., 500 millilitre capacity) are preferred over larger sized bags. When conducting headspace screening of a set of soil samples, the size of bag used should be consistent throughout in order to maintain the same approximate headspace volume in each bag);
- Combustible gas indicator (CGI) capable of operating in methane-elimination and/or photo-ionization detector (PID);

  (The Project Manager will be responsible for selecting the appropriate instrument(s) for each project. CGIs (e.g., RKI Eagle or Gastechtor) are acceptable for screening of petroleum hydrocarbons (PHCs) and related compounds, whereas PIDs (e.g., MiniRAE) are acceptable for screening for volatile organic compounds (VOCs), including chlorinated solvents, but can also be used when screening for PHCs. For many projects, it will be appropriate to employ both a CGI and a PID); and
- Calibration equipment (e.g., calibration gas, regulators, tubing, calibration bags, etc. as provided by the equipment supplier).

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5.2 Soil Headspace Vapour Measurement Procedure

The procedure for conducting soil headspace vapour measurements for soil sample headspace is as follows:

1. Unless pre-calibrated by the equipment supplier, calibrate the CGI/PID as per the instrument manufacturer's instructions before commencing soil vapour measurements. Record the date and time of calibration, and type and concentration of the calibration gas used in the field logbook or field forms;
2. Label the plastic bag with the sample number;
3. Create a split soil sample by splitting the sample core vertically (i.e., along the longitudinal axis) with one half used for soil headspace vapour measurement and the other half used to fill sample jars for laboratory analysis of volatile parameters (e.g., VOCs and PHCs (F1 fraction)). In other words, the depth interval of the soil subjected to soil headspace vapour measurements should be the same as the depth interval from which samples for volatile parameters are collected. This procedure doesn't apply to grab samples but is to be completed when soil cores are obtained, such as sampling with dual tube samplers, split-spoon samplers and hand augers. For grab samples, soil used for laboratory analysis and soil headspace vapour measurements should be collected from proximal locations;
4. Place the soil into the plastic bag until the bag is approximately one-quarter full as soon as possible after the sampling device is retrieved/opened;
5. Seal the bag and break apart the soil by manually kneading the soil in the sealed bag;
6. Allow the soil sample to equilibrate at ambient temperature for a minimum of 5 minutes but no longer than one hour before taking a soil headspace vapour measurement. The exception to this is that during winter conditions, the soil samples should be placed in a heated environment (e.g., building interior) to warm up for a minimum of 15 minutes before taking soil vapour measurements. In this case, the soil vapour measurements do not need to be completed within one hour of sample collection;
7. Do not store the bagged soil samples in direct sunlight prior to taking soil headspace vapour measurements;
8. When conducting soil headspace vapour measurements with a CGI, make sure it is switched to methane elimination mode;
9. When completing soil headspace vapour measurements of a soil sample using both a PID and CGI, the vapour measurement using the PID should be made first;

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10. Immediately before taking a soil headspace vapour measurement, gently agitate the bag and then create a small opening in the top of the bag. Insert the tip of the CGI/PID into the headspace of the bag and quickly reseal the bag around the tip to minimize leakage. If there is any water inside the bag, ensure that the tip does not contact the water;
11. Record the maximum vapour concentration measured within the first 10 seconds after inserting the tip of the CGI/PID into the bag. Note any anomalies that occur during the taking of the measurement (e.g., if the readings displayed by the instrument progressively increase and do not reach an obvious peak);
12. Remove the tip of the CGI/PID from the bag and reseal the bag immediately in case additional soil headspace vapour measurements are needed. If the soil headspace vapour is measured for a sample using a PID and an additional measurement with a CGI is required, wait a minimum of five minutes after the bag is resealed before taking the measurement with the CGI;
13. Before completing the next soil headspace vapour measurement, allow the CGI/PID to reach “zero” or “baseline”. If the CGI/PID does not return to “zero” or “baseline” it should be recalibrated before further soil headspace vapour measurements are made; and
14. At the discretion of the Project Manager, a calibration check of the CGI/PID should be completed at least once per day or at a frequency of once per 100 soil headspace vapour measurements (for projects where numerous soil headspace vapour measurements are made on a daily basis such as a large remediation project). A calibration check is made by measuring the concentration of a sample of the calibration gas with the CGI/PID without making any adjustments to the instrument beforehand and comparing the measured concentration with the known concentration. The comparison of the measured concentration versus the actual concentration of the calibration gas indicates how much the instrument’s calibration may have been altered during soil headspace vapour measurements, which is known as “instrument drift”. Should the calibration check show instrument drift of more than 10%, the CGI/PID needs to be recalibrated before completing further soil headspace vapour measurements. Record all pertinent information for the calibration check (e.g., date and time, initial measured concentration, calibration gas type and concentration) in the field logbook or field forms.

5.3 Visual Screening

Visual screening consists of examining the soil sample for potential indicators of contamination as per the following:

1. Visually examine the soil sample, including breaking apart a portion of the sample;

2. Note any indications of a mottled appearance, dark discolouration or staining, free-phase product or unusual colour;
3. Note any indications of non-soil constituents, such as brick, asphalt, wood or concrete fragments, coal fragments, coal ash, etc.; and
4. Record the findings of the visual screening in the field logbook or field forms. If there is no visual evidence of impacts this should be noted.

5.4 Olfactory Screening

Record in the field logbook or field forms the presence of any odours noted during sample collection and visual screening. Field staff are not expected to directly smell soil samples to assess the presence/absence of odours.

If it is possible to identify the likely type of odour (e.g., PHC-like, solvent-like, etc.) then this information should be recorded along with a comment on the severity of the odour (e.g., slight, strong, etc.). If the odour cannot be readily identified, it should be described in the field notes as “unidentified odour”.

If no odours are observed, this information should also be recorded in the field logbook or field forms.

5.5 Additional Considerations for Ontario Regulation 153/04 Phase Two ESA Compliance

When completing a Phase Two Environmental Assessment (ESA) in accordance with Ontario Regulation 153/04, the following additional procedures must be undertaken:

- Calibration of the CGI/PID must be completed at the beginning of each field day and calibration checks must be made either at the end of each field day or after every 100 soil vapour readings (whichever occurs first); and
- Thorough records of the CGI/PID calibration and calibration checks must be kept, including any calibration sheets provided by the equipment supplier. The Quality Assurance/Quality Control section of the Phase Two ESA report requires a discussion of field screening instrument calibration, and equipment calibration records must be appended to the Phase Two ESA report.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

Association of Professional Geoscientists of Ontario, *Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended),* April 2011.

Ontario Ministry of the Environment, *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, December 1996.

9.0 APPENDICES

None.

I:\2018 SOP Updates\SOP - EDR003 - REV004 - Field Screening of Soil Samples.docx

Template: Master SOP Template – February 2014

SOP – EDR006 – REV003 – BOREHOLE DRILLING

Title:	Borehole Drilling
Practice:	EDR
First Effective Date:	November 25, 2010
Version:	003
Version Date:	January 3, 2018
Author:	Francesco Gagliardi and Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

TABLE OF CONTENTS

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	November 25, 2010	N/A	FG
001	November 22, 2013	Streamlined text to reflect most common current practices/Removed sections covered by other SOPs	RM
002	April 29, 2016	Updated Section 4.0	RM
003	April 28, 2017	Removed reference to Pinchin West	RM
003	January 3, 2018	Reviewed and confirmed current	RM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents a description of the methods employed for the completion of boreholes and the collection of subsurface soil samples.

Boreholes are typically completed to determine geologic conditions for hydrogeological evaluation, to allow the installation of monitoring wells, and to allow for the collection of subsurface soil samples for laboratory analysis.

Several methods are available for the collection of shallow subsurface soil samples using hand-held equipment (e.g., hand augers, post-hole augers). However, the use of a drill rig, equipped with direct-push tooling, solid-stem augers and/or hollow-stem augers, is the most common method used by Pinchin to advance boreholes and will be the focus of this SOP.

A detailed discussion of all the various drilling rigs and drilling methods (e.g., direct push, augering, sonic drilling, air/water/mud rotary drilling, etc.) is beyond the scope of this SOP. The Project Manager will be responsible for determining the appropriate drill rig and drilling method for the site investigation.

The majority of the site investigations completed by Pinchin involve relatively straightforward drilling within the overburden within a one aquifer system. In some situations, such as when multiple aquifers are spanned by a borehole, when drilling into bedrock or when there are known impacts in the shallow subsurface, drilling using telescoped casing methods may be appropriate. Telescoped casing and bedrock drilling methods are beyond the scope of this SOP. In these situations, the Project Manager, in consultation with the drilling contractor, will be required to confirm the drilling requirements and procedures.

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3.0 OVERVIEW

Not applicable.

4.0 DISTRIBUTION

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5.0 PROCEDURE

5.1 General

The overall borehole drilling program is to be managed in accordance with SOP-EDR005. In particular, utility locates must be completed in accordance with SOP-EDR021 before any drilling activities commence.

All non-dedicated drilling and sample collection equipment must be decontaminated in accordance with SOP-EDR009.

5.2 Prior Planning and Preparation

The planning requirements for borehole drilling programs are covered in detail in SOP-EDR005.

As noted above, the type of drilling rig and drilling method will be determined by the Project Manager when scoping out the site investigation. In some cases, a switch in drilling rig and/or drilling method may be required depending on site conditions. For example, if competent bedrock is encountered in the subsurface at a depth above the water table, bedrock coring would be required to advance the borehole deep enough to install a monitoring well.

5.3 Borehole Drilling Procedures

Once the final location for a proposed boring has been selected and utility clearances are complete, one last visual check of the immediate area should be performed before drilling proceeds. This last visual check should confirm the locations of any adjacent utilities (subsurface or overhead) and verification of adequate clearance.

In some instances, in particular where there is uncertainty regarding the location of buried utilities or the borehole is being completed near a buried utility, the use of a hydro-excavating (hydro-vac) unit will be required to advance the borehole to a depth below the bottom of the utility. The hydro-vac uses a combination of high-pressure water and high-suction vacuum (in the form of a vacuum truck) to excavate soil. This is also known as “daylighting”. The need to use a hydro-vac will be determined by the Project Manager.

If it is necessary to relocate any proposed borehole due to terrain, utilities, access, etc., the Project Manager must be notified and an alternate location will be selected.

5.4 Borehole Nomenclature

If a borehole is advanced strictly for the purpose of soil sampling and no monitoring well is installed, the borehole should be identified as “BHxx”. If a monitoring well is installed in a borehole, the borehole should be identified as “MWxx”.

To avoid confusion, for site investigations involving both boreholes and monitoring wells, the numerical identifiers are to be sequential (e.g., there should not be a BH01 and MW01 for the same project).

When completing supplemental drilling programs, the borehole number should start at either the next sequential number after the last borehole number used in the first stage, or label them as ‘100 series’, ‘200 series’, etc. as appropriate (e.g., BH101, MW102, etc. for the first series of additional boreholes).

It is also acceptable to add the 2 digit year either before or after the borehole or monitoring well name (e.g., 17-MW101 or MW101-17).

5.5 Borehole Advancement

Each borehole will be advanced incrementally to permit intermittent or continuous sampling as specified by the Project Manager. Typically, the sampling frequency is one sample for every 2.5 or 5 feet (0.75 or 1.5 metres) the borehole is advanced. At the discretion of the Project Manager, soil samples may be collected at a lower frequency in homogeneous soil or at a higher frequency if changes in stratigraphy or other visual observations warrant it.

5.6 Direct-Push Drilling

This method is most commonly used at Pinchin to obtain representative samples of the subsurface soil material at a site. Direct-push drilling is achieved by driving a steel sampler into the subsurface at 1.5 metre intervals until the desired depth is achieved. The samplers are advanced by the drilling rig by means of a hydraulic hammer. For each soil sample run, a dedicated PVC sample liner is placed within the steel sampler which collects the soil as the sampler is advanced. After each sample run, a new sampler is assembled and it is advanced deeper down the open borehole.

There are generally two methods of direct-push drilling which are used:

- Dual-tube sampling; and
- Macro-core sampling.

A dual-tube sampler consists of an 8.25 centimetre (cm) inner diameter steel tooling (outer tube), equipped with a steel cutting-shoe affixed to the advancing end. A smaller diameter steel tooling, consisting of a 5.75 cm inner diameter (inner tube), fits within the outer tube and contains a PVC sample liner within. These two tubes form the completed dual-tube sampler. The completed dual-tube sampler has a length of 1.5 metres.

A macro-core sampler consists of the smaller inner tube (mentioned above) used independently. The macro-core sampler measures approximately 1.5 metres in length.

The difference in drilling methods used is typically determined by soil conditions. Where soil conditions consist of tight or dense soil types (e.g., silts or clays), the macro-core sampling method may be used as this method provides less resistance to advancing the sampler. In soil types that are less resistive (e.g., loose sands), the dual-tube sampler may be used.

5.7 Auger Drilling (Split-Spoon)

The auger drilling method for borehole advancement and sampling involves using an auger drill rig to advance the borehole to the desired sampling depth and sampling with a split-spoon sampler. Borehole advancement with hollow stem augers is the preferred drilling method when sampling with split-spoon samplers as it minimizes the potential for sloughed material to reach the bottom of a borehole and possibly cross-contaminate samples when the split-spoon is driven beyond the bottom of the borehole. Solid stem augers can be used when drilling at sites with cohesive soils (e.g., silty clay), provided that the borehole remains open after the augers are removed from the ground prior to driving the split-spoon sampler.

The split-spoon sampler consists of an 18- or 24-inch (0.45- or 0.60-metre) long, 2-inch (5.1 cm) outside diameter tube, which comes apart lengthwise into two halves.

Once the borehole is advanced to the target depth, the sampler is driven continuously for either 18 or 24 inches (0.45 or 0.60 metres) by a 140-pound (63.5 kilogram) hammer. The hammer may be lifted and dropped by either the cathead and rope method, or by using an automatic or semi-automatic drop system.

The number of blows applied in each 6-inch (0.15 metre) increment is counted until one of the following occurs:

- A total of 50 blows have been applied during any one of the 6-inch (0.15 metre) increments described above;
- A total of 100 blows have been applied;

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- There is no advancement of the sampler during the application of ten successive blows of the hammer (i.e., the spoon is "bouncing" on a cobble or bedrock); or
- The sampler has advanced the complete 18 or 24 inches (0.45 or 0.60 metre) without the limiting blow counts occurring as described above.

On the field form, record the number of blows required to drive each 6-inch (0.15 metre) increment of penetration. The first 6 inches is considered to be a seating drive.

The sum of the number of blows required for the second and third 6 inches (0.15 metres) of penetration is termed the "standard penetration resistance" or the "N-value". This information is typically provided on the borehole logs included in our site investigation reports.

The drill rods are then removed from the borehole and the split-spoon sampler unthreaded from the drill rods.

Caution must be used when drilling with augers below the groundwater table, particularly in sandy or silty soils. These soils tend to heave or "blow back" up the borehole due to the difference in hydraulic pressure between the inside of the borehole and the undisturbed formation soil. If blowback occurs, the drilling contractor will introduce water or drilling mud into the borehole or inside of the hollow-stem augers (if used) to equalize the hydraulic pressure and permit drilling deeper to proceed.

Heaving conditions and the use of water or drilling mud must be noted on the field logs, including the approximate volume of water or drilling mud used.

5.8 Auger Drilling (Direct Sampling)

In some jurisdictions (e.g., BC, Manitoba) it may be acceptable to collect soil samples directly from auger flights when using solid stem augers.

When sampling directly from auger flights, care must be exercised not to collect soils that were in direct contact with the auger or that were smeared along the edge of the borehole.

5.9 Borehole Advancement In Bedrock

It is sometimes possible to advance augers through weathered bedrock but borehole advancement through competent bedrock requires alternate drilling procedures. Bedrock drilling can be accomplished by advancing core barrels or tri-cone bits using air rotary or water rotary drilling methods. A description of the various bedrock drilling procedures is beyond the scope of this SOP.

The bedrock drilling method selected will depend in part on the type of bedrock, the borehole depth required, whether bedrock core logging is required, whether telescoped casing is required, etc. The Project Manager, in consultation with the drilling contractor, will determine the best method for advancing boreholes in competent bedrock.

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5.10 Borehole Soil Sample Logging and Collection

The following describes the methods for logging and collection of samples from a split-spoon or direct-push sampler but can be adapted for sample collection from augers:

1. After the driller opens the split-spoon sampler or PVC liner, measure the length of the soil core retained in the sampler in inches or centimetres. Be sure to be consistent in the use of metric or imperial units, and that the units used are clearly noted in the field notes. The percentage of soil retained versus the length of the sampler is known as “sample recovery” and this information is presented on the borehole logs within our Phase II ESA reports;
2. Dedicated, disposable nitrile gloves are to be worn during soil logging and sampling;
3. When using a dual-tube or macro-core sampler with direct-push drilling, there is usually sufficient sample recovery to permit the collection of two soil samples from each sample run. In this case, if the sample recovery is greater than 2.5 feet (0.75 metres), divide the recovered soil into two depth intervals and log/collect a sample from each interval. Split-spoon samplers typically are not long enough nor provide enough sample to divide a sample run into two. However, if a recovered sample contains distinct stratigraphic units (e.g., fill material and native material, obviously impacted soil and non-impacted soil), the distinct units are to be sampled separately. It is especially important that potentially impacted soil (e.g., fill material, obviously impacted soil) is not mixed with potentially unimpacted soil (e.g., native soil, soil without obvious impacts) to form one sample;
4. Discard the top several centimetres in each core as this material is the most likely to have sloughed off the borehole wall and may not be representative of the soil from the intended depth interval;
5. To minimize the potential for cross-contamination, scrape the exterior of the soil core with a clean, stainless-steel putty knife, trowel or similar device to remove any smeared soil. Note that is not practical and can be skipped if the soil is non-cohesive (e.g., loose sand);
6. Split the soil core longitudinally along the length of the sampler and to the extent practical, collect the soil samples for laboratory analysis from the centre of the core (i.e., soil that has not contacted the sampler walls). When sampling directly from augers, soils in direct contact with the auger or soils retained on the augers that may have been in contact with the edge of the borehole should not be collected.

   Collect soil samples for potential volatile parameter analysis and soil vapour measurement (in that order) as soon as possible after the core is opened. The length of time between opening the sampler and sample collection for these parameters should not exceed 2 minutes. It is important to follow this as it minimizes the potential for volatile constituents in the soil to be lost. See SOP-EDR003 for additional details regarding the collection of soil samples for soil vapour measurement;

7. Drillers are not to open the split-spoon sampler or PVC liner until instructed to do so. If drilling and sample retrieval is occurring at a rate faster than Pinchin staff are able to sample and log the soil cores, the drillers are to be instructed to slow down or stop until further notice. This will prevent a back log of soil cores from accumulating and minimize the exposure of the soil cores to ambient conditions. This is particularly important when sampling for VOCs;
8. Collect soil samples for the remaining parameters to be analyzed;
9. Soil samples are to be labelled and handled in accordance with SOP-EDR013;
10. Record the parameters sampled for, the type(s) and number of sample containers, and the time and date of sample collection in the field notes;
11. Determine the soil texture in accordance with SOP-EDR019 and record this information in the field notes;
12. Soil samples collected for soil headspace vapour measurement must not be submitted for laboratory analysis except for analysis of non-volatile parameters (i.e., metals and inorganics) or grain size analysis;
13. Immediately following collection, place each sample container in a cooler containing ice bags or ice packs; and
14. After the maximum borehole drilling depth is reached, measure the borehole depth with a weighted measuring tape and record the total depth in the field notes if the borehole diameter is large enough to permit measurement.

5.11 Borehole Backfilling.

Following completion of each borehole in which a well is not installed, it must be properly backfilled with bentonite and/or bentonite grout by the drilling contractor. The drilling contractor is to be consulted to confirm the proper borehole abandonment procedures required by the local regulations (e.g., Ontario Regulation 903 for Ontario sites).

Drill cuttings are not be used to backfill boreholes.

Record the borehole backfilling method and materials used in the field notes.

5.12 Borehole Location Documentation

For each borehole, complete the following to document its location:

1. Photograph the completed borehole location. Close up photographs of the borehole are to be taken as well as more distant photographs that show the location of site landmarks relative to the borehole so that the photograph can be used to locate the borehole in the future; and
2. Using a measuring tape or measuring wheel, measure the distance between the borehole and a nearby landmark (e.g., corner of the nearest building) and provide a borehole location sketch in the field notes. Measurements are to be made at right angles relative to the orientation of the landmark or to a fixed axis (e.g., relative to true north). If required by the Project Manager, measure the UTM coordinates of the borehole with a hand-held GPS device.

5.13 Field Notes

The field notes must document all drilling equipment used, sample depths and measurements collected during the borehole drilling activities. The field notes must be legible and concise such that the entire borehole drilling and soil sampling event can be reconstructed later for future reference. The field notes are to be recorded on the field forms or in a field book.

5.14 Additional Considerations for O. Reg. 153/04 Phase Two ESA Compliance

None. Following this SOP will be sufficient to comply with the Ontario Regulation 153/04 requirements for Phase Two Environmental Site Assessments.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of Health & Safety Training by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

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8.0 REFERENCES

Canadian Standards Association, *Phase II Environmental Site Assessment, CSA Standard Z769-00 (R2008)*, dated 2000 and reaffirmed in 2008.

Association of Professional Geoscientists of Ontario, *Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)*, April 2011.

9.0 APPENDICES

None.

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Template: Master SOP Template – February 2014

SOP – EDR007 – REV004 – MONITORING WELL DESIGN AND CONSTRUCTION

Title:	Monitoring Well Design and Construction
Practice:	EDR
First Effective Date:	August 03, 2009
Version:	004
Version Date:	January 3, 2018
Author:	Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	August 03, 2009	N/A	MEM
001	November 26, 2010	Update approval signatures	FG
002	November 15, 2013	Streamlined to cross reference AAPGO guidance document/Added section on O. Reg. 153/04 compliance	RLM
003	April 29, 2016	Updated Section 4.0/Added procedure for outer casing installation in Ontario	RLM
004	April 28, 2017	Remove reference to Pinchin West/Added note to Section 5.2 about placing a reference mark at the top of the well pipe/Added note to Section 5.3 that O.Reg.153/04 requires well screens to intersect the water table when assessing groundwater for petroleum hydrocarbon impacts during a Phase Two ESA	RLM
004	January 3, 2018	Reviewed and confirmed current	RLM

2.0 SCOPE AND APPLICATION

Monitoring wells are installed in overburden and bedrock to enable the collection of groundwater samples from water bearing formations at project sites. For some projects, monitoring wells are also used to monitor for combustible gases in the subsurface.

A monitoring well consists of two parts: the well screen and the well casing (also known as the well riser). The well screen allows groundwater to enter the well from the formation adjacent to the well so that it can be sampled. The well casing allows access to the well from the ground surface.

In Ontario, the regulatory requirements for monitoring well installation are provided in Ontario Regulation 903. All drilling contractors who install groundwater monitoring wells in Ontario must be licensed with the Ontario Ministry of the Environment and Climate Change (MOECC). In addition, for any well installed at a depth of greater than 3.0 metres below ground surface, a Water Well Record must be prepared by the drilling contractor and submitted to the MOECC and the well owner (typically our client).

The design and construction of soil vapour monitoring wells is beyond the scope of this SOP and is described in SOP-EDR018.

3.0 OVERVIEW

Not applicable.

4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 General Considerations

5.1.1 Borehole and Well Diameters

The borehole diameter must be sufficient in size to accommodate the well casing, sand pack and seal materials. In Ontario, the borehole diameter and annular space surrounding the monitoring well must meet the requirements of Ontario Regulation 903. Other provinces have similar requirements that must be considered. It is the Project Manager's responsibility to be aware of specific provincial requirements. Wherever possible, 2-inch (5.1. centimetre) interior diameter monitoring wells should be installed as they permit the use of most sampling and monitoring devices, and will generally provide greater water volume for sampling, especially in low permeability soils. Monitoring wells with interior diameters between 1-inch (2.5 centimetres) and 1.5-inches (3.8 centimetres) are also considered acceptable in some jurisdictions but the use of monitoring wells smaller than 1-inch (2.5 centimetres) is not permitted unless approved by the Project Manager.

5.1.2 Screen Length and Placement

Well screens typically range in length from 1.5 to 3.0 metres. Saturated well screen lengths beyond 1.8 metres, including sand pack, should be avoided in British Columbia, as per British Columbia Ministry of Environment Technical Guidance 8.

Wells screens must not straddle more than one hydrostratigraphic unit and should not be placed such that a preferential pathway for contaminant migration is created between two hydrostratigraphic units. In particular, a well screen must not straddle the overburden/bedrock interface, and the well screen, sand pack and seal must be situated entirely within either the overburden or the bedrock. An exception to this if the well is installed for assessing dense non-aqueous phase liquid (DNAPL), the penetration into the bedrock is minimal, and bedrock fractures are isolated from the sand pack. This type of well installation must only be completed under the guidance of staff with the appropriate geological expertise to ensure it is done correctly.

When determining the well screen length and depth of screen placement for a project, the following should be considered by the Project Manager:

- When assessing for the presence of light non-aqueous phase liquid (LNAPL) at the water table, longer well screens are preferred due to seasonal fluctuations in the water table and the well screen should intersect the water table whenever possible;
- When assessing for the presence of DNAPL, the well screen should be positioned at the bottom of the aquifer immediately above the aquitard;
- When assessing geochemical parameters, shorter well screens may be preferable to reduce the potential for mixing of water from distinct vertical geochemical zones;
- The use of long well screens within the saturated zone may result in the mixing of impacted and unimpacted groundwater from different depths within the aquifer, with the resulting dilution effect biasing the groundwater concentrations low; and
- Nested wells can be used to determine contaminant stratification within an aquifer or assess multiple aquifers, as long as the wells and individual aquifers are properly sealed off from each other within the borehole.

5.1.3 Well Screen/Casing Materials

Polyvinyl chloride (PVC) is the standard material used to construct groundwater monitoring wells. However, some organic compounds if present at excessive concentrations can degrade PVC, and stainless-steel or Teflon well materials may be considered for use by the Project Manager at such project sites.

A filter sock must not be placed over a well screen.

5.1.4 Well Screen Slot Size and Sand Pack

The slot size of the well screen will be determined by the size of the filter pack used. Pinchin typically uses No. 10 slot screen and #1 silica sand to form the sand pack around the well screen. When investigating a site with fine-grained soil, it may be appropriate to use a finer sand pack and smaller slot size to act as a “filter” to prevent as much fine-grained soil from entering the well as possible. The Project Manager should consult with the drilling contractor to determine the most appropriate screen slot size and sand pack size.

5.1.5 Bentonite Seal

The annular space above the sand pack in all wells is to be filled with bentonite. The purpose of placing the bentonite is create a seal above the sand pack that prevents a connection between other water bearing zones within the subsurface and/or water infiltration from the surface.

5.1.6 Surface Completions

A protective steel casing and lockable cap are to be installed at each well to protect the well and prevent tampering. Protective casings come in two varieties: aboveground casings (commonly known as monument casings) and flush-mount casings.

Aboveground casings have the advantage of having better visibility and can be located more easily, especially during winter, are less likely to need repair, and have fewer problems related to water intrusion and frost heave of the casing.

Flush-mount casings are usually the only available option for wells installed in areas of high vehicular or pedestrian traffic. Also, some clients prefer flush-mount casings for aesthetic reasons as they are less obtrusive.

When installing a well in a high vehicular traffic area such as a roadway, the flush-mount casing must have sufficient strength to avoid damage when run over by vehicles. Flush-mount casings with brass lids should not be installed in high vehicular traffic areas as they are easily damaged to the point where they can no longer be opened.

5.2 Well Installation Procedures

Note that Pinchin field staff are not trained, nor have the necessary licensing, to install monitoring wells. This task is to be performed by the drilling contractor in accordance with the applicable regulatory requirements (e.g., Ontario Regulation 903 in Ontario). Pinchin field staff will assist the drilling contractor by specifying the general design of the monitoring well but will not perform the actual installation. The primary role of Pinchin field staff during well installation is to document the installation (e.g., measuring and/or recording the well length, screen length, depth to top of sand pack, etc.) as outlined below.

The following presents the general procedure for the completion of overburden and bedrock monitoring well installations after the borehole has been advanced to the appropriate depth:

1. Assemble the well by threading sufficient lengths of screen and riser materials together, and placing a threaded cap or slip-on cap at the bottom of the well. Well materials are to be kept in their plastic sleeves until immediately prior to well installation, and are not to be placed on the ground unless the ground surface is covered by clean plastic sheeting. Well materials should not be stored near potentially contaminated materials (e.g., soil cuttings);
2. Dedicated, disposable nitrile gloves are to be worn by all personnel handling the well materials and are to be replaced if they become contaminated during well installation. Confirm the length of the well screen, well riser and total length of well. This is especially important if the screen and/or riser are trimmed to fit the borehole depth or desired

screen interval. Record the length of the well screen, the length of the well casing, the total length of the well (including the bottom cap), the type of bottom cap used, and the interior diameter of the well screen/well casing in the field notes;

3. Prior to placing the assembled well into the borehole, measure the depth from ground surface to the bottom of the borehole and record this depth in the field notes;
4. When possible, place a minimum of 0.15 metres of filter pack into the bottom of the borehole to provide a firm base for the well. Note that the placement of such a filter pack base may not be appropriate when investigating a site where DNAPLs are suspected as the filter pack base may act as a DNAPL "sump" beneath the well and the DNAPL may go undetected when monitoring the well;
5. Place the assembled well into the open borehole or within the interior of the hollow stem augers. If trimming of the well casing is required, measure the length of the trimmed piece and record this information in the field notes. Before installing the sand pack, place a J-plug or slip cap on the top of the well to prevent sand and seal materials from entering the well when backfilling the annular space between the well and the borehole walls;
6. Install the sand pack around the exterior of the well screen and extend it to between 0.3 and 0.6 metres above the top of the well screen. The sand pack should be installed slowly, and with a tremie pipe if possible, to minimize the potential for bridging of the sand pack. When installing a sand pack in a borehole that has been drilled with hollow stem augers, the sand pack should be installed in lifts of approximately 0.5 metres. After placement of each lift, the augers are withdrawn from the ground by approximately 0.5 metres and the process repeated until the sand pack is placed to the required depth. Measure the depth to the top of the sand pack and record this depth in the field notes;
7. Install a bentonite seal comprised of granular and/or powdered bentonite above the sand pack to within approximately 0.6 metres of the ground surface. The bentonite should be installed slowly, and with a tremie pipe if possible, to minimize the potential for bridging of the seal. For the portion of the seal located above the water table, distilled water is to be poured into the borehole for each lift placed above the water table (approximately 0.3 to 0.6 metres per lift) to hydrate the seal. Approximately 1 to 2 litres of distilled water per lift is considered sufficient to hydrate the seal. Measure the depth to the top of the bentonite seal and record this depth in the field notes;
8. Record whether the seal was hydrated during installation and over which depth interval. Note that in some jurisdictions very long bentonite seals can be broken up with sand intervals. This reduces the potential for ground heaving due to bentonite shrinking and swelling but the sand intervals must not connect hydraulically separated aquifers;

9. (Ontario only) If the well is to be installed with a flush-mount protective casing, an outer casing comprised of a short length (10 to 15 cm) of PVC riser, or PVC coupling, that is slightly larger in diameter than the well casing needs to be installed around the well casing into the top of the bentonite seal, with the gap between the two casings sealed with bentonite. The top of the outer casing needs to be flush with or slightly below the top of the well casing. For example, if a 2-inch diameter well is installed, then a 10 to 15 cm length of 3-inch or 4-inch diameter riser or coupling placed around the 2-inch diameter well casing will suffice provided that bentonite is placed between the two casings. The flush-mount protective casing is then installed around the two casings. The outer casing does not need to be capped, and we only need to cap the well casing with a J-plug or slip cap;
10. (Ontario only) If the well is to be installed with a stick up protected by a monument casing, the procedure for installing the outer casing is essentially the same, except that the outer casing will extend from 10 to 15 cm below ground to above the ground surface, preferably flush with or slightly below the top of the well casing if the design of the monument casing permits it;
11. Place a protective well casing (monument or flush-mount) around the well casing and cement it in place;
12. Using a permanent marker, mark a point on the top of the well casing that will serve as a reference point for all future depth to water and elevation survey measurements. Measure the depth to groundwater in the well at the time of completion. Note the depth to water and time of measurement in the field notes;
13. Place a lockable J-plug on the well casing and ensure that the J-plug is tightened sufficiently to prevent surface water from infiltrating into the well if the well has a flush-mount completion. Place a lock on the J-plug for a flush-mount completion or on the lockable cap for an aboveground completion if required by the Project Manager. A PVC slip cap can also be used, especially for an aboveground completion;
14. Photograph the completed well installation. Close up photographs of the well are to be taken as well as more distant photographs that show the location of site landmarks relative to the well so that the photograph can be used to locate the well in the future; and
15. Using a measuring tape or measuring wheel, measure the distance between the well and a nearby landmark (e.g., corner of the nearest building) and provide a well location sketch in the field notes. Measurements are to be made at right angles relative to the orientation of the landmark or to a fixed axis (e.g., relative to true north). If required by the Project Manager, measure the UTM coordinates of the well with a hand-held GPS device.

5.3 Additional Considerations for O. Reg. 153/04 Phase Two ESA Compliance

Ontario Regulation 153/04 mandates that well screens must not exceed 3.1 metres in length. In addition, whenever the Phase Two ESA includes the assessment of petroleum hydrocarbon impacts in groundwater, the well screen in each well must intersect the water table.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

Association of Professional Geoscientists of Ontario, *Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended),* April 2011.

British Columbia Ministry of the Environment, *Technical Guidance 8: Groundwater Investigation and Characterization*, July 2010.

9.0 APPENDICES

None.

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Template: Master SOP Template – February 2014

SOP – EDR008 – REV005 – MONITORING WELL SAMPLING

Title:	Monitoring Well Sampling
Practice:	EDR
First Effective Date:	November 8, 2013
Version:	005
Version Date:	January 3, 2018
Author:	Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	November 08, 2013	N/A	RM
001	September 25, 2015	Incorporated procedures specific to Pinchin West into SOP	RM
002	February 9, 2016	Revised overall procedure to be consistent with well development SOP/Added reference to revised well development field forms	RM
003	April 29, 2016	Updated Section 4.0	RM
004	April 28, 2017	Removed reference to Pinchin West	RM
005	January 3, 2018	Changed “submersible” to “centrifugal” throughout	RM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes the standard procedures for groundwater monitoring well purging and sampling, and provides a description of the equipment required and field methods.

Note that this SOP pertains to monitoring well sampling using the “well volume” purging procedure. Groundwater monitoring well purging and sampling using low flow procedures is described in SOP-EDR023.

3.0 OVERVIEW

Groundwater sampling involves two main steps: well purging followed by sample collection. All groundwater monitoring wells must be purged prior to groundwater sampling to remove groundwater that may have been chemically altered while residing in the well so that groundwater samples representative of actual groundwater quality within the formation intersected by the well screen can be obtained.

Monitoring well sampling should not be completed until at least 24 hours have elapsed following monitoring well development to allow subsurface conditions to equilibrate. Any deviation from this procedure must be discussed with the Project Manager before proceeding.

4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 Equipment and Supplies

5.1.1 Documents and Information Gathering

- A copy of the proposal or work plan;
- Monitoring well construction details (borehole logs, well construction summary table from a previous report or well installation field notes);
- A copy of this SOP;
- A site-specific Health and Safety Plan (as per the project requirements); and
- Client or site representative's contact details.

5.1.2 Well Purging and Sampling Equipment

- Inertial pump (e.g., Waterra tubing and foot valve) (Optional depending on jurisdiction);
- Peristaltic pump (Optional depending on the parameters being sampled);
- Centrifugal or bladder pump (Optional depending on jurisdiction and well depth);
- Disposable bailer (Optional);
- Graduated pail (to contain purge water and permit the volume of groundwater purged to be tracked);
- Pails or drums for purge water storage prior to disposal;
- Well keys (if wells are locked);
- Tools to open monitoring well (T-bar, socket set, Allen keys, etc.);
- Interface probe;
- Equipment cleaning supplies (see SOP-EDR009);
- Disposable latex or nitrile gloves; and
- Field forms.

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5.2 Purging Procedures

The well purging procedure employed will be determined by the hydraulic conductivity of the formation in which the groundwater monitoring well is installed. For this SOP, a high yield well is defined as a well that cannot be purged to dryness when pumping continuously at a rate of up to 2 litres per minute (L/min) and a low yield well is defined as a well that can be purged to dryness when pumping continuously at a rate of 2 L/min or less. This threshold represents a “normal” pumping rate when hand pumping with an inertial pump.

5.2.1 Purging of High Yield Wells

The procedure for purging a high yield monitoring well is as follows:

1. Decontaminate all non-dedicated monitoring and sampling equipment that will be used, including the interface probe and centrifugal or bladder pump (if used), in accordance with the procedures described in SOP-EDR009;
2. Review the well construction details provided in the borehole logs, previous field notes or well construction summary table from a previous report. Determine the well depth, well stick up, screen length, depth to top of sand pack and diameter of the borehole annulus. If the well depth is unavailable, measure it with the interface probe;
3. Measure the initial water level (i.e., static water level) from the reference point on the well (which should be marked at the top of the well pipe) with an interface probe. If measurable free-phase product is present on the water table, record the depth to the top of the free-phase product and the depth to the free-phase product/water boundary (i.e., water level), and discuss this with the Project Manager before proceeding further;
4. Calculate the well volume. **Note that for the purpose of this SOP, there are two definitions of well volume depending on the province in which the project is being conducted.** For Ontario and Manitoba, the well volume is defined as the volume of water within the wetted length of the well pipe (well pipe volume) plus the volume of water within the wetted length of the sand pack (sand pack volume). For British Columbia, Alberta and Saskatchewan, the well volume is defined as the volume of water within the wetted length of the well pipe (well pipe volume) only.

   The volume of water in the well pipe is calculated as follows:

   Well Pipe Volume (litres) = $h_w \times \pi r_w^2 \times$ 1,000 litres per cubic metre (L/m^3)

   Where $\pi = 3.14$

   h_w = the height of the water column in the monitoring well in metres (wetted length)

   r_w = the radius of the monitoring well in metres (i.e., half the interior diameter of the well)

The volume of the sand pack in the monitoring well is calculated as follows:

Sand Pack Volume (litres) = h_w x [(0.3 π r_b^2 x 1,000 L/m^3) – (0.3 π r_w^2 x 1,000 L/m^3)]

Where 0.3 = the assumed porosity of the sand pack

h_w = the height of the water column in the monitoring well in metres (wetted length)

π = 3.14

r_b = the radius of the borehole annulus in metres

r_w = the radius of the monitoring well in metres

For Ontario and Manitoba projects, the following table provides well volumes in litres/metre for typical well installations:

Borehole Annulus Diameter (Inches/Metres)	Well Interior Diameter (Inches)	Well Pipe Volume (Litres/Metre)*	Well Volume (Litres/Metre)*
4/0.1	1.25	0.8	2.9
	1.5	1.1	3.2
	2	2.0	3.8
6/0.15	1.25	0.8	5.9
	1.5	1.1	6.1
	2	2.0	6.7
8.25/0.21	1.5	1.1	11.2
	2	2.0	11.8
10.25/0.26	1.5	1.1	16.7
	2	2.0	17.3

* Litres to be removed per metre of standing water in the well (wetted length).

If the borehole annulus and well interior diameters match one of those listed above, to determine the volume of one well volume simply multiply the number in the last column of the table by the wetted length in the well. For example, if a 2-inch diameter well installed in a 8.25-inch diameter borehole has 2.2 metres of standing water, one well volume equals 26.0 litres (2.2 metres x 11.8 litres/metre).

Note that the above well volume calculations apply only to wells where the water level in the well is below the top of the sand pack. If the water level is above the top of the sand pack, then the well volume is the volume of water in the sand pack and well pipe within the sand pack interval, plus the volume of water in the well pipe (i.e., well pipe volume) above the top of the sand pack. For example, assume a 2-inch diameter well has been installed in a 8.25-inch diameter borehole to a depth of 6.0 metres below ground surface (mbgs), with a 3.05 metre long screen. The sand pack extends from 6.0 mbgs to 2.5 mbgs and the water level is at 1.85 mbgs. One well volume equals ([6.0 metres – 2.5 metres] x 11.8 litres/metre) + ([2.5 metres – 1.85 metres] x 2.0 litres/metre) or 42.6 litres.

For British Columbia, Alberta and Saskatchewan projects, the well volume is calculated using the conversion factor listed in the third column of the above table. For example, if there are 2.5 metres of standing water in a 1.5-inch diameter well, one well volume equals 2.75 litres (2.5 metres x 1.1 litres/metre);

5. Lower the pump intake into the well until it is approximately 0.3 metres above the bottom of the well. Remove half a well volume while pumping at a rate of approximately 1 to 2 L/min. Record the approximate purge volume, pump intake depth and pertinent visual/olfactory observations (e.g., sheen, odour, free-phase product, sediment content, clarity, colour, etc.);
6. Move the pump intake upward to the middle of the water column (or middle of the screened interval if the water level in the well is above the top of the screen). Remove half a well volume (for a cumulative total of 1 well volume) while pumping at a rate of approximately 1 to 2 L/min. Record the approximate purge volume, pump intake depth and any pertinent visual/olfactory observations;
7. Move the pump intake upward to near the top of the screened interval (or near the top of the water column if the water level is currently below the top of the screen). Remove half a well volume (for a cumulative total of 1.5 well volumes) while pumping at a rate of approximately 1 to 2 L/min. Record the approximate purge volume, pump intake depth and any pertinent visual/olfactory observations.

   Note that if the wetted length is short within a well (e.g., 1.5 metres or less), there will not be enough separation between pump intake depths to warrant pumping from three depths (i.e., near the bottom, middle and top of the water column). In this case, pumping from two depths (i.e., near the bottom and top of the water column) is sufficient;
8. Repeat steps 5 through 7 until a minimum of 3 well volumes in total have been removed. If the purge water contains high sediment content after the removal of 3 well volumes, well purging should continue by removing additional well volumes until the sediment content visibly decreases. If the purge water continues to have high sediment content after the removal of 2 additional well volumes (i.e., 5 well volumes in total), contact the Project Manager to discuss whether well purging should continue; and

9. Proceed with groundwater sample collection (see below).

Note that the use of a bailer to purge a high yield well with a wetted interval greater than 2 metres is not recommended given that the depth from which groundwater is removed is difficult to control.

5.2.2 Purging of Low Yield Wells

The procedure for purging a low yield monitoring well is as follows:

1. Decontaminate all non-dedicated monitoring and sampling equipment that will be used, including the interface probe and centrifugal or bladder pump (if used), in accordance with the procedures described in SOP-EDR009;
2. Review the well construction details provided in the borehole logs, previous field notes or well construction summary table from a previous report. Determine the well depth, well stick up, screen length, depth to top of sand pack and diameter of the borehole annulus. If the well depth is unavailable, measure it with the interface probe;
3. Measure the initial water level (i.e., static water level) from the reference point on the well (which should be marked at the top of the well pipe) with an interface probe. If measurable free-phase product is present on the water table, record the depth to the top of the free-phase product and the depth to the free-phase product/water boundary (i.e., water level), and discuss this with the Project Manager before proceeding further;
4. Position the pump intake at the bottom of the well. Purge the well to dryness at a rate of between approximately 1 and 2 litres L/min. At the conclusion of purging, drain the pump tubing if possible. Record the approximate purge volume;
5. After allowing sufficient time for the well to recover, proceed with sample collection (see below). Note that wherever possible, the well should be allowed to recover to at least 90% recovery before proceeding with sample collection. However, if recovery to this level requires more than one hour to complete, it is better to sample the well as soon as it recovers sufficiently to permit sampling, especially if samples are being collected for volatile parameters such as volatile organic compounds (VOCs) and petroleum hydrocarbons (PHCs) (F1); and
6. Record the water levels, time of water level measurements and well status (e.g., well recovery incomplete, 90% recovery target met) on the field form to document the well recovery. Purging of wells at the end of a day and returning to the site the following day to collect samples is not permitted unless the well recovery is so poor that this amount of time is needed for there to be sufficient recovery to permit sample collection.

Note that bailers can be used in lieu of a pump to purge a low yield well provided that the well yield is low enough to permit the draining of all of the groundwater in the well with the bailer.

5.3 Well Purging Record

Well purging prior to sampling is to be documented through the completion in full of the following field forms located in the Pinchin Orchard:

- EDR-GW-Well Sampling-Low Yield Well; or
- EDR-GW-Well Sampling-High Yield Well.

Any deviations from this SOP along with the rationale for these deviations must be recorded on the forms.

5.4 Sample Collection

5.4.1 General Considerations

Inertial pumps are generally suitable for all sample collection for due diligence projects. However, the motion of the inertial pump in the water column of a well, even when pumping at a low rate, can create turbulence in the well that can suspend sediment already in the well or draw it in from the formation. Sediment captured in a sample can often result in positive bias to the analytical results, especially for the parameters PHCs (F3 and F4) and polycyclic aromatic hydrocarbons (PAHs), resulting in "false positives" that are not representative of actual groundwater quality. Sampling for these parameters following low flow purging and sampling procedures (SOP-EDR023) is an acceptable option to minimize potential sediment bias but because it is more expensive and time consuming than "conventional" sampling, it is typically not completed for due diligence projects. In lieu of low flow purging and sampling, a peristaltic pump, centrifugal pump or bladder pump is to be used as a "grab sampler" when sampling for PHCs (F2-F4) and PAHs.

In Ontario and Manitoba, or where otherwise prohibited by provincial guidance documents, peristaltic pumps must not be used to collect samples for analysis of volatile parameters, namely VOCs and PHCs (F1). As such, if the suite of parameters to be sampled at a given well includes VOCs and/or PHCs (F1), a "hybrid" sampling procedure is to be followed, in which samples for VOCs, PHCs (F1), PCBs and/or metals analysis are to be collected using an inertial pump and samples for PHCs (F2-F4) and PAHs analysis are to be collected using a peristaltic pump. Alternatively, the entire suite of parameters can be collected using a centrifugal or bladder pump.

The following table summarizes the pump types, parameters that can be sampled using each pump and how the well volume is determined for each province:

Jurisdiction	**Pump Type**	**Parameters**	**Well Volume**
BC	Inertial Pump	All Parameters	Well Pipe Volume
	Peristaltic Pump	All Parameters	Well Pipe Volume

Jurisdiction	**Pump Type**	**Parameters**	**Well Volume**
Alberta/Saskatchewan	Inertial Pump	All Parameters Except PHCs (F2) and PAHs	Well Pipe Volume
	Peristaltic Pump	PHCs (F2) and PAHs	Well Pipe Volume
Manitoba/Ontario	Inertial Pump	All Parameters Except PHCs (F2-F4) and PAHs	Well Pipe Volume + Casing Volume
	Peristaltic Pump	PHCs (F2-F4) and PAHs	
All Provinces	Centrifugal Pump	All Parameters	As Per Above
All Provinces	Bladder Pump	All Parameters	As Per Above

Bailers should not be used for sample collection unless there is no other option (e.g., when there is minimal groundwater in a well). They can be used as a substitute for an inertial pump but may bias concentrations of volatile parameters low and concentrations of PHCs (F2-F4) and PAHs high. The use of a bailer for groundwater sample collection must be approved by the Project Manager.

There is a common misconception that using a peristaltic pump, centrifugal pump or bladder pump and sampling at a low pumping rate is “low flow sampling”. Sampling in this manner is essentially “grab sampling” using a device other than an inertial pump and is not “low flow sampling”. Only if groundwater sampling was completed in accordance with SOP-EDR023 can the sampling be referred to as “low flow sampling”.

5.4.2 Sampling of High and Low Yield Wells

The procedure for collecting groundwater samples from a high or low yield monitoring well is as follows:

1. Label the sample containers with the sample identifier, project number and date and time of sample collection. The sample containers for each well are be filled in the following order:
    - Volatiles parameters (e.g., VOCs, PHCs (F1));
    - Semi-volatile parameters (e.g., PHCs (F2-F4), PAHs); and
    - Non-volatile parameters (e.g., inorganic parameters, metals).

    There is an exception to the above sample collection order when using the “hybrid” sampling method. In this case, the semi-volatile parameters (PHCs (F2-F4) and/or PAHs) are to be sampled first using the peristaltic pump, centrifugal pump or bladder pump, followed by sampling volatile parameters and then non-volatile parameters using the inertial pump;

2. Position the pump intake at the approximate middle of the screened interval (or middle of the water column if the water level is below the top of the screen). At the discretion of the Project Manager, the pump intake may be positioned near the top of the water column if light non-aqueous phase liquids (LNAPLs) are being investigated (e.g., gasoline, fuel oil) and at the bottom of the well when dense non-aqueous phase liquids (DNAPLs) (e.g., chlorinated solvents) are being investigated. For a low yield well when the tubing was (or could) not be drained at the conclusion of purging, or when a high yield well is not sampled immediately after purging, pump sufficient water from the tubing before initiating sample collection at a rate of approximately 0.5 L/min to remove any water that was left over in the tubing following purging;
3. When sampling for volatile parameters (i.e., VOCs and PHCs (F1)), pump at a rate of approximately 0.5 L/min. When using an inertial pump, hold the pump vertical while pumping to minimize agitation and possible contaminant volatilization. During volatile parameter sampling, the tubing of the inertial pump must not contain air bubbles. If air bubbles are present, continue pumping until there are no air bubbles in the tubing. Once the tubing is full and free of air bubbles, carefully pour the groundwater from the tubing into the sample vials until they are filled to be headspace-free. When using a peristaltic pump (BC only), centrifugal pump or bladder pump for volatile parameter sampling, the samples can be collected by pumping directly into the sample containers until they are headspace-free. Once filled and capped, check each vial for air bubbles by turning it upside down. If bubbles are present in a vial, reopen it and add additional groundwater until there are no remaining bubbles;
4. When sampling for semi-volatile parameters, pump at a rate of between 0.5 and 1 L/min. The samples can be collected by pumping directly into the sample containers;
5. When sampling for non-volatile parameters, pump at a rate of between 0.5 and 1 L/min. The samples can be collected by pumping directly into the sample containers;
6. Samples collected for dissolved metals analysis are to be filtered in the field using dedicated, disposable 0.45 micron in-line filters or marked to be filtered by the laboratory, except for samples collected in Ontario for methyl mercury analysis which are not to be filtered. Field filtering must occur before samples for metals analysis are preserved. Prior to filling the first sample container using a new filter, the filter is to be “primed” by flushing a volume of water equal to twice the capacity of the filter through the filter. Samples for other parameters are not to be filtered in the field. In situations where field filtering cannot be completed, such as when sampling with a bailer, samples for metals analysis

are to be collected in sample containers without preservatives and the analytical laboratory is to be instructed on the Chain-of-Custody to filter and preserve the samples upon receipt;

7. When collecting samples in containers that are pre-charged with preservatives, care must be taken not to overfill the containers as some of the preservative may be lost which will result in the sample not being properly preserved. Also, sample containers for metals analysis typically have a fill line marked on the container and the container must not be filled to above this line as this will cause dilution of the preservative and the sample may not be properly preserved;
8. Record the parameters sampled for, the purging and sampling equipment used, whether samples for metals analysis were field filtered, and the time and date of sample collection in the field forms; and
9. Immediately following collection, place each sample container in a cooler containing ice bags or ice packs.

5.5 Additional Considerations for O. Reg. 153/04 Phase Two ESA Compliance

Groundwater sampling conducted for a Phase Two ESA completed in accordance Ontario Regulation 153/04 must be completed when well yields permit using the low flow purging and sampling methods provided in SOP-EDR023 unless authorized by the Qualified Person responsible for the Phase Two ESA.

6.0 TRAINING

The Practice Leader is responsible for identifying the initial training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

Association of Professional Geoscientists of Ontario, "*Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)",* April 2011.

9.0 APPENDICES

None.

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Template: Master SOP Template – February 2014

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SOP – EDR009 – REV004 – FIELD DECONTAMINATION OF NON-DEDICATED MONITORING AND SAMPLING EQUIPMENT

Title:	Field Decontamination of Non-Dedicated Monitoring and Sampling Equipment
Practice:	EDR
First Effective Date:	August 03, 2009
Version:	004
Version Date:	January 3, 2018
Author:	Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

TABLE OF CONTENTS

1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	August 02, 2009	N/A	MEM
001	November 26, 2010	Updated Approval Signature/Added reference to Ontario Regulation 511/09	FG
002	September 20, 2013	Revised majority of text to reflect current practices/Focused on equipment cleaning and removed reference to personnel decontamination/Added section on O. Reg. 153/04 requirements/Revised reference list	RLM
003	April 29, 2016	Updated Section 4.0/Removed methanol as optional cleaning reagent	RLM
004	April 28, 2017	Removed reference to Pinchin West/In Section 5.2.2, modified requirements for cleaning water level tapes and interface probes/In Section 5.2.3, modified requirements for cleaning electrical or retrieval cables for pumps	RLM
004	January 3, 2018	Reviewed and confirmed current	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents the general requirements for field decontamination of non-dedicated equipment used for monitoring of environmental media and the collection of environmental samples (i.e., equipment that is re-used between monitoring and sampling locations). Note that the procedures described in this SOP also apply to pumps used for well development.

3.0 OVERVIEW

The main purpose of non-dedicated monitoring and sampling equipment decontamination is to minimize the potential for cross-contamination during monitoring/sampling activities completed for site investigations. Cross-contamination can occur when equipment used to monitor/sample contaminated soil, groundwater or sediment is reused at another monitoring/sampling location without cleaning. This can result in the transfer of contaminants from a “dirty” monitoring/sampling location to a “clean” monitoring/sampling location, causing possible positive bias of subsequent samples. Positive sample bias can result in reported analytical results that are not representative of actual site conditions and, if significant cross-contamination occurs, can result in reported exceedances of the applicable regulatory standards for samples that would have met the standards had cross-contamination not occurred.

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Site investigations completed by Pinchin typically use the following non-dedicated monitoring/sampling equipment:

- Manually operated equipment (e.g., water level tapes/interface probes using during groundwater monitoring and sampling, knifes/spatulas used for soil sampling, hand augers);
- Pumps for groundwater monitoring well development, purging and/or sampling (e.g., bladder pumps, submersible pumps); and
- Downhole drilling/sampling equipment (e.g., split-spoon samplers, augers).

The above list is not all inclusive and other non-dedicated monitoring/sampling equipment may be employed during a site investigation that requires decontamination. For example, it may be appropriate to decontaminate the bucket of a backhoe used for test pitting between test pit locations. The Project Manager will be responsible for identifying the additional monitoring/sampling equipment that requires decontamination and instructing field staff regarding the procedure to be followed for cleaning this equipment.

When conducting field monitoring and sampling work in the field, it is not always possible to judge whether a monitoring/sampling location is uncontaminated. Because of this, it is important that all non-dedicated monitoring/sampling equipment be properly cleaned before initial use and between uses to minimize the potential for cross-contamination to occur.

4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 Equipment and Supplies

The following is a list of equipment needed to perform the decontamination of non-dedicated monitoring and sampling equipment in accordance with this SOP:

- Personal Protective Equipment (PPE);
- Potable tap water;
- Distilled water (store bought);

- Volatile organic compound (VOC)-free deionized distilled water (supplied by the analytical laboratory);
- Laboratory grade, phosphate-free soap;
- Wash buckets (minimum of three);
- Scrub brushes;
- Paper towels; and
- Buckets or drums with resealable lids for containing liquids generated by equipment cleaning.

Other equipment required to clean drilling equipment (e.g., steam cleaner, power washer, tub for containing wash water, etc.) is typically provided by the drilling subcontractor. The Project Manager is responsible for ensuring that the drilling subcontractor brings the required cleaning equipment to the project site. Prior to mobilization, the Project Manager should also assess the availability of a potable water supply for drilling equipment cleaning at the project site. When no accessible potable water supply is available at a project site, the drilling subcontractor will need to bring a potable water supply to the site in the drill rig water supply tank or separate support vehicle, or arrange to have a third-party supplier deliver potable water to the site.

5.2 Procedure

5.2.1 General Procedures and Considerations

The following general procedures and considerations apply to all decontamination of non-dedicated monitoring/sampling equipment activities:

- Personnel will dress in suitable PPE to reduce personal exposure during equipment decontamination activities;
- In addition to cleaning between monitoring/sampling locations, all non-dedicated monitoring/sampling equipment must be cleaned before initial use. Field staff should not assume that the equipment was properly cleaned by the last person to use it;
- Prior to starting a drilling program, the downhole drilling equipment (e.g., augers) must be inspected and any “dirty” equipment must not be used in the drilling program or it must be cleaned prior to use; and
- All liquids and solids generated by the cleaning of non-dedicated monitoring/sampling equipment are to be containerized and managed in accordance with the procedures outlined in SOP-EDR020 – Investigation Derived Wastes.

5.2.2 Decontamination of Manually Operated Monitoring/Sampling Equipment

The procedure for decontaminating manually operated monitoring/sampling equipment is as follows:

- Wash the equipment in a bucket filled with a mixture of phosphate-free soap/potable water, while using a brush to remove any obvious contamination and/or adhered soil;
- Rinse the equipment thoroughly in a bucket filled with potable water;
- Rinse the equipment thoroughly using a spray bottle filled with distilled water, capturing the rinsate in a bucket; and
- Allow the equipment to air dry. If there is insufficient time to allow the equipment to air dry before reusing, or the equipment cleaning is occurring during winter conditions, the equipment should be dried after the final rinse with a clean paper towel.

At the discretion of the Project Manager, it may be acceptable to use spray bottles, rather than buckets, for lightly contaminated equipment or if no obvious contaminants are present.

Should soil or obvious contaminants remain on the equipment after cleaning, the above procedure must be repeated until the soil or contaminants have been removed. The equipment should not be reused if repeated cleanings do not remove the soil or contaminants.

The above equipment cleaning procedure applies to, but is not limited to, the following non-dedicated monitoring/sampling equipment:

- Knives/spatulas used for soil sampling;
- Hand augers;
- Water level tapes and interface probes (both the end probe and portion of the tape that entered the well);
- The exterior of submersible pumps and interior/exterior of bladder pumps (including the portion of the electrical or retrieval cables that contact groundwater in a well); and
- Various pieces of drilling equipment, including split-spoon samplers, hollow stem auger centre plugs, continuous sampling tubes, and the reusable portions of dual-tube samplers.

At the discretion of the Project Manager, the distilled water used for the final equipment rinse will be VOC-free deionized distilled water supplied by the analytical laboratory. For example, the use of VOC-free distilled water would be appropriate for a project where trace VOCs are being investigated and it is important to minimize the potential for cross-contamination and positive bias of VOC sample results.

For tapes associated with water level tapes and interface probes, if they were submerged in a monitoring well water free of non-aqueous phase liquids or obvious contamination, the tape can be cleaned at the discretion of the Project Manager by pulling the tape through a towel dampened with phosphate-free soap/potable water as the tape is retrieved. The end probe should then be cleaned as described above.

5.2.3 Decontamination of Groundwater Sampling Pumps

The exterior of each bladder or submersible pump that is used for well development, well purging and/or groundwater sampling, and the portion of any electrical or retrieval cables that entered the well, are to be cleaned following the procedure described above for decontaminating manually operated monitoring/sampling equipment.

Submersible pumps are not designed to be disassembled in the field and cleaning of the interior of this type of pump requires flushing of cleaning solutions through the pump. After cleaning the exterior of the pump, the minimum decontamination requirement for a submersible pump is the flushing of a phosphate-free soap/potable water mixture contained in a bucket through the pump (i.e., pumping the mixture through the pump and capturing the pump outflow in the same bucket or a separate bucket), followed by flushing distilled water contained in a separate bucket through the pump and capturing the pump outflow in the same bucket or separate bucket. Note that store bought distilled water is acceptable for this purpose.

At the discretion of the Project Manager and depending on the requirements of the project, the final step in the process is a final flush with laboratory-supplied VOC-free distilled water.

The following summarizes the flushing sequence for decontaminating the interior of a submersible pump:

- Soap/water mixture*;
- Distilled water (store bought)*; and
- Distilled water (laboratory supplied VOC-free distilled water - to be confirmed by the Project Manager).

* Minimum requirement.

Bladder pumps are designed for disassembly in the field to facilitate the replacement of the bladders. The internal parts of a bladder pump are to be cleaned in accordance with the procedure described above for decontaminating manually operated monitoring/sampling equipment. Whenever possible, bladders are to be disposed of between well locations. However, if it is necessary to reuse a bladder, it must be cleaned in accordance with the procedure for cleaning manually operated monitoring/sampling equipment. It should be noted that bladders are difficult to clean and the decontamination procedure needs to be thorough.

Flushing of a bladder pump with distilled water after cleaning and reassembly is not required unless specified by the Project Manager.

5.2.4 Decontamination of Downhole Drilling Equipment

Hollow stem and solid stem augers used for borehole advancement are to be decontaminated by the drilling contractor using the following procedure:

- Wherever possible, all augers used for borehole drilling should be cleaned before initial use and between borehole locations by steam cleaning or power washing with potable water. However, the minimum requirements for auger cleaning are as follows:
  - Use a brush or shovel to remove excess soil from all used augers; and
  - Any augers that may come into contact with groundwater are to be decontaminated by steam cleaning or power washing with potable water. An auger must not be used for the balance of the drilling program if obvious contaminants or residual soil remain on the auger following decontamination, unless subsequent cleaning efforts remove these materials.

As noted previously, downhole drilling equipment used for soil sample retrieval (e.g., split-spoon samplers, continuous sampling tubes and the reusable portions of dual-tube samplers used with direct push rigs) and the hollow stem auger centre plug are to be decontaminated following the procedure outlined above for cleaning manually operated monitoring/sampling equipment.

5.3 Decontamination Records

Field personnel will be responsible for documenting the decontamination of non-dedicated monitoring/sampling equipment and drilling equipment in their field log book or field forms. The documentation should include the type of equipment cleaned and the frequency of cleaning, the methods and reagents used for equipment cleaning, and how fluids generated by the equipment cleaning were stored.

5.4 Additional Considerations for Ontario Regulation 153/04 Phase Two ESA Compliance

When completing a Phase Two Environmental Assessment (ESA) in accordance with Ontario Regulation 153/04, the following additional procedures must be undertaken:

- All augers must have excess soil removed by a brush or shovel and be steam cleaned or power washed before initial use and between borehole locations regardless of whether they contact the groundwater or not (i.e., the minimum requirements listed above for auger cleaning are not sufficient); and

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- Thorough records of the frequency and cleaning materials used for the decontamination of non-dedicated monitoring/sampling equipment and downhole drilling equipment must be kept. The Quality Assurance/Quality Control section of the Phase Two ESA report requires a summary of what steps were taken to minimize the potential for cross-contamination during the Phase Two ESA. The handling and disposal of fluids generated by equipment decontamination must also be well documented in the field for inclusion in the Phase Two ESA report.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

Association of Professional Geoscientists of Ontario, *Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended),* April 2011.

9.0 APPENDICES

None.

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SOP – EDR013 – REV004 – SAMPLE HANDLING DOCUMENTATION

Title:	Sample Handling Documentation
Practice:	EDR
First Effective Date:	August 03, 2009
Version:	004
Version Date:	January 3, 2018
Author:	Mark McCormack and Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	August 03, 2009	N/A	MEM
001	November 26, 2010	Updated Approval Signature/Added reference to Ontario Regulation 511/09	FG
002	September 12, 2013	Updated text/Added tables from MOE lab protocol/Streamlined reference section/Added O. Reg. 153/04 compliance section	RLM
003	April 29, 2016	Updated Section 4.0/Aligned document retention with PEP	RLM
004	April 28, 2017	Removed reference to Pinchin West	RLM
004	January 3, 2018	Reviewed and confirmed current	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents the general requirements for sample handling and documentation practices.

3.0 OVERVIEW

Not applicable.

4.0 DISTRIBUTION

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- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 Equipment Required

- Laboratory-supplied sample containers;
- Field log book or field forms; and
- Laboratory-supplied Chain-of-Custody forms.

5.2 Procedures

5.2.1 Sample Labelling

Sample labels are to be filled out in the field at the time of sampling as completely as possible by field personnel. All sample labels shall be filled out using waterproof ink. At a minimum, each label shall contain the following information:

- Sample identifier, consisting of sample location (borehole number, monitoring well number, surface sample location, etc.) and sample number (if appropriate). For example, the second soil sample collected during borehole advancement at borehole BH3 would be labelled “BH3-2”;
- Pinchin project number;
- Date and time of sample collection;
- Company name (i.e., Pinchin); and
- Type of analysis.

5.2.2 Sample Containers, Preservation and Holding Times

The sample containers, sample preservation and holding times for projects in Ontario are to be those specified in Table A (for soil and sediment) and Table B (groundwater) from the Ontario Ministry of the Environment Climate Change (MOECC, formerly the Ontario Ministry of the Environment) document entitled *“Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act”,* dated March 9, 2004, amended as of July 1, 2011. These tables are attached and form part of this SOP.

With reference to the attached Tables A and B, field personnel must use the sample containers appropriate for the parameters being sampled for, undertake any required field preservation or filtration and observe the sample holding times.

Each province has its own preservation and holding time regulations or guidance, which are generally similar. It is the Project Manager’s responsibility to ensure that field staff are aware of, and can meet, the requirements in the province they are working in.

5.2.3 Sample Documentation

The following sections describe documentation required in the field notes and on the Chain-of-Custody forms.

Field Notes

Documentation of observations and data from the field will provide information on sample collection and also provide a permanent record of field activities. The observations and data will be recorded using a pen with permanent ink in the field log book or on field forms.

The information in the field book or field forms will, at a minimum, include the following:

- Site name;
- Name of field personnel;
- Sample location (borehole number, monitoring well number, surface sample location, etc.);
- Sample number;
- Date and time of sample collection;
- Description of sample;
- Matrix sampled;
- Sample depth (if applicable);
- Method of field preservation (if applicable);
- Whether filtration was completed for water samples;
- Analysis requested;
- Field observations;
- Results of any field measurements (e.g., field screening measurements, depth to water, etc.); and
- Volumes purged (if applicable).

In addition to the above, other pertinent information is to be recorded in the field log book or field forms depending on the type of sampling being completed (e.g., field parameter measurements and pumping rates for low flow sampling) as required by the SOP for the particular sampling activity.

Sufficient information should be recorded to allow the sampling event to be reconstructed without relying on the sampler’s memory.

All field notes are to be scanned and saved to the project folder on the server immediately upon returning from the field.

Sample Chain-of-Custody

Sample Chain-of-Custody maintains the traceability of the samples from the time they are collected until the analytical data are issued by the laboratory. Initial information concerning collection of the samples will be recorded in the field log book or field forms as described above. Information on the custody, transfer, handling and shipping of samples will be recorded on a Chain-of-Custody for each sample submission.

All signed Chain-of-Custody forms will be photocopied or duplicate copies retained prior to sample shipment. A Chain-of-Custody should be laboratory-specific and will typically be supplied by the laboratory with the sample containers requested for the project. The sampler will be responsible for fully filling out the Chain-of-Custody for each sample submission.

The Chain-of-Custody will be signed by the sampler when the sampler relinquishes the samples to anyone else (i.e., courier or laboratory). Until samples are picked up by the courier or delivered to the laboratory, they must be stored in a secure area. The following information needs to be provided on the Chain-of-Custody at a minimum:

- Company name;
- Name, address, phone number, fax number and e-mail address of the main contact for the submission (typically the Project Manager);
- Project information (project number, site address, quotation number, rush turnaround number, etc.);
- Regulatory standards or criteria applicable to the samples (including whether the samples are for regulated drinking water or whether the samples are for a Record of Site Condition);
- Sample identifiers;
- Date and time of sample collection;
- Matrix (e.g., soil, groundwater, sediment, etc.);
- Field preservation information (e.g., whether groundwater samples for metals analysis were field filtered);
- Analyses required;
- Number of sample containers per sample;
- Analytical turnaround required (i.e., standard or rush turnaround);
- Sampler’s name and signature;
- Date and time that custody of the samples was transferred;

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- Name and signature of person accepting custody of the samples from Pinchin, and date and time of custody transfer; and
- Method of shipment (if applicable).

The person responsible for delivery of the samples to the laboratory or transfer to a courier will sign the Chain-of-Custody, retain a duplicate copy or photocopy of the Chain-of-Custody so it can be scanned and saved to the project file, document the method of shipment, and send the original copy of the Chain-of Custody with the samples.

5.3 Additional Considerations for Ontario Regulation. 153/04 Phase Two ESA Compliance

Custody seals must be placed on all coolers containing samples prior to transfer to a courier or delivery to the laboratory. The laboratory will comment on the presence/absence of custody seals in the Certificate-of-Analysis for each submission and this information must be discussed in the Quality Assurance/Quality Control section of the Phase Two Environmental Site Assessment report.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

Ontario Ministry of the Environment and Climate Change, *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*, March 9, 2004, as amended as of July 1, 2011.

9.0 APPENDICES

Appendix I Tables A and B From Ontario MOECC Laboratory Protocol

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Template: Master SOP Template – February 2014

APPENDIX I

Tables A and B From Ontario MOECC Laboratory Protocol

TABLE A: SOIL AND SEDIMENT Sample Handling and Storage Requirements

SOIL Inorganic Parameters	**Container[1]**	**Field Preservation**	**Storage Temp.[2]**	**Preserved Holding Time[3]**	**Unpreserved Holding Time [3]**
Chloride, electrical conductivity	glass, HDPE or PET	none	5 ± 3 °C		30 days as received (without lab drying); indefinite when dried at the lab
Cyanide (CN^-)	glass wide-mouth jar, Teflon™ lined lid	protect from light	5 ± 3 °C		14 days
Fraction organic carbon (FOC)	glass jar, Teflon™ lined lid	none	5 ± 3 °C		28 days as received(without lab drying); indefinite storage time when dried
Hexavalent chromium	glass, HDPE	none	5 ± 3 °C		30 days as received
Metals (includes hydride-forming metals, SAR, HWS boron, calcium, magnesium, sodium)	glass, HDPE	none	5 ± 3 °C		180 days as received (without lab drying); indefinite when dried at the lab
Mercury, methyl mercury	glass, HDPE or PET	none	5 ± 3 °C		28 days
pH	glass, HDPE or PET	none	5 ± 3 °C		30 days as received
SOIL Organic Parameters	**Container [1,5,6,7,20]**	**Field Preservation**	**Storage Temp.[2]**	**Preserved Holding Time[3]**	**Unpreserved Holding Time[3]**
BTEX [8], PHCs (F1)[8], THMs, VOCs[7] **NB: SEE FOOTNOTE #20**	40–60 mL glass vial (charged with methanol preservative, pre-weighed)[6]AND glass jar (for moisture content) [hermetic samplers are an acceptable alternative [5, 18]]	methanol (aqueous NaHSO$_4$ is an acceptable alternative for bromomethane)[6, 7, 18,20]	5 ± 3 °C	14 days	hermetic samples: stabilize with methanol preservative within 48 hours of sampling[18]
1,4-Dioxane[9, 15]	when processed as a VOC sample: same as per VOCs above; when processed as an extractable: same as per ABNs below; (consult laboratory)[9,15,18]		5 ± 3 °C	14 days	when processed as a VOC sample: same as per VOCs above; when processed as an extractable: same as per ABNs below; (consult laboratory)[18]
PHCs (F2–F4)	glass wide-mouth jar, Teflon™ lined lid	none	5 ± 3 °C		14 days
ABNs, CPs, OCs, PAHs	glass wide-mouth jar, Teflon™ lined lid	none	5 ± 3 °C		60 days
Dioxins and furans, PCBs	glass wide-mouth jar Teflon™ lined lid	none	5 ± 3 °C		indefinite storage time

HDPE = high density polyethylene; PET = polyethylene terephthalate; HWS = hot water soluble boron; THM = trihalomethanes; VOC = volatile organic compounds; BTEX = benzene, toluene, ethylbenzene, xylenes; PHCs = petroleum hydrocarbons; CPs = chlorophenols; PCBs = polychlorinated biphenyls; OCs = organochlorine pesticides

[1–20]footnotes immediately follow Table B

TABLE B: GROUND WATER Sample Handling and Storage Requirement

GROUND WATER Inorganic Parameters	**Container[10]**	**Field Preservation**	**Storage Temperature[2]**	**Preserved Holding Time[3]**	**Unpreserved Holding Time[3]**
Chloride, electrical conductivity, pH	HDPE or glass	none	5 ± 3 °C		28 days
Cyanide (CN^-)	HDPE or glass	NaOH to a pH > 12	5 ± 3 °C	14 days	must be field preserved
Hexavalent chromium	HDPE or glass	field filter followed by buffer solution to a pH 9.3–9.7 [17]	5 ± 3 °C	28 days[17]	24 hours[17]
Metals (includes hydride-forming metals, calcium, magnesium, sodium)	HDPE or Teflon™ [10]	field filter followed by HNO_3 to pH < 2[11]	room temperature when preserved	60 days	must be field preserved
Mercury	glass or Teflon™ [10]	field filter followed by HCl to pH < 2[11]	room temperature when preserved	28 days	must be field preserved
Methyl mercury	glass or Teflon™	DO NOT FILTER HCl or H_2SO_4 to pH <2[12]	5 ± 3 °C	28 days	DO NOT FILTER must be field preserved[12]
GROUND WATER Organic Parameters[10, 13, 14]	**Container[10, 13, 14]**	**Field Preservation**	**Storage Temperature[2]**	**Preserved Holding Time[3]**	**Unpreserved Holding Time[3]**
BTEX, PHCs (F1),THMs, VOCs;	40–60 mL glass vials (minimum of 2)[14] (no headspace)	$NaHSO_4$ or HCl to a pH < 2[16]	5 ± 3 °C	14 days	7 days
1,4-Dioxane[9, 15]	when processed as a VOC sample: same as per VOCs above; when processed as an extractable: same as per ABNs below; (consult laboratory)[9, 15]		5 ± 3 °C	14 days	14 days
PHCs (F2–F4)	1L amber glass bottle, Teflon™ lined lid	$NaHSO_4$ or HCl to a pH < 2[16]	5 ± 3 °C	40 days	7 days
ABNs, CP, OCs, PAHs[19], PCBs	1L amber glass bottle, Teflon™ lined lid	none	5 ± 3 °C		14 days
Dioxins and furans	1L amber glass bottle, Teflon™ lined lid	None	5 ± 3 °C		indefinite storage time

HDPE = high density polyethylene;THM = trihalomethanes; VOC = volatile organic compounds; BTEX = benzene, toluene, ethylbenzene, xylenes; PHCs = petroleum hydrocarbons; CPs = chlorophenols; PCBs = polychlorinated biphenyls; OCs = organochlorine pesticides

[1] One soil container is generally sufficient for inorganic analysis and another for extractable organics. A separate container is required for BTEX, THM, VOC and PHC (F1) moisture analysis.

[2] Storage temperature refers to storage at the laboratory. Samples should be cooled and transported as soon as possible after collection.

[3] Holding time refers to the time delay between time of sample collection and time stabilization/analysis is initiated. For samples stabilized with methanol, the hold time for the recovered methanol extract is up to 40 days.

[4] PET can not be used for samples requiring antimony analysis.

[5] As an alternative, the USEPA has investigated hermetic sample devices that take and seal a single core sample. The sample is submitted as is to the laboratory where it is extruded into an extracting solvent. Samples must be received at the laboratory within 48 hours of sampling. (Note that replicate samples are necessary for bisulphate and methanol extraction for all samples plus laboratory duplicates and spikes.) Consult the laboratory for the number of samples required.

[6] The USEPA has approved field preservation. Pre-weighed vials containing known weights of methanol preservative (or aqueous sodium bisulphate if used for bromomethane) are sent to the field. Sample cores (approximately 5 g) are extruded directly into the vial. The vials are sealed, and submitted directly to the laboratory. In practice, this technique requires great care to prevent losses of methanol due to leaking vials or through splashing. Consult the laboratory for the number of containers required.

[7] Methanol-preserved samples may elevate the detection limit for bromomethane (VOC); a separate bisulphate-preserved sample or hermetically sealed sample may be submitted at the time of sampling if bromomethane is a chemical of concern – contact the laboratory to determine if a separate sample should be collected.

[8] For BTEX and PHC (F1) pre-charging the soil sampling container with methanol preservative is an accepted deviation from the CCME method.

[9] 1,4-Dioxane may be analyzed with the ABNs or VOCs; sample container requirements used for ABNs or VOCs are both acceptable. If 1,4-dioxane is to be analyzed with ABNs, follow the ABN sample container requirements; similarly if it is to be analyzed with VOCs, follow VOC sample container requirements. Consult the laboratory for the container type and the total number required (see also footnote #15).

[10] Samples containing visual sediment at the time of analysis should be documented and noted on the Certificate of Analysis or written report as results may be biased high due to the inclusion of sediment in the extraction.

[11] Field filter with 0.45µm immediately prior to adding preservative or filling pre-charged container.

[12] Sample directly into a HCl or H_2SO_4 preserved container, or add acid to an unfiltered sample immediately after sample collection in the field.

[13] Aqueous organic samples should be protected from light. If amber bottles are not available, glass should be wrapped in foil.

[14] Separate containers are required for each organic water analysis. Consult the laboratory for required volumes. Chloride and electrical conductivity can be taken from the same container.

[15] For 1,4-dioxane in soil and sediment, no preservative is required if processed as an ABN, however. Methanol is an acceptable alternative if processed as a VOC. For 1,4-dioxane in groundwater, no preservative is required, however, $NaHSO_4$ or HCl are acceptable alternatives.

[16] Preserved to reduce biodegradation, however effervescence/degassing may occur in some ground water samples. In this case, rinse preservative out three times with sample and submit to the laboratory as unpreserved.

[17] To achieve the 28-day holding time, use the ammonium sulfate buffer solution [i.e., $(NH_4)_2SO_4/NH_4OH$] or $(NH_4)_2SO_4/NH_4OH/NaOH$ + NaOH] as specified in EPA Method 218.6 (revision 3.3, 1994) or Standard Methods 3500-Cr Chromium (2009).Using only NaOH without the ammonium sulfate buffer to adjust the pH would require analysis within 24 hours of sampling.

[18] Alternatively, to achieve a longer hold time, hermetic samples may be frozen within 48 hours of sampling as per ASTM method D6418 – 09; however, storage stability must be validated by the laboratory with no more than 10% losses.

[19] For benzo(a)pyrene in ground water samples filtration prior to analysis on a duplicate sample is permitted.

[20] For VOC, BTEX, F1 PHCs, 1,4 dioxane soil samples collected before July 1, 2011, the following sampling and handling requirements are also permitted.

SOIL Organic Parameters	**Container**	**Preservative**	**Storage Temperature**	**Preserved Holding Time**	**Unpreserved Holding Time**
VOC, BTEX, F1 PHCs, 1,4-dioxane*	glass jar, Teflon lined lid, no headspace, separate container required Hermetic samplers are an acceptable alternative	none field preservation with aqueous sodium bisulphate and methanol is an acceptable alternative	5 ± 3C	See notations 1-3 below	Stabilize by extraction or freezing within 48 hrs of receipt at the laboratory (7days from sampling). Frozen or field preserved samples must be extracted within 14 days of sampling.

*Special care must be used when sampling for VOC, BTEX and F1 in soil and sediment. Studies have shown that substantial losses can occur through volatilization and bacterial degradation. There are several allowable options for field collection of samples. Each is discussed below. Consult SW846, Method 5035A for additional detail. The laboratory is required to stabilize the sample on the day of receipt, either by extraction or freezing.

1. Collection in soil containers: To minimize volatilization losses, minimize sample handling and mixing during the process of filling the sample container. The bottle should be filled with headspace and voids minimized. Care is required to ensure that no soil remains on the threads of the jar, preventing a tight seal and allowing volatilization losses. To minimize losses through bacterial degradation, commence cooling of the samples immediately and transport the samples to the lab as soon as possible, ideally on the day of sampling. Samples must be received at the laboratory within 48 hours of sampling. Freezing can be used to extend the hold time to 14 days, however the practice is difficult to implement in the field and can cause sample breakage.
2. As an alternative, the USEPA has investigated hermetic sample devices that take and seal a single core sample. The sampler is submitted as is to the laboratory where it is extruded into the extracting solvent. Samples must be received at the laboratory within 48 hours of sampling. This technique minimizes volatilization losses and is worth consideration for critical sites. (Note that replicate samplers are necessary for bisulphate and methanol extraction for all samples plus lab duplicates and spikes). Consult the laboratory for the number of samplers required.
3 The USEPA has also approved field preservation. Pre-weighed vials containing known weights of methanol and aqueous sodium bisulphate preservative are sent to the field. Sample cores (≈5 g) are extruded directly into the vial. The vials are sealed, and submitted directly to the laboratory. In practice, this technique requires great care to implement successfully. Losses due to leaking vials, through splashing and effervescence (aqueous bisulphate) can easily occur and make the sample unusable. Consult the laboratory for the number of containers required.

SOP – EDR016 – REV003 – FIELD MEASUREMENT OF WATER QUALITY PARAMETERS

Title:	Field Measurement of Water Quality Parameters
Practice:	EDR
First Effective Date:	November 24, 2010
Version:	003
Version Date:	January 3, 2018
Author:	Paresh Patel
Authorized by:	Robert MacKenzie
Signature:	

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	November 24, 2010	N/A	PDP
001	October 31, 2013	Cross-referenced low flow sampling SOP/Added section on O. Reg. 153/04 compliance	RLM
002	April 29, 2016	Updated Section 4.0	RLM
003	April 28, 2017	Removed reference to Pinchin West	RLM
003	January 3, 2018	Reviewed and confirmed current	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes the standard procedures for measuring water quality parameters during water sampling, and covers the calibration and use of multi-parameter and single-parameter probes for monitoring in situ water quality parameters in streams, down hole in monitoring wells and in flow-through cells. Water quality parameters may include temperature, pH, dissolved oxygen (DO), oxidation reduction potential (ORP), conductivity and turbidity.

Measurements of water quality parameters are typically made for two main purposes: to provide information on water geochemistry to assist in designing in situ remediation programs and to assess whether representative formation groundwater is being sampled during low flow purging and sampling. They can also be used to assess whether well development is complete in certain situations (see SOP-EDR018).

3.0 OVERVIEW

Not applicable.

4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

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5.0 PROCEDURE

5.1 Equipment and Reagents Required

- Single or multi-parameter probes for monitoring water quality parameters;
- Calibration solutions for calibrating the probes to the standard values;
- Field book or field forms;
- Distilled water;
- Beaker or bucket;
- Stirrer for DO measurement (optional); and
- Flow-through cell (optional).

5.2 Probe Measurement Accuracy

The probes utilized for measuring water quality parameters shall be capable of producing measurement accuracy greater or equal to the following specifications:

Temperature:	± 0.5 degrees Celsius (°C)
Conductivity:	± 1 microSiemens per centimetre (µS/cm)
pH:	±0.1 pH unit
Dissolved Oxygen:	±0.2 milligrams per litre (mg/L) up to20 mg/L
	± 0.6 mg/L greater than 20 mg/L
Turbidity:	±1% up to 100 Nephelometric Turbidity Units (NTU)
	±3% up to 100-400 NTU
	±5% up to 400-3,000 NTU
ORP:	± 20 millivolts (mV)

5.3 Probe Calibration

Calibrate the water quality probes used for field parameter measurement in accordance with the manufacturer's specifications. Wherever possible, arrange for the equipment rental company to calibrate the water quality probes and provide a calibration sheet that contains information such as calibration date and calibration measurements for each parameter. If the water quality probes are used for more than one day, a calibration check must be performed using standard calibration solutions at the start of each day at a minimum. If the calibration check shows deviations from the standard values that exceed the ranges provided below, the probe(s) that exceed the ranges must be calibrated prior to further use:

pH	±0.1 pH units
Specific Conductance	±3%
Temperature	±3%

DO	±10%
ORP	±10 mV
Turbidity	±10%

A calibration check should also be performed if the parameter measurements suggest that calibration drift has occurred. Document all calibration activities in the field notes, including date and time of calibration/calibration check, calibration solutions used, probe readings, and make, model and serial number of the instrument(s). Note that if the water quality probe manufacturer recommends more frequent calibration/calibration checks than specified above, the manufacturer's recommendations are to be followed.

Extra care must be taken to calibrate a multi-parameter probe to prevent cross-contamination. Specifically, following immersion of the probes into each calibration standard, all probes should be thoroughly rinsed in distilled water and the excess water shaken off or blotted dry with a lint-free wipe. Conductivity standards are much more sensitive to cross contamination/dilution than other standards, and prior to immersion in a conductivity standard, all probes should be thoroughly rinsed and completely dried with lint-free wipes. Besides being easily diluted, conductivity also affects other parameters (specifically DO), and the conductivity probe should always be the first probe calibrated. The following order for calibration of a multi-parameter probe is to be followed:

1. Specific Conductance;
2. pH;
3. DO; and
4. Turbidity.

There is no recommended order for calibration of other parameters.

5.4 Single-Parameter Probes

Prior to conducting field measurements, probe sensors must be allowed to equilibrate to the temperature of the water being monitored. Probe sensors have equilibrated adequately when the temperature reading has stabilized. Deployment of single-parameter probes will follow the following procedures:

5.4.1 Temperature

Whenever possible the temperature shall be measured in situ (i.e., within a stream, direct deployment in a monitoring well). When temperature cannot be measured in situ, it can be measured in a beaker or bucket. The following conditions must be met when measuring temperature within a beaker or bucket:

- The beaker or bucket shall be large enough to allow full immersion of the temperature probe. The beaker or bucket is to be rinsed with water from the well or stream being measured prior to obtaining the measurement;

- The probe must be placed in the beaker or bucket immediately before the temperature changes due to ambient conditions;
- The beaker or bucket must be shaded from direct sunlight and strong breezes before and during temperature measurement; and
- The probe must be allowed to equilibrate for at least 1 minute before temperature is recorded.

5.4.2 pH

Preferably, pH is measured in situ at the centroid of flow and at the mid-depth of a stream, or the mid-point of the well screen in a well. The pH probe must be allowed to equilibrate according to the manufacturer's recommendations before the pH value is recorded without removing the probe from the water.

If the pH cannot be measured in situ, it should be measured in a bucket or beaker using the procedures outlined above for measuring temperature.

5.4.3 Dissolved Oxygen

As for pH, it is preferable to measure DO in situ at the centroid of flow and at the mid-depth of a stream, or the mid-point of the well screen in a well. The DO probe must be allowed to equilibrate according to manufacturer's recommendations before the DO value is recorded without removing the probe from the water.

If DO cannot be measured in situ, it should be measured in a bucket or beaker using the procedures outlined above for measuring temperature.

Some types of DO probes require a sufficient flow of fresh water across the membrane to maintain the accuracy and precision of the DO measurement. When taking DO measurements in a bucket or beaker, either employ a stirrer, or physically move the probe in a gentle motion. Moving the probe in a gentle motion should also be completed when measuring DO in situ down hole in a monitoring well.

5.4.4 ORP

ORP shall be measured using the procedures outlined above for measuring pH. Note that changes in temperature directly affect ORP values and ORP should be measured as soon as possible after the probe has stabilized.

5.4.5 Turbidity

In situ turbidity shall be measured using the procedures outlined above for measuring pH.

If turbidity cannot be measured in situ, it can be measured with a probe in a bucket or beaker using the procedures outlined above for measuring temperature. Note that some turbidity measuring instruments do not use a probe, and a sample of the water is collected in a small vial that is inserted into the instrument which then measures the turbidity of the water.

5.4.6 Multi-Parameter Probe Use With A Flow-Through Cell

A multi-parameter probe and a flow-through cell are typically employed when undertaking low flow purging and sampling of groundwater. SOP-EDR023 describes the procedures to be followed when using a multi-parameter probe and a flow-through cell.

5.5 Additional Considerations for Ontario Regulation 153/04 Phase Two ESA Compliance

When completing a Phase Two Environmental Assessment (ESA) in accordance with Ontario Regulation 153/04, the following additional procedures must be undertaken:

- Thorough records of the calibration and calibration checks of the probes/instruments used for water quality parameter measurement must be kept, including any calibration sheets provided by the equipment supplier. The Quality Assurance/Quality Control section of the Phase Two ESA report requires a discussion of field equipment calibration, and equipment calibration records must be appended to the Phase Two ESA report; and
- If groundwater samples collected for a Phase Two ESA are not collected using low flow purging and sampling, which mandates the measurement of water quality parameters, water quality parameters must be measured (pH, temperature and specific conductance at a minimum) and the measurements included in the Phase Two ESA report. Ontario Regulation 153/04 does not provide specifics as to when or how these water quality parameter measurements are to be made but one set of measurements made at the conclusion of purging prior to sampling is the minimum requirement. These measurements can be made by filling a clean bucket or beaker with purge water and immersing the probes in the purge water.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

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7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

New Jersey Department of Environmental Protection, *Field Sampling Procedures Manual,* August 2005.

Commonwealth of Kentucky – Department of Environmental Protection, *Standard Operating Procedure – In Situ Water Quality Measurements and Meter Calibration,* January 1, 2009.

U.S Environmental Protection Agency – Science and Ecosystem Support Division, Athens, Georgia, *In Situ Water Quality Monitoring,* December 7, 2009.

U.S. Geological Survey, *National Field Manual for the Collection of Water-Quality Data: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 9, Chapters A1-A9,* Various dates.

9.0 APPENDICES

None.

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Template: Master SOP Template – February 2014

SOP – EDR017 – REV006 – MONITORING WELL DEVELOPMENT

Title:	Monitoring Well Development
Practice:	EDR
First Effective Date:	November 23, 2010
Version:	006
Version Date:	January 3, 2018
Author:	Paresh Patel and Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	November 23, 2010	N/A	PDP
001	June 15, 2013	Streamlined background section/Focused procedure on tasks that can be completed by Pinchin personnel/Provided step-by-step summary of field procedure	RLM
002	January 22, 2015	Incorporated procedures specific to Pinchin West into SOP	RLM
003	February 9, 2016	Revised overall procedure to include initial determination of well yield/Added reference to revised well development field forms/Provided guidance on assessing field parameter stabilization when developing wells where water or air were used during drilling	RLM
004	April 29, 2016	Updated Section 4.0	RLM
005	April 28, 2017	Removed references to Pinchin West	RLM
006	January 3, 2018	Modified Section 3.0 to allow well development to occur immediately after well installation under certain circumstances.	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes the standard procedures for groundwater monitoring well development and provides a description of the equipment required and field methods.

All groundwater monitoring wells are to be developed following installation prior to groundwater sampling or the completion of hydraulic conductivity testing. In addition, previously installed groundwater monitoring wells that have not been purged in over one year should be redeveloped prior to additional sampling or hydraulic conductivity testing if there is evidence of sediment impacting the monitoring well (e.g., the depth to bottom of well measurement indicates sediment accumulation) or at the discretion of the Project Manager.

This SOP pertains to monitoring well development that can be undertaken by Pinchin personnel. Monitoring well development completed by drilling rigs is beyond the scope of this SOP.

3.0 OVERVIEW

The main objective of groundwater monitoring well development is to ensure that groundwater sampled from a well is representative of the groundwater in the formation adjacent to the well and that hydraulic conductivity testing provides data representative of the hydraulic characteristics of the adjacent formation.

The specific goals of well development include the following:

- Rectifying the clogging or smearing of formation materials that may have occurred during drilling of the borehole;
- Retrieving lost drilling fluids;
- Improving well efficiency (i.e., the hydraulic connection between the sand pack and the formation);
- Restoring groundwater properties that may have been altered during the drilling process (e.g., volatilization of volatile parameters due to frictional heating during auger advancement or use of air rotary drilling methods); and
- Grading the filter pack to effectively trap fine particles that may otherwise interfere with water quality analysis.

Monitoring well development should not be completed until at least 24 hours have elapsed following monitoring well installation to permit enough time for the well seal to set up, unless both of the following conditions are met:

- The well seal is entirely above the water table; and
- Surface runoff (e.g., from heavy rainfall or snow melt) is not occurring at the well location at the time of development.

Any deviation from this procedure must be approved by the Project Manager before proceeding.

4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

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5.0 PROCEDURE

5.1 Equipment and Supplies

- Inertial pump (e.g., Waterra tubing and foot valve);
- Surge block for use with an inertial pump (Optional);
- Submersible pump (including pump controller and power supply) (Optional);
- Disposable bailer (Optional);
- Graduated pail (to contain purge water and permit the volume of groundwater purged to be tracked);
- Pails or drums for purge water storage prior to disposal;
- Well keys (if wells are locked);
- Tools to open monitoring well (T-bar, socket set, Allen keys, etc.);
- Interface probe;
- Equipment cleaning supplies (see SOP-EDR009);
- Field parameter measurement equipment (see SOP-EDR016) (Optional);
- Disposable nitrile gloves; and
- Field forms.

Pinchin typically employs inertial pumps or bailers for well development because they can be dedicated to each well. However, the use of submersible pumps is a viable alternative for developing deep wells with high well volumes at the discretion of the Project Manager.

5.2 Procedures

The well development procedures employed will be determined by the hydraulic conductivity of the formation in which the groundwater monitoring well is installed. For this SOP, a high yield well is defined as a well that cannot be purged to dryness when pumping continuously at a rate of up to 2 litres per minute (L/min) and a low yield well is defined as a well that can be purged to dryness when pumping continuously at a rate of up to 2 L/min or less. This threshold represents a “normal” pumping rate when hand pumping with an inertial pump.

The initial stage of well development (Stage 1) will apply to all wells and will involve the removal of up to one well volume, followed by an evaluation of the well yield. The procedures followed for Stage 2 of well development will be contingent on whether the well is determined to be a low yield or high yield well.

5.2.1 Well Development for Low and High Yield Wells - Stage 1

The initial procedure for developing a low yield or high yield monitoring well is as follows:

1. Decontaminate all non-dedicated monitoring and pumping equipment that will be used, including the interface probe and submersible pump (if used), in accordance with the procedures described in SOP-EDR009;
2. Review the well construction details provided in the borehole log, previous field notes or well construction summary table from a previous report. Determine the well depth, well stick up, screen length, depth to the top of the sand pack and diameter of the borehole annulus. If the well depth is unavailable, measure it with the interface probe;
3. Measure the initial water level (i.e., static water level) from the reference point on the well (which should be marked at the top of the well pipe) with an interface probe. If measurable free-phase product is present on the water table, record the depth to the top of the free-phase product and the depth to the free-phase product/water boundary (i.e., water level), and discuss this with the Project Manager before proceeding further;
4. Calculate the well volume. **Note that for the purpose of this SOP, there are two definitions of well volume depending on the province in which the project is being conducted.** For Ontario and Manitoba, the well volume is defined as the volume of water within the wetted length of the well pipe (well pipe volume) plus the volume of water within the wetted length of the sand pack (sand pack volume). For British Columbia, Alberta and Saskatchewan, the well volume is defined as the volume of water within the wetted length of the well pipe (well pipe volume) only.

   The volume of water in the well pipe is calculated as follows:

   Well Pipe Volume (litres) = $h_w \times \pi r_w^2 \times 1{,}000$ litres per cubic metre (L/m^3)

   Where $\pi = 3.14$

   h_w = the height of the water column in the monitoring well in metres (wetted length)

   r_w = the radius of the monitoring well in metres (i.e., half the interior diameter of the well)

   The volume of the sand pack in the monitoring well is calculated as follows:

   Sand Pack Volume (litres) = $h_w \times [(0.3\ \pi r_b^2 \times 1{,}000\ \text{L/m}^3) - (0.3\ \pi r_w^2 \times 1{,}000\ \text{L/m}^3)]$

   Where 0.3 = the assumed porosity of the sand pack

h_w = the height of the water column in the monitoring well in metres (wetted length)

π = 3.14

r_b = the radius of the borehole annulus in metres

r_w = the radius of the monitoring well in metres

For Ontario and Manitoba projects, the following table provides well volumes in litres/metre for typical well installations:

Borehole Annulus Diameter (Inches/Metres)	Well Interior Diameter (Inches)	Well Pipe Volume (Litres/Metre)*	Well Volume (Litres/Metre)*
4/0.1	1.25	0.8	2.9
	1.5	1.1	3.2
	2	2.0	3.8
6/0.15	1.25	0.8	5.9
	1.5	1.1	6.1
	2	2.0	6.7
8.25/0.21	1.5	1.1	11.2
	2	2.0	11.8
10.25/0.26	1.5	1.1	16.7
	2	2.0	17.3

* Litres to be removed per metre of standing water in the well (wetted length).

If the borehole annulus and well interior diameters match one of those listed above, to determine the volume of one well volume simply multiply the number in the last column of the table by the wetted length in the well. For example, if a 2-inch diameter well installed in a 8.25-inch diameter borehole has 2.2 metres of standing water, one well volume equals 26.0 litres (2.2 metres x 11.8 litres/metre).

Note that the above well volume calculations apply only to wells where the water level in the well is below the top of the sand pack. If the water level is above the top of the sand pack, then the well volume is the volume of water in the sand pack and well pipe within the sand pack interval, plus the volume of water in the well pipe (i.e., well pipe volume) above the top of the sand pack.

For example, assume a 2-inch diameter well has been installed in a 8.25-inch diameter borehole to a depth of 6.0 metres below ground surface (mbgs), with a 3.05 metre long screen. The sand pack extends from 6.0 mbgs to 2.5 mbgs and the water level is at 1.85 mbgs. One well volume equals ([6.0 metres – 2.5 metres] x 11.8 litres/metre) + ([2.5 metres – 1.85 metres] x 2.0 litres/metre) or 42.6 litres.

For British Columbia, Alberta and Saskatchewan projects, the well volume is calculated using the conversion factor listed in the third column of the above table. For example, if there are 2.5 metres of standing water in a 1.5-inch diameter well, one well volume equals 2.75 litres (2.5 metres x 1.1 litres/metre);

5. Lower the pump into the well until the pump intake is approximately 0.3 metres above the bottom of the well. Remove half a well volume while pumping at a rate of approximately 1 to 2 L/min. Measure the depth to water after the half a well volume is removed. Record the approximate purge volume, pump intake depth and any pertinent visual/olfactory observations (e.g., sheen, odour, free-phase product, sediment content, clarity, colour, etc.); and
6. Move the pump intake upward to the middle of the water column (or middle of the screened interval if the static water level in the well is above the top of the screen). Remove half a well volume (for a cumulative total of 1 well volume) or purge until dry while pumping at a rate of approximately 1 to 2 L/min, whichever occurs first. Measure the depth to water after the half a well volume is removed unless dry. Record the approximate purge volume, pump intake depth and any pertinent visual/olfactory observations. Note that if suction is broken (indicating that drawdown to the pump intake depth has occurred), move the pump intake to the bottom of the well and continue purging.

After completing Step 6, review the water level data to assess whether the well is a low yield or high yield well. If the well is purged dry or close to dryness, or significant drawdown has occurred, then the well is a low yield well. If little or no drawdown has occurred then the well is a high yield well. Some judgement will be required by field personnel when classifying the well yield if moderate drawdown has occurred during removal of the first well volume.

5.2.2 Well Development for High Yield Wells - Stage 2

The procedure for the second stage of developing a high yield monitoring well is as follows:

1. Move the pump intake upward to near the top of the screened interval (or near the top of the water column if the water level is currently below the top of the screen). Remove half a well volume (for a cumulative total of 1.5 well volumes) while pumping at the maximum practical rate that is greater than 2 L/min. Record the approximate purge volume, pump

intake depth and any pertinent visual/olfactory observations (e.g., sheen, odour, free-phase product, sediment content, clarity, colour, etc.);

2. Note that if the wetted length is short within a well (e.g., 1.5 metres or less), there will not be enough separation between pump intake depths to warrant pumping from three depths (i.e., near the bottom, middle and top of the water column). In this case, pumping from two depths (i.e., near the bottom and top of the water column) is sufficient;
3. Lower the pump intake until it is approximately 0.3 metres above the bottom of the well. Remove half a well volume (for a cumulative total of 2 well volumes) while pumping at the maximum practical rate that is greater than 2 L/min. Record the approximate purge volume, pump intake depth and any pertinent visual/olfactory observations;
4. Move the pump intake upward to the middle of the water column (or middle of the screened interval if the water level in the well is above the top of the screen). Remove half a well volume (for a cumulative total of 2.5 well volumes) while pumping at the maximum practical rate that is greater than 2 L/min. Record the approximate purge volume, pump intake depth and any pertinent visual/olfactory observations;
5. Move the pump intake upward to near the top of the screened interval (or near the top of the water column if the water level is currently below the top of the screen). Remove half a well volume (for a cumulative total of 3 well volumes) while pumping at the maximum practical rate that is greater than 2 L/min. Record the approximate purge volume, pump intake depth and any pertinent visual/olfactory observations;
6. If the purge water contains high sediment content after the removal of 3 well volumes, well development should continue by removing additional well volumes following the same procedure as above until the sediment content visibly decreases. If the purge water continues to have high sediment content after the removal of 2 additional well volumes (i.e., 5 well volumes in total), contact the Project Manager to discuss whether well development should continue. A cap of 10 well volumes removed is considered sufficient for high yield well development regardless of sediment content; and
7. Record the water level at the conclusion of well development.

Note that at the discretion of the Project Manager, when developing a monitoring well using an inertial pump, a surge block can be attached to the foot valve before completing Step 1 (i.e., the first time groundwater is pumped from near the top of the screened interval or water column) and then leaving it on the foot valve for the remainder of well development. A surge block is used to increase the turbulence created by pumping and enhance the removal of fine-grained material from the sand pack.

Note that the use of a bailer to develop a high yield well with a wetted interval greater than 2 metres is not recommended given that the depth from which groundwater is removed is difficult to control. However, a bailer can be used as a substitute for a surge block by raising and lowering it through the screened interval for approximately 5 to 10 minutes before the start of Step 1.

5.2.3 Well Development for Low Yield Wells - Stage 2

The procedure for the second stage of developing a low yield monitoring well is as follows:

1. Position the pump intake at the bottom of the well and purge the well to dryness if it was not purged to dryness during completion of Stage 1 at the maximum practical rate that is greater than 2 L/min. Allow sufficient time for the well to recover to at least 90% of the initial static water level or allow the well to recover for a period of time designated by the Project Manager; and
2. Repeat Step 1 until the well has been purged to dryness a minimum of 3 times. An exception to this is that if recovery is slow, and especially if sediment content is low, repeat purging (i.e., purging the well to dryness more than once) may not be necessary and the need for additional purging is to be discussed with the Project Manager. If the purge water contains high sediment content after purging to dryness 3 times, well development should continue by purging the well to dryness until the sediment content visibly decreases. If the purge water continues to have high sediment content after purging the well to dryness 2 additional times (i.e., purging the well to dryness 5 times in total), contact the Project Manager to discuss whether well development should continue. A cap of purging a well to dryness 10 times is considered sufficient for low yield well development regardless of sediment content.

As per the procedure for high yield well development, a surge block can be attached to the foot valve to increase the effectiveness of the pumping action. If a surge block is used, pumping should commence at the top of the water column in the well (instead of near the bottom of the well as described above) with the pump intake progressively lowered as the water level in the well decreases.

Note that bailers can be used in lieu of an inertial pump for the development of a low yield well. The turbulence created in a well by the act of dropping a bailer into it and then removing it full of groundwater can be effective in removing fine-grained material from the sand pack. If a bailer is left in a well, it should be “hung” above the water table to facilitate future water level monitoring.

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5.2.4 Removal of Water Lost During Well Installation

When water has been used during well installation (e.g., for bedrock coring, to control heaving sands), the total volume of water required to be purged from a well during development will be equal to 3 times the estimated volume of water lost during drilling plus the volume of water that would normally be removed during well development.

For example, for a high yield well where 25 litres of water were lost during drilling and the well volume is 10 litres, the minimum amount of water to be purged during development is 105 litres (i.e., 3 times the volume of water lost during drilling [75 litres] plus a minimum of 3 well volumes [30 litres]).

For a low yield well, the well will need to be purged to dryness enough times to remove a volume equivalent to 3 times the volume of water lost during drilling plus the volume of water that would normally be removed during well development.

As an alternative to removing 3 times the volume of water lost during drilling, field parameter stabilization during well development can be used to assess whether sufficient water has been removed. For example, the conductivity of drill water (which is usually tap water) is typically much lower than groundwater, and conductivity measurements can act as a guide during development as to whether the water being removed is formation groundwater or drill water.

For assessing field parameter stability when developing a high yield well, field parameter measurements of pH, conductivity, temperature and oxidation-reduction potential are to be made after every half well volume is removed and stability is considered achieved if the field parameters are all within ±10% over 3 consecutive readings. Note that a minimum of 3 well volumes must be removed even if field parameter stabilization is achieved prior to the removal of 3 well volumes to comply with the minimum well purging requirements of this SOP (i.e., removal of a minimum of 3 well volumes from a high yield well).

For assessing field parameter stability when developing a low yield well, field parameter measurements of pH, conductivity, temperature and oxidation-reduction potential are to be made once each time a well is purged to dryness, approximately halfway through purging. For example, if based on the current water level it is estimated that 10 litres will be removed before a well is purged to dryness, the field parameters are to be measured after 5 litres have been removed. Stability is considered achieved if the field parameters are all within ±10% over 3 consecutive readings. After stabilization is achieved, continue to purge the well to dryness a final time at which point development is complete.

A second alternative would be to allow sufficient time for the drill water to dissipate into the formation. The appropriate amount of time will depend on the amount of water lost to the formation and the formation characteristics, but will be a minimum of one week. A Senior Project

Manager or Senior Technical Reviewer will be responsible for determining the suitability of this approach and the required length of time. At the discretion of the Senior Project Manager or Senior Technical Reviewer, field parameter measurements may be made during pre-sampling purging to assess whether the drill water has dissipated by the time of sampling.

Note that it can be difficult to estimate the amount of water lost during drilling. If the driller's water tank is accessible, measure the water levels in the water tank before and after drilling the well and then estimate the volume of water used during drilling using the water tank dimensions and subtract this volume from the volume of water recovered at the end of drilling from this volume to estimate the volume of water lost. If this is not possible, ask the driller to estimate the approximate volume of water lost during drilling.

For some well installations, determining even an approximate volume of water lost during drilling is not possible. In this situation, field parameter stabilization should be used as a guide in deciding how much water to remove during well development.

5.2.5 Development of Monitoring Wells Installed Using Air Rotary Drilling Methods

When developing a monitoring well installed using an air rotary drilling procedure, field parameter stabilization must be used to assess whether sufficient water has been removed and the field parameters measured must include dissolved oxygen. This is particularly important when the contaminants of concern at a site include volatile organic compounds (VOCs) as the use of compressed air during the drilling process can result in sparging of VOCs from the groundwater, resulting in groundwater samples that are biased low with respect to VOC concentrations.

The well development procedure is the same as described in Section 5.2.4, except that the field parameters measured are to include pH, conductivity, temperature, oxidation-reduction potential and dissolved oxygen. The criterion for determining field parameter stabilization for dissolved oxygen is ±10% over 3 consecutive readings or 3 consecutive readings with concentrations less than 0.5 milligrams per litre.

5.2.6 Assessing Field Parameter Stabilization

When determining whether field parameter stabilization has occurred over 3 consecutive readings (except for dissolved oxygen when using the less than 0.5 milligrams per litre over 3 consecutive readings criterion), the following procedure is to be followed:

1. For each parameter, use the first of the 3 readings and calculate 10% of this reading; and
2. The range that the next 2 readings must be within is ± 10% of the first reading.

For example, if the temperature of the first of 3 consecutive readings is 10º C, the next 2 readings must fall between 9 and 11 º C for temperature to be considered stable.

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5.3 Well Development Record

Well development is to be documented through the completion in full of the following field forms located in the Pinchin Orchard:

- EDR-GW-Well Development-S1-Low/High Yield Well (completed for Stage 1 for both low and high yield wells);
- EDR-GW-Well Development-S2-Low Yield Well (completed for Stage 2 for low yield wells); and/or
- EDR-GW-Well Development-S2-High Yield Well (completed for Stage 2 for high yield wells).

Any deviations from this SOP along with the rationale for these deviations must be recorded on the EDR-GW-Well Development-S1-Low/High Yield Well form.

5.4 Additional Considerations for O. Reg. 153/04 Phase Two ESA Compliance

When developing a low yield well, the well must be purged to dryness a minimum of 3 times regardless of the recovery time unless reduced purging is authorized by the Qualified Person responsible for the Phase Two ESA.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

Association of Professional Geoscientists of Ontario, "*Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)",* April 2011.

9.0 APPENDICES

None.

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SOP – EDR019 – REV004 – SOIL SAMPLE LOGGING

Title:	Soil Sample Logging
Practice:	EDR
First Effective Date:	August 03, 2013
Version:	004
Version Date:	January 3, 2018
Author:	Francesco Gagliardi and Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	November 26, 2010	N/A	FG
001	October 31, 2013	Streamlined SOP to focus only on soil sample logging/Added O. Reg. 153/04 compliance section	RLM
002	April 29, 2016	Updated Section 4.0	RLM
003	April 28, 2017	Removed reference to Pinchin West	RLM
004	January 3, 2018	Modified percentages of minor constituents in Section 5.1.3/Clarified when geotechnical terms can be used for soil logging in Section 5.2	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) presents the methods used to describe the physical characteristics of soil samples collected during site investigations.

The methods and equipment used for retrieving soil samples are provided in other SOPs (e.g., SOP-EDR007 – Borehole Drilling) and will not be repeated herein.

3.0 OVERVIEW

Not applicable.

4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 General Procedures

For each soil sample collected during a site investigation, the following information is to be recorded in the field log book or field forms in the order presented below:

- Depth;
- Primary soil texture;
- Colour;
- Minor constituents*;
- Noticeable odours;
- Noticeable staining;
- Noticeable free-phase product/sheen*; and
- Moisture content.

*These constituents only need to be noted if they are actually present in the sample.

5.1.1 Primary Soil Texture

The primary soil texture should be determined using the attached flow chart as a guide to help classify the soil.

5.1.2 Colour

Describe the primary colour of the soil sample (e.g., brown, grey, black, green, white, yellow, red). The relative lightness or darkness of the primary colour can be described using the adjectives “light” or “dark” as appropriate. Soil that exhibits different shades or tints is to be described by using two colours (e.g., brown-grey). If the soil sample contains spots of a different colour, this is to be described as “mottling” (e.g., grey with green mottling).

5.1.3 Minor Constituents

Note the presence of minor constituents in the soil that are “natural” materials (e.g., gravel, cobbles, sand, oxidation, etc.) or “man-made” materials (e.g., asphalt, brick, concrete, coal or glass fragments, coal ash, etc.). Gravel comprises particles between 5 millimetres (mm) and 75 mm in diameter. Cobbles comprise particles greater than 75 mm in diameter (approximately the size of a man’s fist) and boulders are particles greater than 150 mm in diameter (approximately the size of man’s head).

When the percentage of the minor constituents in the soil is between approximately 1 and 10%, the adjective used to describe the relative amount of the minor constituent is “trace” (e.g., silty sand with trace brick fragments).

When the percentage of minor constituents of soil is between approximately 10 and 20%, the adjective used to describe the relative amount of the minor constituent is “some” (e.g., silty sand with some concrete fragments).

When the percentage of the “natural” minor soil constituents is between approximately 20 and 35%, the minor soil type is described by adding a ‘y’ or ‘ey’ to the soil type (e.g., silty, sandy, clayey).

When the percentage of the “natural” minor soil constituents is also greater than 35%, the minor soil type is described by using “and” the soil type (e.g., sand and gravel, sand and silt).

When the percentage of the “man-made” minor soil constituents is between approximately 30 and 50%, describe the soil as per the normal procedure and add “with” the minor constituent type(s) (e.g., silty sand with coal ash and brick fragments).

5.1.4 Noticeable Odours

Field staff are not expected to directly smell soil samples to assess the presence/absence of odours.

If it is possible to identify the likely type of odour then this information should be recorded along with a comment on the severity of the odour (e.g., slight, strong, etc.). Identification of specific chemical compounds, such as petroleum hydrocarbons (PHCs) or solvents is acceptable; however, this identification should be referenced as “xxxx-like” (e.g., PHC-like, solvent-like, etc.). This principle also applies when describing staining and free-phase product.

If the odour cannot be readily identified, it should be described in the field notes as “unidentified odour”. If no noticeable odours are observed, this needs to be recorded in the field notes as “no odour”.

5.1.5 Noticeable Staining

Describe the colour and possible source of the staining (e.g., black PHC-like staining).

If no noticeable staining is observed, this needs to be recorded in the field notes as “no staining”.

5.1.6 Noticeable Free-Phase Product/Sheen

Describe the colour, odour, possible composition and relative viscosity (if sufficient product is present to assess) of the product (e.g., dark brown, viscous, motor oil-like product). Identification of the composition of the product is acceptable but needs to be described as PHC-like, motor oil-like. Alternatively, the product can be described as “resembling” a substance (e.g., “resembling motor oil”).

The presence of any observed iridescent sheen is to be recorded in the field notes. Note that the presence of an iridescent sheen by itself in the soil does not constitute the presence of free-phase product but may be an indicator that free-phase product is present within the vicinity of the borehole.

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5.1.7 *Moisture Content*

Describe the moisture content of the soil sample using one of the following three terms:

- Dry – no visible evidence of water and the soil is dry to the touch;
- Moist – visible evidence of water but the soil is relatively dry to the touch. Do not use the term “damp” to describe this type of soil; and
- Wet – visible evidence of water and the soil is wet to the touch. Free water is evident when sandy soil is squeezed. Do not use the term “saturated” to describe this type of soil.

5.1.8 *Recording Soil Sample Descriptions in Field Notes*

Recording the information in the field notes consistently in the above order will make it easier to prepare the borehole logs for the site investigation report.

Example soil sample descriptions are as follows:

- Sand, grey, trace gravel, PHC-like odours, free-phase PHC-like product, wet;
- Silty sand, brownish-grey, some gravel, trace asphalt and brick fragments, no odours or staining, moist; and
- Silty clay, brown, trace gravel, no odours or staining, moist to wet at 2.4 mbgs.

5.2 General Considerations

Where any physical properties change within a soil sample, the depth at which this transition takes place needs to be recorded. For example, for a soil sample collected from 1.8 to 2.4 metres below ground surface (mbgs), if the upper 0.3 metres has no odours but PHC-like odours are present below this depth then the field notes need to state “no odours from 1.8 to 2.1 mbgs, PHC-like odours from 2.1 to 2.4 mbgs”.

Some soil samples will contain a thin seam of a different soil type, such as a sand seam within a silty clay. The depth interval of any such seam is to be recorded in the field notes, and the material comprising the seam should be described separately using the logging procedure outlined above.

Unless soil sampling is being completed as part of a combined environmental/geotechnical investigation and EDR staff logging the soil samples have the appropriate geotechnical training, avoid the use of geotechnical terms (e.g., stiff, dense, high plasticity, etc.) when logging soil samples. If any geotechnical terms are inadvertently included in the field notes by staff who have not had geotechnical training, they must not be included in the borehole logs provided in our report.

5.3 Additional Considerations for Ontario Regulation 153/04 Phase Two ESA Compliance

None. Following this SOP will be sufficient to comply with the Ontario Regulation 153/04 requirements for Phase Two ESAs with respect to field logging. Risk assessments completed in accordance with Ontario Regulation 153/04 will typically require soil samples to be submitted to a laboratory for full soil texture analysis, but this is beyond the scope of field logging.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

American Society for Testing and Materials, *ASTM D2487-11 - Standard Practice for Classification of Soils for Engineering Purposes (United Soil Classification System)*, 2011.

Association of Professional Geoscientists of Ontario, *Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended)*, April 2011.

9.0 APPENDICES

Appendix 1 Soil Texture by Feel Chart

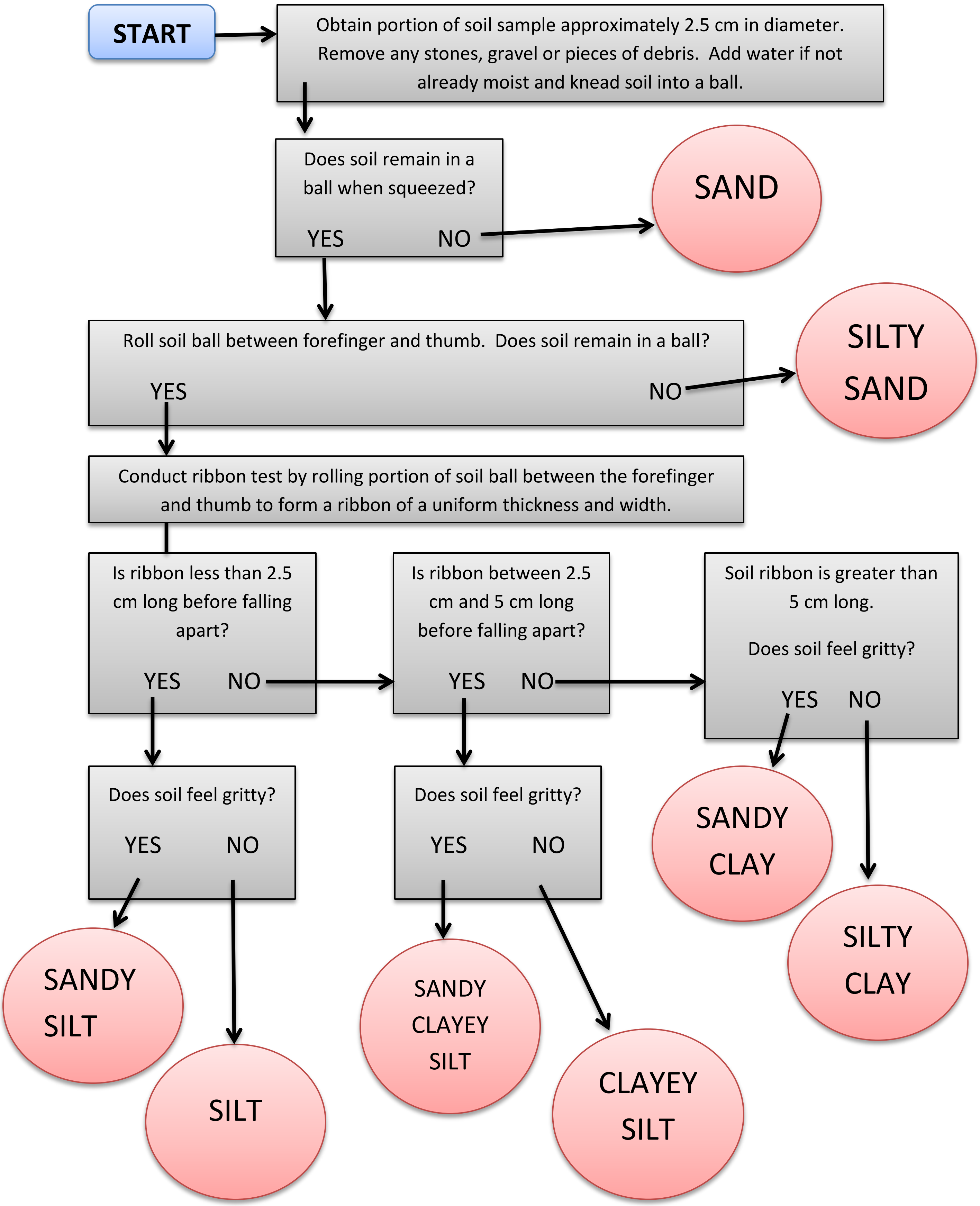
I:\2018 SOP Updates\SOP - EDR019 - REV004 - Soil Sampling Logging.docx

Template: Master SOP Template – February 2014

APPENDIX I

Soil Texture by Feel Chart

Key to Soil Texture by Feel



SOP – EDR023 – REV006 – LOW FLOW GROUNDWATER SAMPLING

Title:	Low Flow Groundwater Sampling
Practice:	EDR
First Effective Date:	July 08, 2011
Version:	006
Version Date:	January 3, 2018
Author:	Paresh Patel and Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	July 08, 2011	N/A	PDP
001	April 15, 2013	Streamlined background section/Provided step-by-step summary of field procedure/Added O. Reg. 153/04 compliance items	RLM
002	September 11, 2013	Added centrifugal submersible pump to list of pumps suitable for low flow sampling	RLM
003	January 26, 2015	Adjusted well development, sampling and field parameter measurement procedures to reflect Pinchin West practices.	RLM
004	April 29, 2016	Updated Section 4.0/Updated Section 5.3 to reflect current field documentation requirements and new document retention policy	RLM
005	April 28, 2017	Removed reference to Pinchin West/In Section 5.2, removed the requirement to complete a post-sampling water level and total purge volume, and added requirement to record pump intake depth at the time of sampling	RLM
006	January 3, 2018	Minor wording changes throughout	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes the standard procedures for collecting groundwater samples from monitoring wells using low flow (low stress) sampling techniques and provides a description of the equipment required and field procedures.

Low flow sampling provides an alternative to the conventional groundwater purge and sampling technique using inertial pumps, submersible pumps and/or bailers, and emphasizes the need to minimize hydraulic stress at the well-aquifer interface by maintaining low water level drawdown, and by using low pumping rates during purging and sampling. Rather than removing a specified number of well volumes or purging a well to dryness a specified number of times prior to sampling, purging is completed at a low pumping rate until first, a stable water level is achieved, and second, field parameters such as pH, temperature, dissolved oxygen (DO), oxidation-reduction potential (ORP), specific conductance and turbidity, which are monitored during purging, have stabilized indicating that representative formation groundwater is being

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purged. It is important that water level and field parameter stabilization are achieved prior to groundwater sampling as this indicates that fresh formation water is being purged and not stagnant groundwater from within the well itself.

Low flow groundwater sampling methods work best for moderate to high yield wells (i.e., wells installed in permeable soils such as sand, silty sand and some silts). For low yield wells (e.g., wells installed in silty clay), low flow groundwater sampling may not be suitable and alternate purging and sampling procedures will be required (see SOP-EDR008 for low yield well sampling procedures).

Conventional sampling can result in sediment entrainment in samples which can result in “positive bias” (i.e., reported concentrations greater than actual groundwater concentrations). This is particularly an issue with petroleum hydrocarbons (PHCs) in the F3 and F4 fraction ranges and polycyclic aromatic hydrocarbons (PAHs) and low flow sampling as per this SOP is strongly recommended when sampling for these parameters unless the hybrid sampling method described in SOP-EDR008 is employed.

This SOP is based primarily on the procedures described in the United States Environmental Protection Agency Region 1 document *“Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells”*, revised January 19, 2010.

3.0 OVERVIEW

The low flow sampling technique can be implemented for any size of monitoring well that can accommodate a positive lift pump or tubing assembly. Note that low flow sampling can be conducted for bedrock monitoring wells without well screens (i.e., with an open interval below the well casing) but for simplicity the screen interval or open interval will be referred to collectively in this SOP as the “screen interval”.

Advantages of the low flow sampling technique over conventional groundwater sampling techniques include:

- Minimal disturbance at the sampling point, reducing the potential for sediment to be entrained during the purging process which can result in positive bias (elevated and unrepresentative concentrations) of parameters such as heavy fraction range PHCs and PAHs;
- Reduced operator variability resulting in greater operator control;
- Reduced purge water volumes resulting in reduced investigation derived waste disposal costs; and
- Improved sample consistency resulting in more representative (unbiased) and reproducible sample results.

Disadvantages of the low flow sampling technique over conventional groundwater sampling techniques include:

- Purging and sampling typically requires more time than conventional sampling methods;
- Use of non-dedicated equipment (e.g., submersible pumps) that requires cleaning before initial use and between monitoring well locations; and
- Overall project costs for low flow groundwater sampling programs are typically higher than groundwater sampling programs completed using conventional sampling methods.

It is imperative that the monitoring wells to be sampled are properly developed prior to conducting low flow groundwater sampling. This often includes redevelopment of previously installed wells that have not been sampled for a prolonged period of time (i.e., more than one year). During well development or redevelopment, the hydraulic characteristics of each well should be assessed to provide guidance on the suitability of using the low flow groundwater sampling procedure. Well development procedures are provided in SOP-EDR017.

When groundwater conditions are known, sample the background monitoring wells (i.e., outside of the impacted groundwater area) and wells with low concentrations of contaminants of concern first prior to sampling wells with known impacts. Leave impacted wells to the last to minimize the potential for cross contamination.

In Ontario and Manitoba, or where otherwise specified by provincial guidance documents, a peristaltic pump is not to be used for the collection of groundwater samples for analysis of volatile parameters (i.e., volatile organic compounds (VOCs) and PHCs F1 Fraction). When sampling for volatile parameters using low flow groundwater sampling methods, a bladder pump or centrifugal pump (collectively referred to herein as “submersible pumps”) must be used. A “hybrid” groundwater purging and sampling procedure using a peristaltic pump to undertake low flow groundwater sampling for non-volatile parameters as described in this SOP followed by conventional purging and sampling methods for volatile parameters is an acceptable alternative to using a bladder pump or centrifugal pump.

Peristaltic pumps cannot be used where the suction lift (i.e., vertical distance between the pump and ground level) is more than 8.5 metres (28 feet).

It is very important to maintain consistency in applying low flow groundwater sampling procedures to purging and sampling for each monitoring well and for each sampling event. Any deviation from the field procedures described in this SOP can induce variability in the analytical results.

Our primary objective is to obtain unbiased groundwater samples whose analytical results are representative of actual groundwater quality at the property being investigated.

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4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
- Distributed to senior staff at Le Groupe Gesfor Poirier and Pinchin LeBlanc for distribution as appropriate.

5.0 PROCEDURE

5.1 Equipment and Supplies

5.1.1 Documents and Information Gathering

The following documents and information are required to complete low flow groundwater sampling:

- A copy of the proposal or work plan;
- Monitoring well construction details;
- A copy of this SOP;
- Field data from the last sampling event (if available);
- Operation, maintenance and calibration manuals for the multi-parameter water quality meter;
- A site-specific Health and Safety Plan (as per the project requirements); and
- Client or site representative’s contact details.

5.1.2 Extraction Devices and Tubing

This SOP will not discuss in detail the various pumps and tubing options that are available for completing low flow groundwater sampling. The following section provides some general guidelines for the use of this equipment and it is recommended that the equipment supplier be consulted when selecting the appropriate pump and tubing, taking into account site-specific parameters (e.g., well depth, well diameter, site accessibility) and the parameters that will be sampled.

5.1.3 Extraction Devices

For purging and sampling using the low flow sampling procedure, submersible pumps (e.g., centrifugal, bladder) and peristaltic pumps are the most commonly used extraction devices. Regardless of the type of extraction device used, the low flow sampling procedure requires precise control over the flow rate during purging and sample collection. A battery-operated pump controller is required to operate submersible pumps and to control the extraction flow rate. Peristaltic pumps have built-in flow rate adjusters.

Submersible pumps with internal parts constructed of stainless-steel or Teflon are preferred. If the internal parts are constructed of other materials, adequate information must be provided by the equipment supplier to show that the substituted materials do not leach contaminants nor cause interference to the analytical procedures to be used. The use of any such substituted materials must be approved by the Project Manager prior to the field program.

If a bladder pump is selected for the collection of samples for volatile parameters analysis, it should be capable of delivering a water volume sufficient to fill a VOC sample vial in one pulse.

5.1.4 Tubing

Teflon, Teflon-lined polyethylene or polyethylene 1/4-inch interior diameter (ID) or 3/8-inch ID tubing is to be used to connect to the pump and the flow-through cell. In the winter time, the use of 3/8-inch ID tubing is recommended to avoid groundwater freezing in the tubing during severe cold weather conditions.

If the tubing is constructed of other materials (other than mentioned above), adequate information must be provided to show that the substitute materials do not leach contaminants nor cause interference with the analytical procedures. The use of any such substituted materials must be approved by the Project Manager prior to the field program.

Direct sunlight and hot ambient air temperatures may cause groundwater in the tubing to heat up and de-gas resulting in loss of volatile parameters. When sampling under these conditions, the length of the tubing between the top of the monitoring well and the flow-through cell should be kept as short as possible to minimize exposure to sunlight or ambient air and heating of the groundwater.

5.1.5 Groundwater Monitoring, Purging and Sampling

The following equipment is required to complete the low flow purging and sampling procedure described in this SOP:

- Well keys;
- Interface probe;
- Assorted tools (e.g., knife, screwdriver, etc.);
- Equipment cleaning reagents required as per SOP-EDR009 (e.g., distilled water, phosphate-free detergent, etc.);
- Multi-parameter water quality meter (including calibration solutions);
- Graduated cylinder, graduated measuring cup or graduated bucket;
- Stopwatch;

- Flow-through cell;
- Peristaltic pump, centrifugal pump or bladder pump;
- Tubing;
- Pails or drums for storing purge water;
- Paper towels or wipes;
- Calculator;
- Field forms (see Section 5.3) and/or field notebook (hereafter the "field notes");
- Waterproof and permanent markers;
- Disposable gloves and appropriate personal protective equipment based on site-specific conditions;
- Cooler and ice packs;
- Sample bottles and labels. Several extra sample bottles of each type should be available in case of breakage or other problems; and
- Laboratory Chain of Custody forms.

The following equipment may be used during well sampling, in addition to the above:

- Disposable field filtration units/filters (if appropriate).

5.2 Low Flow Groundwater Sampling Procedures

The following is the summary of the procedures to be followed for low flow groundwater sampling:

1. Develop the monitoring wells to be sampled (if required) prior to sampling by removing between three and five well volumes or by purging them to dryness between one and three times. Further details regarding well development are provided in SOP-EDR017. Well development is to be completed for all newly installed wells prior to low flow sampling and may be required for previously installed monitoring wells that have not been sampled in more than one year. Ideally, well development should occur at least one day prior to low flow sampling. At the discretion of the Project Manager, low flow sampling can occur on the same day as the well is developed but the well must be allowed to fully recover to its original static level prior to the start of purging;
2. Decontaminate all non-dedicated monitoring and sampling equipment that will be used, including the interface probe, submersible pump (if used), water quality meter probes and flow-through cell in accordance with the procedures described in SOP-EDR009;

3. Calibrate the water quality meter used for field parameter measurement in accordance with the manufacturer's specifications. Wherever possible, arrange for the equipment rental company to calibrate the water quality meter and provide a calibration sheet that contains information such as calibration date and calibration measurements for each parameter. If the water quality meter is to be used for more than a one day, a calibration check shall be performed using standard calibration solutions at the start of each day at a minimum. If the calibration check shows deviations from the standard values that exceed the ranges provided in bullet 10 below, the instrument shall be calibrated prior to further use. A calibration check should also be performed during the course of purging and sampling if the parameter measurements suggest that calibration drift has occurred. Document all calibration activities in the field notes, including date and time of calibration/calibration check, calibration solutions used, probe readings and make, model and serial number of the water quality meter. Note that if the water quality meter manufacturer recommends more frequent calibration/calibration checks than specified above, the manufacturer's recommendations are to be followed. See SOP-EDR016 for additional procedures regarding water quality meter calibration.

   Extra care must be taken when calibrating the multi-parameter probe to prevent cross-contamination. Specifically, following immersion of the probes into each calibration standard, all probes should be thoroughly rinsed in distilled or de-ionized water and the excess water shaken off or blotted dry with a lint-free wipe. Conductivity standards are much more sensitive to cross contamination/dilution than other standards. Besides being easily diluted, conductivity standards also affect other parameters (specifically DO), and the conductivity probe should always be the first probe calibrated. The following order for calibration of a multi-parameter probe is to be followed:

   - Specific Conductance;
   - pH;
   - DO;
   - Turbidity; and
   - All other parameters (there is no recommended order for these parameters).

4. Review the well construction details provided in the well development forms, borehole logs or well construction summary table from a previous report. Determine the well depth, well stick up, length of the screen interval, and depth to the top of the screen interval. If the well depth is unavailable, measure it with the interface probe;

Measure the initial water level (i.e., static water level) from the reference point on the well (which should be marked at the top of the well casing) with an interface probe. If measurable free-phase product is present in the well, discuss this with the Project Manager before proceeding further. Using the known well depth, confirm that at least 0.6 metres of water is present within the well. If less than 0.6 metres of water is present, low flow sampling may not be appropriate and the Project Manager is to be contacted before proceeding further;

5. Following decontamination, slowly install the pump or tubing (for peristaltic pumps) to the appropriate depth within the well. Do not connect the pump discharge tubing to the flow-through cell at this time. If the water level in the well is above the top of the screen interval, the pump or tubing intake depth will be the mid-point of the screen interval. If the water level is below the top of the screen interval, the pump or tubing intake will be set at the mid-point of the wetted interval (i.e., the distance between the static water level and the bottom of the well) or 0.6 metres from the bottom of the well, whichever is a greater distance from the bottom of the well. Pumping from within 0.6 metres of the bottom of the well has a higher potential to entrain sediment from the bottom of the well and is not to be completed unless authorized by the Project Manager.

   The pump intake depth may vary from that described above at the discretion of the Project Manager depending on the specific purpose of the groundwater sampling program. For example, if chlorinated solvents that are denser than water are being assessed, it may be desirable to position the pump intake as close to the bottom of the well as possible, or if PHC-related parameters which are lighter than water are being assessed, it may be preferable to position the pump intake as close to the water table as possible. Pump intake depth should be confirmed with the Project Manager prior to the field program;

6. Turn on the pump and discharge groundwater into a purge bucket. Purge initially at a flow rate of approximately 250 millilitres/minute (mL/min). Increase or decrease the flow rate until the water level in the well reaches a steady state condition (i.e., a stabilized water level). The goal is to purge at as high a pumping rate as the well will sustain and still maintain a stabilized water level; however, purging rates should not exceed 500 mL/min during purging and sampling. Also, it is important that during the early phase of purging, emphasis should be put on minimizing pumping stress (i.e., rapid fluctuations in pumping rates).

Whenever possible, purge at a pumping rate low enough to keep the total drawdown in the well to less than 10 centimetres although this may not be achievable for low to moderate yield wells. Once a steady state condition is achieved, the purge rate must be maintained constant and should not be changed. Determine the flow rate using a graduated bucket, graduated measuring cup or graduated cylinder and a stop watch. If the well is purged dry even after reducing the flow rate to the minimum practical purging rate of approximately 50 mL/min to 100 mL/min, then low flow sampling procedures will not work for the well and the sampling procedure described in SOP-EDR008 for sampling low yield wells is to be followed. During purging and sampling, it is important to keep the pump intake below the water level in the well at all times to avoid aeration of the groundwater;

7. If the visual appearance of the groundwater is highly turbid once a stabilized water level is achieved, continue to discharge purged water directly into the purge bucket until the groundwater clears, as highly turbid groundwater may foul the flow-through cell. Once the turbidity clears up, connect the flow-through cell to the pump discharge tubing. If the groundwater remains highly turbid after approximately 15 minutes of purging, contact the Project Manager to discuss whether sampling should occur. Further well development may be required to remove excess sediment from the monitoring well before sampling can proceed;
8. Confirm the volume of the flow-through cell excluding the volume of the water quality meter probes. If this information is not readily available, fill the cell with water with the water quality probes inserted and empty its contents into a graduated cylinder or measuring cup to determine the volume. After connecting the discharge tubing to the flow-through cell, continue purging until the flow-through cell is full and turn on the multi-parameter meter. Record the initial field parameter readings in the field notes. At a minimum, the field parameters that are to be monitored are pH, specific conductance, temperature, DO and ORP. The monitoring of turbidity is also a minimum requirement in Ontario and Manitoba. Field parameter readings are to be obtained at a frequency of <u>no less</u> than once every 5 minutes. Obtaining field parameter readings at a spacing of greater than 5 minutes apart may be required if the volume of the flow-through cell is large or pumping occurs at a low rate (e.g., 50 or 100 mL/min). For example, if the flow-through cell has a volume of 300 mL and the pumping rate is 50 mL/min, it will take 6 minutes for the volume of water equivalent to the flow-through cell volume to pass through the cell and field parameter readings should be taken 6 minutes apart. If the pumping rate for the same flow-through cell is 100 mL/min, although it will take only 3

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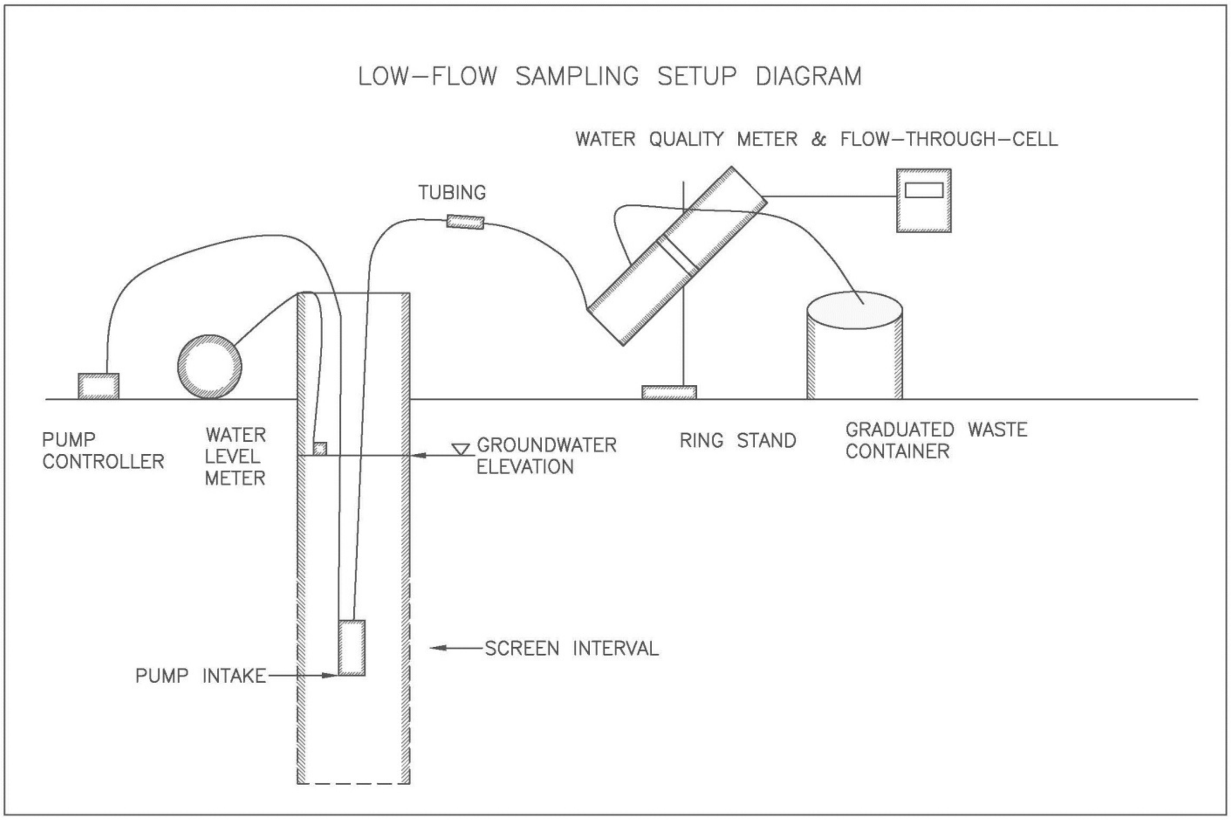
minutes for the volume of water equivalent to the flow-through cell volume to pass through the cell, field parameter readings are to be taken at 5 minute intervals.

Figure 1 shows a typical low flow groundwater sampling set up using a submersible pump. The set up when using a peristaltic pump is similar except that the only part of the extraction system in the well is tubing that is connected to the peristaltic pump at the ground surface (i.e., there is no pump mechanism within the well), and a second section of tubing connects the discharge of the peristaltic pump to the flow-through cell.

Figure 1: Low Flow Sampling Set Up Diagram



Reference: USEPA Region I EQASOP-GW 001, July 30, 1996, Revised January 19, 2010.

Air bubbles in the flow-through cell can result in inaccurate field parameter measurements, in particular for DO. If air bubbles appear in the flow-through cell, check that the discharge tubing is properly connected to the flow-through cell and check that the pump intake is located below the water table by confirming the pump intake depth and checking the water level in the well. If air bubbles persist in the flow-through cell, position the flow-through cell at a 45-degree angle with the ports facing upwards. This configuration should keep any gas bubbles entering the cell away from the multimeter probes and allow the air bubbles to exit the cell easily;

9. Regardless of the frequency of field parameter readings, purging is to be completed until field parameter stabilization is achieved, which occurs when the field parameter measurements for <u>all</u> of the parameters are within the following ranges for <u>three consecutive</u> sets of readings:

pH	±0.1 pH units
Specific Conductance	±3%
Temperature	±3%
DO	±10% for values greater than 0.5 milligrams per litres (mg/L), or three consecutive values less than 0.5 mg/L
ORP	±10 millivolts
Turbidity	±10% for values greater than 5 Nephelometric Turbidity Units (NTUs), or three consecutive values less than 5 NTU

10. Check the water level in the well during purging a minimum of once every 10 minutes to confirm that steady state conditions are being maintained. Although not mandatory, more frequent water level measurements can be made (e.g., at the time of each set of water quality parameters). Reduce the pumping rate if the water level measurements indicate that drawdown is occurring. Confirm the new pumping rate as per Step 7 and record it in the field notes;
11. Record the time of all water level and field parameter measurements in the field notes;
12. Should field parameter stabilization not occur within one hour of the start of purging, contact the Project Manager to discuss whether to continue purging to attempt to achieve field parameter stabilization or whether to proceed with groundwater sample collection. The Project Manager will consider the total volume of water purged to this point and may

deem it suitable to collect the groundwater sample if, for example, three or more well volumes in total have been purged despite the lack of field parameter stability. Note that achieving stabilization of some parameters is more important with respect to certain contaminant types. For example, the stabilization of DO readings is important for volatile parameter sampling because fluctuations in DO concentrations may indicate that the groundwater is being aerated during the purging process which could result in volatile loss from the groundwater samples;

13. Following field parameter stabilization, disconnect the tubing from the flow-through cell and collect the groundwater samples by filling the appropriate laboratory-supplied sample containers directly from the discharge tubing. Note that it is important not to sample groundwater that has passed through the flow-through cell. If pumping at a moderate to high pumping (i.e., > 200 mL/min), the pumping rate should be reduced to prevent overfilling or the splashing of preservatives out of the sample containers. The order of sample collection should be most volatile parameters to least volatile parameters as follows:

- VOCs and PHCs F1 Fraction;
- PHCs F2-F4 Fraction;
- PAHs and Base/Neutral/Acid Extractables;
- Metals and Inorganics; and
- Polychlorinated Biphenyls and Organochlorine Pesticides.

Special Notes for Volatile Parameter Sampling

When collecting samples for volatile parameter analysis (i.e., VOCs and PHCs F1 Fraction), the tubing must be filled completely and must not contain air bubbles prior to sample collection. If this is observed, increase the pumping rate slightly prior to sample collection until the tubing is filled and/or there are no longer any air bubbles, and then collect the sample. When collecting the groundwater samples for volatile parameter analysis, the sample vials should be tilted to avoid agitation and bubbling to minimize the potential for volatilization.

Special Notes for Metals Sampling

Groundwater samples collected for metals analysis will require filtering prior to preservation if dissolved metals concentrations are sought. Depending on the type and diameter of the discharge tubing used, in-line filters can be used for field filtering. Disposable filtration kits (e.g., Nalgene 0.45 micron filters) can also be used for field filtering. When collecting samples in containers that are pre-charged with preservatives, care must be taken not to overfill the containers as some of the preservative may be lost which will result in the sample not being properly preserved. Also, sample containers for metals analysis typically have a fill line marked on the container and the container must not be filled to above this line as this will cause dilution of the preservative and the sample may not be properly preserved.

If field filtering cannot be completed, then the groundwater samples are to be collected in sample containers that do not contain preservatives, and the analytical laboratory is to be instructed to filter and preserve the samples immediately upon receipt. The procedure and necessary equipment required to filter and preserve metals samples using the low flow methods should be discussed with the Project Manager prior to mobilization to the field; and

14. Record the pump intake depth at the time of sample collection. Remove the pump and/or tubing from the well and decontaminate the sampling equipment.

5.3 Fieldwork Records

The purging and sampling of a monitoring well using the low flow groundwater sampling procedure described in this SOP are to be documented through the completion in full of the following field forms located in the Pinchin Orchard:

- EDR-GW-Low Flow Sampling; and
- EDR-GW-Water Quality Parameters.

Any deviations from this SOP along with the rationale for these deviations must be recorded on the forms.

Upon completion of the sampling event, the field notes must be submitted to the Project Manager for review. The field notes must also be scanned and a copy of the scan placed in the project folder on the server.

5.4 Additional Considerations for O. Reg. 153/04 Phase Two ESA Compliance

When completing a Phase Two Environmental Assessment (ESA) in accordance with Ontario Regulation 153/04, the following must be undertaken:

- Calibration checks must be made for the water quality meter used for field parameter measurements at the frequency specified in Step 3 of Section 5.2. Records of the calibration checks must be kept and appended to the Phase Two ESA report;

- At least one field duplicate groundwater sample must be collected for every ten samples submitted for analysis. The frequency is one for one to 10 samples, two for 11 to 20 samples, etc. for all parameters analyzed. For example, even if only one groundwater sample is collected for PAHs analysis, a duplicate of this sample must be collected; and
- When sampling for VOCs, one trip blank sample must be submitted to the laboratory for VOCs analysis for each submission to the laboratory. In other words, if a groundwater sampling program lasts three days and samples are submitted to the laboratory at the end of each day, there must be a total of three trip blanks submitted with the samples (i.e., one per day of sampling). Note that analysis of trip blank samples for other volatile parameters (e.g., PHCs (F1 Fraction)) is not mandatory but can be completed at the discretion of the Qualified Person.

In addition, low flow groundwater sampling using a bladder pump or centrifugal pump should be completed whenever well yields are high enough to permit it for all Phase Two ESAs undertaken to support the filing of a Record of Site Condition. This will minimize potential issues the Ministry of the Environment and Climate Change may have regarding the representativeness of the groundwater analytical data.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

U.S. Environmental Protection Agency Region I, *Low Stress ('low flow') Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells,* EQASOP-GW 001, July 30, 1996, Revised January 19, 2010.

9.0 APPENDICES

None.

I:\2018 SOP Updates\SOP - EDR023 - REV006 - Low Flow Groundwater Sampling.docx

Template: Master SOP Template – February 2014

SOP – EDR025 – REV004 – QA/QC SAMPLING

Title:	QA/QC Sampling
Practice:	EDR
First Effective Date:	January 17, 2014
Version:	004
Version Date:	January 3, 2018
Author:	Robert MacKenzie
Authorized by:	Robert MacKenzie
Signature:	

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1.0 VERSION HISTORY

Version	Date	Summary of Changes	Author
Original	January 17, 2014	N/A	RLM
001	June 26, 2014	Amended blind duplicate sampling requirements	RLM
002	April 29, 2016	Updated Section 4.0/Amended O.Reg. 153/04 trip blank requirements	RLM
003	April 28, 2017	Removed reference to Pinchin West	RLM
004	January 3, 2018	In Section 5.2.6, clarified order of regular investigative sample and duplicate sample collection	RLM

2.0 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes the standard procedures for collecting soil, water and sediment samples for quality assurance/quality control (QA/QC) purposes.

A QA/QC program is essentially a management system that ensures that quality standards are met within a stated level of confidence. The QC component of the program comprises daily activities in the field and laboratory that are used to control the quality of both the samples collected and the sample analytical data. The QA component of the program is made up of measures used to determine whether the QC activities are effective.

When completing a site investigation, one of our primary goals is to obtain analytical data that are representative of actual soil, water and/or sediment conditions at the site. The completion of a QA/QC program, consisting of the collection and analysis of various QA/QC samples, provides information for use in evaluating the accuracy of the analytical data used to assess the environmental quality of the site.

The type and number of samples comprising the QA/QC program will be determined by the Project Manager on a site-by-site basis, but will typically include at a minimum a trip blank when collecting water samples for volatile parameter analysis and duplicate soil, water or sediment samples. Other types of QA/QC samples may be collected (e.g., equipment or field blanks) to meet project-specific requirements at the discretion of the Project Manager or to meet regulatory requirements.

The QA/QC sampling requirements and procedures for indoor air, soil vapour and sorbent tube samples are described in SOP-EDR012, SOP-EDR018 and SOP-EDR027, respectively.

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3.0 OVERVIEW

The types of samples collected for the QA/QC program during site investigations may include the following:

- Trip blanks;
- Field blanks;
- Equipment blanks; and
- Field duplicates.

Trip blanks are used to assess whether ambient air conditions may have resulted in positive bias of water samples collected for volatile parameter analysis during transportation of the sample containers to and from a project site. Note that the term “positive bias” means that reported sample concentrations are greater than actual in situ sample concentrations due to some form of “cross-contamination”.

Field blanks are collected to assess whether ambient air conditions may have resulted in positive bias of samples collected at a project site for volatile parameter analysis at the time of sampling.

Equipment blanks are collected to assess the efficiency of non-dedicated monitoring/sampling equipment cleaning procedures.

Duplicate samples are collected to assess whether field sampling and laboratory analytical methods are suitable and reproducible.

The analytical results of the QA/QC samples are reviewed by the Project Manager to assess whether any data quality issues are evident which may affect the interpretation of the soil, water and/or sediment sample analytical data.

4.0 DISTRIBUTION

This is an on-line document. Paper copies are valid only on the day they are printed. Refer to the author if you are in any doubt about the accuracy of this document.

This SOP will be distributed to all Pinchin staff and others as follows:

- Posted to the SOP section of the Environmental Due Diligence and Remediation (EDR) Practice Line on the Pinchin Orchard; and
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5.0 PROCEDURE

5.1 Equipment and Supplies

The equipment/supplies required for QA/QC sample collection are the same as that used for regular investigative sampling, except for the following:

- Volatile organic compound (VOC)-free distilled water supplied by the analytical laboratory for use in the collection of field blanks and/or equipment blanks;
- Additional sample jars supplied by the analytical laboratory for the collection of field blanks, equipment blanks and field duplicates; and
- Trip blanks supplied by the analytical laboratory.

5.2 QA/QC Sampling Procedures

5.2.1 General Procedures for QA/QC Blank Sampling

The analytical laboratory that will be completing the analysis of the regular investigative samples and QA/QC samples for a project must supply the water used to collect field blanks and equipment blanks. Water provided by another analytical laboratory or store-bought distilled water must not be used.

5.2.2 Trip Blanks

A trip blank is a set of VOC sample vials filled by the analytical laboratory with VOC-free distilled water and shipped with the sample containers. A trip blank is to be stored with the sample containers provided by the analytical laboratory during travel to the project site, while on the project site, and during travel from the project site back to the analytical laboratory. The sample containers comprising a trip blank are not to be opened in the field.

For some projects, submissions of volatile parameter samples to the analytical laboratory over several days will be required. In this case, a trip blank sample should accompany each submission to the laboratory. If this situation is anticipated, the Project Manager must request that the analytical laboratory provide sufficient trip blanks so that a trip blank can accompany the submission of each set of samples to the laboratory.

Trip blanks are to be analyzed for the same volatile parameters (i.e., VOCs and/or petroleum hydrocarbons (PHCs) (F1 fraction)) as the regular investigative samples. For example, if the groundwater sampling program includes analysis of VOCs and PHCs (F1-F4 fractions), then the trip blank(s) require analysis of VOCs and PHCs (F1 fraction). If the groundwater sampling program only includes VOC analysis, then the trip blank(s) require analysis of VOCs only.

Unless specified by the Project Manager, trip blanks are not required for soil and sediment sampling, or for water sampling involving only non-volatile parameters. At the discretion of the Project Manager and to meet project-specific requirements, trip blanks for non-volatile parameters can be prepared and analyzed using the same principles as for volatile parameter trip blanks.

5.2.3 Field Blanks

A field blank is a set of VOC sample vials filled during a sampling event at a project site with VOC-free distilled water supplied by the analytical laboratory and submitted for analysis of volatile parameters (i.e., VOCs and/or PHCs (F1 fraction)).

Field blanks are to be collected at a sample location considered “worst case” with respect to ambient air conditions (e.g., adjacent to and downwind of the pump island of an active retail fuel outlet, inside an active on-the-premises dry cleaner, etc.). At project sites where there is no obvious “worst case” ambient air location, the field blank can be collected at a sampling location picked randomly. The field blank collection location and rationale for selecting it must be documented in the field notes.

If a groundwater sampling event at a project site occurs over more than one day, a field blank is to be collected for each day of sampling.

Some project sites may have an isolated area where the ambient air conditions are significantly poorer than the remainder of the site and a field blank collected from this area may not be representative of conditions elsewhere on the site. In this case, at the discretion of the Project Manager, the collection of two field blanks may be appropriate, with one field blank collected from the poor ambient air area and one field blank collected from a location outside of this area.

Unless specified by the Project Manager, field blanks are not required for soil and sediment sampling, or for water sampling involving only non-volatile parameters. At the discretion of the Project Manager and to meet project-specific requirements, field blanks for non-volatile parameters can be collected and analyzed using the same principles as for volatile parameter field blanks.

5.2.4 Equipment Blanks

An equipment blank is collected by pouring VOC-free distilled water supplied by the analytical laboratory either over or through non-dedicated sampling/monitoring equipment that has been cleaned following sampling/monitoring using the procedures outlined in SOP-EDR009. The resulting rinsate is then captured in sample containers appropriate for the intended analysis. Note that the surface over which the distilled water is poured must be the surface from which samples are collected from or that is in contact with the medium being monitored. For example, if an equipment blank is being collected from a split-spoon sampler, the distilled water must be poured through the interior of the sampler, and not the exterior of the sampler.

The Project Manager will be responsible for determining the sampling/monitoring equipment from which equipment blanks will be obtained, the number of equipment blanks and the parameters to be analyzed. Regarding the latter, the parameters analyzed for equipment blanks are typically the parameters of concern for a given project site.

5.2.5 Evaluation of Blank Sample Results

The Project Manager will evaluate the results of the blank sample analysis to assess whether these results show that bias may have been introduced to investigative samples collected during the field sampling activities. Judgement by the Project Manager will be required to assess whether the blank sample results have any effect on the interpretation of the investigative sample results. This is assessed on a case-by-case basis, but the following general principles can be applied:

- If all soil, groundwater and/or sediment samples collected for a site investigation meet the applicable environmental standards/criteria, the presence of detectable or elevated parameter concentrations in the blanks has no effect on the interpretation of the investigative sample results;
- If parameters have detectable or elevated concentrations in the blank samples but none of these parameters are present in the regular investigative samples at concentrations exceeding the applicable environmental standards/criteria, the blank sample results have no effect on the interpretation of the investigative sample results;
- If parameters have detectable or elevated parameter concentrations in the blank samples and one or more of these parameters are present in the regular investigative samples at concentrations exceeding the applicable environmental standards/criteria, then positive bias of the regular investigative samples may have occurred. The Project Manager will need to assess a number of variables, including the relative parameter concentrations in the blank and regular investigative samples, to determine whether the regular investigative sample data are considered representative and usable for assessing the environmental quality of the site. If the regular investigative sample data are questionable, then resampling may be required; and
- If the regular investigative samples have exceedances of the applicable environmental standards/criteria and the blank samples have non-detectable parameter concentrations, the blank sample results have no effect on the interpretation of the investigative sample results.

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5.2.6 General Procedures for QA/QC Duplicate Sampling

Whenever possible, duplicate samples are to be collected from “worst case” sample locations. The reason for this is that Relative Percent Differences (RPDs) are calculated using the analytical results of the duplicate and regular investigative samples to evaluate the suitability and reproducibility of field sampling and laboratory analytical methods. However, RPDs for a given parameter can only be calculated if there are detectable concentrations in both samples, and “worst case” sample locations are the most likely to have detectable levels of parameters of concern. The calculation and evaluation of RPDs is discussed at the end of this section.

When filling sample containers, the order of collection is to fill the sample container for a particular parameter or parameters for the regular investigative sample first and then fill the sample container for the same parameter or parameters for the duplicate sample second. For example, if groundwater was being sampled for PAHs and metals and a duplicate sample was required, the order of filling the sample containers would regular investigative sample for PAHs, duplicate sample for PAHs, regular investigative sample for metals and duplicate sample for metals.

5.2.7 Field Duplicate Samples – Soil/Sediment

Soils/sediments are frequently heterogeneous because they are typically deposited in horizontal layers over time, causing both small scale and large scale grain size variations that can often result in significant variations in contaminant concentrations between layers. Because of this, it is important that duplicate soil/sediment samples be collected from the same vertical depths as the regular investigative samples in sample cores or at discrete sampling locations (e.g., grab samples).

When collecting a duplicate soil/sediment sample from a sampling device that provides a soil core (e.g., dual-tube sampler, split-spoon sampler), the soil core is to be split in half vertically (i.e., longitudinally). A portion of one half of the core is used for the regular investigative sample and a portion of the other half of the core is used for the duplicate sample. The portion of each core placed in sample jars for analysis must be obtained from the same depth interval within the cores.

When collecting a duplicate soil/sediment sample from a grab sample (e.g., excavation floor or sidewall), the field duplicate sample must be collected as close as possible to the regular investigative sample location at the sample depth and within the same soil layer.

There are no special procedures for collecting field duplicates of composite soil/sediment samples given that the soil/sediment is homogenized during the composite sample collection procedure.

A field duplicate soil/sediment sample must be collected at the same time as the regular investigative sample. Retroactively splitting a soil/sediment sample to obtain a field duplicate sample is not permitted.

5.2.8 Field Duplicate Samples – Surface Water/Potable Water/Groundwater

There are no special procedures for collecting surface water/potable water/groundwater field duplicate samples with the following exceptions:

- When collecting a duplicate water sample for metals analysis and field filtering is required, a new filter is to be used to collect the duplicate sample unless the groundwater has a low sediment content; and
- When collecting a duplicate surface water sample, the sample containers for the same parameter(s) should be immersed in the surface water body at the same location and at the same time whenever possible.

5.2.9 Duplicate Sample Labelling

The duplicate sample should have the term “DUP” in the sample identifier to distinguish it as a duplicate sample.

5.2.10 Evaluation of Duplicate Sample Results

Duplicate sample results are evaluated by calculating RPDs using the following equation:

$$\text{RPD} = \frac{\text{Absolute Value (Original Concentration – Duplicate Concentration)}}{\text{(Original Concentration + Duplicate Concentration)/2}} \times 100\%$$

RPDs are not calculated unless the parameter concentrations in both the regular investigative sample and duplicate sample are detectable concentrations above the corresponding practical quantitation limit (PQL) for the parameter, which is equal to five times the lowest laboratory reportable detection limit (RDL).

For example, if the RDL for a parameter is 0.1 parts per million (ppm), and the concentration in the regular investigative sample is 0.4 ppm and the concentration in the duplicate sample is 0.6 ppm, the RPD cannot be calculated because the concentration in the regular investigative sample (0.4 ppm) is less than the PQL of 0.5 ppm (5 times the RDL of 0.1 ppm).

Also, if the regular investigative sample concentration is 2 ppm and the duplicate sample concentration is <1 ppm, then the RPD cannot be calculated regardless of the PQL since detectable concentrations were not reported for both samples.

Calculated RPDs for the regular investigative and field duplicate samples are compared to established performance standards to evaluate the suitability and reproducibility of field sampling and laboratory analytical methods. In Ontario, the Ontario Ministry of the Environment and Climate Change (formerly the Ontario Ministry of the Environment) provides duplicate sample performance standards in the document *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the*

Environmental Protection Act, dated March 9, 2004, amended as of July 1, 2011. Although these performance standards only strictly apply to laboratory duplicate samples, they are considered suitable for comparison to field duplicate samples. Other provinces provide their own similar guidance.

When calculated RPDs exceed the performance standards, the Project Manager will evaluate whether these results have any effect on the interpretation of the investigative sample results. This is judged on a case-by-case basis, but in many situations RPD values above the performance standards can be attributed to small scale heterogeneity inherent in soil samples or variations in the quantity of sediment in groundwater or surface water samples, and are not indicative of poor field sampling or laboratory procedures. The results of internal laboratory QA/QC sampling may provide additional information as to the precision of the data. Furthermore, if all soil, water and/or sediment samples collected for a site investigation meet the applicable environmental standards/criteria, the apparent lack of precision shown by elevated RPD values should not affect the interpretation of the investigative sample results.

Sometimes a regular investigative sample will meet the applicable environmental standards/criteria and its corresponding duplicate sample will fail the applicable environmental standards/criteria (or vice versa). In Ontario, it is permitted to average the parameter concentrations of two samples provided they are collected at the same time and from the same sample location and depth. The resulting average parameter concentrations are then compared with the applicable standards to determine whether the sample meets or fails the standards. This approach is not acceptable in all jurisdictions. In situations where averaging is not acceptable to the regulatory agency, the “worst case” sample result is to be used in assessing the environmental condition of the project site.

5.3 Fieldwork Records

The field notes must include the following information with respect to QA/QC samples:

- The date and time of sampling for all blank/duplicate samples;
- The sample location for field blanks and the rationale for selecting the field blank locations;
- The type of equipment from which a rinsate was collected for equipment blanks and the parameters to be analyzed; and
- The corresponding regular investigative sample location/sample interval for duplicate samples and the parameters to be analyzed.

5.4 Additional Considerations for Ontario Regulation 153/04 Phase Two ESA Compliance

When completing a Phase Two ESA in accordance with Ontario Regulation 153/04, the QA/QC sampling program must consist of the following as a minimum:

- At least one field duplicate soil, sediment or groundwater sample must be collected for every ten samples submitted for analysis. The frequency is one duplicate sample for one to 10 regular investigative samples, two duplicate samples for 11 to 20 samples, etc. for all parameters analyzed. For example, even if only one groundwater sample is collected for PAHs analysis, a duplicate of this sample must be collected.

When sampling for VOCs, one trip blank sample must be submitted to the laboratory for VOCs analysis for each submission to the laboratory. In other words, if a groundwater sampling program lasts three days and samples are submitted to the laboratory at the end of each day, there must be a total of three trip blanks submitted with the samples (i.e., one per day of sampling). Note that analysis of trip blank samples for other volatile parameters (e.g., PHCs (F1 Fraction)) is not mandatory but can be completed at the discretion of the Qualified Person.

6.0 TRAINING

The Practice Leader is responsible for identifying the training needs of EDR staff and ensuring that staff are trained and competent before undertaking work assignments.

All trained personnel are responsible for identifying coaching or re-training needs (if they are uncomfortable with work assignments that have been assigned).

The careful application of *Health & Safety Training* by each employee is an integral part of all activities and is assumed as part of this SOP.

7.0 MAINTENANCE OF SOP

1 Year.

8.0 REFERENCES

Association of Professional Geoscientists of Ontario, *Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended),* April 2011.

Ontario Ministry of the Environment and Climate Change, *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*, March 9, 2004, as amended as of July 1, 2011.

Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection, Province of British Columbia, *British Columbia Field Sampling Manual*, 2003.

9.0 APPENDICES

None.

I:\2018 SOP Updates\SOP - EDR025 - REV004 - QA QC Sampling.docx

Template: Master SOP Template – February 2014

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APPENDIX C

Borehole Logs

Log of Borehole: MW19-01

Project #: 230989.001 **Logged By:** WM

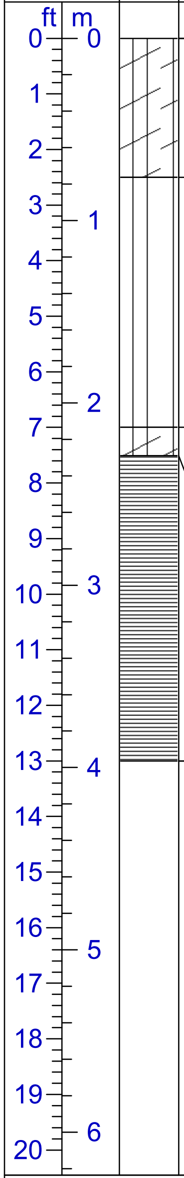
Project: Phase Two Environmental Site Assessment

Client: 91 Eglinton Limited Partnership

Location: 131 Eglinton Avenue East, Mississauga, ON

Drill Date: March 27, 2019 **Project Manager:** MB

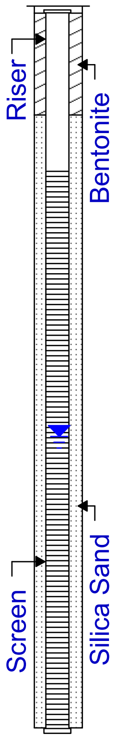
SUBSURFACE PROFILE



Description	Measured Depth (m)
Ground Surface	0.00
Clayey Silt Brown, some sand, moist, trace gravel.	0.76
Silt Brown, some sand, trace orange oxidation, moist. Trace gravel, moist.	2.13
Clayey Silt Brownish grey, some weathered bedrock fragments, damp.	2.29
Inferred Weathered Shale Bedrock Grey, some gravel, wet.	3.96
End of Borehole	

Sampler Refusal encountered at 3.05 mbgs on March 27, 2019.
Monitoring well installed by augering to 3.96 mbgs on March 29, 2019.
Groundwater measured at 2.35 mbgs on April 2, 2019.

Monitoring Well Details



SAMPLE

Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) (CGI/PID)	Laboratory Analysis
1	100	S1	15/1	OC Pesticides, Metals, EC, SAR, pH, GrainSize
		S2	5/1	
2	100	S3	50/1	
		S4	10/1	Metals

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 2"

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: 171.10 mamsl

Top of Casing Elevation: 171.94 mamsl

Sheet: 1 of 1

Log of Borehole: MW19-02

Project #: 230989.001 **Logged By:** WM

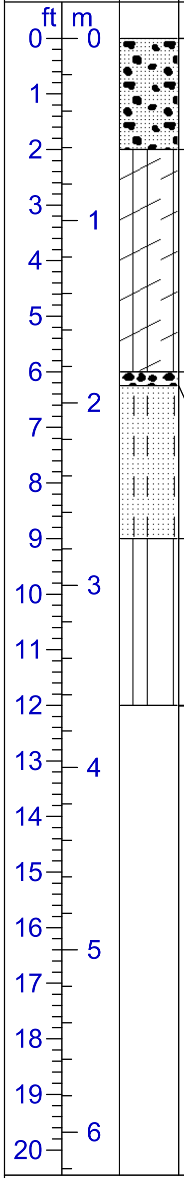
Project: Phase Two Environmental Site Assessment

Client: 91 Eglinton Limited Partnership

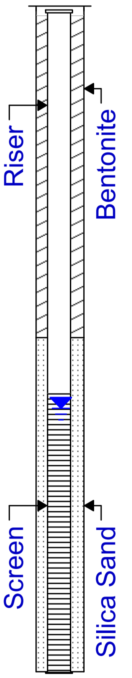
Location: 131 Eglinton Avenue East, Mississauga, ON

Drill Date: March 27, 2019 **Project Manager:** MB

SUBSURFACE PROFILE



Description	Measured Depth (m)
Ground Surface	0.00
Sand and Gravel Brown, moist.	0.61
Clayey Silt Brown, some gravel, some grey mottling, moist. Moist to wet.	1.83
Gravel Grey, shaley fragments, damp.	
Silty Sand Brown, wet.	2.74
Silt Grey, some bedrock fragments, moist to wet.	3.66
End of Borehole Sampler Refusal encountered at 3.66 mbgs on March 27, 2019. Groundwater measured at 2.19 mbgs on March 29, 2019.	



SAMPLE

Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) (CGI/PID)	Laboratory Analysis
1	100	S1	25/2	OC Pesticides, Metals, EC, SAR, pH
		S2	5/2	
2	100	S3	10/2	
		S4	25/2	
3	40	S5	30/1	

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 2"

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: 169.49 mamsl

Top of Casing Elevation: 170.37 mamsl

Sheet: 1 of 1

Log of Borehole: MW19-03

Project #: 230989.001 **Logged By:** WM

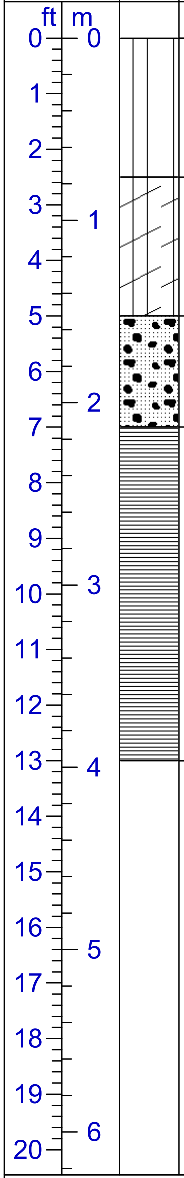
Project: Phase Two Environmental Site Assessment

Client: 91 Eglinton Limited Partnership

Location: 131 Eglinton Avenue East, Mississauga, ON

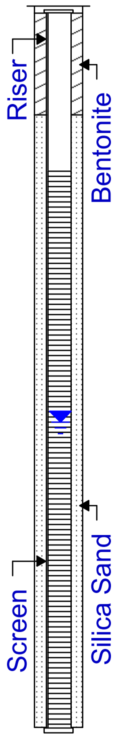
Drill Date: March 27, 2019 **Project Manager:** MB

SUBSURFACE PROFILE



Description	Measured Depth (m)
Ground Surface	0.00
Silt Brown, some sand and gravel, moist, trace clay.	0.76
Clayey Silt Brown with grey mottling, trace orange oxidation, moist to wet.	1.52
Sand and Gravel Brown, some clay, wet.	2.13
Inferred Weathered Shale Bedrock Grey, trace silt, damp.	3.96
End of Borehole	

Sampler Refusal encountered at 3.05 mbgs on March 27, 2019.
Monitoring well installed by augering to 3.96 mbgs on March 28, 2019.
Groundwater measured at 2.24 mbgs on April 2, 2019.



SAMPLE

Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) (CGI/PID)	Laboratory Analysis
1	100	S1	5/1	OC Pesticides
		S2	5/1	Metals, pH
2	100	S3	35/2	BTEX, PHCs, PAHs
		S4	0/1	

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 2"

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: 169.10 mamsl

Top of Casing Elevation: 169.92 mamsl

Sheet: 1 of 1

Log of Borehole: MW19-04

Project #: 230989.001 **Logged By:** WM

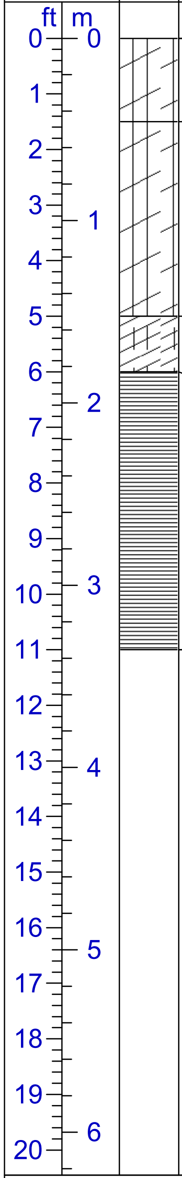
Project: Phase Two Environmental Site Assessment

Client: 91 Eglinton Limited Partnership

Location: 131 Eglinton Avenue East, Mississauga, ON

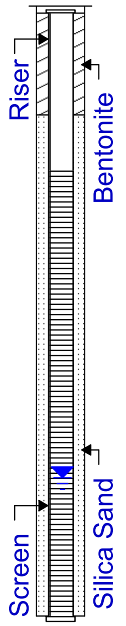
Drill Date: March 27, 2019 **Project Manager:** MB

SUBSURFACE PROFILE



Description	Measured Depth (m)
Ground Surface	0.00
Clay and Silt Brown, trace sand, moist.	0.46
Clayey Silt Brown, some sand, trace red brick, moist.	1.52
Silty Clay Brownish grey, wet.	1.83
Inferred Weathered Shale Bedrock Grey, some gravel, wet.	3.35
End of Borehole	

Monitoring Well Details



Sampler Refusal encountered at 2.13 mbgs on March 27, 2019.
Monitoring well installed by augering to 3.35 mbgs on March 28, 2019.
Groundwater measured at 2.52 mbgs on April 2, 2019.

SAMPLE

Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) (CGI/PID)	Laboratory Analysis
1	60	S1	0/1	OC Pesticides, Cyanide, EC, SAR, pH
		S2	0/1	Metals
2	100	S3	0/0	BTEX, PHCs, PAHs, pH

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 2"

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: 169.26 mamsl

Top of Casing Elevation: 170.12 mamsl

Sheet: 1 of 1

Log of Borehole: MW19-05

Project #: 230989.001 **Logged By:** WM

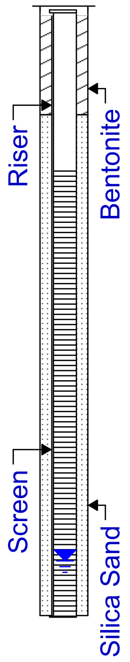
Project: Phase Two Environmental Site Assessment

Client: 91 Eglinton Limited Partnership

Location: 131 Eglinton Avenue East, Mississauga, ON

Drill Date: March 27, 2019 **Project Manager:** MB

SUBSURFACE PROFILE				SAMPLE				
Description	Measured Depth (m)	Monitoring Well Details		Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) (CGI/PID)	Laboratory Analysis
Ground Surface	0.00							
Clayey Silt Brown, some sand and topsoil, trace black mottling, moist. Brown, trace sand, some gravel and weathered shale, damp, trace grey mottling.	1.52			1	100	S1 S2	25/1 25/1	BTEX, PHCs, PAHs, pH
Silty Clay Grey, some weathered bedrock fragments, damp.	2.13			2	60	S3	10/0	
Silt Grey, weathered bedrock fragments, damp.	2.44							
Inferred Weathered Shale Bedrock Grey, wet.	3.35							
End of Borehole								



Sampler Refusal encountered at 2.44 mbgs on March 27, 2019.
Monitoring well installed by augering to 3.35 mbgs on March 27, 2019.
Groundwater measured at 3.02 mbgs on April 2, 2019.

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 2"

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: 169.38 mamsl

Top of Casing Elevation: 170.37 mamsl

Sheet: 1 of 1

Log of Borehole: BH19-06

Project #: 230989.001 **Logged By:** WM

Project: Phase Two Environmental Site Assessment

Client: 91 Eglinton Limited Partnership

Location: 131 Eglinton Avenue East, Mississauga, ON

Drill Date: March 27, 2019 **Project Manager:** MB

SUBSURFACE PROFILE					SAMPLE				
Depth	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) (CGI/PID)	Laboratory Analysis
ft m		Ground Surface	0.00						
0 ft, 0 m 1 2 3 ft, 1 m 4		**Clayey Silt** Brown, trace gravel and sand, moist. Some sand, some rock fragments, damp.	1.52	No Monitoring Well Installed	1	100	S1	0/0	OC Pesticides, Cyanide, EC, SAR, pH
							S2	0/0	BTEX, PHCs, PAHs, GrainSize
5 6 ft, 2 m		**Silty Clay** Grey, some weathered bedrock fragments, damp.	2.13		2	40	S3	0/1	
7 8 9 10 ft, 3 m 11 12 13 ft, 4 m 14 15 16 ft, 5 m 17 18 19 ft, 6 m 20		End of Borehole Sampler Refusal encountered at 2.13 mbgs on March 27, 2019.							

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: NA

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: 169.44 mamsl

Top of Casing Elevation: NA

Sheet: 1 of 1

Log of Borehole: BH19-07

Project #: 230989.001 **Logged By:** WM

Project: Phase Two Environmental Site Assessment

Client: 91 Eglinton Limited Partnership

Location: 131 Eglinton Avenue East, Mississauga, ON

Drill Date: March 27, 2019 **Project Manager:** MB

SUBSURFACE PROFILE					SAMPLE				
Depth	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) (CGI/PID)	Laboratory Analysis
ft m		Ground Surface	0.00						
	▨	**Clayey Silt** Brown, trace orange oxidation. Some gravel fragments, moist.	1.52	No Monitoring Well Installed	1	80	S1	0/1	BTEX, PHCs, PAHs, EC, SAR, pH
							S2	0/0	
	▨	**Silty Clay** Brown, moist to wet.	1.98		2	100	S3	50/1	
	▨	**Silty Sand** Brown, trace gravel, moist to wet.	2.29						
	▤	**Inferred Weathered Shale Bedrock** Grey, some silt, damp.	3.05				S4	0/1	
		End of Borehole Sampler Refusal encountered at 3.05 mbgs on March 27, 2019.							

Contractor: Strata Drilling Group Inc.
Drilling Method: Direct Push
Well Casing Size: NA

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: 169.41 mamsl
Top of Casing Elevation: NA
Sheet: 1 of 1

Log of Borehole: BH19-08

Project #: 230989.001 **Logged By:** WM

Project: Phase Two Environmental Site Assessment

Client: 91 Eglinton Limited Partnership

Location: 131 Eglinton Avenue East, Mississauga, ON

Drill Date: March 27, 2019 **Project Manager:** MB

SUBSURFACE PROFILE					SAMPLE				
Depth	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) (CGI/PID)	Laboratory Analysis
ft 0 m 0		Ground Surface	0.00						
	░	**Sandy Silt** Brown, trace gravel, trace orange oxidation, moist.	0.61	No Monitoring Well Installed	1	100	S1	20/2	OC Pesticides, BTEX, PHCs, PAHs, EC, SAR, pH
	▨	**Clayey Silt** Brown, some sand, some bedrock fragments, moist.	1.52				S2	0/1	Metals
	●	**Sand and Gravel** Brown, moist.	2.29		2	60	S3	0/1	
	▨	**Silty Clay** Grey, some weathered bedrock, damp.	2.74				S4	5/1	
ft 20 m 6		End of Borehole Sampler Refusal encountered at 2.90 mbgs on March 27, 2019.							

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: NA

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: 169.48 mamsl

Top of Casing Elevation: NA

Sheet: 1 of 1

APPENDIX D

Field Instrument Calibration Records

RENTALS, SALES, SUPPORT
Maxim
1-888-285-2324
ENVIRONMENTAL AND SAFETY INC.
"Exceptional Customer Service!"

Certificate of Calibration

HORIBA U-52 Serial Number F1WP0DSC has been calibrated per the Manufacturers published instructions, using NIST traceable solutions and standards.

2-Point pH	Cond.	Turb,	DO	ORP
4.00, 7.00	4.49mS/cm	0, 100 NTU	9.79 mg/L @ 21 DegC	240mV
	zero checked		Sodium Sulfite Zero	
AutoCal Solution Lot #9GA524	AutoCalSolution Lot#9GA524	AutoCal Solution Lot #9GA524	OAKTON	
pH 7.00 Lot #9GA167 exp.07/2020	@ 25 deg C exp.01/2020	Turb. 100 NTU Horiba Lot #A8074	Lot# WW1	Lot # 3086exp. 06/2023

Solutions ref. to NIST SRM's

MAR. 28,
2019

Calibrated

MAXIM ENVIRONMENTAL AND SAFETY INC.
170 AMBASSADOR DRIVE, UNIT # 9
MISSISSAUGA, ONTARIO L5T 2H9

Phone: **(905)670-1304**

CERTIFICATE OF CALIBRATION

The RKI Instruments **Model EAGLE-2** as listed below has been inspected and calibrated following the Manufacturer's published specifications and methods.

- Instrument Model: **EAGLE-2** Serial Number: **E29926** Date of Calibration: **March 20, 2019**

SENSOR	**CALIBRATION GAS STANDARD**	**CALIBRATION GAS CONCENTRATION**	**READING PRIOR TO ADJUSTMENT**	**INSTRUMENT SPAN SETTING**	**ALARM LEVEL SETTINGS**
Combustible	Hexane lot # 901366	15% LEL	15% LEL	15% LEL **"Methane Elimination" Mode**	10 & 50% LEL
Combustible	Methane lot # 636904	50% LEL	<500 PPM	Verification Only **"Methane Elimination" Mode**	
Combustible	Hexane lot # 901366	15% LEL	15% LEL	15% LEL **"Methane Response Enabled" Mode**	10 & 50% LEL
VOC	Isobutylene lot # 857738	100 PPM	100 PPM	100 PPM	400 & 1000 PPM

The calibration gas standard used is considered to be a certified standard and is traceable to the National Institute of Standards and Technology (NIST). Certificate of Analysis is available upon request.

The instrument indicated above is now certified to be operating within the Manufacturer's specifications. **This does not preclude the requirement for regular maintenance and pre-use sensor response checks in order to ensure continued complete and accurate operating condition.**

Certified: ____________________

APPENDIX E

Well Records

S-23395

Ontario Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (Place Sticker and/or Print Below)
A265478 **Tag#:A265478**

Well Record

lation 903 Ontario Water Resources Act

Page_____ of _____

Well Owner's Information

First Name Attn: Mark Liddy	Last Name / Organization 91 Eglinton Limited, Partnership		E-mail Address		☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name) 1 Steelcase Rd W, Unit 8	Municipality Markham		Province ON	Postal Code L3R0T3	Telephone No. (inc. area code)

Well Location

Address of Well Location (Street Number/Name) 131 EGLINTON AVE E	Township	Lot	Concession
County/District/Municipality	City/Town/Village MISSISSAUGA.	Province Ontario	Postal Code
UTM Coordinates NAD 83 Zone 17 Easting 608866 Northing 4829469	Municipal Plan and Sublot Number	Other	

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
BRN	FILL	SAND/GRAVEL	LOOSE	0	2
BRN	SILT	CLAY	DENSE-	2	10
GRY	SHALE		DENSE-	10	13

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	1	CONCRETE.	
1	2	BENTONITE.	
2	13	SAND	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☑ Other, specify AUGER

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
2	PLASTIC		+1	3

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
2.1	PLASTIC	10	3	13

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas | Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	13	6

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify
If pumping discontinued, give reason:
Pump intake set at (m/ft)
Pumping rate (l/min / GPM)
Duration of pumping ___ hrs + ___ min
Final water level end of pumping (m/ft)
If flowing give rate (l/min / GPM)
Recommended pump depth (m/ft)
Recommended pump rate (l/min / GPM)
Well production (l/min / GPM)
Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Map of Well Location

Please provide a map below following instructions on the back.

SEE ATTACHED map (MW1)

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor Strata Drilling Group	Well Contractor's Licence No. 7241
Business Address (Street Number/Name) 165 SHIELDS CRT.	Municipality MARKHAM
Province ON	Postal Code / Business E-mail Address L3R 8U2 wellrecords@stratasoil.com
Bus.Telephone No. (inc. area code) 9057649304	Name of Well Technician (Last Name, First Name) Dowarsingh Ernie.
Well Technician's Licence No. 3716	Signature of Technician and/or Contractor / Date Submitted

Well owner's information package delivered ☐ Yes ☐ No
Date Package Delivered
Date Work Completed 20190329

Ministry Use Only
Audit No. Z219525
Received

0506E (2014/11)

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Ontario Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*
A265756

Well Record

Regulation 903 Ontario Water Resources Act

S-23395

Page_____ of _____

Well Owner's Information

First Name Att: Mark Liddy	Last Name / Organization 91 Eglinton Limited Partnership	E-mail Address	☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name) 1 Steelcase Rd W, Unit 8	Municipality Markham	Province ON	Postal Code L3R0T3
Telephone No. *(inc. area code)*			

Well Location

Address of Well Location (Street Number/Name) 131 Eglinton Ave East	Township	Lot	Concession
County/District/Municipality	City/Town/Village Mississauga	Province **Ontario**	Postal Code
UTM Coordinates Zone Easting Northing NAD 83 17 608917 4829454	Municipal Plan and Sublot Number	Other	

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth *(m/ft)* From	Depth *(m/ft)* To
Brown	Topsoil			0	2'
Brown	fill			2'	4'
Grey	Silt			4'	6'
Grey	Shale			6'	12'

Annular Space

Depth Set at *(m/ft)* From	To	Type of Sealant Used *(Material and Type)*	Volume Placed *(m³/ft³)*
0	0.5'	Concrete	
0.5'	6'	Holeplug	
6'	12'	Sand	

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify*

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping
____ hrs + ____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

Well production *(l/min / GPM)*

Disinfected?
☐ Yes ☐ No

Draw Down Time *(min)*	Draw Down Water Level *(m/ft)*	Recovery Time *(min)*	Recovery Water Level *(m/ft)*
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Method of Construction

☐ Cable Tool
☐ Rotary (Conventional)
☐ Rotary (Reverse)
☐ Boring
☐ Air percussion
☑ Other, *specify* Direct Push
☐ Diamond
☐ Jetting
☐ Driving
☐ Digging

Well Use

☐ Public
☐ Domestic
☐ Livestock
☐ Irrigation
☐ Industrial
☐ Other, *specify*
☐ Commercial
☐ Municipal
☑ Test Hole
☐ Cooling & Air Conditioning
☐ Not used
☐ Dewatering
☑ Monitoring

Construction Record - Casing

Inside Diameter *(cm/in)*	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness *(cm/in)*	Depth *(m/ft)* From	To
2"	PVC	0.125	0'	7'

Construction Record - Screen

Outside Diameter *(cm/in)*	Material (Plastic, Galvanized, Steel)	Slot No.	Depth *(m/ft)* From	To
2.25	PVC	10	7'	12'

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth *(m/ft)* ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*
Water found at Depth *(m/ft)* ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*
Water found at Depth *(m/ft)* ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*

Hole Diameter

Depth *(m/ft)* From	To	Diameter *(cm/in)*
0	12'	6"

Map of Well Location

Please provide a map below following instructions on the back.

See Map

MWD

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor Strata Soil Sampling	Well Contractor's Licence No. 7241
Business Address (Street Number/Name) 165 Sheilds Court	Municipality Markham.
Province ON	Postal Code L3R8V2
Business E-mail Address WRecords@stratasoil.com	
Bus.Telephone No. *(inc. area code)* 9059407919	Name of Well Technician (Last Name, First Name) Jonathan Walker
Well Technician's Licence No. 3833	Signature of Technician and/or Contractor
Date Submitted 20190327	

Well owner's information package delivered
☐ Yes
☐ No

Date Package Delivered
Y Y Y Y M M D D

Date Work Completed
20190327

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Ontario
Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*
A265474
Tag#:A265474

Well Record

tion 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name Hn: Mark Liddy	Last Name / Organization 91 Eglinton Limited Partnership	E-mail Address	☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name) 1 Steelcase Road W, Unit 8	Municipality Markham	Province ON	Postal Code L3R0T3

Telephone No. *(inc. area code)*

Well Location

Address of Well Location (Street Number/Name) 131 EGLINTON AVE E	Township	Lot	Concession
County/District/Municipality	City/Town/Village MISSISSAUGA.	Province **Ontario**	Postal Code
UTM Coordinates Zone Easting Northing NAD 83 17 608939 4829435	Municipal Plan and Sublot Number	Other	

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth *(m/ft)* From	To
BRN	FILL	SAND/GRAVEL	LOOSE	0	2
BRN	SILT	CLAY	DENSE	2	10
GRY	SHALE		DENSE	10	13

Annular Space

Depth Set at *(m/ft)* From	To	Type of Sealant Used *(Material and Type)*	Volume Placed *(m³/ft³)*
0	2	BENTONITE.	
2	13	SAND	

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* ____
If pumping discontinued, give reason:
Pump intake set at *(m/ft)*
Pumping rate *(l/min / GPM)*
Duration of pumping ___ hrs + ___ min
Final water level end of pumping *(m/ft)*
If flowing give rate *(l/min / GPM)*
Recommended pump depth *(m/ft)*
Recommended pump rate *(l/min / GPM)*
Well production *(l/min / GPM)*
Disinfected? ☐ Yes ☐ No

Draw Down Time *(min)*	Water Level *(m/ft)*	Recovery Time *(min)*	Water Level *(m/ft)*
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Method of Construction

☐ Cable Tool
☐ Rotary (Conventional)
☐ Rotary (Reverse)
☐ Boring
☐ Air percussion
☑ Other, *specify* AUGER
☐ Diamond
☐ Jetting
☐ Driving
☐ Digging

Well Use

☐ Public
☐ Domestic
☐ Livestock
☐ Irrigation
☐ Industrial
☐ Other, *specify*
☐ Commercial
☐ Municipal
☑ Test Hole
☐ Cooling & Air Conditioning
☐ Not used
☐ Dewatering
☑ Monitoring

Construction Record - Casing

Inside Diameter *(cm/in)*	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness *(cm/in)*	Depth *(m/ft)* From	To
2	PLASTIC		+3	3

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Construction Record - Screen

Outside Diameter *(cm/in)*	Material (Plastic, Galvanized, Steel)	Slot No.	Depth *(m/ft)* From	To
2.1	PLASTIC	10	3	13

Map of Well Location

Please provide a map below following instructions on the back.

SEE ATTACHED MAP
(MW3)

Water Details

Water found at Depth *(m/ft)* Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*
Water found at Depth *(m/ft)* Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*
Water found at Depth *(m/ft)* Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*

Hole Diameter

Depth *(m/ft)* From	To	Diameter *(cm/in)*
0	13	6

Well Contractor and Well Technician Information

Business Name of Well Contractor Strata Drilling Group	Well Contractor's Licence No. 7241
Business Address (Street Number/Name) 165 SHIELDS CRT.	Municipality MARKHAM

Province ON
Postal Code L3R9V2
Business E-mail Address wrecords@stratadrilling.com
Bus.Telephone No. *(inc. area code)* 9057649304
Name of Well Technician (Last Name, First Name) Pouraschch Ernie
Well Technician's Licence No. 3766
Signature of Technician and/or Contractor
Date Submitted Y Y Y Y M M D D

Comments:

Well owner's information package delivered ☐ Yes ☐ No
Date Package Delivered Y Y Y Y M M D D
Date Work Completed 20190329

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Ontario

Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (Place Sticker and/or Print Below)

A265480

Tag#:A265480

Well Record

Regulation 903 Ontario Water Resources Act

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Well Owner's Information

First Name	Last Name / Organization	E-mail Address	
Attn: Mark Liddy	91 Eglinton ~~A~~ Limited, Partnership		☐ Well Constructed by Well Owner

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
1 Steelcase Rd. W, Unit 8	Markham	ON	L3R0T3	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
131 EGLINTON AVE E.			

County/District/Municipality	City/Town/Village	Province	Postal Code
	MISSISSAUGA.	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	608953	4829471		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
BRN	FILL	SAND/GRAVEL	LOOSE-	0	2
BRN	SILT	CLAY	DENSE.	2	8
GRY	SHALE		DENSE	8	11

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	2	BENTONITE.	
2	11	SAND	

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Method of Construction

☐ Cable Tool
☐ Rotary (Conventional)
☐ Rotary (Reverse)
☐ Boring
☐ Air percussion
☑ Other, specify AUGER
☐ Diamond
☐ Jetting
☐ Driving
☐ Digging

Well Use

☐ Public
☐ Domestic
☐ Livestock
☐ Irrigation
☐ Industrial
☐ Other, specify
☐ Commercial
☐ Municipal
☑ Test Hole
☐ Cooling & Air Conditioning
☐ Not used
☐ Dewatering
☑ Monitoring

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
2	PLASTIC		+3	3

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
2.1	PLASTIC	10	3	11

Map of Well Location

Please provide a map below following instructions on the back.

SEE ATTACHED MAP (MW4)

Comments:

Water Details

Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	11	6

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
STRATA DRILLING Group	7241

Business Address (Street Number/Name)	Municipality
165 SHIELDS CRT.	MARKHAM

Province	Postal Code	Business E-mail Address
ON	L3R8V2	wellrecords@stratasoil.co

Bus.Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9057649304	POLLATSCHEK EMILE.

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3716		YYYYMMDD

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered YYYYMMDD

Date Work Completed 20190329

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Ontario

Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*
A265477 Tag#:A265477

Well Record

Regulation 903 Ontario Water Resources Act

Page ______ of ______

Well Owner's Information

First Name: Attn: Mark Liddy
Last Name / Organization: 91 Eglinton Limited, Partnership
E-mail Address:
☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name): 1 Steelcase Road W, Unit 8
Municipality: Markham
Province: ON
Postal Code: L3R0T3
Telephone No. *(inc. area code)*:

Well Location

Address of Well Location (Street Number/Name): 131 EGLINTON AVE E
Township:
Lot:
Concession:
County/District/Municipality:
City/Town/Village:
Province: **Ontario**
Postal Code:
UTM Coordinates NAD 83 Zone 17 Easting 608936 Northing 4829413
Municipal Plan and Sublot Number:
Other:

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BRN	FILL	SAND/GRAVEL	LOOSE.	0	2
BRN	SILT	CLAY	DENSE	2	8
GRY	SHALE.		DENSE.	8	11

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	2	BENTONITE.	
2	11	SAND	

Method of Construction

☐ Cable Tool
☐ Rotary (Conventional)
☐ Rotary (Reverse)
☐ Boring
☐ Air percussion
☑ Other, *specify* AUGER
☐ Diamond
☐ Jetting
☐ Driving
☐ Digging

Well Use

☐ Public
☐ Domestic
☐ Livestock
☐ Irrigation
☐ Industrial
☐ Other, *specify*
☐ Commercial
☐ Municipal
☑ Test Hole
☐ Cooling & Air Conditioning
☐ Not used
☐ Dewatering
☑ Monitoring

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2	PLASTIC		+3	3

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.1	PLASTIC	10	3	11

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*
Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*
Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	11	6

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify*
If pumping discontinued, give reason:
Pump intake set at (m/ft)
Pumping rate (l/min / GPM)
Duration of pumping ___ hrs + ___ min
Final water level end of pumping (m/ft)
If flowing give rate (l/min / GPM)
Recommended pump depth (m/ft)
Recommended pump rate (l/min / GPM)
Well production (l/min / GPM)
Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Map of Well Location

Please provide a map below following instructions on the back.

SEE ATTACHED MAP (MW8)

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: STRATA DRILLING GROUP
Well Contractor's Licence No.: 7241
Business Address (Street Number/Name): 165 SHIELDS CRT.
Municipality: MARKHAM
Province: ON
Postal Code: L3R9T2
Business E-mail Address: wellrecords@stratasoil.com
Bus. Telephone No. *(inc. area code)*: 9057649304
Name of Well Technician (Last Name, First Name): POLLATSCHEK LANCE.
Well Technician's Licence No.: 3716
Signature of Technician and/or Contractor:
Date Submitted: Y Y Y Y M M D D

Well owner's information package delivered ☐ Yes ☐ No
Date Package Delivered: Y Y Y Y M M D D
Date Work Completed: 20190329

Ministry Use Only
Audit No. Z219521
Received

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Ontario Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*
A265755

Well Record

Regulation 903 Ontario Water Resources Act

S-23395

Page ____ of ____

Well Owner's Information

First Name: Attn: Mark Liddy
Last Name / Organization: 91 Eglinton Limited Partnership
E-mail Address:
☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name): 1 Steelcase Road W, Unit 8
Municipality: Markham
Province: ON
Postal Code: L3R0T3
Telephone No. *(inc. area code)*:

Well Location

Address of Well Location (Street Number/Name): 131 Eglinton Ave E
Township:
Lot:
Concession:
County/District/Municipality:
City/Town/Village: Mississauga
Province: **Ontario**
Postal Code:
UTM Coordinates NAD 83 Zone 17 Easting 608936 Northing 4829418
Municipal Plan and Sublot Number:
Other:

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth *(m/ft)* From	To
Brown	Top Soil			0	2'
Brown	fill			2'	4'
~~Brown~~					
Grey	Silt			4'	6'
Grey	Shale			6'	11'

Annular Space

Depth Set at *(m/ft)* From	To	Type of Sealant Used *(Material and Type)*	Volume Placed *(m³/ft³)*
0	0.5'	Concrete	
0.5'	~~8~~7'	Holeplug	
7'	11'	Sand	

Method of Construction

☐ Cable Tool
☐ Rotary (Conventional)
☐ Rotary (Reverse)
☐ Boring
☐ Air percussion
☑ Other, specify Direct Push
☐ Diamond
☐ Jetting
☐ Driving
☐ Digging

Well Use

☐ Public
☐ Domestic
☐ Livestock
☐ Irrigation
☐ Industrial
☐ Other, specify
☐ Commercial
☐ Municipal
☑ Test Hole
☐ Cooling & Air Conditioning
☐ Not used
☐ Dewatering
☑ Monitoring

Construction Record - Casing

Inside Diameter *(cm/in)*	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness *(cm/in)*	Depth *(m/ft)* From	To
2"	PVC	0.125"	0	8'

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Construction Record - Screen

Outside Diameter *(cm/in)*	Material (Plastic, Galvanized, Steel)	Slot No.	Depth *(m/ft)* From	To
2.25"	PVC	10	8'	11'

Water Details

Water found at Depth ____ *(m/ft)* ☐ Gas Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth ____ *(m/ft)* ☐ Gas Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth ____ *(m/ft)* ☐ Gas Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth *(m/ft)* From	To	Diameter *(cm/in)*
0	11'	6"

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify
If pumping discontinued, give reason:
Pump intake set at *(m/ft)*
Pumping rate *(l/min / GPM)*
Duration of pumping ____ hrs + ____ min
Final water level end of pumping *(m/ft)*
If flowing give rate *(l/min / GPM)*
Recommended pump depth *(m/ft)*
Recommended pump rate *(l/min / GPM)*
Well production *(l/min / GPM)*
Disinfected? ☐ Yes ☐ No

Draw Down Time *(min)*	Water Level *(m/ft)*	Recovery Time *(min)*	Water Level *(m/ft)*
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Map of Well Location

Please provide a map below following instructions on the back.

See Map MW6

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: Strata Soil Sampling
Well Contractor's Licence No.: 7241
Business Address (Street Number/Name): 165 Sheilds Court
Municipality: Markham.
Province: ON
Postal Code: L3R8V2
Business E-mail Address: WRecords@stratasoil.com
Bus. Telephone No. *(inc. area code)*: 9059407919
Name of Well Technician (Last Name, First Name): Walker, Jonathan
Well Technician's Licence No.: 3833
Signature of Technician and/or Contractor:
Date Submitted: 20190327

Well owner's information package delivered ☐ Yes ☐ No
Date Package Delivered: Y Y Y Y M M D D
Date Work Completed: 20190327

Ministry Use Only
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Received

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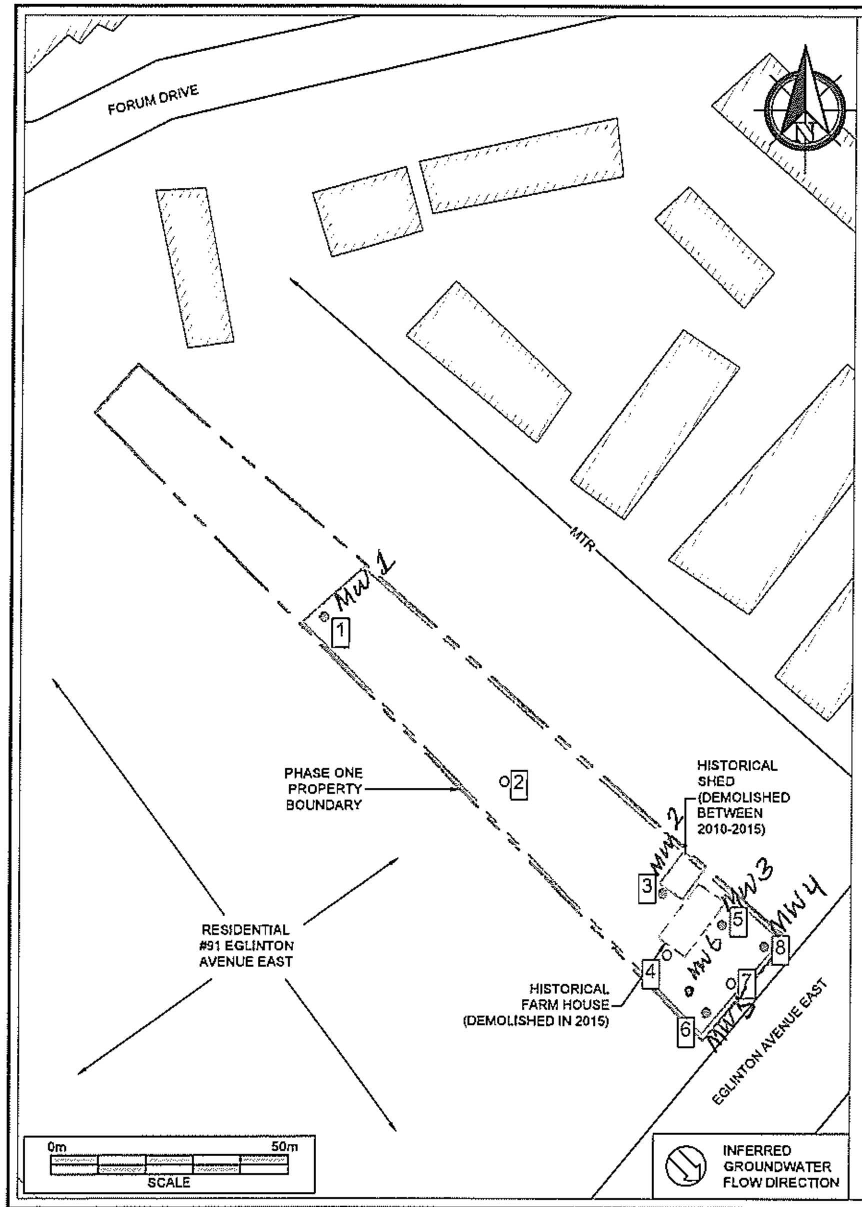


Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC #1 (Historical heating oil AST associated with the historical farm house formerly utilized as a car parking garage)	West exterior wall of the historical farm house that was converted to a car parking garage located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #2 (Unknown heating source for the historical farm house)	In the vicinity of the historical farm house located at the southeast end of the Phase One Property.	Item 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs PAHs BTEX	Soil and Groundwater
APEC #3 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil
APEC #4 (Frank's Garden Centre)	Central and southeast portions of the Phase One Property	Item 22 – Fertilizer Manufacturing, Processing and Bulk Storage	On-Site	Metals and Inorganics Pesticides and Herbicides	Soil

○ Borehole

◉ Borehole with Monitoring Well

LEGEND

MTR	MULTI-TENANT RESIDENTIAL
APEC	AREA OF ENVIRONMENTAL CONCERN
BTEX	BENZENE, TOLUENE, ETHYLBENZENE AND TOTAL XYLENES
PHCs	PETROLEUM HYDROCARBON FRACTIONS F1-F4
PAHs	POLYCYCLIC AROMATIC HYDROCARBONS
NA	NOT APPLICABLE
☐	APEC1
☐	APEC2
☐	APEC3&4

PINCHIN

PROJECT NAME
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT

PROJECT LOCATION
131 EGLINTON AVENUE EAST,
MISSISSAUGA, ONTARIO

FIGURE NAME
AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

SCALE	PROJECT NO.
AS SHOWN	230989
DATE	FIGURE NO.
FEB. 2019	5

APPENDIX F

Field Measured Parameters

PINCHIN

WATER QUALITY PARAMETERS

Well ID MW19-02

Project No. 230989.001

Field Technician WM

Site Location 131 Eglinton Ave. E.

Date March 28.2019.

Time	Water Level (mbtoc)	Pumping Rate (mL/min)	Total Purge Volume (litres)	pH (pH units)	Specific Cond [✓ (mS/cm)] (µS/cm)	Temp (°C)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments (e.g., sheen, odour, free-phase product, sediment content, clarity, colour, etc.)
9:26	3.08									
9:27	3.08	150	0.15							
9:28	3.09	150								
9:29	3.09	150	0.5							
9:30	3.09	150								
9:31	3.09	150								flow through filling.
9:32	3.09	150	1 L							
9:35	3.09	"	1.5	7.28	0.907	5.55	2.43	293	85.5	flow through filled, clear, no sheen or odours
9:38	3.09	"	2	7.29	0.92	5.45	0.60	282	82.2	"
9:41	3.10	"	2.5	7.32	0.91	5.40	0.15	273	66.8	"
9:44	3.16	"	3	7.45	0.91	5.35	0.00	252	59.0	"
9:47	3.16	"	3.5	7.52	0.91	5.37	0.00	237	56.4	"
9:50	3.16	"	4	7.53	0.909	5.40	0.00	225	51.9	"
9:53	3.17	"	4.5	7.54 ✓	0.911 ✓	5.46 ✓	0.00 ✓	217 ✓	54.1 ✓	"
										Good to sample
										@ 10:00 am.

APPENDIX G

Residue Management

Your Project #: 230989.001
Site Location: PHASE TWO ESA / 131 EGLINTON AVE
Your C.O.C. #: 709705-03-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/03
Report #: R5655466
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B980786
Received: 2019/03/28, 14:02

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Cyanide (WAD) in Leachates	1	N/A	2019/04/02	CAM SOP-00457	OMOE 3015 m
Fluoride by ISE in Leachates	1	2019/04/02	2019/04/02	CAM SOP-00449	SM 23 4500-F- C m
Mercury (TCLP Leachable) (mg/L)	1	N/A	2019/04/03	CAM SOP-00453	EPA 7470A m
Total Metals in TCLP Leachate by ICPMS	1	2019/04/02	2019/04/03	CAM SOP-00447	EPA 6020B m
Nitrate(NO3) + Nitrite(NO2) in Leachate	1	N/A	2019/04/03	CAM SOP-00440	SM 23 4500-NO3I/NO2B
PAH Compounds in Leachate by GC/MS (SIM)	1	2019/04/02	2019/04/03	CAM SOP-00318	EPA 8270D m
Polychlorinated Biphenyl in Leachate	1	2019/04/02	2019/04/02	CAM SOP-00309	EPA 8082A m
TCLP - % Solids	1	2019/04/01	2019/04/02	CAM SOP-00401	EPA 1311 Update I m
TCLP - Extraction Fluid	1	N/A	2019/04/02	CAM SOP-00401	EPA 1311 Update I m
TCLP - Initial and final pH	1	N/A	2019/04/02	CAM SOP-00401	EPA 1311 Update I m
TCLP Zero Headspace Extraction	1	2019/04/01	2019/04/02	CAM SOP-00430	EPA 1311 m
VOCs in ZHE Leachates	1	2019/04/02	2019/04/02	CAM SOP-00228	EPA 8260C m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam’s profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

Your Project #: 230989.001
Site Location: PHASE TWO ESA / 131 EGLINTON AVE
Your C.O.C. #: 709705-03-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/03
Report #: R5655466
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B980786
Received: 2019/03/28, 14:02
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817
===
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

O.REG 558 TCLP BENZO(A)PYRENE

Maxxam ID		JHR495	JHR495		
Sampling Date		2019/03/27 13:50	2019/03/27 13:50		
COC Number		709705-03-01	709705-03-01		
	UNITS	**TCLP**	**TCLP Lab-Dup**	**RDL**	**QC Batch**
Polyaromatic Hydrocarbons					
Leachable Benzo(a)pyrene	ug/L	<0.10	<0.10	0.10	6049847
Surrogate Recovery (%)					
Leachable D10-Anthracene	%	126	120		6049847
Leachable D14-Terphenyl (FS)	%	95	88		6049847
Leachable D8-Acenaphthylene	%	120	112		6049847

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

O.REG 558 TCLP INORGANICS PACKAGE (SOIL)

Maxxam ID		JHR495		
Sampling Date		2019/03/27 13:50		
COC Number		709705-03-01		
	UNITS	**TCLP**	**RDL**	**QC Batch**
Inorganics				
Leachable Fluoride (F-)	mg/L	0.22	0.10	6048837
Leachable WAD Cyanide (Free)	mg/L	<0.010	0.010	6048839
Leachable Nitrite (N)	mg/L	<0.10	0.10	6048841
Leachable Nitrate (N)	mg/L	<1.0	1.0	6048841
Leachable Nitrate + Nitrite (N)	mg/L	<1.0	1.0	6048841
Metals				
Leachable Mercury (Hg)	mg/L	<0.0010	0.0010	6048714
Leachable Arsenic (As)	mg/L	<0.2	0.2	6048676
Leachable Barium (Ba)	mg/L	0.3	0.2	6048676
Leachable Boron (B)	mg/L	0.1	0.1	6048676
Leachable Cadmium (Cd)	mg/L	<0.05	0.05	6048676
Leachable Chromium (Cr)	mg/L	<0.1	0.1	6048676
Leachable Lead (Pb)	mg/L	<0.1	0.1	6048676
Leachable Selenium (Se)	mg/L	<0.1	0.1	6048676
Leachable Silver (Ag)	mg/L	<0.01	0.01	6048676
Leachable Uranium (U)	mg/L	<0.01	0.01	6048676

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 558 TCLP LEACHATE PREPARATION (SOIL)

Maxxam ID		JHR495		
Sampling Date		2019/03/27 13:50		
COC Number		709705-03-01		
	UNITS	**TCLP**	**RDL**	**QC Batch**
Inorganics				
Final pH	pH	6.05		6046839
Initial pH	pH	8.93		6046839
TCLP - % Solids	%	100	0.2	6046833
TCLP Extraction Fluid	N/A	FLUID 1		6046838

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 558 TCLP PCBS (SOIL)

Maxxam ID		JHR495		
Sampling Date		2019/03/27 13:50		
COC Number		709705-03-01		
	UNITS	**TCLP**	**RDL**	**QC Batch**
PCBs				
Leachable Aroclor 1016	ug/L	<3.0	3.0	6049374
Leachable Aroclor 1221	ug/L	<3.0	3.0	6049374
Leachable Aroclor 1242	ug/L	<3.0	3.0	6049374
Leachable Aroclor 1248	ug/L	<3.0	3.0	6049374
Leachable Aroclor 1254	ug/L	<3.0	3.0	6049374
Leachable Aroclor 1260	ug/L	<3.0	3.0	6049374
Leachable Total PCB	ug/L	<3.0	3.0	6049374
Surrogate Recovery (%)				
Leachable Decachlorobiphenyl	%	101		6049374

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 558 TCLP VOLATILE ORGANICS HS (SOIL)

Maxxam ID		JHR495		
Sampling Date		2019/03/27 13:50		
COC Number		709705-03-01		
	UNITS	**TCLP**	**RDL**	**QC Batch**
Charge/Prep Analysis				
Amount Extracted (Wet Weight) (g)	N/A	25	N/A	6046750
Volatile Organics				
Leachable Benzene	mg/L	<0.020	0.020	6048258
Leachable Carbon Tetrachloride	mg/L	<0.020	0.020	6048258
Leachable Chlorobenzene	mg/L	<0.020	0.020	6048258
Leachable Chloroform	mg/L	<0.020	0.020	6048258
Leachable 1,2-Dichlorobenzene	mg/L	<0.050	0.050	6048258
Leachable 1,4-Dichlorobenzene	mg/L	<0.050	0.050	6048258
Leachable 1,2-Dichloroethane	mg/L	<0.050	0.050	6048258
Leachable 1,1-Dichloroethylene	mg/L	<0.020	0.020	6048258
Leachable Methylene Chloride(Dichloromethane)	mg/L	<0.20	0.20	6048258
Leachable Methyl Ethyl Ketone (2-Butanone)	mg/L	<1.0	1.0	6048258
Leachable Tetrachloroethylene	mg/L	<0.020	0.020	6048258
Leachable Trichloroethylene	mg/L	<0.020	0.020	6048258
Leachable Vinyl Chloride	mg/L	<0.020	0.020	6048258
Surrogate Recovery (%)				
Leachable 4-Bromofluorobenzene	%	90		6048258
Leachable D4-1,2-Dichloroethane	%	103		6048258
Leachable D8-Toluene	%	101		6048258

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

TEST SUMMARY

Maxxam ID: JHR495
Sample ID: TCLP
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Cyanide (WAD) in Leachates	SKAL/CN	6048839	N/A	2019/04/02	Xuanhong Qiu
Fluoride by ISE in Leachates	ISE	6048837	2019/04/02	2019/04/02	Surinder Rai
Mercury (TCLP Leachable) (mg/L)	CV/AA	6048714	N/A	2019/04/03	Medhat Nasr
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	6048676	2019/04/02	2019/04/03	Arefa Dabhad
Nitrate(NO3) + Nitrite(NO2) in Leachate	LACH	6048841	N/A	2019/04/03	Chandra Nandlal
PAH Compounds in Leachate by GC/MS (SIM)	GC/MS	6049847	2019/04/02	2019/04/03	Mitesh Raj
Polychlorinated Biphenyl in Leachate	GC/ECD	6049374	2019/04/02	2019/04/02	Svitlana Shaula
TCLP - % Solids	BAL	6046833	2019/04/01	2019/04/02	Jian (Ken) Wang
TCLP - Extraction Fluid		6046838	N/A	2019/04/02	Jian (Ken) Wang
TCLP - Initial and final pH	PH	6046839	N/A	2019/04/02	Jian (Ken) Wang
TCLP Zero Headspace Extraction		6046750	2019/04/01	2019/04/02	Walt Wang
VOCs in ZHE Leachates	GC/MS	6048258	2019/04/02	2019/04/02	Juan Pangilinan

Maxxam ID: JHR495 Dup
Sample ID: TCLP
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PAH Compounds in Leachate by GC/MS (SIM)	GC/MS	6049847	2019/04/02	2019/04/03	Mitesh Raj

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.3°C

Cooler custody seal was present and intact.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**UNITS**	**Value (%)**	**QC Limits**	**Value**	**UNITS**
6048258	Leachable 4-Bromofluorobenzene	2019/04/02	95	70 - 130	96	70 - 130	91	%				
6048258	Leachable D4-1,2-Dichloroethane	2019/04/02	98	70 - 130	100	70 - 130	99	%				
6048258	Leachable D8-Toluene	2019/04/02	107	70 - 130	106	70 - 130	101	%				
6049374	Leachable Decachlorobiphenyl	2019/04/02	99	30 - 130	101	30 - 130	100	%				
6049847	Leachable D10-Anthracene	2019/04/03	119	50 - 130	109	50 - 130	113	%				
6049847	Leachable D14-Terphenyl (FS)	2019/04/03	88	50 - 130	85	50 - 130	85	%				
6049847	Leachable D8-Acenaphthylene	2019/04/03	115	50 - 130	106	50 - 130	104	%				
6048258	Leachable 1,1-Dichloroethylene	2019/04/02	96	70 - 130	97	70 - 130	<0.020	mg/L	NC	30		
6048258	Leachable 1,2-Dichlorobenzene	2019/04/02	98	70 - 130	99	70 - 130	<0.050	mg/L	NC	30		
6048258	Leachable 1,2-Dichloroethane	2019/04/02	95	70 - 130	97	70 - 130	<0.050	mg/L	NC	30		
6048258	Leachable 1,4-Dichlorobenzene	2019/04/02	99	70 - 130	100	70 - 130	<0.050	mg/L	NC	30		
6048258	Leachable Benzene	2019/04/02	95	70 - 130	96	70 - 130	<0.020	mg/L	NC	30		
6048258	Leachable Carbon Tetrachloride	2019/04/02	92	70 - 130	92	70 - 130	<0.020	mg/L	NC	30		
6048258	Leachable Chlorobenzene	2019/04/02	94	70 - 130	95	70 - 130	<0.020	mg/L	NC	30		
6048258	Leachable Chloroform	2019/04/02	96	70 - 130	97	70 - 130	<0.020	mg/L	NC	30		
6048258	Leachable Methyl Ethyl Ketone (2-Butanone)	2019/04/02	102	60 - 140	107	60 - 140	<1.0	mg/L	NC	30		
6048258	Leachable Methylene Chloride (Dichloromethane)	2019/04/02	94	70 - 130	96	70 - 130	<0.20	mg/L	NC	30		
6048258	Leachable Tetrachloroethylene	2019/04/02	95	70 - 130	95	70 - 130	<0.020	mg/L	NC	30		
6048258	Leachable Trichloroethylene	2019/04/02	91	70 - 130	91	70 - 130	<0.020	mg/L	NC	30		
6048258	Leachable Vinyl Chloride	2019/04/02	101	70 - 130	103	70 - 130	<0.020	mg/L	NC	30		
6048676	Leachable Arsenic (As)	2019/04/03	99	80 - 120	98	80 - 120	<0.2	mg/L	NC	35	<0.2	mg/L
6048676	Leachable Barium (Ba)	2019/04/03	NC	80 - 120	99	80 - 120	<0.2	mg/L	NC	35	<0.2	mg/L
6048676	Leachable Boron (B)	2019/04/03	96	80 - 120	99	80 - 120	<0.1	mg/L	NC	35	<0.1	mg/L
6048676	Leachable Cadmium (Cd)	2019/04/03	100	80 - 120	99	80 - 120	<0.05	mg/L	NC	35	<0.05	mg/L
6048676	Leachable Chromium (Cr)	2019/04/03	98	80 - 120	98	80 - 120	<0.1	mg/L	NC	35	<0.1	mg/L
6048676	Leachable Lead (Pb)	2019/04/03	94	80 - 120	96	80 - 120	<0.1	mg/L	NC	35	<0.1	mg/L
6048676	Leachable Selenium (Se)	2019/04/03	100	80 - 120	101	80 - 120	<0.1	mg/L	NC	35	<0.1	mg/L
6048676	Leachable Silver (Ag)	2019/04/03	98	80 - 120	97	80 - 120	<0.01	mg/L	NC	35	<0.01	mg/L
6048676	Leachable Uranium (U)	2019/04/03	92	80 - 120	95	80 - 120	<0.01	mg/L	NC	35	<0.01	mg/L
6048714	Leachable Mercury (Hg)	2019/04/03	112	75 - 125	93	80 - 120	<0.0010	mg/L	NC	25	<0.0010	mg/L
6048837	Leachable Fluoride (F-)	2019/04/02	90	80 - 120	98	80 - 120	<0.10	mg/L	NC	25	<0.10	mg/L

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**UNITS**	**Value (%)**	**QC Limits**	**Value**	**UNITS**
6048839	Leachable WAD Cyanide (Free)	2019/04/02	115	80 - 120	98	80 - 120	<0.0020	mg/L	NC	20	<0.010	mg/L
6048841	Leachable Nitrate (N)	2019/04/03	106	80 - 120	104	80 - 120	<1.0	mg/L	NC	25	<1.0	mg/L
6048841	Leachable Nitrate + Nitrite (N)	2019/04/03	107	80 - 120	104	80 - 120	<1.0	mg/L	NC	25	<1.0	mg/L
6048841	Leachable Nitrite (N)	2019/04/03	113	80 - 120	107	80 - 120	<0.10	mg/L	NC	25	<0.10	mg/L
6049374	Leachable Aroclor 1016	2019/04/02					<3.0	ug/L	NC	40		
6049374	Leachable Aroclor 1221	2019/04/02					<3.0	ug/L	NC	40		
6049374	Leachable Aroclor 1242	2019/04/02					<3.0	ug/L	NC	40		
6049374	Leachable Aroclor 1248	2019/04/02					<3.0	ug/L	NC	40		
6049374	Leachable Aroclor 1254	2019/04/02					<3.0	ug/L	NC	40		
6049374	Leachable Aroclor 1260	2019/04/02	99	30 - 130	103	30 - 130	<3.0	ug/L	NC	40		
6049374	Leachable Total PCB	2019/04/02	99	30 - 130	103	30 - 130	<3.0	ug/L	NC	40		
6049847	Leachable Benzo(a)pyrene	2019/04/03	104	50 - 130	99	50 - 130	<0.10	ug/L	NC	40		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Eva

CHARTERED
Eva Pranjic
CHEMIST

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel (905) 817-5700 Toll-free 800-563-6266 Fax (905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:

Company Name: #3103 Pinchin Ltd
Attention: Accounts Payable
Address: 2470 Milltower Crt
Mississauga ON L5N 7W5
Tel: (905) 363-0678 Fax: (905) 363-0681
Email: ap@pinchin.com

REPORT TO:

Company Name:
Attention: Michael Birch Craig Kelly
Address:
Tel: Fax:
Email: mbirch@pinchin.com; cxkelly@pinchin.com

PROJECT INFORMATION:

Quotation #: A70927
P.O. #:
Project: 230989.001
Project Name: Phase TWO ESA
Site #: 131 Eglinton Ave E.
Sampled By: William Martyniuk

Laboratory Use Only:

Maxxam Job #:
Bottle Order #: 709705
COC #: C#709705-03-01
Project Manager: Antonella Brasil

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
☐ Table 1 ☐ Res/Park ☐ Medium/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☑ For RSC
☐ Table ___

Other Regulations
☐ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558 ☐ Storm Sewer Bylaw
☐ MISA Municipality ______
☐ PWQO
☐ Other ______

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ______

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ______ Time Required: ______ ☐
Rush Confirmation Number: ______ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	TCLP Inorganics ~~Free (WAD) Cyanide~~	~~Strong Acid Leachable Metals by ICPMS~~ TCLP VOC	~~Conductivity~~ TCLP Benzoapyrene	~~SAR - ICP Metals~~ TCLP PCBs	Hexavalent Chromium in Soil by IC	O.Reg 153 PAHs (Soil)	O.Reg 153 Petroleum Hydrocarbons (Soil)	O.Reg 153 OC Pesticides (Soil)			# of Bottles	Comments
1		TCLP	19/3/27	13:50	Soil		✓	✓	✓	✓							7	
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

28-Mar-19 14:02
Antonella Brasil
B980786
CA2 ENV-800

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
W Martyniuk	19/3/28	14:01	COLENE CURIMAO	~~2019/03/27~~ 2019/03/28	14:02	

Laboratory Use Only				
Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	1/0/0 ICE	Present	✓	
		Intact	✓	

White: Maxxa Yellow: Client

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

APPENDIX H

Laboratory Certificates of Analysis

Your Project #: 230989.001
Site Location: PHASE TWO ESA /131 EGLINTON AVE.
Your C.O.C. #: 710775-01-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/08
Report #: R5661962
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B981984
Received: 2019/03/29, 12:11

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	2	N/A	2019/04/04	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	1	N/A	2019/04/03		EPA 8260C m
Chloride by Automated Colourimetry	2	N/A	2019/04/02	CAM SOP-00463	SM 4500-Cl E m
Chromium (VI) in Water	2	N/A	2019/04/02	CAM SOP-00436	EPA 7199 m
Free (WAD) Cyanide	1	N/A	2019/04/01	CAM SOP-00457	OMOE E3015 m
Free (WAD) Cyanide	1	N/A	2019/04/02	CAM SOP-00457	OMOE E3015 m
Petroleum Hydro. CCME F1 & BTEX in Water	2	N/A	2019/04/03	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	2019/04/03	2019/04/04	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	2	N/A	2019/04/03	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	2	N/A	2019/04/03	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	2	N/A	2019/04/02	CAM SOP-00440	SM 23 4500-NO3I/NO2B
OC Pesticides (Selected) & PCB (3)	2	2019/04/01	2019/04/02	CAM SOP-00307	EPA 8081A/8082B m
OC Pesticides Summed Parameters	2	N/A	2019/04/02	CAM SOP-00307	EPA 8081A/8082B m
PAH Compounds in Water by GC/MS (SIM)	2	2019/04/03	2019/04/04	CAM SOP-00318	EPA 8270D m
pH	2	2019/04/01	2019/04/02	CAM SOP-00413	SM 4500H+ B m
Volatile Organic Compounds in Water	1	N/A	2019/04/02	CAM SOP-00228	EPA 8260C m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope

Your Project #: 230989.001
Site Location: PHASE TWO ESA /131 EGLINTON AVE.
Your C.O.C. #: 710775-01-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/08
Report #: R5661962
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B981984
Received: 2019/03/29, 12:11

dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(3) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF WATER

Maxxam ID		JHY078		JHY079		
Sampling Date		2019/03/28 10:00		2019/03/28 10:00		
COC Number		710775-01-01		710775-01-01		
	UNITS	**MW19-02**	**QC Batch**	**DUP19-02 GW**	**RDL**	**QC Batch**
Inorganics						
Total Ammonia-N	mg/L	<0.050	6049391	<0.050	0.050	6049257
pH	pH	7.39	6047346	7.33		6047346
WAD Cyanide (Free)	ug/L	<1	6046824	<1	1	6048539
Dissolved Chloride (Cl-)	mg/L	36	6047314	35	1.0	6047314
Nitrite (N)	mg/L	<0.010	6047135	<0.010	0.010	6047135
Nitrate (N)	mg/L	1.23	6047135	1.24	0.10	6047135
Nitrate + Nitrite (N)	mg/L	1.23	6047135	1.24	0.10	6047135

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		JHY078	JHY079		
Sampling Date		2019/03/28 10:00	2019/03/28 10:00		
COC Number		710775-01-01	710775-01-01		
	UNITS	**MW19-02**	**DUP19-02 GW**	**RDL**	**QC Batch**
Metals					
Chromium (VI)	ug/L	<0.50	<0.50	0.50	6046786
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	0.50	6045957
Dissolved Arsenic (As)	ug/L	<1.0	<1.0	1.0	6045957
Dissolved Barium (Ba)	ug/L	45	45	2.0	6045957
Dissolved Beryllium (Be)	ug/L	<0.50	<0.50	0.50	6045957
Dissolved Boron (B)	ug/L	19	19	10	6045957
Dissolved Cadmium (Cd)	ug/L	<0.10	<0.10	0.10	6045957
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	5.0	6045957
Dissolved Cobalt (Co)	ug/L	<0.50	<0.50	0.50	6045957
Dissolved Copper (Cu)	ug/L	1.2	1.2	1.0	6045957
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	6045957
Dissolved Molybdenum (Mo)	ug/L	<0.50	<0.50	0.50	6045957
Dissolved Nickel (Ni)	ug/L	<1.0	<1.0	1.0	6045957
Dissolved Selenium (Se)	ug/L	<2.0	<2.0	2.0	6045957
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	0.10	6045957
Dissolved Sodium (Na)	ug/L	17000	17000	100	6045957
Dissolved Thallium (Tl)	ug/L	<0.050	<0.050	0.050	6045957
Dissolved Uranium (U)	ug/L	1.0	0.99	0.10	6045957
Dissolved Vanadium (V)	ug/L	<0.50	<0.50	0.50	6045957
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	5.0	6045957

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 OC PESTICIDES (WATER)

Maxxam ID		JHY078	JHY079		
Sampling Date		2019/03/28 10:00	2019/03/28 10:00		
COC Number		710775-01-01	710775-01-01		
	UNITS	**MW19-02**	**DUP19-02 GW**	**RDL**	**QC Batch**
Calculated Parameters					
Chlordane (Total)	ug/L	<0.005	<0.005	0.005	6044820
o,p-DDD + p,p-DDD	ug/L	<0.005	<0.005	0.005	6044820
o,p-DDE + p,p-DDE	ug/L	<0.005	<0.005	0.005	6044820
o,p-DDT + p,p-DDT	ug/L	<0.005	<0.005	0.005	6044820
Total Endosulfan	ug/L	<0.005	<0.005	0.005	6044820
Total PCB	ug/L	<0.05	<0.05	0.05	6044820
Pesticides & Herbicides					
Aldrin	ug/L	<0.005	<0.005	0.005	6046761
Dieldrin	ug/L	<0.005	<0.005	0.005	6046761
a-Chlordane	ug/L	<0.005	<0.005	0.005	6046761
g-Chlordane	ug/L	<0.005	<0.005	0.005	6046761
o,p-DDD	ug/L	<0.005	<0.005	0.005	6046761
p,p-DDD	ug/L	<0.005	<0.005	0.005	6046761
o,p-DDE	ug/L	<0.005	<0.005	0.005	6046761
p,p-DDE	ug/L	<0.005	<0.005	0.005	6046761
o,p-DDT	ug/L	<0.005	<0.005	0.005	6046761
p,p-DDT	ug/L	<0.005	<0.005	0.005	6046761
Lindane	ug/L	<0.003	<0.003	0.003	6046761
Endosulfan I (alpha)	ug/L	<0.005	<0.005	0.005	6046761
Endosulfan II (beta)	ug/L	<0.005	<0.005	0.005	6046761
Endrin	ug/L	<0.005	<0.005	0.005	6046761
Heptachlor	ug/L	<0.005	<0.005	0.005	6046761
Heptachlor epoxide	ug/L	<0.005	<0.005	0.005	6046761
Hexachlorobenzene	ug/L	<0.005	<0.005	0.005	6046761
Hexachlorobutadiene	ug/L	<0.009	<0.009	0.009	6046761
Hexachloroethane	ug/L	<0.01	<0.01	0.01	6046761
Methoxychlor	ug/L	<0.01	<0.01	0.01	6046761
Aroclor 1242	ug/L	<0.05	<0.05	0.05	6046761
Aroclor 1248	ug/L	<0.05	<0.05	0.05	6046761
Aroclor 1254	ug/L	<0.05	<0.05	0.05	6046761
Aroclor 1260	ug/L	<0.05	<0.05	0.05	6046761

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 OC PESTICIDES (WATER)

Maxxam ID		JHY078	JHY079		
Sampling Date		2019/03/28 10:00	2019/03/28 10:00		
COC Number		710775-01-01	710775-01-01		
	UNITS	**MW19-02**	**DUP19-02 GW**	**RDL**	**QC Batch**
Surrogate Recovery (%)					
2,4,5,6-Tetrachloro-m-xylene	%	84	81		6046761
Decachlorobiphenyl	%	120	115		6046761

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 PAHS (WATER)

Maxxam ID		JHY078	JHY079		
Sampling Date		2019/03/28 10:00	2019/03/28 10:00		
COC Number		710775-01-01	710775-01-01		
	UNITS	MW19-02	DUP19-02 GW	RDL	QC Batch
Calculated Parameters					
Methylnaphthalene, 2-(1-)	ug/L	<0.071	<0.071	0.071	6044385
Polyaromatic Hydrocarbons					
Acenaphthene	ug/L	<0.050	<0.050	0.050	6051392
Acenaphthylene	ug/L	<0.050	<0.050	0.050	6051392
Anthracene	ug/L	<0.050	<0.050	0.050	6051392
Benzo(a)anthracene	ug/L	<0.050	<0.050	0.050	6051392
Benzo(a)pyrene	ug/L	<0.010	<0.010	0.010	6051392
Benzo(b/j)fluoranthene	ug/L	<0.050	<0.050	0.050	6051392
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	0.050	6051392
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	0.050	6051392
Chrysene	ug/L	<0.050	<0.050	0.050	6051392
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	0.050	6051392
Fluoranthene	ug/L	<0.050	<0.050	0.050	6051392
Fluorene	ug/L	<0.050	<0.050	0.050	6051392
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	0.050	6051392
1-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	6051392
2-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	6051392
Naphthalene	ug/L	<0.050	<0.050	0.050	6051392
Phenanthrene	ug/L	<0.030	<0.030	0.030	6051392
Pyrene	ug/L	<0.050	<0.050	0.050	6051392
Surrogate Recovery (%)					
D10-Anthracene	%	119	101		6051392
D14-Terphenyl (FS)	%	86	74		6051392
D8-Acenaphthylene	%	112	94		6051392

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Maxxam ID		JHY078			JHY078			JHY079		
Sampling Date		2019/03/28 10:00			2019/03/28 10:00			2019/03/28 10:00		
COC Number		710775-01-01			710775-01-01			710775-01-01		
	UNITS	**MW19-02**	**RDL**	**QC Batch**	**MW19-02 Lab-Dup**	**RDL**	**QC Batch**	**DUP19-02 GW**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons										
Benzene	ug/L	<0.20	0.20	6050062	<0.20	0.20	6050062	<0.20	0.20	6050062
Toluene	ug/L	<0.20	0.20	6050062	<0.20	0.20	6050062	<0.20	0.20	6050062
Ethylbenzene	ug/L	<0.20	0.20	6050062	<0.20	0.20	6050062	<0.20	0.20	6050062
o-Xylene	ug/L	<0.20	0.20	6050062	<0.20	0.20	6050062	<0.20	0.20	6050062
p+m-Xylene	ug/L	<0.40	0.40	6050062	<0.40	0.40	6050062	<0.40	0.40	6050062
Total Xylenes	ug/L	<0.40	0.40	6050062	<0.40	0.40	6050062	<0.40	0.40	6050062
F1 (C6-C10)	ug/L	<25	25	6050062	<25	25	6050062	<25	25	6050062
F1 (C6-C10) - BTEX	ug/L	<25	25	6050062	<25	25	6050062	<25	25	6050062
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	6051394				<100	100	6051394
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	6051394				<200	200	6051394
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	6051394				<200	200	6051394
Reached Baseline at C50	ug/L	Yes		6051394				Yes		6051394
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	110		6050062	109		6050062	109		6050062
4-Bromofluorobenzene	%	98		6050062	97		6050062	97		6050062
D10-Ethylbenzene	%	92		6050062	91		6050062	91		6050062
D4-1,2-Dichloroethane	%	96		6050062	95		6050062	94		6050062
o-Terphenyl	%	115		6051394				113		6051394

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 VOCS BY HS (WATER)

Maxxam ID		JHY080		
Sampling Date		2019/03/28		
COC Number		710775-01-01		
	UNITS	**F1 TRIP BLANK**	**RDL**	**QC Batch**
Calculated Parameters				
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	6044229
Volatile Organics				
Acetone (2-Propanone)	ug/L	<10	10	6046899
Benzene	ug/L	<0.20	0.20	6046899
Bromodichloromethane	ug/L	<0.50	0.50	6046899
Bromoform	ug/L	<1.0	1.0	6046899
Bromomethane	ug/L	<0.50	0.50	6046899
Carbon Tetrachloride	ug/L	<0.20	0.20	6046899
Chlorobenzene	ug/L	<0.20	0.20	6046899
Chloroform	ug/L	<0.20	0.20	6046899
Dibromochloromethane	ug/L	<0.50	0.50	6046899
1,2-Dichlorobenzene	ug/L	<0.50	0.50	6046899
1,3-Dichlorobenzene	ug/L	<0.50	0.50	6046899
1,4-Dichlorobenzene	ug/L	<0.50	0.50	6046899
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	6046899
1,1-Dichloroethane	ug/L	<0.20	0.20	6046899
1,2-Dichloroethane	ug/L	<0.50	0.50	6046899
1,1-Dichloroethylene	ug/L	<0.20	0.20	6046899
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	6046899
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	6046899
1,2-Dichloropropane	ug/L	<0.20	0.20	6046899
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	6046899
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	6046899
Ethylbenzene	ug/L	<0.20	0.20	6046899
Ethylene Dibromide	ug/L	<0.20	0.20	6046899
Hexane	ug/L	<1.0	1.0	6046899
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	6046899
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	6046899
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	6046899
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	6046899
Styrene	ug/L	<0.50	0.50	6046899

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 VOCS BY HS (WATER)

Maxxam ID		JHY080		
Sampling Date		2019/03/28		
COC Number		710775-01-01		
	UNITS	**F1 TRIP BLANK**	**RDL**	**QC Batch**
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	6046899
1,1,2,2-Tetrachloroethane	ug/L	<0.50	0.50	6046899
Tetrachloroethylene	ug/L	<0.20	0.20	6046899
Toluene	ug/L	<0.20	0.20	6046899
1,1,1-Trichloroethane	ug/L	<0.20	0.20	6046899
1,1,2-Trichloroethane	ug/L	<0.50	0.50	6046899
Trichloroethylene	ug/L	<0.20	0.20	6046899
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	6046899
Vinyl Chloride	ug/L	<0.20	0.20	6046899
p+m-Xylene	ug/L	<0.20	0.20	6046899
o-Xylene	ug/L	<0.20	0.20	6046899
Total Xylenes	ug/L	<0.20	0.20	6046899
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	89		6046899
D4-1,2-Dichloroethane	%	106		6046899
D8-Toluene	%	100		6046899

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

TEST SUMMARY

Maxxam ID: JHY078
Sample ID: MW19-02
Matrix: Water

Collected: 2019/03/28
Shipped:
Received: 2019/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6044385	N/A	2019/04/04	Automated Statchk
Chloride by Automated Colourimetry	KONE	6047314	N/A	2019/04/02	Deonarine Ramnarine
Chromium (VI) in Water	IC	6046786	N/A	2019/04/02	Lang Le
Free (WAD) Cyanide	SKAL/CN	6046824	N/A	2019/04/01	Xuanhong Qiu
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6050062	N/A	2019/04/03	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6051394	2019/04/03	2019/04/04	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6045957	N/A	2019/04/03	Thao Nguyen
Total Ammonia-N	LACH/NH4	6049391	N/A	2019/04/03	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6047135	N/A	2019/04/02	Chandra Nandlal
OC Pesticides (Selected) & PCB	GC/ECD	6046761	2019/04/01	2019/04/02	Li Peng
OC Pesticides Summed Parameters	CALC	6044820	N/A	2019/04/02	Automated Statchk
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6051392	2019/04/03	2019/04/04	Mitesh Raj
pH	AT	6047346	2019/04/01	2019/04/02	Gnana Thomas

Maxxam ID: JHY078 Dup
Sample ID: MW19-02
Matrix: Water

Collected: 2019/03/28
Shipped:
Received: 2019/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6050062	N/A	2019/04/03	Georgeta Rusu

Maxxam ID: JHY079
Sample ID: DUP19-02 GW
Matrix: Water

Collected: 2019/03/28
Shipped:
Received: 2019/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6044385	N/A	2019/04/04	Automated Statchk
Chloride by Automated Colourimetry	KONE	6047314	N/A	2019/04/02	Deonarine Ramnarine
Chromium (VI) in Water	IC	6046786	N/A	2019/04/02	Lang Le
Free (WAD) Cyanide	SKAL/CN	6048539	N/A	2019/04/02	Xuanhong Qiu
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6050062	N/A	2019/04/03	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6051394	2019/04/03	2019/04/04	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6045957	N/A	2019/04/03	Thao Nguyen
Total Ammonia-N	LACH/NH4	6049257	N/A	2019/04/03	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6047135	N/A	2019/04/02	Chandra Nandlal
OC Pesticides (Selected) & PCB	GC/ECD	6046761	2019/04/01	2019/04/02	Li Peng
OC Pesticides Summed Parameters	CALC	6044820	N/A	2019/04/02	Automated Statchk
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6051392	2019/04/03	2019/04/04	Mitesh Raj
pH	AT	6047346	2019/04/01	2019/04/02	Gnana Thomas

TEST SUMMARY

Maxxam ID: JHY080
Sample ID: F1 TRIP BLANK
Matrix: Water

Collected: 2019/03/28
Shipped:
Received: 2019/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6044229	N/A	2019/04/03	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	6046899	N/A	2019/04/02	Juan Pangilinan

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C

Cooler custody seal was present and intact .

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6046761	2,4,5,6-Tetrachloro-m-xylene	2019/04/02	81	50 - 130	74	50 - 130	73	%		
6046761	Decachlorobiphenyl	2019/04/02	117	50 - 130	107	50 - 130	128	%		
6046899	4-Bromofluorobenzene	2019/04/02	93	70 - 130	94	70 - 130	89	%		
6046899	D4-1,2-Dichloroethane	2019/04/02	106	70 - 130	99	70 - 130	102	%		
6046899	D8-Toluene	2019/04/02	107	70 - 130	108	70 - 130	100	%		
6050062	1,4-Difluorobenzene	2019/04/02	112	70 - 130	108	70 - 130	106	%		
6050062	4-Bromofluorobenzene	2019/04/02	96	70 - 130	98	70 - 130	97	%		
6050062	D10-Ethylbenzene	2019/04/02	85	70 - 130	94	70 - 130	86	%		
6050062	D4-1,2-Dichloroethane	2019/04/02	97	70 - 130	98	70 - 130	97	%		
6051392	D10-Anthracene	2019/04/03	113	50 - 130	109	50 - 130	118	%		
6051392	D14-Terphenyl (FS)	2019/04/03	84	50 - 130	81	50 - 130	89	%		
6051392	D8-Acenaphthylene	2019/04/03	104	50 - 130	98	50 - 130	103	%		
6051394	o-Terphenyl	2019/04/04	118	60 - 130	118	60 - 130	109	%		
6045957	Dissolved Antimony (Sb)	2019/04/02	106	80 - 120	102	80 - 120	<0.50	ug/L		
6045957	Dissolved Arsenic (As)	2019/04/02	99	80 - 120	97	80 - 120	<1.0	ug/L		
6045957	Dissolved Barium (Ba)	2019/04/02	102	80 - 120	103	80 - 120	<2.0	ug/L		
6045957	Dissolved Beryllium (Be)	2019/04/02	104	80 - 120	103	80 - 120	<0.50	ug/L		
6045957	Dissolved Boron (B)	2019/04/02	102	80 - 120	102	80 - 120	<10	ug/L		
6045957	Dissolved Cadmium (Cd)	2019/04/02	101	80 - 120	100	80 - 120	<0.10	ug/L		
6045957	Dissolved Chromium (Cr)	2019/04/02	97	80 - 120	98	80 - 120	<5.0	ug/L		
6045957	Dissolved Cobalt (Co)	2019/04/02	94	80 - 120	97	80 - 120	<0.50	ug/L		
6045957	Dissolved Copper (Cu)	2019/04/02	100	80 - 120	101	80 - 120	<1.0	ug/L		
6045957	Dissolved Lead (Pb)	2019/04/02	93	80 - 120	95	80 - 120	<0.50	ug/L	NC	20
6045957	Dissolved Molybdenum (Mo)	2019/04/02	107	80 - 120	104	80 - 120	<0.50	ug/L		
6045957	Dissolved Nickel (Ni)	2019/04/02	92	80 - 120	95	80 - 120	<1.0	ug/L		
6045957	Dissolved Selenium (Se)	2019/04/02	97	80 - 120	102	80 - 120	<2.0	ug/L		
6045957	Dissolved Silver (Ag)	2019/04/02	59 (1)	80 - 120	99	80 - 120	<0.10	ug/L		
6045957	Dissolved Sodium (Na)	2019/04/02	NC	80 - 120	96	80 - 120	<100	ug/L		
6045957	Dissolved Thallium (Tl)	2019/04/02	94	80 - 120	95	80 - 120	<0.050	ug/L		
6045957	Dissolved Uranium (U)	2019/04/02	97	80 - 120	96	80 - 120	<0.10	ug/L		
6045957	Dissolved Vanadium (V)	2019/04/02	101	80 - 120	99	80 - 120	<0.50	ug/L		
6045957	Dissolved Zinc (Zn)	2019/04/02	95	80 - 120	96	80 - 120	<5.0	ug/L		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**UNITS**	**Value (%)**	**QC Limits**
6046761	a-Chlordane	2019/04/02	95	50 - 130	97	50 - 130	<0.005	ug/L		
6046761	Aldrin	2019/04/02	71	50 - 130	70	50 - 130	<0.005	ug/L		
6046761	Aroclor 1242	2019/04/02					<0.05	ug/L	200 (1)	30
6046761	Aroclor 1248	2019/04/02					<0.05	ug/L		
6046761	Aroclor 1254	2019/04/02					<0.05	ug/L		
6046761	Aroclor 1260	2019/04/02					<0.05	ug/L		
6046761	Dieldrin	2019/04/02	111	50 - 130	103	50 - 130	<0.005	ug/L		
6046761	Endosulfan I (alpha)	2019/04/02	93	50 - 130	82	50 - 130	<0.005	ug/L		
6046761	Endosulfan II (beta)	2019/04/02	103	50 - 130	108	50 - 130	<0.005	ug/L		
6046761	Endrin	2019/04/02	96	50 - 130	97	50 - 130	<0.005	ug/L		
6046761	g-Chlordane	2019/04/02	100	50 - 130	91	50 - 130	<0.005	ug/L		
6046761	Heptachlor epoxide	2019/04/02	90	50 - 130	92	50 - 130	<0.005	ug/L		
6046761	Heptachlor	2019/04/02	83	50 - 130	79	50 - 130	<0.005	ug/L		
6046761	Hexachlorobenzene	2019/04/02	96	50 - 130	92	50 - 130	<0.005	ug/L		
6046761	Hexachlorobutadiene	2019/04/02	79	50 - 130	76	50 - 130	<0.009	ug/L		
6046761	Hexachloroethane	2019/04/02	74	50 - 130	68	50 - 130	<0.01	ug/L		
6046761	Lindane	2019/04/02	101	50 - 130	98	50 - 130	<0.003	ug/L	NC	30
6046761	Methoxychlor	2019/04/02	116	50 - 130	114	50 - 130	<0.01	ug/L		
6046761	o,p-DDD	2019/04/02	108	50 - 130	108	50 - 130	<0.005	ug/L		
6046761	o,p-DDE	2019/04/02	97	50 - 130	97	50 - 130	<0.005	ug/L		
6046761	o,p-DDT	2019/04/02	92	50 - 130	96	50 - 130	<0.005	ug/L		
6046761	p,p-DDD	2019/04/02	99	50 - 130	102	50 - 130	<0.005	ug/L		
6046761	p,p-DDE	2019/04/02	95	50 - 130	85	50 - 130	<0.005	ug/L		
6046761	p,p-DDT	2019/04/02	97	50 - 130	96	50 - 130	<0.005	ug/L		
6046786	Chromium (VI)	2019/04/02	99	80 - 120	101	80 - 120	<0.50	ug/L	4.4	20
6046824	WAD Cyanide (Free)	2019/04/01	106	80 - 120	97	80 - 120	<1	ug/L	14	20
6046899	1,1,1,2-Tetrachloroethane	2019/04/02	96	70 - 130	97	70 - 130	<0.50	ug/L		
6046899	1,1,1-Trichloroethane	2019/04/02	93	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
6046899	1,1,2,2-Tetrachloroethane	2019/04/02	112	70 - 130	104	70 - 130	<0.50	ug/L		
6046899	1,1,2-Trichloroethane	2019/04/02	110	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
6046899	1,1-Dichloroethane	2019/04/02	104	70 - 130	105	70 - 130	<0.20	ug/L	NC	30
6046899	1,1-Dichloroethylene	2019/04/02	99	70 - 130	101	70 - 130	<0.20	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6046899	1,2-Dichlorobenzene	2019/04/02	98	70 - 130	99	70 - 130	<0.50	ug/L		
6046899	1,2-Dichloroethane	2019/04/02	103	70 - 130	97	70 - 130	<0.50	ug/L		
6046899	1,2-Dichloropropane	2019/04/02	105	70 - 130	103	70 - 130	<0.20	ug/L		
6046899	1,3-Dichlorobenzene	2019/04/02	96	70 - 130	100	70 - 130	<0.50	ug/L		
6046899	1,4-Dichlorobenzene	2019/04/02	97	70 - 130	101	70 - 130	<0.50	ug/L		
6046899	Acetone (2-Propanone)	2019/04/02	113	60 - 140	101	60 - 140	<10	ug/L		
6046899	Benzene	2019/04/02	98	70 - 130	98	70 - 130	<0.20	ug/L		
6046899	Bromodichloromethane	2019/04/02	98	70 - 130	96	70 - 130	<0.50	ug/L		
6046899	Bromoform	2019/04/02	98	70 - 130	94	70 - 130	<1.0	ug/L		
6046899	Bromomethane	2019/04/02	98	60 - 140	98	60 - 140	<0.50	ug/L		
6046899	Carbon Tetrachloride	2019/04/02	90	70 - 130	94	70 - 130	<0.20	ug/L		
6046899	Chlorobenzene	2019/04/02	95	70 - 130	96	70 - 130	<0.20	ug/L		
6046899	Chloroform	2019/04/02	100	70 - 130	99	70 - 130	<0.20	ug/L		
6046899	cis-1,2-Dichloroethylene	2019/04/02	99	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
6046899	cis-1,3-Dichloropropene	2019/04/02	87	70 - 130	86	70 - 130	<0.30	ug/L		
6046899	Dibromochloromethane	2019/04/02	100	70 - 130	97	70 - 130	<0.50	ug/L		
6046899	Dichlorodifluoromethane (FREON 12)	2019/04/02	94	60 - 140	85	60 - 140	<1.0	ug/L		
6046899	Ethylbenzene	2019/04/02	93	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
6046899	Ethylene Dibromide	2019/04/02	104	70 - 130	98	70 - 130	<0.20	ug/L		
6046899	Hexane	2019/04/02	103	70 - 130	106	70 - 130	<1.0	ug/L		
6046899	Methyl Ethyl Ketone (2-Butanone)	2019/04/02	118	60 - 140	103	60 - 140	<10	ug/L		
6046899	Methyl Isobutyl Ketone	2019/04/02	115	70 - 130	103	70 - 130	<5.0	ug/L		
6046899	Methyl t-butyl ether (MTBE)	2019/04/02	95	70 - 130	94	70 - 130	<0.50	ug/L		
6046899	Methylene Chloride(Dichloromethane)	2019/04/02	101	70 - 130	98	70 - 130	<2.0	ug/L		
6046899	o-Xylene	2019/04/02	90	70 - 130	97	70 - 130	<0.20	ug/L		
6046899	p+m-Xylene	2019/04/02	92	70 - 130	97	70 - 130	<0.20	ug/L		
6046899	Styrene	2019/04/02	94	70 - 130	100	70 - 130	<0.50	ug/L		
6046899	Tetrachloroethylene	2019/04/02	93	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
6046899	Toluene	2019/04/02	95	70 - 130	98	70 - 130	<0.20	ug/L		
6046899	Total Xylenes	2019/04/02					<0.20	ug/L		
6046899	trans-1,2-Dichloroethylene	2019/04/02	97	70 - 130	99	70 - 130	<0.50	ug/L		
6046899	trans-1,3-Dichloropropene	2019/04/02	94	70 - 130	91	70 - 130	<0.40	ug/L		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6046899	Trichloroethylene	2019/04/02	90	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
6046899	Trichlorofluoromethane (FREON 11)	2019/04/02	94	70 - 130	96	70 - 130	<0.50	ug/L		
6046899	Vinyl Chloride	2019/04/02	108	70 - 130	106	70 - 130	<0.20	ug/L	NC	30
6047135	Nitrate (N)	2019/04/02	NC	80 - 120	103	80 - 120	<0.10	mg/L	0.26	20
6047135	Nitrite (N)	2019/04/02	101	80 - 120	103	80 - 120	<0.010	mg/L	7.0	20
6047314	Dissolved Chloride (Cl-)	2019/04/02	NC	80 - 120	103	80 - 120	<1.0	mg/L	0.23	20
6047346	pH	2019/04/02			100	98 - 103			0.40	N/A
6048539	WAD Cyanide (Free)	2019/04/02	110	80 - 120	97	80 - 120	<1	ug/L	NC	20
6049257	Total Ammonia-N	2019/04/03	94	75 - 125	97	80 - 120	<0.050	mg/L	NC	20
6049391	Total Ammonia-N	2019/04/03	92	75 - 125	97	80 - 120	<0.050	mg/L	5.9	20
6050062	Benzene	2019/04/03	105	70 - 130	110	70 - 130	<0.20	ug/L	NC	30
6050062	Ethylbenzene	2019/04/03	100	70 - 130	105	70 - 130	<0.20	ug/L	NC	30
6050062	F1 (C6-C10) - BTEX	2019/04/03					<25	ug/L	NC	30
6050062	F1 (C6-C10)	2019/04/03	110	70 - 130	106	70 - 130	<25	ug/L	NC	30
6050062	o-Xylene	2019/04/03	96	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
6050062	p+m-Xylene	2019/04/03	101	70 - 130	105	70 - 130	<0.40	ug/L	NC	30
6050062	Toluene	2019/04/03	104	70 - 130	109	70 - 130	<0.20	ug/L	NC	30
6050062	Total Xylenes	2019/04/03					<0.40	ug/L	NC	30
6051392	1-Methylnaphthalene	2019/04/04	112	50 - 130	96	50 - 130	<0.050	ug/L	2.1	30
6051392	2-Methylnaphthalene	2019/04/04	99	50 - 130	85	50 - 130	<0.050	ug/L	2.1	30
6051392	Acenaphthene	2019/04/04	96	50 - 130	86	50 - 130	<0.050	ug/L	NC	30
6051392	Acenaphthylene	2019/04/04	99	50 - 130	88	50 - 130	<0.050	ug/L	NC	30
6051392	Anthracene	2019/04/04	90	50 - 130	83	50 - 130	<0.050	ug/L	NC	30
6051392	Benzo(a)anthracene	2019/04/04	105	50 - 130	97	50 - 130	<0.050	ug/L	NC	30
6051392	Benzo(a)pyrene	2019/04/04	99	50 - 130	92	50 - 130	<0.010	ug/L	NC	30
6051392	Benzo(b/j)fluoranthene	2019/04/04	103	50 - 130	96	50 - 130	<0.050	ug/L	NC	30
6051392	Benzo(g,h,i)perylene	2019/04/04	99	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
6051392	Benzo(k)fluoranthene	2019/04/04	100	50 - 130	85	50 - 130	<0.050	ug/L	NC	30
6051392	Chrysene	2019/04/04	101	50 - 130	92	50 - 130	<0.050	ug/L	NC	30
6051392	Dibenz(a,h)anthracene	2019/04/04	91	50 - 130	85	50 - 130	<0.050	ug/L	NC	30
6051392	Fluoranthene	2019/04/04	85	50 - 130	79	50 - 130	<0.050	ug/L	NC	30
6051392	Fluorene	2019/04/04	99	50 - 130	88	50 - 130	<0.050	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**UNITS**	**Value (%)**	**QC Limits**
6051392	Indeno(1,2,3-cd)pyrene	2019/04/04	103	50 - 130	96	50 - 130	<0.050	ug/L	NC	30
6051392	Naphthalene	2019/04/04	93	50 - 130	75	50 - 130	<0.050	ug/L	2.0	30
6051392	Phenanthrene	2019/04/04	99	50 - 130	91	50 - 130	<0.030	ug/L	NC	30
6051392	Pyrene	2019/04/04	87	50 - 130	81	50 - 130	<0.050	ug/L	NC	30
6051394	F2 (C10-C16 Hydrocarbons)	2019/04/04	109	50 - 130	103	60 - 130	<100	ug/L	0.62	30
6051394	F3 (C16-C34 Hydrocarbons)	2019/04/04	121	50 - 130	115	60 - 130	<200	ug/L	NC	30
6051394	F4 (C34-C50 Hydrocarbons)	2019/04/04	118	50 - 130	113	60 - 130	<200	ug/L	NC	30

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Anastassia Hamanov, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:

Company Name: #3103 Pinchin Ltd
Attention: Accounts Payable
Address: 2470 Milltower Crt
Mississauga ON L5N 7W5
Tel: (905) 363-0678 Fax: (905) 363-0681
Email: ap@pinchin.com

REPORT TO:

Company Name:
Attention: Mike Birch, Craig Kelly
Address:
Tel: Fax:
Email: Mbirch@pinchin.com ckelly@pinchin

PROJECT INFORMATION:

Quotation #: A70927
P.O. #:
Project: 230989.001
Project Name: Phase TWO ESA
Site #: 131 Eglinton Ave E.
Sampled By: William Martyniw

Laboratory Use Only:

Maxxam Job #:	Bottle Order #:
	710775
COC #:	**Project Manager:**
C#710775-01-01	Antonella Brasil

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
☐ Table 1 ☐ Res/Park ☐ Medium/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☑ For RSC
☐ Table ____

Other Regulations
☐ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558. ☐ Storm Sewer Bylaw
☐ MISA Municipality ________
☐ PWQO
☐ Other ________

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ______

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ________ Time Required: ________ ☐
Rush Confirmation Number: ________ *(call lab for #)*

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): [✓ Metals / Hg / Cr VI]	O Reg 153 PHCs, BTEX/F1-F4	O Reg 153 PAHs	O.Reg 153 OC Pesticides (Water)	pH	Nitrate (NO3) and Nitrite (NO2) in Water	Total Ammonia-N	Chloride by Automated Colourimetry	Chromium (VI) in Water	Free (WAD) Cyanide	Dissolved Metals by ICPMS	# of Bottles	Comments
1		MW19-02	19/3/28	10:00	Groundwater	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	11	
2		DUP19-02 GW	〃	10:00	〃	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	11	
3		F1 Trip Blank	19/3/28	N/A	N/A		✓										1	(Trip Blank analysis
4																		
5																		
6																		
7																		
8																		
9																		
10																		

29-Mar-19 12:11
Antonella Brasil
B981984
CA2 ENV-1100

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
	19/3/28	11:30	Brittany Assafine	19/3/28	12:00	
				2019/03/29	1211	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	7/4/6	Present	✓	
		Intact	✓	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

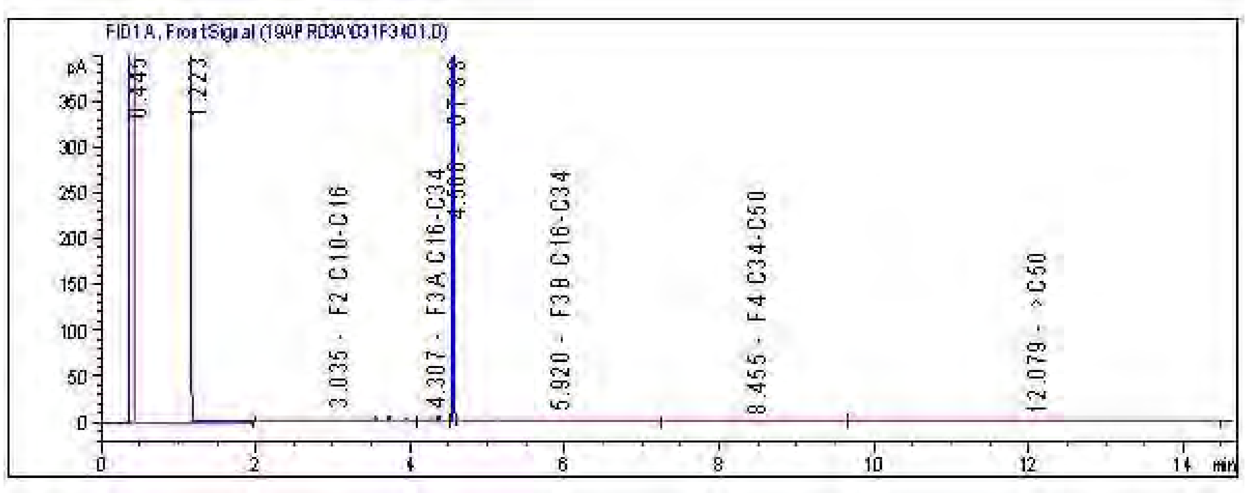
SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client

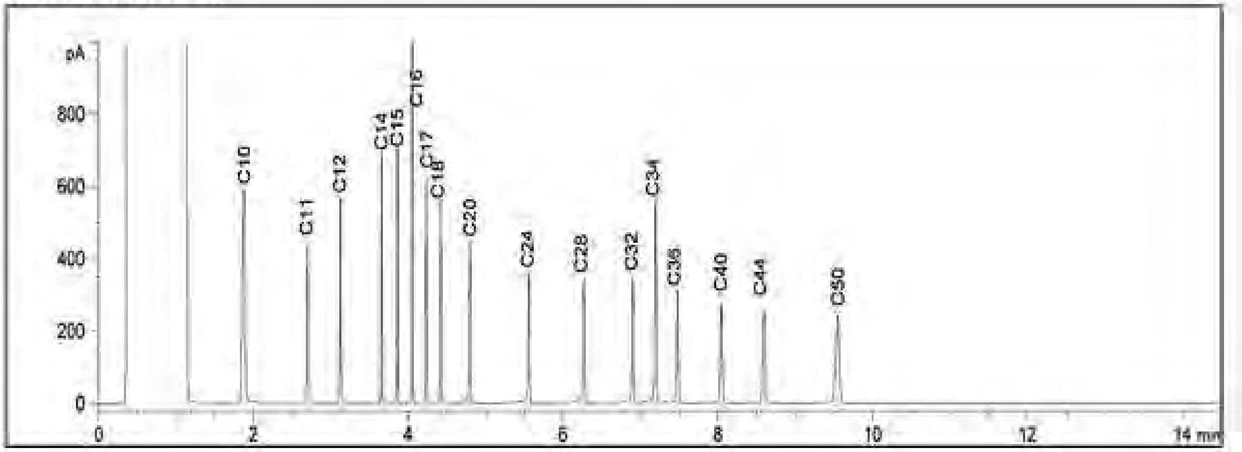
Maxxam Job #: B981984
Report Date: 2019/04/08
Maxxam Sample: JHY078

Pinchin Ltd
Client Project #: 230989.001
Project name: PHASE TWO ESA /131 EGLINTON AVE.
Client ID: MW19-02

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: **C6 - C12**
Varsol: **C8 - C12**
Kerosene: **C8 - C16**

Diesel: **C10 - C24**
Fuel Oils: **C6 - C32**
Motor Oils: **C16 - C50**

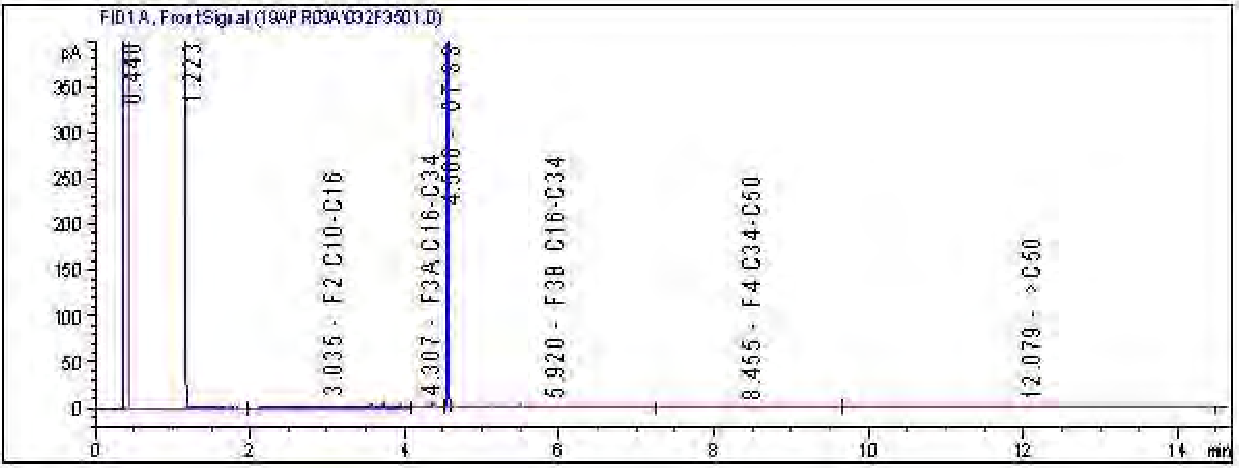
Jet Fuels: **C6 - C16**
Creosote: **C10 - C26**
Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

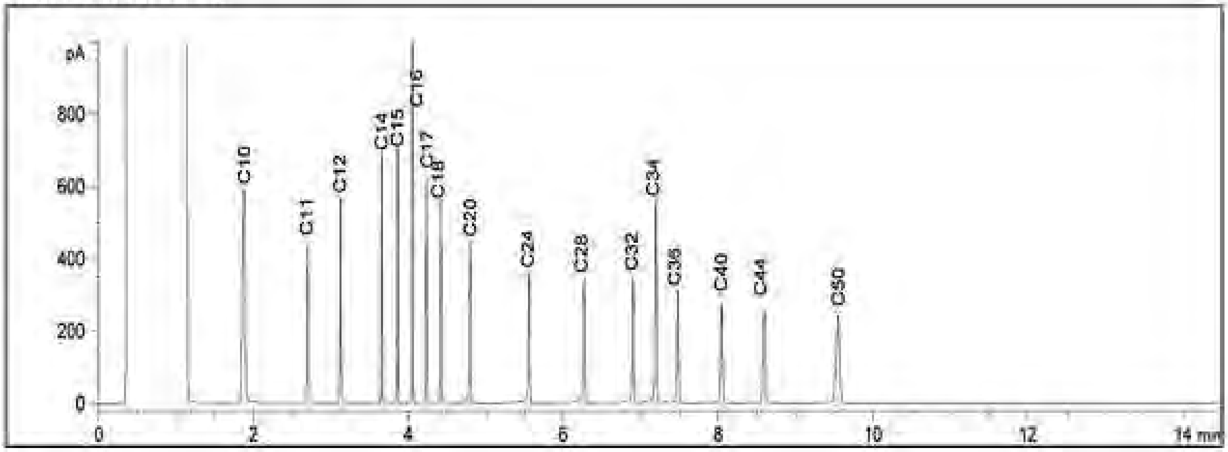
Maxxam Job #: B981984
Report Date: 2019/04/08
Maxxam Sample: JHY079

Pinchin Ltd
Client Project #: 230989.001
Project name: PHASE TWO ESA /131 EGLINTON AVE.
Client ID: DUP19-02 GW

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: **C6 - C12**
Varsol: **C8 - C12**
Kerosene: **C8 - C16**
Diesel: **C10 - C24**
Fuel Oils: **C6 - C32**
Motor Oils: **C16 - C50**
Jet Fuels: **C6 - C16**
Creosote: **C10 - C26**
Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Your Project #: 230989.001
Site Location: 131 EGLINTON AVE. EAST, MISS.
Your C.O.C. #: 711195-02-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/11
Report #: R5667028
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B986440
Received: 2019/04/03, 10:20

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	3	N/A	2019/04/08	CAM SOP-00301	EPA 8270D m
Chloride by Automated Colourimetry	3	N/A	2019/04/05	CAM SOP-00463	SM 4500-Cl E m
Chromium (VI) in Water	3	N/A	2019/04/05	CAM SOP-00436	EPA 7199 m
Free (WAD) Cyanide	3	N/A	2019/04/05	CAM SOP-00457	OMOE E3015 m
Petroleum Hydro. CCME F1 & BTEX in Water	5	N/A	2019/04/05	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	2019/04/05	2019/04/05	CAM SOP-00316	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	2019/04/05	2019/04/06	CAM SOP-00316	CCME PHC-CWS m
Mercury	3	2019/04/05	2019/04/08	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS	3	N/A	2019/04/08	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	4	N/A	2019/04/08	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	2	N/A	2019/04/08	CAM SOP-00440	SM 23 4500-NO3I/NO2B
OC Pesticides (Selected) & PCB (3)	3	2019/04/04	2019/04/05	CAM SOP-00307	EPA 8081A/8082B m
OC Pesticides Summed Parameters	3	N/A	2019/04/05	CAM SOP-00307	EPA 8081A/8082B m
PAH Compounds in Water by GC/MS (SIM)	3	2019/04/05	2019/04/06	CAM SOP-00318	EPA 8270D m
pH	4	2019/04/04	2019/04/05	CAM SOP-00413	SM 4500H+ B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam’s profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Your Project #: 230989.001
Site Location: 131 EGLINTON AVE. EAST, MISS.
Your C.O.C. #: 711195-02-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/11
Report #: R5667028
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B986440
Received: 2019/04/03, 10:20

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(3) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total Cover Pages : 2

RESULTS OF ANALYSES OF WATER

Maxxam ID		JIW636			JIW637	JIW638			JIW638	
Sampling Date		2019/04/02 14:10			2019/04/02 14:20	2019/04/02 14:24			2019/04/02 14:24	
COC Number		711195-02-01			711195-02-01	711195-02-01			711195-02-01	
	UNITS	**MW19-01**	**RDL**	**QC Batch**	**MW19-03**	**MW19-04**	**RDL**	**QC Batch**	**MW19-04 Lab-Dup**	**QC Batch**
Inorganics										
Total Ammonia-N	mg/L	0.062	0.050	6055528	0.084	0.073	0.050	6055528		
pH	pH	7.40		6054467	7.64	7.56		6054467	7.56	6054467
Nitrite (N)	mg/L	<0.010	0.010	6055603						
Nitrate (N)	mg/L	4.73	0.10	6055603						
Nitrate + Nitrite (N)	mg/L	4.73	0.10	6055603						

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		JIW640		
Sampling Date		2019/04/02		
COC Number		711195-02-01		
	UNITS	**DUP-02**	**RDL**	**QC Batch**
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	6055528
pH	pH	7.39		6054467
Nitrite (N)	mg/L	<0.010	0.010	6055603
Nitrate (N)	mg/L	4.63	0.10	6055603
Nitrate + Nitrite (N)	mg/L	4.63	0.10	6055603

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		JIW641		
Sampling Date				
COC Number		711195-02-01		
	UNITS	**TRIP BLANK**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons				
Benzene	ug/L	<0.20	0.20	6054016
Toluene	ug/L	<0.20	0.20	6054016
Ethylbenzene	ug/L	<0.20	0.20	6054016
o-Xylene	ug/L	<0.20	0.20	6054016
p+m-Xylene	ug/L	<0.40	0.40	6054016
Total Xylenes	ug/L	<0.40	0.40	6054016
F1 (C6-C10)	ug/L	<25	25	6054016
F1 (C6-C10) - BTEX	ug/L	<25	25	6054016
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	99		6054016
4-Bromofluorobenzene	%	97		6054016
D10-Ethylbenzene	%	98		6054016
D4-1,2-Dichloroethane	%	101		6054016

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 METALS & INORGANICS PKG (WTR)

Maxxam ID		JIW636			JIW636			JIW638		
Sampling Date		2019/04/02 14:10			2019/04/02 14:10			2019/04/02 14:24		
COC Number		711195-02-01			711195-02-01			711195-02-01		
	UNITS	**MW19-01**	**RDL**	**QC Batch**	**MW19-01 Lab-Dup**	**RDL**	**QC Batch**	**MW19-04**	**RDL**	**QC Batch**
Inorganics										
WAD Cyanide (Free)	ug/L	<1	1	6055375				<1	1	6055375
Dissolved Chloride (Cl-)	mg/L	10	1.0	6054149				310	4.0	6054007
Metals										
Chromium (VI)	ug/L	<0.50	0.50	6053955				<0.50	0.50	6053955
Mercury (Hg)	ug/L	<0.1	0.1	6055550				<0.1	0.1	6055550
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	6056190	<0.50	0.50	6056190	<0.50	0.50	6056190
Dissolved Arsenic (As)	ug/L	<1.0	1.0	6056190	<1.0	1.0	6056190	1.0	1.0	6056190
Dissolved Barium (Ba)	ug/L	65	2.0	6056190	66	2.0	6056190	55	2.0	6056190
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	6056190	<0.50	0.50	6056190	<0.50	0.50	6056190
Dissolved Boron (B)	ug/L	130	10	6056190	130	10	6056190	83	10	6056190
Dissolved Cadmium (Cd)	ug/L	<0.10	0.10	6056190	<0.10	0.10	6056190	<0.10	0.10	6056190
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	6056190	<5.0	5.0	6056190	<5.0	5.0	6056190
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	6056190	<0.50	0.50	6056190	<0.50	0.50	6056190
Dissolved Copper (Cu)	ug/L	<1.0	1.0	6056190	<1.0	1.0	6056190	6.5	1.0	6056190
Dissolved Lead (Pb)	ug/L	<0.50	0.50	6056190	<0.50	0.50	6056190	<0.50	0.50	6056190
Dissolved Molybdenum (Mo)	ug/L	<0.50	0.50	6056190	<0.50	0.50	6056190	1.7	0.50	6056190
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	6056190	<1.0	1.0	6056190	<1.0	1.0	6056190
Dissolved Selenium (Se)	ug/L	<2.0	2.0	6056190	<2.0	2.0	6056190	<2.0	2.0	6056190
Dissolved Silver (Ag)	ug/L	<0.10	0.10	6056190	<0.10	0.10	6056190	<0.10	0.10	6056190
Dissolved Sodium (Na)	ug/L	7700	100	6056190	7700	100	6056190	120000	100	6056190
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	6056190	<0.050	0.050	6056190	<0.050	0.050	6056190
Dissolved Uranium (U)	ug/L	1.4	0.10	6056190	1.4	0.10	6056190	7.9	0.10	6056190
Dissolved Vanadium (V)	ug/L	<0.50	0.50	6056190	<0.50	0.50	6056190	1.5	0.50	6056190
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	6056190	<5.0	5.0	6056190	<5.0	5.0	6056190

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 METALS & INORGANICS PKG (WTR)

Maxxam ID		JIW640		
Sampling Date		2019/04/02		
COC Number		711195-02-01		
	UNITS	**DUP-02**	**RDL**	**QC Batch**
Inorganics				
WAD Cyanide (Free)	ug/L	<1	1	6055375
Dissolved Chloride (Cl-)	mg/L	10	1.0	6054007
Metals				
Chromium (VI)	ug/L	<0.50	0.50	6053955
Mercury (Hg)	ug/L	<0.1	0.1	6055550
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	6056190
Dissolved Arsenic (As)	ug/L	<1.0	1.0	6056190
Dissolved Barium (Ba)	ug/L	67	2.0	6056190
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	6056190
Dissolved Boron (B)	ug/L	140	10	6056190
Dissolved Cadmium (Cd)	ug/L	<0.10	0.10	6056190
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	6056190
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	6056190
Dissolved Copper (Cu)	ug/L	<1.0	1.0	6056190
Dissolved Lead (Pb)	ug/L	<0.50	0.50	6056190
Dissolved Molybdenum (Mo)	ug/L	<0.50	0.50	6056190
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	6056190
Dissolved Selenium (Se)	ug/L	<2.0	2.0	6056190
Dissolved Silver (Ag)	ug/L	<0.10	0.10	6056190
Dissolved Sodium (Na)	ug/L	8100	100	6056190
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	6056190
Dissolved Uranium (U)	ug/L	1.3	0.10	6056190
Dissolved Vanadium (V)	ug/L	<0.50	0.50	6056190
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	6056190

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 OC PESTICIDES (WATER)

Maxxam ID		JIW636	JIW638	JIW640			JIW640		
Sampling Date		2019/04/02 14:10	2019/04/02 14:24	2019/04/02			2019/04/02		
COC Number		711195-02-01	711195-02-01	711195-02-01			711195-02-01		
	UNITS	**MW19-01**	**MW19-04**	**DUP-02**	**RDL**	**QC Batch**	**DUP-02 Lab-Dup**	**RDL**	**QC Batch**
Calculated Parameters									
Chlordane (Total)	ug/L	<0.005	<0.005	<0.005	0.005	6051719			
o,p-DDD + p,p-DDD	ug/L	<0.005	<0.005	<0.005	0.005	6051719			
o,p-DDE + p,p-DDE	ug/L	<0.005	<0.005	<0.005	0.005	6051719			
o,p-DDT + p,p-DDT	ug/L	<0.005	<0.005	<0.005	0.005	6051719			
Total Endosulfan	ug/L	<0.005	<0.005	<0.005	0.005	6051719			
Total PCB	ug/L	<0.05	<0.05	<0.05	0.05	6051719			
Pesticides & Herbicides									
Aldrin	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
Dieldrin	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
a-Chlordane	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
g-Chlordane	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
o,p-DDD	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
p,p-DDD	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
o,p-DDE	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
p,p-DDE	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
o,p-DDT	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
p,p-DDT	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
Lindane	ug/L	<0.003	<0.003	<0.003	0.003	6053064	<0.003	0.003	6053064
Endosulfan I (alpha)	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
Endosulfan II (beta)	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
Endrin	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
Heptachlor	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
Heptachlor epoxide	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
Hexachlorobenzene	ug/L	<0.005	<0.005	<0.005	0.005	6053064	<0.005	0.005	6053064
Hexachlorobutadiene	ug/L	<0.009	<0.009	<0.009	0.009	6053064	<0.009	0.009	6053064
Hexachloroethane	ug/L	<0.01	<0.01	<0.01	0.01	6053064	<0.01	0.01	6053064
Methoxychlor	ug/L	<0.01	<0.01	<0.01	0.01	6053064	<0.01	0.01	6053064
Aroclor 1242	ug/L	<0.05	<0.05	<0.05	0.05	6053064	<0.05	0.05	6053064
Aroclor 1248	ug/L	<0.05	<0.05	<0.05	0.05	6053064	<0.05	0.05	6053064
Aroclor 1254	ug/L	<0.05	<0.05	<0.05	0.05	6053064	<0.05	0.05	6053064

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 OC PESTICIDES (WATER)

Maxxam ID		JIW636	JIW638	JIW640			JIW640		
Sampling Date		2019/04/02 14:10	2019/04/02 14:24	2019/04/02			2019/04/02		
COC Number		711195-02-01	711195-02-01	711195-02-01			711195-02-01		
	UNITS	**MW19-01**	**MW19-04**	**DUP-02**	**RDL**	**QC Batch**	**DUP-02 Lab-Dup**	**RDL**	**QC Batch**
Aroclor 1260	ug/L	<0.05	<0.05	<0.05	0.05	6053064	<0.05	0.05	6053064
Surrogate Recovery (%)									
2,4,5,6-Tetrachloro-m-xylene	%	70	69	64		6053064	73		6053064
Decachlorobiphenyl	%	112	113	105		6053064	124		6053064

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 PAHS (WATER)

Maxxam ID		JIW637	JIW638	JIW640		
Sampling Date		2019/04/02 14:20	2019/04/02 14:24	2019/04/02		
COC Number		711195-02-01	711195-02-01	711195-02-01		
	UNITS	**MW19-03**	**MW19-04**	**DUP-02**	**RDL**	**QC Batch**
Calculated Parameters						
Methylnaphthalene, 2-(1-)	ug/L	<0.071	<0.071	<0.071	0.071	6051177
Polyaromatic Hydrocarbons						
Acenaphthene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Anthracene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Benzo(a)anthracene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	0.010	6055729
Benzo(b/j)fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Chrysene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Fluorene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Naphthalene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Phenanthrene	ug/L	<0.030	<0.030	<0.030	0.030	6055729
Pyrene	ug/L	<0.050	<0.050	<0.050	0.050	6055729
Surrogate Recovery (%)						
D10-Anthracene	%	116	113	112		6055729
D14-Terphenyl (FS)	%	105	106	99		6055729
D8-Acenaphthylene	%	103	105	101		6055729

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Maxxam ID		JIW637	JIW638	JIW639	JIW640		
Sampling Date		2019/04/02 14:20	2019/04/02 14:24	2019/04/02 14:50	2019/04/02		
COC Number		711195-02-01	711195-02-01	711195-02-01	711195-02-01		
	UNITS	**MW19-03**	**MW19-04**	**MW19-05**	**DUP-02**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons							
Benzene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6054016
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6054016
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6054016
o-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	6054016
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6054016
Total Xylenes	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	6054016
F1 (C6-C10)	ug/L	<25	<25	<25	<25	25	6054016
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	<25	25	6054016
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	<100	100	6055714
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	200	6055714
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	200	6055714
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes		6055714
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	100	101	97	101		6054016
4-Bromofluorobenzene	%	98	99	101	98		6054016
D10-Ethylbenzene	%	98	100	94	100		6054016
D4-1,2-Dichloroethane	%	100	101	104	101		6054016
o-Terphenyl	%	109	112	109	110		6055714

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

TEST SUMMARY

Maxxam ID: JIW636
Sample ID: MW19-01
Matrix: Water

Collected: 2019/04/02
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	6054149	N/A	2019/04/05	Deonarine Ramnarine
Chromium (VI) in Water	IC	6053955	N/A	2019/04/05	Lang Le
Free (WAD) Cyanide	SKAL/CN	6055375	N/A	2019/04/05	Xuanhong Qiu
Mercury	CV/AA	6055550	2019/04/05	2019/04/08	Medhat Nasr
Dissolved Metals by ICPMS	ICP/MS	6056190	N/A	2019/04/08	Thao Nguyen
Total Ammonia-N	LACH/NH4	6055528	N/A	2019/04/08	Chandra Nandlal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6055603	N/A	2019/04/08	Chandra Nandlal
OC Pesticides (Selected) & PCB	GC/ECD	6053064	2019/04/04	2019/04/05	Li Peng
OC Pesticides Summed Parameters	CALC	6051719	N/A	2019/04/05	Automated Statchk
pH	AT	6054467	2019/04/04	2019/04/05	Surinder Rai

Maxxam ID: JIW636 Dup
Sample ID: MW19-01
Matrix: Water

Collected: 2019/04/02
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	6056190	N/A	2019/04/08	Thao Nguyen

Maxxam ID: JIW637
Sample ID: MW19-03
Matrix: Water

Collected: 2019/04/02
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6051177	N/A	2019/04/08	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6054016	N/A	2019/04/05	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6055714	2019/04/05	2019/04/05	Prabhjot Gulati
Total Ammonia-N	LACH/NH4	6055528	N/A	2019/04/08	Chandra Nandlal
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6055729	2019/04/05	2019/04/06	Mitesh Raj
pH	AT	6054467	2019/04/04	2019/04/05	Surinder Rai

Maxxam ID: JIW638
Sample ID: MW19-04
Matrix: Water

Collected: 2019/04/02
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6051177	N/A	2019/04/08	Automated Statchk
Chloride by Automated Colourimetry	KONE	6054007	N/A	2019/04/05	Deonarine Ramnarine
Chromium (VI) in Water	IC	6053955	N/A	2019/04/05	Lang Le
Free (WAD) Cyanide	SKAL/CN	6055375	N/A	2019/04/05	Xuanhong Qiu
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6054016	N/A	2019/04/05	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6055714	2019/04/05	2019/04/05	Prabhjot Gulati
Mercury	CV/AA	6055550	2019/04/05	2019/04/08	Medhat Nasr
Dissolved Metals by ICPMS	ICP/MS	6056190	N/A	2019/04/08	Thao Nguyen
Total Ammonia-N	LACH/NH4	6055528	N/A	2019/04/08	Chandra Nandlal
OC Pesticides (Selected) & PCB	GC/ECD	6053064	2019/04/04	2019/04/05	Li Peng

TEST SUMMARY

Maxxam ID: JIW638
Sample ID: MW19-04
Matrix: Water

Collected: 2019/04/02
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
OC Pesticides Summed Parameters	CALC	6051719	N/A	2019/04/05	Automated Statchk
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6055729	2019/04/05	2019/04/06	Mitesh Raj
pH	AT	6054467	2019/04/04	2019/04/05	Surinder Rai

Maxxam ID: JIW638 Dup
Sample ID: MW19-04
Matrix: Water

Collected: 2019/04/02
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH	AT	6054467	2019/04/04	2019/04/05	Surinder Rai

Maxxam ID: JIW639
Sample ID: MW19-05
Matrix: Water

Collected: 2019/04/02
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6054016	N/A	2019/04/05	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6055714	2019/04/05	2019/04/06	Prabhjot Gulati

Maxxam ID: JIW640
Sample ID: DUP-02
Matrix: Water

Collected: 2019/04/02
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6051177	N/A	2019/04/08	Automated Statchk
Chloride by Automated Colourimetry	KONE	6054007	N/A	2019/04/05	Deonarine Ramnarine
Chromium (VI) in Water	IC	6053955	N/A	2019/04/05	Lang Le
Free (WAD) Cyanide	SKAL/CN	6055375	N/A	2019/04/05	Xuanhong Qiu
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6054016	N/A	2019/04/05	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6055714	2019/04/05	2019/04/06	Prabhjot Gulati
Mercury	CV/AA	6055550	2019/04/05	2019/04/08	Medhat Nasr
Dissolved Metals by ICPMS	ICP/MS	6056190	N/A	2019/04/08	Thao Nguyen
Total Ammonia-N	LACH/NH4	6055528	N/A	2019/04/08	Chandra Nandlal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6055603	N/A	2019/04/08	Chandra Nandlal
OC Pesticides (Selected) & PCB	GC/ECD	6053064	2019/04/04	2019/04/05	Li Peng
OC Pesticides Summed Parameters	CALC	6051719	N/A	2019/04/05	Automated Statchk
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6055729	2019/04/05	2019/04/06	Mitesh Raj
pH	AT	6054467	2019/04/04	2019/04/05	Surinder Rai

Maxxam ID: JIW640 Dup
Sample ID: DUP-02
Matrix: Water

Collected: 2019/04/02
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
OC Pesticides (Selected) & PCB	GC/ECD	6053064	2019/04/04	2019/04/05	Li Peng

TEST SUMMARY

Maxxam ID: JIW641
Sample ID: TRIP BLANK
Matrix: Water

Collected:
Shipped:
Received: 2019/04/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6054016	N/A	2019/04/05	Joe Paino

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.7°C

Cooler custody seal was present and intact.

The following sediment comments apply to sample MW19-04, DUP-02
All of the 250mL plastic General bottles contained visible sediment.
All of the 120mL plastic bottles for NH4LOW analysis contained visible sediment.
All containers for Cyanide analysis contained trace sediment.
All 500mL amber glass bottle for PCB analysis contained visible sediment

The following sediment comments apply to sample MW19-04, MW19-05, DUP-02
All 100mL amber glass bottles for F2-F4 analysis contained visible sediment, which was included in the extraction.
All 40mL vials for F1BTEX analysis contained visible sediment in all the samples.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6053064	2,4,5,6-Tetrachloro-m-xylene	2019/04/05	56	50 - 130	68	50 - 130	63	%		
6053064	Decachlorobiphenyl	2019/04/05	103	50 - 130	125	50 - 130	113	%		
6054016	1,4-Difluorobenzene	2019/04/04	100	70 - 130	99	70 - 130	100	%		
6054016	4-Bromofluorobenzene	2019/04/04	102	70 - 130	101	70 - 130	99	%		
6054016	D10-Ethylbenzene	2019/04/04	94	70 - 130	94	70 - 130	96	%		
6054016	D4-1,2-Dichloroethane	2019/04/04	101	70 - 130	100	70 - 130	101	%		
6055714	o-Terphenyl	2019/04/05	116	60 - 130	116	60 - 130	111	%		
6055729	D10-Anthracene	2019/04/05	115	50 - 130	112	50 - 130	114	%		
6055729	D14-Terphenyl (FS)	2019/04/05	106	50 - 130	106	50 - 130	106	%		
6055729	D8-Acenaphthylene	2019/04/05	109	50 - 130	99	50 - 130	101	%		
6053064	a-Chlordane	2019/04/05	82	50 - 130	104	50 - 130	<0.005	ug/L	NC	30
6053064	Aldrin	2019/04/05	70	50 - 130	80	50 - 130	<0.005	ug/L	NC	30
6053064	Aroclor 1242	2019/04/05					<0.05	ug/L	NC	30
6053064	Aroclor 1248	2019/04/05					<0.05	ug/L	NC	30
6053064	Aroclor 1254	2019/04/05					<0.05	ug/L	NC	30
6053064	Aroclor 1260	2019/04/05					<0.05	ug/L	NC	30
6053064	Dieldrin	2019/04/05	91	50 - 130	118	50 - 130	<0.005	ug/L	NC	30
6053064	Endosulfan I (alpha)	2019/04/05	72	50 - 130	97	50 - 130	<0.005	ug/L	NC	30
6053064	Endosulfan II (beta)	2019/04/05	79	50 - 130	108	50 - 130	<0.005	ug/L	NC	30
6053064	Endrin	2019/04/05	71	50 - 130	91	50 - 130	<0.005	ug/L	NC	30
6053064	g-Chlordane	2019/04/05	79	50 - 130	98	50 - 130	<0.005	ug/L	NC	30
6053064	Heptachlor epoxide	2019/04/05	75	50 - 130	98	50 - 130	<0.005	ug/L	NC	30
6053064	Heptachlor	2019/04/05	72	50 - 130	84	50 - 130	<0.005	ug/L	NC	30
6053064	Hexachlorobenzene	2019/04/05	77	50 - 130	92	50 - 130	<0.005	ug/L	NC	30
6053064	Hexachlorobutadiene	2019/04/05	70	50 - 130	80	50 - 130	<0.009	ug/L	NC	30
6053064	Hexachloroethane	2019/04/05	59	50 - 130	71	50 - 130	<0.01	ug/L	NC	30
6053064	Lindane	2019/04/05	69	50 - 130	90	50 - 130	<0.003	ug/L	NC	30
6053064	Methoxychlor	2019/04/05	79	50 - 130	106	50 - 130	<0.01	ug/L	NC	30
6053064	o,p-DDD	2019/04/05	87	50 - 130	112	50 - 130	<0.005	ug/L	NC	30
6053064	o,p-DDE	2019/04/05	84	50 - 130	103	50 - 130	<0.005	ug/L	NC	30
6053064	o,p-DDT	2019/04/05	74	50 - 130	94	50 - 130	<0.005	ug/L	NC	30
6053064	p,p-DDD	2019/04/05	84	50 - 130	109	50 - 130	<0.005	ug/L	NC	30

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6053064	p,p-DDE	2019/04/05	82	50 - 130	101	50 - 130	<0.005	ug/L	NC	30
6053064	p,p-DDT	2019/04/05	76	50 - 130	94	50 - 130	<0.005	ug/L	NC	30
6053955	Chromium (VI)	2019/04/05	100	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
6054007	Dissolved Chloride (Cl-)	2019/04/05	NC	80 - 120	104	80 - 120	<1.0	mg/L	0.36	20
6054016	Benzene	2019/04/04	91	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
6054016	Ethylbenzene	2019/04/04	96	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
6054016	F1 (C6-C10) - BTEX	2019/04/04					<25	ug/L	NC	30
6054016	F1 (C6-C10)	2019/04/04	98	70 - 130	104	70 - 130	<25	ug/L	NC	30
6054016	o-Xylene	2019/04/04	94	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
6054016	p+m-Xylene	2019/04/04	99	70 - 130	98	70 - 130	<0.40	ug/L	NC	30
6054016	Toluene	2019/04/04	96	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
6054016	Total Xylenes	2019/04/04					<0.40	ug/L	NC	30
6054149	Dissolved Chloride (Cl-)	2019/04/05	NC	80 - 120	105	80 - 120	<1.0	mg/L	0.73	20
6054467	pH	2019/04/05			102	98 - 103			0.0040	N/A
6055375	WAD Cyanide (Free)	2019/04/05	93	80 - 120	104	80 - 120	<1	ug/L	NC	20
6055528	Total Ammonia-N	2019/04/08	99	75 - 125	100	80 - 120	<0.050	mg/L	0.58	20
6055550	Mercury (Hg)	2019/04/08	98	75 - 125	94	80 - 120	<0.1	ug/L	NC	20
6055603	Nitrate (N)	2019/04/08	84	80 - 120	101	80 - 120	<0.10	mg/L	0.76	20
6055603	Nitrite (N)	2019/04/08	99	80 - 120	104	80 - 120	<0.010	mg/L	14	20
6055714	F2 (C10-C16 Hydrocarbons)	2019/04/06	NC	50 - 130	123	60 - 130	<100	ug/L	NC	30
6055714	F3 (C16-C34 Hydrocarbons)	2019/04/06	NC	50 - 130	120	60 - 130	<200	ug/L	NC	30
6055714	F4 (C34-C50 Hydrocarbons)	2019/04/06	117	50 - 130	118	60 - 130	<200	ug/L	NC	30
6055729	1-Methylnaphthalene	2019/04/05	117	50 - 130	95	50 - 130	<0.050	ug/L	NC	30
6055729	2-Methylnaphthalene	2019/04/05	112	50 - 130	85	50 - 130	<0.050	ug/L	NC	30
6055729	Acenaphthene	2019/04/05	88	50 - 130	86	50 - 130	<0.050	ug/L	NC	30
6055729	Acenaphthylene	2019/04/05	87	50 - 130	86	50 - 130	<0.050	ug/L	NC	30
6055729	Anthracene	2019/04/05	78	50 - 130	75	50 - 130	<0.050	ug/L	NC	30
6055729	Benzo(a)anthracene	2019/04/05	94	50 - 130	90	50 - 130	<0.050	ug/L	NC	30
6055729	Benzo(a)pyrene	2019/04/05	88	50 - 130	85	50 - 130	<0.010	ug/L	NC	30
6055729	Benzo(b/j)fluoranthene	2019/04/05	85	50 - 130	83	50 - 130	<0.050	ug/L	NC	30
6055729	Benzo(g,h,i)perylene	2019/04/05	81	50 - 130	82	50 - 130	<0.050	ug/L	NC	30
6055729	Benzo(k)fluoranthene	2019/04/05	79	50 - 130	79	50 - 130	<0.050	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6055729	Chrysene	2019/04/05	93	50 - 130	89	50 - 130	<0.050	ug/L	NC	30
6055729	Dibenz(a,h)anthracene	2019/04/05	76	50 - 130	76	50 - 130	<0.050	ug/L	NC	30
6055729	Fluoranthene	2019/04/05	93	50 - 130	89	50 - 130	<0.050	ug/L	NC	30
6055729	Fluorene	2019/04/05	88	50 - 130	86	50 - 130	<0.050	ug/L	NC	30
6055729	Indeno(1,2,3-cd)pyrene	2019/04/05	87	50 - 130	86	50 - 130	<0.050	ug/L	NC	30
6055729	Naphthalene	2019/04/05	110	50 - 130	81	50 - 130	<0.050	ug/L	NC	30
6055729	Phenanthrene	2019/04/05	91	50 - 130	88	50 - 130	<0.030	ug/L	NC	30
6055729	Pyrene	2019/04/05	92	50 - 130	89	50 - 130	<0.050	ug/L	NC	30
6056190	Dissolved Antimony (Sb)	2019/04/08	103	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
6056190	Dissolved Arsenic (As)	2019/04/08	102	80 - 120	100	80 - 120	<1.0	ug/L	NC	20
6056190	Dissolved Barium (Ba)	2019/04/08	96	80 - 120	96	80 - 120	<2.0	ug/L	1.1	20
6056190	Dissolved Beryllium (Be)	2019/04/08	100	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
6056190	Dissolved Boron (B)	2019/04/08	99	80 - 120	97	80 - 120	<10	ug/L	0.14	20
6056190	Dissolved Cadmium (Cd)	2019/04/08	101	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
6056190	Dissolved Chromium (Cr)	2019/04/08	99	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
6056190	Dissolved Cobalt (Co)	2019/04/08	97	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
6056190	Dissolved Copper (Cu)	2019/04/08	99	80 - 120	98	80 - 120	<1.0	ug/L	NC	20
6056190	Dissolved Lead (Pb)	2019/04/08	96	80 - 120	95	80 - 120	<0.50	ug/L	NC	20
6056190	Dissolved Molybdenum (Mo)	2019/04/08	105	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
6056190	Dissolved Nickel (Ni)	2019/04/08	95	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
6056190	Dissolved Selenium (Se)	2019/04/08	101	80 - 120	99	80 - 120	<2.0	ug/L	NC	20
6056190	Dissolved Silver (Ag)	2019/04/08	99	80 - 120	98	80 - 120	<0.10	ug/L	NC	20
6056190	Dissolved Sodium (Na)	2019/04/08	97	80 - 120	95	80 - 120	<100	ug/L	0.44	20
6056190	Dissolved Thallium (Tl)	2019/04/08	97	80 - 120	95	80 - 120	<0.050	ug/L	NC	20
6056190	Dissolved Uranium (U)	2019/04/08	100	80 - 120	97	80 - 120	<0.10	ug/L	1.9	20
6056190	Dissolved Vanadium (V)	2019/04/08	102	80 - 120	100	80 - 120	<0.50	ug/L	NC	20

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**UNITS**	**Value (%)**	**QC Limits**
6056190	Dissolved Zinc (Zn)	2019/04/08	97	80 - 120	98	80 - 120	<5.0	ug/L	NC	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Anastassia Hamanov, Scientific Specialist

Eva

Eva Pranjic

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel (905) 817-5700 Toll-free 800-563-6266 Fax (905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:

Company Name: #3103 Pinchin Ltd
Attention: Accounts Payable
Address: 2470 Milltower Crt
Mississauga ON L5N 7W5
Tel: (905) 363-0678 Fax: (905) 363-0681
Email: ap@pinchin.com

REPORT TO:

Company Name:
Attention: Michael Birch, Will Martyniw
Address:
Tel: Fax:
Email: mbirch@pinchin.com, wmartyniw@pinchin.com

PROJECT INFORMATION:

Quotation #: A70927
P.O. #:
Project: 230989.001
Project Name:
Site #: 131 Eglinton Ave. East, Miss.
Sampled By: A.V.

Laboratory Use Only:

Maxxam Job #:
Bottle Order #: 711195
COC #: C#711195-02-01
Project Manager: Antonella Brasil

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)

☐ Table 1 ☒ Res/Park ☒ Medium/Fine
☒ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☒ For RSC
☐ Table ___

Other Regulations

☐ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558 ☐ Storm Sewer Bylaw
☐ MISA Municipality ___
☐ PWQO
☐ Other ___

Special Instructions

RSC Analysis

Include Criteria on Certificate of Analysis (Y/N)? ___

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (If applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle) [✓ Metals] / Hg / [✓ Cr VI]	O Reg 153 OC Pesticides (Water)	pH	Total Ammonia-N	O Reg 153 PAHs	O Reg 153 VOCs by HS & F1-F4	Nitrate (NO3) and Nitrite (NO2) in Water	O Reg 153 Metals & Inorganics Pkg (Metals, Hydrides, CN, Cr+6, Na, B, Hg)	O.Reg 153 (water) BTEX	O. Reg 153 (water) PHC: F1 - F4		# of Bottles	Comments
1		MW19 - 01	April 2 2019	2:10	GW	Y	X	X	X	-		X	X				8	Mercury cap broken, sealed, talked to lab, please proceed
2		MW19 - 03		2:20	GW	N/A		X	X	X				X	X		7	
3		MW19 - 04		2:40	GW	Y	X	X	X	X			X	X	X		13	
4		MW19 - 05		2:50	GW	Y								X	X		5	trace sediment
5		DUP - 02	↓	/	GW	Y	X	X	X	X		X	X	X	X		13	
6																		
7																		
8																		
9																		
10																		

03-Apr-19 10:20
Antonella Brasil
B986440
KVG ENV-1421

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Abhishek Vyas /	19/04/03	10:00		2019/04/03	1020	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	4/4/3	Present	✓	
		Intact	✓	

White: Maxxa Yellow: Client

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

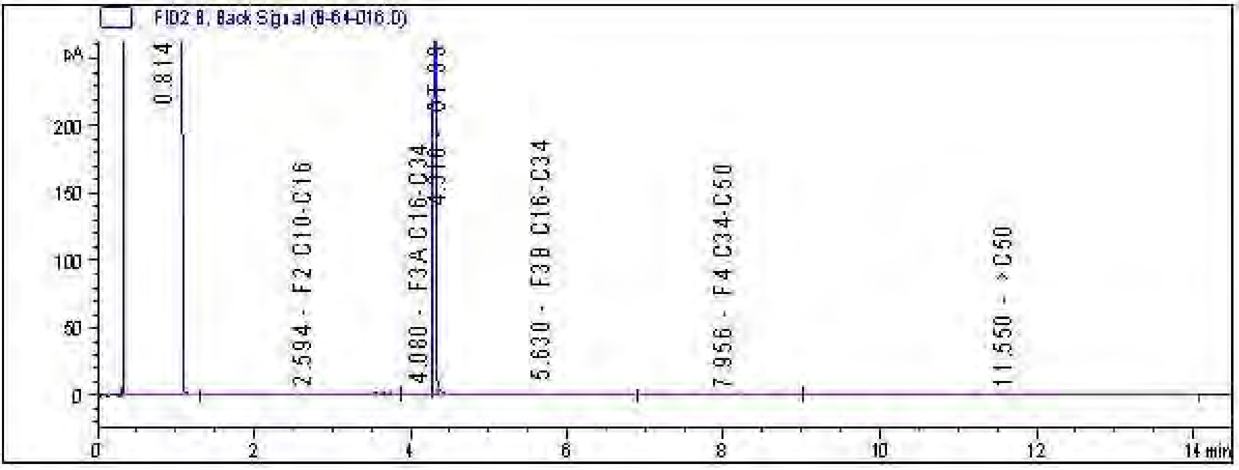
SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

Maxxam Analytics International Corporation o/a Maxxam Analytics

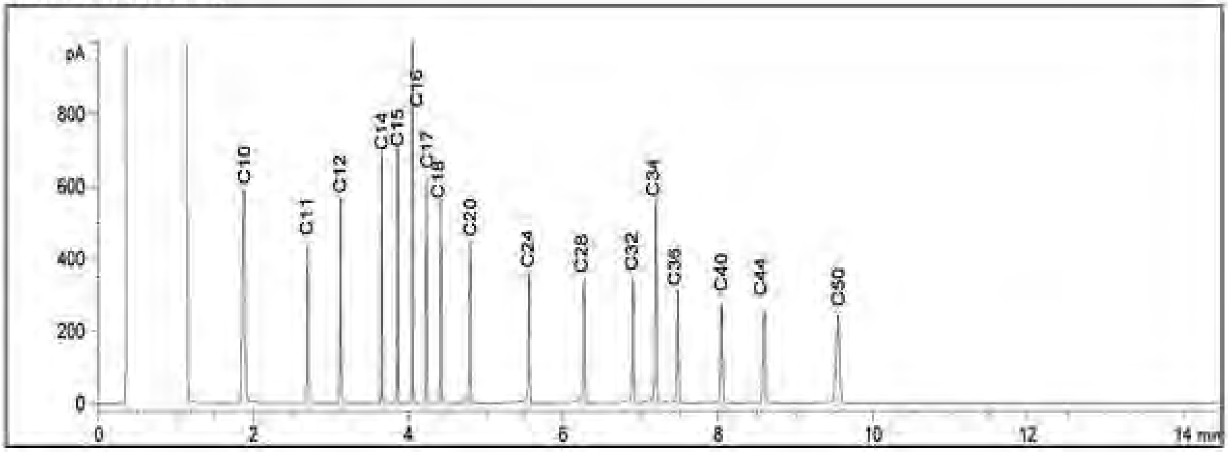
Maxxam Job #: B986440
Report Date: 2019/04/11
Maxxam Sample: JIW637

Pinchin Ltd
Client Project #: 230989.001
Project name: 131 EGLINTON AVE. EAST, MISS.
Client ID: MW19-03

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: **C6 - C12**
Varsol: **C8 - C12**
Kerosene: **C8 - C16**

Diesel: **C10 - C24**
Fuel Oils: **C6 - C32**
Motor Oils: **C16 - C50**

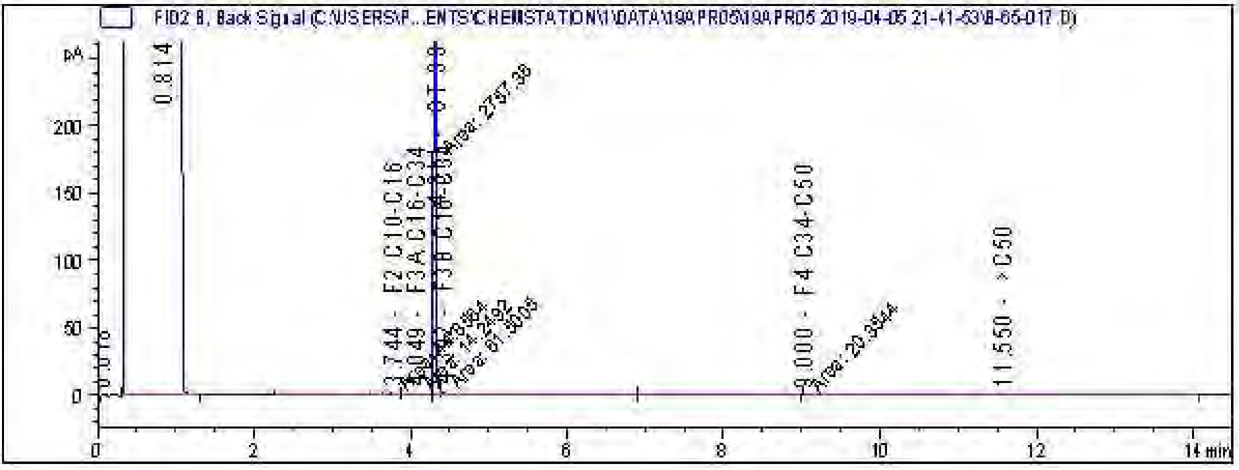
Jet Fuels: **C6 - C16**
Creosote: **C10 - C26**
Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

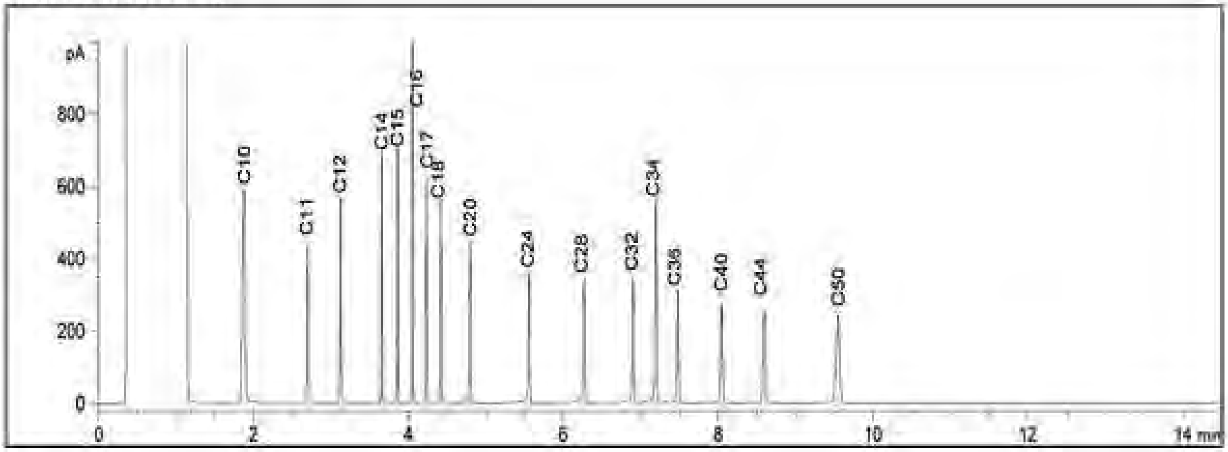
Maxxam Job #: B986440
Report Date: 2019/04/11
Maxxam Sample: JIW638

Pinchin Ltd
Client Project #: 230989.001
Project name: 131 EGLINTON AVE. EAST, MISS.
Client ID: MW19-04

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



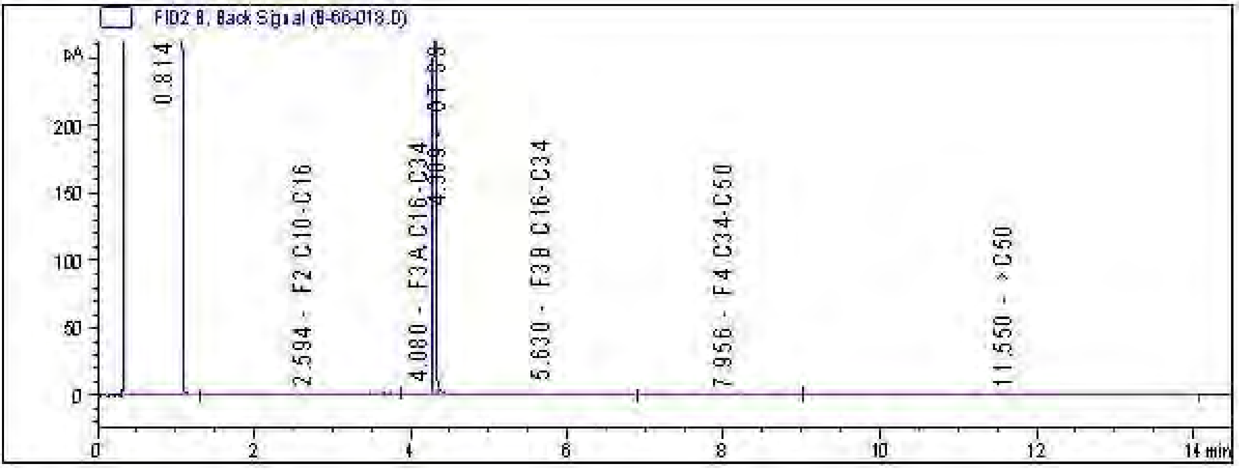
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	**C6 - C12**	Diesel:	**C10 - C24**	Jet Fuels:	**C6 - C16**
Varsol:	**C8 - C12**	Fuel Oils:	**C6 - C32**	Creosote:	**C10 - C26**
Kerosene:	**C8 - C16**	Motor Oils:	**C16 - C50**	Asphalt:	**C18 - C50+**

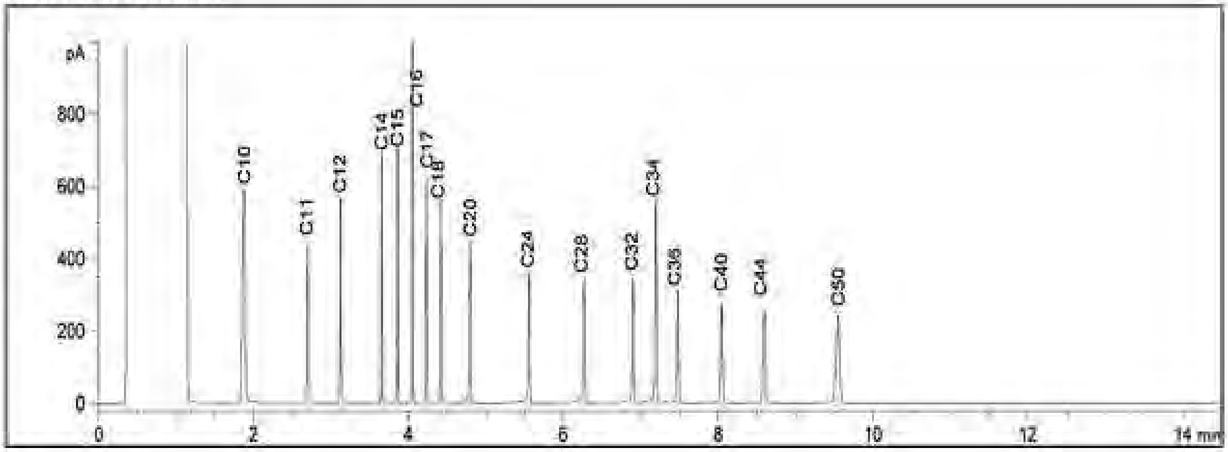
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Client ID: MW19-05

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: **C6 - C12**
Varsol: **C8 - C12**
Kerosene: **C8 - C16**

Diesel: **C10 - C24**
Fuel Oils: **C6 - C32**
Motor Oils: **C16 - C50**

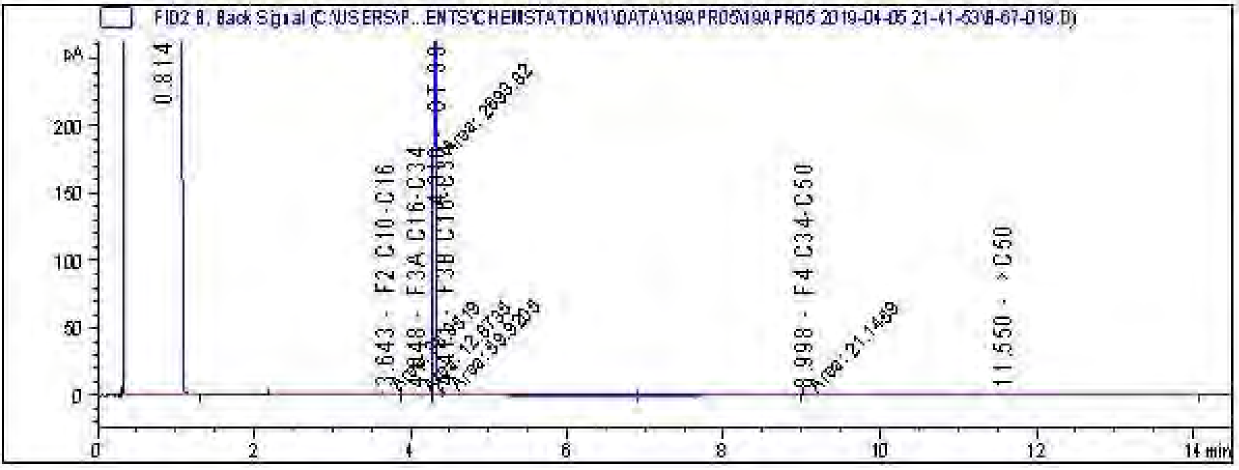
Jet Fuels: **C6 - C16**
Creosote: **C10 - C26**
Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

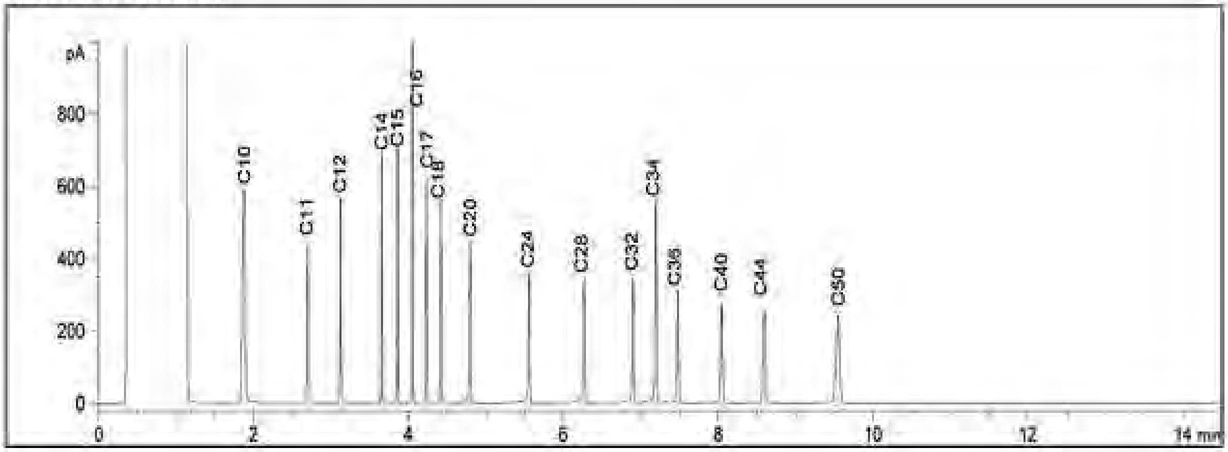
Maxxam Job #: B986440
Report Date: 2019/04/11
Maxxam Sample: JIW640

Pinchin Ltd
Client Project #: 230989.001
Project name: 131 EGLINTON AVE. EAST, MISS.
Client ID: DUP-02

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	**C6 - C12**	Diesel:	**C10 - C24**	Jet Fuels:	**C6 - C16**
Varsol:	**C8 - C12**	Fuel Oils:	**C6 - C32**	Creosote:	**C10 - C26**
Kerosene:	**C8 - C16**	Motor Oils:	**C16 - C50**	Asphalt:	**C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Your Project #: 230989.001
Site Location: 131 EGLINTON AVE. EAST, MISSISSAUGA
Your C.O.C. #: 711893-01-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/11
Report #: R5667112
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B989881
Received: 2019/04/05, 15:05

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	1	N/A	2019/04/10	CAM SOP-00301	EPA 8270D m
Chloride by Automated Colourimetry	1	N/A	2019/04/08	CAM SOP-00463	SM 4500-Cl E m
Chromium (VI) in Water	1	N/A	2019/04/08	CAM SOP-00436	EPA 7199 m
Free (WAD) Cyanide	1	N/A	2019/04/08	CAM SOP-00457	OMOE E3015 m
Mercury	1	2019/04/09	2019/04/09	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS	1	N/A	2019/04/09	CAM SOP-00447	EPA 6020B m
OC Pesticides (Selected) & PCB (1)	1	2019/04/08	2019/04/10	CAM SOP-00307	EPA 8081A/8082B m
OC Pesticides Summed Parameters	1	N/A	2019/04/08	CAM SOP-00307	EPA 8081A/8082B m
PAH Compounds in Water by GC/MS (SIM)	1	2019/04/09	2019/04/10	CAM SOP-00318	EPA 8270D m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane

Your Project #: 230989.001
Site Location: 131 EGLINTON AVE. EAST, MISSISSAUGA
Your C.O.C. #: 711893-01-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/11
Report #: R5667112
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B989881
Received: 2019/04/05, 15:05

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

O.REG 153 METALS & INORGANICS PKG (WTR)

Maxxam ID		JJO651			JJO651		
Sampling Date		2019/04/05 11:30			2019/04/05 11:30		
COC Number		711893-01-01			711893-01-01		
	UNITS	**MW19-05**	**RDL**	**QC Batch**	**MW19-05 Lab-Dup**	**RDL**	**QC Batch**
Inorganics							
WAD Cyanide (Free)	ug/L	<1	1	6058475			
Dissolved Chloride (Cl-)	mg/L	450	5.0	6057622			
Metals							
Chromium (VI)	ug/L	<0.50	0.50	6055697			
Mercury (Hg)	ug/L	<0.1	0.1	6060635			
Dissolved Antimony (Sb)	ug/L	1.7	0.50	6057731	1.6	0.50	6057731
Dissolved Arsenic (As)	ug/L	1.4	1.0	6057731	1.6	1.0	6057731
Dissolved Barium (Ba)	ug/L	110	2.0	6057731	110	2.0	6057731
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	6057731	<0.50	0.50	6057731
Dissolved Boron (B)	ug/L	68	10	6057731	66	10	6057731
Dissolved Cadmium (Cd)	ug/L	<0.10	0.10	6057731	<0.10	0.10	6057731
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	6057731	<5.0	5.0	6057731
Dissolved Cobalt (Co)	ug/L	1.2	0.50	6057731	1.1	0.50	6057731
Dissolved Copper (Cu)	ug/L	2.5	1.0	6057731	2.3	1.0	6057731
Dissolved Lead (Pb)	ug/L	<0.50	0.50	6057731	<0.50	0.50	6057731
Dissolved Molybdenum (Mo)	ug/L	3.7	0.50	6057731	3.7	0.50	6057731
Dissolved Nickel (Ni)	ug/L	2.0	1.0	6057731	1.8	1.0	6057731
Dissolved Selenium (Se)	ug/L	<2.0	2.0	6057731	<2.0	2.0	6057731
Dissolved Silver (Ag)	ug/L	<0.10	0.10	6057731	<0.10	0.10	6057731
Dissolved Sodium (Na)	ug/L	170000	100	6057731	170000	100	6057731
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	6057731	<0.050	0.050	6057731
Dissolved Uranium (U)	ug/L	6.4	0.10	6057731	6.5	0.10	6057731
Dissolved Vanadium (V)	ug/L	0.63	0.50	6057731	<0.50	0.50	6057731
Dissolved Zinc (Zn)	ug/L	6.0	5.0	6057731	6.2	5.0	6057731

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 OC PESTICIDES (WATER)

Maxxam ID		JJO651		
Sampling Date		2019/04/05 11:30		
COC Number		711893-01-01		
	UNITS	**MW19-05**	**RDL**	**QC Batch**
Calculated Parameters				
Chlordane (Total)	ug/L	<0.005	0.005	6055738
o,p-DDD + p,p-DDD	ug/L	<0.005	0.005	6055738
o,p-DDE + p,p-DDE	ug/L	<0.005	0.005	6055738
o,p-DDT + p,p-DDT	ug/L	<0.005	0.005	6055738
Total Endosulfan	ug/L	<0.005	0.005	6055738
Total PCB	ug/L	<0.05	0.05	6055738
Pesticides & Herbicides				
Aldrin	ug/L	<0.005	0.005	6059443
Dieldrin	ug/L	<0.005	0.005	6059443
a-Chlordane	ug/L	<0.005	0.005	6059443
g-Chlordane	ug/L	<0.005	0.005	6059443
o,p-DDD	ug/L	<0.005	0.005	6059443
p,p-DDD	ug/L	<0.005	0.005	6059443
o,p-DDE	ug/L	<0.005	0.005	6059443
p,p-DDE	ug/L	<0.005	0.005	6059443
o,p-DDT	ug/L	<0.005	0.005	6059443
p,p-DDT	ug/L	<0.005	0.005	6059443
Lindane	ug/L	<0.003	0.003	6059443
Endosulfan I (alpha)	ug/L	<0.005	0.005	6059443
Endosulfan II (beta)	ug/L	<0.005	0.005	6059443
Endrin	ug/L	<0.005	0.005	6059443
Heptachlor	ug/L	<0.005	0.005	6059443
Heptachlor epoxide	ug/L	<0.005	0.005	6059443
Hexachlorobenzene	ug/L	<0.005	0.005	6059443
Hexachlorobutadiene	ug/L	<0.009	0.009	6059443
Hexachloroethane	ug/L	<0.01	0.01	6059443
Methoxychlor	ug/L	<0.01	0.01	6059443
Aroclor 1242	ug/L	<0.05	0.05	6059443
Aroclor 1248	ug/L	<0.05	0.05	6059443
Aroclor 1254	ug/L	<0.05	0.05	6059443
Aroclor 1260	ug/L	<0.05	0.05	6059443
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				

O.REG 153 OC PESTICIDES (WATER)

Maxxam ID		JJO651		
Sampling Date		2019/04/05 11:30		
COC Number		711893-01-01		
	UNITS	**MW19-05**	**RDL**	**QC Batch**
Surrogate Recovery (%)				
2,4,5,6-Tetrachloro-m-xylene	%	53		6059443
Decachlorobiphenyl	%	109		6059443

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 PAHS (WATER)

Maxxam ID		JJO651		
Sampling Date		2019/04/05 11:30		
COC Number		711893-01-01		
	UNITS	**MW19-05**	**RDL**	**QC Batch**
Calculated Parameters				
Methylnaphthalene, 2-(1-)	ug/L	<0.071	0.071	6056320
Polyaromatic Hydrocarbons				
Acenaphthene	ug/L	<0.050	0.050	6061367
Acenaphthylene	ug/L	<0.050	0.050	6061367
Anthracene	ug/L	<0.050	0.050	6061367
Benzo(a)anthracene	ug/L	<0.050	0.050	6061367
Benzo(a)pyrene	ug/L	<0.010	0.010	6061367
Benzo(b/j)fluoranthene	ug/L	<0.050	0.050	6061367
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	6061367
Benzo(k)fluoranthene	ug/L	<0.050	0.050	6061367
Chrysene	ug/L	<0.050	0.050	6061367
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	6061367
Fluoranthene	ug/L	<0.050	0.050	6061367
Fluorene	ug/L	<0.050	0.050	6061367
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	6061367
1-Methylnaphthalene	ug/L	<0.050	0.050	6061367
2-Methylnaphthalene	ug/L	<0.050	0.050	6061367
Naphthalene	ug/L	<0.050	0.050	6061367
Phenanthrene	ug/L	<0.030	0.030	6061367
Pyrene	ug/L	<0.050	0.050	6061367
Surrogate Recovery (%)				
D10-Anthracene	%	118		6061367
D14-Terphenyl (FS)	%	105		6061367
D8-Acenaphthylene	%	108		6061367

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

TEST SUMMARY

Maxxam ID: JJO651
Sample ID: MW19-05
Matrix: Water

Collected: 2019/04/05
Shipped:
Received: 2019/04/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6056320	N/A	2019/04/10	Automated Statchk
Chloride by Automated Colourimetry	KONE	6057622	N/A	2019/04/08	Deonarine Ramnarine
Chromium (VI) in Water	IC	6055697	N/A	2019/04/08	Lang Le
Free (WAD) Cyanide	SKAL/CN	6058475	N/A	2019/04/08	Xuanhong Qiu
Mercury	CV/AA	6060635	2019/04/09	2019/04/09	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	6057731	N/A	2019/04/09	Thao Nguyen
OC Pesticides (Selected) & PCB	GC/ECD	6059443	2019/04/08	2019/04/10	Li Peng
OC Pesticides Summed Parameters	CALC	6055738	N/A	2019/04/08	Automated Statchk
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6061367	2019/04/09	2019/04/10	Mitesh Raj

Maxxam ID: JJO651 Dup
Sample ID: MW19-05
Matrix: Water

Collected: 2019/04/05
Shipped:
Received: 2019/04/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	6057731	N/A	2019/04/09	Thao Nguyen

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.7°C

Cooler custody seal was present and intact.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6059443	2,4,5,6-Tetrachloro-m-xylene	2019/04/10	51	50 - 130	56	50 - 130	79	%		
6059443	Decachlorobiphenyl	2019/04/10	123	50 - 130	119	50 - 130	99	%		
6061367	D10-Anthracene	2019/04/10	121	50 - 130	123	50 - 130	123	%		
6061367	D14-Terphenyl (FS)	2019/04/10	114	50 - 130	119	50 - 130	123	%		
6061367	D8-Acenaphthylene	2019/04/10	109	50 - 130	111	50 - 130	110	%		
6055697	Chromium (VI)	2019/04/08	99	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
6057622	Dissolved Chloride (Cl-)	2019/04/08	NC	80 - 120	102	80 - 120	<1.0	mg/L	1.2	20
6057731	Dissolved Antimony (Sb)	2019/04/09	108	80 - 120	101	80 - 120	<0.50	ug/L	6.4	20
6057731	Dissolved Arsenic (As)	2019/04/09	101	80 - 120	97	80 - 120	<1.0	ug/L	11	20
6057731	Dissolved Barium (Ba)	2019/04/09	99	80 - 120	97	80 - 120	<2.0	ug/L	1.0	20
6057731	Dissolved Beryllium (Be)	2019/04/09	101	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
6057731	Dissolved Boron (B)	2019/04/09	98	80 - 120	99	80 - 120	<10	ug/L	2.2	20
6057731	Dissolved Cadmium (Cd)	2019/04/09	102	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
6057731	Dissolved Chromium (Cr)	2019/04/09	100	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
6057731	Dissolved Cobalt (Co)	2019/04/09	98	80 - 120	97	80 - 120	<0.50	ug/L	4.4	20
6057731	Dissolved Copper (Cu)	2019/04/09	100	80 - 120	98	80 - 120	<1.0	ug/L	7.8	20
6057731	Dissolved Lead (Pb)	2019/04/09	92	80 - 120	94	80 - 120	<0.50	ug/L	NC	20
6057731	Dissolved Molybdenum (Mo)	2019/04/09	110	80 - 120	103	80 - 120	<0.50	ug/L	0.48	20
6057731	Dissolved Nickel (Ni)	2019/04/09	96	80 - 120	98	80 - 120	<1.0	ug/L	6.6	20
6057731	Dissolved Selenium (Se)	2019/04/09	104	80 - 120	102	80 - 120	<2.0	ug/L	NC	20
6057731	Dissolved Silver (Ag)	2019/04/09	101	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
6057731	Dissolved Sodium (Na)	2019/04/09	NC	80 - 120	94	80 - 120	<100	ug/L	0.83	20
6057731	Dissolved Thallium (Tl)	2019/04/09	92	80 - 120	94	80 - 120	<0.050	ug/L	NC	20
6057731	Dissolved Uranium (U)	2019/04/09	99	80 - 120	98	80 - 120	<0.10	ug/L	1.5	20
6057731	Dissolved Vanadium (V)	2019/04/09	102	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
6057731	Dissolved Zinc (Zn)	2019/04/09	96	80 - 120	98	80 - 120	<5.0	ug/L	3.4	20
6058475	WAD Cyanide (Free)	2019/04/08	103	80 - 120	104	80 - 120	<1	ug/L	0	20
6059443	a-Chlordane	2019/04/10	88	50 - 130	86	50 - 130	<0.005	ug/L	9.0	30
6059443	Aldrin	2019/04/10	70	50 - 130	63	50 - 130	<0.005	ug/L	9.4	30
6059443	Aroclor 1242	2019/04/10					<0.05	ug/L		
6059443	Aroclor 1248	2019/04/10					<0.05	ug/L		
6059443	Aroclor 1254	2019/04/10					<0.05	ug/L		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6059443	Aroclor 1260	2019/04/10					<0.05	ug/L		
6059443	Dieldrin	2019/04/10	101	50 - 130	103	50 - 130	<0.005	ug/L	8.9	30
6059443	Endosulfan I (alpha)	2019/04/10	80	50 - 130	90	50 - 130	<0.005	ug/L	0.81	30
6059443	Endosulfan II (beta)	2019/04/10	93	50 - 130	96	50 - 130	<0.005	ug/L	7.5	30
6059443	Endrin	2019/04/10	86	50 - 130	85	50 - 130	<0.005	ug/L	8.8	30
6059443	g-Chlordane	2019/04/10	83	50 - 130	86	50 - 130	<0.005	ug/L	9.3	30
6059443	Heptachlor epoxide	2019/04/10	78	50 - 130	78	50 - 130	<0.005	ug/L	8.5	30
6059443	Heptachlor	2019/04/10	86	50 - 130	63	50 - 130	<0.005	ug/L	22	30
6059443	Hexachlorobenzene	2019/04/10	81	50 - 130	81	50 - 130	<0.005	ug/L	9.5	30
6059443	Hexachlorobutadiene	2019/04/10	84	50 - 130	66	50 - 130	<0.009	ug/L	10	30
6059443	Hexachloroethane	2019/04/10	77	50 - 130	62	50 - 130	<0.01	ug/L	4.9	30
6059443	Lindane	2019/04/10	86	50 - 130	84	50 - 130	<0.003	ug/L	9.6	30
6059443	Methoxychlor	2019/04/10	128	50 - 130	99	50 - 130	<0.01	ug/L	12	30
6059443	o,p-DDD	2019/04/10	103	50 - 130	102	50 - 130	<0.005	ug/L	7.8	30
6059443	o,p-DDE	2019/04/10	90	50 - 130	88	50 - 130	<0.005	ug/L	9.1	30
6059443	o,p-DDT	2019/04/10	95	50 - 130	82	50 - 130	<0.005	ug/L	13	30
6059443	p,p-DDD	2019/04/10	93	50 - 130	91	50 - 130	<0.005	ug/L	6.6	30
6059443	p,p-DDE	2019/04/10	96	50 - 130	99	50 - 130	<0.005	ug/L	0.060	30
6059443	p,p-DDT	2019/04/10	109	50 - 130	84	50 - 130	<0.005	ug/L	13	30
6060635	Mercury (Hg)	2019/04/09	99	75 - 125	99	80 - 120	<0.1	ug/L	NC	20
6061367	1-Methylnaphthalene	2019/04/10	101	50 - 130	105	50 - 130	<0.050	ug/L	NC	30
6061367	2-Methylnaphthalene	2019/04/10	92	50 - 130	96	50 - 130	<0.050	ug/L	NC	30
6061367	Acenaphthene	2019/04/10	88	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
6061367	Acenaphthylene	2019/04/10	89	50 - 130	92	50 - 130	<0.050	ug/L	NC	30
6061367	Anthracene	2019/04/10	88	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
6061367	Benzo(a)anthracene	2019/04/10	88	50 - 130	93	50 - 130	<0.050	ug/L	NC	30
6061367	Benzo(a)pyrene	2019/04/10	81	50 - 130	86	50 - 130	<0.010	ug/L	NC	30
6061367	Benzo(b/j)fluoranthene	2019/04/10	77	50 - 130	82	50 - 130	<0.050	ug/L	NC	30
6061367	Benzo(g,h,i)perylene	2019/04/10	70	50 - 130	77	50 - 130	<0.050	ug/L	NC	30
6061367	Benzo(k)fluoranthene	2019/04/10	73	50 - 130	78	50 - 130	<0.050	ug/L	NC	30
6061367	Chrysene	2019/04/10	84	50 - 130	88	50 - 130	<0.050	ug/L	NC	30
6061367	Dibenz(a,h)anthracene	2019/04/10	71	50 - 130	78	50 - 130	<0.050	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6061367	Fluoranthene	2019/04/10	91	50 - 130	94	50 - 130	<0.050	ug/L	NC	30
6061367	Fluorene	2019/04/10	87	50 - 130	89	50 - 130	<0.050	ug/L	NC	30
6061367	Indeno(1,2,3-cd)pyrene	2019/04/10	77	50 - 130	85	50 - 130	<0.050	ug/L	NC	30
6061367	Naphthalene	2019/04/10	87	50 - 130	90	50 - 130	<0.050	ug/L	NC	30
6061367	Phenanthrene	2019/04/10	88	50 - 130	90	50 - 130	<0.030	ug/L	NC	30
6061367	Pyrene	2019/04/10	90	50 - 130	93	50 - 130	<0.050	ug/L	NC	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Service Specialist

Eva

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Eva Pranjic
CHEMIST

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:

Company Name: #3103 Pinchin Ltd
Attention: Accounts Payable
Address: 2470 Milltower Crt
Mississauga ON L5N 7W5
Tel: (905) 363-0678 Fax: (905) 363-0681
Email: ap@pinchin.com

REPORT TO:

Company Name:
Attention: Michael Birch, Jenny Park
Address:
Tel: Fax:
Email: mbirch@pinchin.com, JPark@pinchin.com

PROJECT INFORMATION:

Quotation #: A70927
P.O. #:
Project: 230989.001
Project Name:
Site #: 131 Eglinton Ave East, Miss.
Sampled By: JP.

Laboratory Use Only:

Maxxam Job #:
Bottle Order #: 711893
COC #: C#711893-01-01
Project Manager: Antonella Brasil

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)

☐ Table 1 ☑ Res/Park ☑ Medium/Fine
☑ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☑ For RSC
☐ Table ___

Other Regulations

☐ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558 ☐ Storm Sewer Bylaw
☐ MISA Municipality ______
☐ PWQO
☐ Other ______

Special Instructions

RSC Analysis

Include Criteria on Certificate of Analysis (Y/N)? N

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ______ Time Required: ______ ☐
Rush Confirmation Number: ______ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): [✓ Metals / Hg / Cr VI]	O.Reg 153 PAHs	O.Reg 153 OC Pesticides (Water)	O.Reg 153 Metals & Inorganics Pkg (Wtr)								# of Bottles	Comments
1		MW19-05	April 5, 19	11:30Am	GW	Yes	✓	✓	✓								9	trace Sediment
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

05-Apr-19 15:05
Antonella Brasil
B989881
DSG ENV-748

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Jenny Park	19/04/05	3:00pm	K VAN GRUNSVEN.	2019/04/05	15:05	0

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	4/3/4	Present	✓	
		Intact	✓	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client

Your Project #: 230989.001
Site Location: PHASE TWO ESA / 131 EGLINGTON AVE.E
Your C.O.C. #: 709705-01-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/16
Report #: R5673351
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B980920
Received: 2019/03/28, 14:02

Sample Matrix: Soil
Samples Received: 20

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	7	N/A	2019/04/03	CAM SOP-00301	EPA 8270D m
Methylnaphthalene Sum	1	N/A	2019/04/09	CAM SOP-00301	EPA 8270D m
Hot Water Extractable Boron	2	2019/04/08	2019/04/08	CAM SOP-00408	R153 Ana. Prot. 2011
Free (WAD) Cyanide	6	2019/03/29	2019/04/01	CAM SOP-00457	OMOE E3015 m
Free (WAD) Cyanide	2	2019/04/05	2019/04/08	CAM SOP-00457	OMOE E3015 m
Conductivity	7	2019/04/03	2019/04/03	CAM SOP-00414	OMOE E3530 v1 m
Conductivity	1	2019/04/08	2019/04/08	CAM SOP-00414	OMOE E3530 v1 m
Hexavalent Chromium in Soil by IC (1)	8	2019/04/02	2019/04/03	CAM SOP-00436	EPA 3060/7199 m
Hexavalent Chromium in Soil by IC (1)	2	2019/04/09	2019/04/09	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	7	N/A	2019/04/01	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	1	N/A	2019/04/05	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	7	2019/04/02	2019/04/03	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	1	2019/04/08	2019/04/09	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS	8	2019/04/01	2019/04/01	CAM SOP-00447	EPA 6020B m
Strong Acid Leachable Metals by ICPMS	2	2019/04/08	2019/04/08	CAM SOP-00447	EPA 6020B m
Moisture	18	N/A	2019/03/29	CAM SOP-00445	Carter 2nd ed 51.2 m
OC Pesticides (Selected) & PCB (4)	7	2019/03/29	2019/03/30	CAM SOP-00307	SW846 8081, 8082
OC Pesticides (Selected) & PCB (4)	2	2019/04/08	2019/04/08	CAM SOP-00307	SW846 8081, 8082
OC Pesticides Summed Parameters	7	N/A	2019/03/30	CAM SOP-00307	EPA 8081/8082 m
OC Pesticides Summed Parameters	2	N/A	2019/04/08	CAM SOP-00307	EPA 8081/8082 m
PAH Compounds in Soil by GC/MS (SIM)	7	2019/04/02	2019/04/03	CAM SOP-00318	EPA 8270D m
PAH Compounds in Soil by GC/MS (SIM)	1	2019/04/08	2019/04/09	CAM SOP-00318	EPA 8270D m
pH CaCl2 EXTRACT	10	2019/04/02	2019/04/02	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	7	N/A	2019/04/03	CAM SOP-00102	EPA 6010C
Sodium Adsorption Ratio (SAR)	1	N/A	2019/04/09	CAM SOP-00102	EPA 6010C

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless

Your Project #: 230989.001
Site Location: PHASE TWO ESA / 131 EGLINGTON AVE.E
Your C.O.C. #: 709705-01-01

Attention: Michael Birch
Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/16
Report #: R5673351
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B980920
Received: 2019/03/28, 14:02

indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Soils are reported on a dry weight basis unless otherwise specified.
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
(4) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total Cover Pages : 2

O.REG 153 METALS & INORGANICS PKG (SOIL)

Maxxam ID		JHS261			JHS264		
Sampling Date		2019/03/27 09:00			2019/03/27 13:45		
COC Number		709705-01-01			709705-01-01		
	UNITS	**MW19-05 S1**	**RDL**	**QC Batch**	**BH19-07 S1**	**RDL**	**QC Batch**
Calculated Parameters							
Sodium Adsorption Ratio	N/A	2.2		6055328			
Inorganics							
Conductivity	mS/cm	0.51	0.002	6058242			
WAD Cyanide (Free)	ug/g	0.02	0.01	6056479	0.01	0.01	6056479
Chromium (VI)	ug/g	<0.2	0.2	6060088	<0.2	0.2	6060088
Metals							
Hot Water Ext. Boron (B)	ug/g	1.3	0.050	6058338	0.82	0.050	6058338
Acid Extractable Antimony (Sb)	ug/g	0.28	0.20	6058365	<0.20	0.20	6058365
Acid Extractable Arsenic (As)	ug/g	8.5	1.0	6058365	11	1.0	6058365
Acid Extractable Barium (Ba)	ug/g	150	0.50	6058365	410	0.50	6058365
Acid Extractable Beryllium (Be)	ug/g	0.92	0.20	6058365	1.2	0.20	6058365
Acid Extractable Boron (B)	ug/g	8.4	5.0	6058365	8.3	5.0	6058365
Acid Extractable Cadmium (Cd)	ug/g	0.26	0.10	6058365	0.59	0.10	6058365
Acid Extractable Chromium (Cr)	ug/g	23	1.0	6058365	33	1.0	6058365
Acid Extractable Cobalt (Co)	ug/g	11	0.10	6058365	18	0.10	6058365
Acid Extractable Copper (Cu)	ug/g	32	0.50	6058365	45	0.50	6058365
Acid Extractable Lead (Pb)	ug/g	18	1.0	6058365	11	1.0	6058365
Acid Extractable Molybdenum (Mo)	ug/g	0.77	0.50	6058365	0.74	0.50	6058365
Acid Extractable Nickel (Ni)	ug/g	20	0.50	6058365	27	0.50	6058365
Acid Extractable Selenium (Se)	ug/g	0.58	0.50	6058365	1.0	0.50	6058365
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	6058365	<0.20	0.20	6058365
Acid Extractable Thallium (Tl)	ug/g	0.15	0.050	6058365	0.21	0.050	6058365
Acid Extractable Uranium (U)	ug/g	1.1	0.050	6058365	1.0	0.050	6058365
Acid Extractable Vanadium (V)	ug/g	36	5.0	6058365	46	5.0	6058365
Acid Extractable Zinc (Zn)	ug/g	71	5.0	6058365	72	5.0	6058365
Acid Extractable Mercury (Hg)	ug/g	0.056	0.050	6058365	0.071	0.050	6058365

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		JHS252	JHS254			JHS255	JHS258		
Sampling Date		2019/03/27 10:30	2019/03/27 11:30			2019/03/27 12:40	2019/03/27 13:10		
COC Number		709705-01-01	709705-01-01			709705-01-01	709705-01-01		
	UNITS	**MW19-01 S1**	**MW19-02 S1**	**RDL**	**QC Batch**	**MW19-03 S1**	**MW19-04 S1**	**RDL**	**QC Batch**
Inorganics									
Moisture	%					28	20	1.0	6043752
Calculated Parameters									
Chlordane (Total)	ug/g	<0.0020	<0.0020	0.0020	6042953	<0.020	<0.020	0.020	6042953
o,p-DDD + p,p-DDD	ug/g	<0.0020	<0.0020	0.0020	6042953	<0.020	<0.020	0.020	6042953
o,p-DDE + p,p-DDE	ug/g	0.0071	<0.0020	0.0020	6042953	<0.020	<0.020	0.020	6042953
o,p-DDT + p,p-DDT	ug/g	0.0028	<0.0020	0.0020	6042953	<0.020	<0.020	0.020	6042953
Total Endosulfan	ug/g	<0.0020	<0.0020	0.0020	6042953	<0.020	<0.020	0.020	6042953
Total PCB	ug/g	<0.015	<0.015	0.015	6042953	<0.15	<0.15	0.15	6042953
Pesticides & Herbicides									
Aldrin	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
a-Chlordane	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
g-Chlordane	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
o,p-DDD	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
p,p-DDD	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
o,p-DDE	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
p,p-DDE	ug/g	0.0071	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
o,p-DDT	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
p,p-DDT	ug/g	0.0028	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Dieldrin	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Lindane	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Endosulfan I (alpha)	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Endosulfan II (beta)	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Endrin	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Heptachlor	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Heptachlor epoxide	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Hexachlorobenzene	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Hexachlorobutadiene	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Hexachloroethane	ug/g	<0.0020	<0.0020	0.0020	6044017	<0.020	<0.020	0.020	6044017
Methoxychlor	ug/g	<0.0050	<0.0050	0.0050	6044017	<0.050	<0.050	0.050	6044017
Aroclor 1242	ug/g	<0.015	<0.015	0.015	6044017	<0.15	<0.15	0.15	6044017
Aroclor 1248	ug/g	<0.015	<0.015	0.015	6044017	<0.15	<0.15	0.15	6044017

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		JHS252	JHS254			JHS255	JHS258		
Sampling Date		2019/03/27 10:30	2019/03/27 11:30			2019/03/27 12:40	2019/03/27 13:10		
COC Number		709705-01-01	709705-01-01			709705-01-01	709705-01-01		
	UNITS	**MW19-01 S1**	**MW19-02 S1**	**RDL**	**QC Batch**	**MW19-03 S1**	**MW19-04 S1**	**RDL**	**QC Batch**
Aroclor 1254	ug/g	<0.015	<0.015	0.015	6044017	<0.15	<0.15	0.15	6044017
Aroclor 1260	ug/g	<0.015	<0.015	0.015	6044017	<0.15	<0.15	0.15	6044017
Surrogate Recovery (%)									
2,4,5,6-Tetrachloro-m-xylene	%	93	83		6044017	106	97		6044017
Decachlorobiphenyl	%	116	97		6044017	108	92		6044017

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		JHS261			JHS262			JHS264		
Sampling Date		2019/03/27 09:00			2019/03/27 13:30			2019/03/27 13:45		
COC Number		709705-01-01			709705-01-01			709705-01-01		
	UNITS	**MW19-05 S1**	**RDL**	**QC Batch**	**BH19-06 S1**	**RDL**	**QC Batch**	**BH19-07 S1**	**RDL**	**QC Batch**
Inorganics										
Moisture	%				17	1.0	6043752			
Calculated Parameters										
Chlordane (Total)	ug/g	<0.0020	0.0020	6055768	<0.0020	0.0020	6042953	<0.0020	0.0020	6055768
o,p-DDD + p,p-DDD	ug/g	0.0022	0.0020	6055768	<0.0020	0.0020	6042953	0.0038	0.0020	6055768
o,p-DDE + p,p-DDE	ug/g	0.053	0.010	6055768	<0.0020	0.0020	6042953	0.034	0.010	6055768
o,p-DDT + p,p-DDT	ug/g	<0.0020	0.0020	6055768	<0.0020	0.0020	6042953	0.0079	0.0020	6055768
Total Endosulfan	ug/g	<0.0020	0.0020	6055768	<0.0020	0.0020	6042953	<0.0020	0.0020	6055768
Total PCB	ug/g	<0.020	0.020	6055768	<0.015	0.015	6042953	<0.015	0.015	6055768
Pesticides & Herbicides										
Aldrin	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
a-Chlordane	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
g-Chlordane	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
o,p-DDD	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
p,p-DDD	ug/g	0.0022	0.0020	6058218	<0.0020	0.0020	6044017	0.0038	0.0020	6058218
o,p-DDE	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
p,p-DDE	ug/g	0.053	0.010	6058218	<0.0020	0.0020	6044017	0.034	0.010	6058218
o,p-DDT	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
p,p-DDT	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	0.0079	0.0020	6058218
Dieldrin	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Lindane	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Endosulfan I (alpha)	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Endosulfan II (beta)	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Endrin	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Heptachlor	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Heptachlor epoxide	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Hexachlorobenzene	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Hexachlorobutadiene	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Hexachloroethane	ug/g	<0.0020	0.0020	6058218	<0.0020	0.0020	6044017	<0.0020	0.0020	6058218
Methoxychlor	ug/g	<0.0050	0.0050	6058218	<0.0050	0.0050	6044017	<0.0050	0.0050	6058218
Aroclor 1242	ug/g	<0.020	0.020	6058218	<0.015	0.015	6044017	<0.015	0.015	6058218
Aroclor 1248	ug/g	<0.015	0.015	6058218	<0.015	0.015	6044017	<0.015	0.015	6058218

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		JHS261			JHS262			JHS264		
Sampling Date		2019/03/27 09:00			2019/03/27 13:30			2019/03/27 13:45		
COC Number		709705-01-01			709705-01-01			709705-01-01		
	UNITS	**MW19-05 S1**	**RDL**	**QC Batch**	**BH19-06 S1**	**RDL**	**QC Batch**	**BH19-07 S1**	**RDL**	**QC Batch**
Aroclor 1254	ug/g	<0.015	0.015	6058218	<0.015	0.015	6044017	<0.015	0.015	6058218
Aroclor 1260	ug/g	<0.015	0.015	6058218	<0.015	0.015	6044017	<0.015	0.015	6058218
Surrogate Recovery (%)										
2,4,5,6-Tetrachloro-m-xylene	%	71		6058218	85		6044017	76		6058218
Decachlorobiphenyl	%	96		6058218	104		6044017	110		6058218

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		JHS265			JHS270		
Sampling Date		2019/03/27 11:10			2019/03/27 13:30		
COC Number		709705-01-01			709705-01-01		
	UNITS	**BH19-08 S1**	**RDL**	**QC Batch**	**DUP19-06**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	16	1.0	6044034	19	1.0	6043752
Calculated Parameters							
Chlordane (Total)	ug/g	<0.020	0.020	6042953	<0.0020	0.0020	6042953
o,p-DDD + p,p-DDD	ug/g	<0.020	0.020	6042953	<0.0020	0.0020	6042953
o,p-DDE + p,p-DDE	ug/g	<0.020	0.020	6042953	0.0038	0.0020	6042953
o,p-DDT + p,p-DDT	ug/g	<0.020	0.020	6042953	<0.0020	0.0020	6042953
Total Endosulfan	ug/g	<0.020	0.020	6042953	<0.0020	0.0020	6042953
Total PCB	ug/g	<0.15	0.15	6042953	<0.015	0.015	6042953
Pesticides & Herbicides							
Aldrin	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
a-Chlordane	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
g-Chlordane	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
o,p-DDD	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
p,p-DDD	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
o,p-DDE	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
p,p-DDE	ug/g	<0.020	0.020	6044017	0.0038	0.0020	6044017
o,p-DDT	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
p,p-DDT	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Dieldrin	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Lindane	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Endosulfan I (alpha)	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Endosulfan II (beta)	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Endrin	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Heptachlor	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Heptachlor epoxide	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Hexachlorobenzene	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Hexachlorobutadiene	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Hexachloroethane	ug/g	<0.020	0.020	6044017	<0.0020	0.0020	6044017
Methoxychlor	ug/g	<0.050	0.050	6044017	<0.0050	0.0050	6044017
Aroclor 1242	ug/g	<0.15	0.15	6044017	<0.015	0.015	6044017
Aroclor 1248	ug/g	<0.15	0.15	6044017	<0.015	0.015	6044017

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		JHS265			JHS270		
Sampling Date		2019/03/27 11:10			2019/03/27 13:30		
COC Number		709705-01-01			709705-01-01		
	UNITS	**BH19-08 S1**	**RDL**	**QC Batch**	**DUP19-06**	**RDL**	**QC Batch**
Aroclor 1254	ug/g	<0.15	0.15	6044017	<0.015	0.015	6044017
Aroclor 1260	ug/g	<0.15	0.15	6044017	<0.015	0.015	6044017
Surrogate Recovery (%)							
2,4,5,6-Tetrachloro-m-xylene	%	111		6044017	89		6044017
Decachlorobiphenyl	%	104		6044017	114		6044017

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 PAHS (SOIL)

Maxxam ID		JHS254		JHS257	JHS260			JHS261		
Sampling Date		2019/03/27 11:30		2019/03/27 12:50	2019/03/27 13:20			2019/03/27 09:00		
COC Number		709705-01-01		709705-01-01	709705-01-01			709705-01-01		
	UNITS	**MW19-02 S1**	**QC Batch**	**MW19-03 S3**	**MW19-04 S3**	**RDL**	**QC Batch**	**MW19-05 S1**	**RDL**	**QC Batch**
Inorganics										
Moisture	%							16	1.0	6044034
Calculated Parameters										
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	6055278	<0.0071	<0.0071	0.0071	6042896	<0.0071	0.0071	6042896
Polyaromatic Hydrocarbons										
Acenaphthene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Acenaphthylene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Anthracene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Benzo(a)anthracene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Benzo(a)pyrene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Benzo(b/j)fluoranthene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Benzo(g,h,i)perylene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Benzo(k)fluoranthene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Chrysene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Dibenz(a,h)anthracene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Fluoranthene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Fluorene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
1-Methylnaphthalene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
2-Methylnaphthalene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Naphthalene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Phenanthrene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Pyrene	ug/g	<0.0050	6058330	<0.0050	<0.0050	0.0050	6049061	<0.0050	0.0050	6049061
Surrogate Recovery (%)										
D10-Anthracene	%	87	6058330	93	96		6049061	96		6049061
D14-Terphenyl (FS)	%	74	6058330	97	101		6049061	107		6049061
D8-Acenaphthylene	%	73	6058330	96	94		6049061	95		6049061

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 PAHS (SOIL)

Maxxam ID		JHS263	JHS264	JHS265	JHS268		
Sampling Date		2019/03/27 13:35	2019/03/27 13:45	2019/03/27 11:10	2019/03/27 12:50		
COC Number		709705-01-01	709705-01-01	709705-01-01	709705-01-01		
	UNITS	**BH19-06 S2**	**BH19-07 S1**	**BH19-08 S1**	**DUP19-03**	**RDL**	**QC Batch**
Calculated Parameters							
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	<0.0071	<0.0071	<0.0071	0.0071	6042896
Polyaromatic Hydrocarbons							
Acenaphthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6049061
Acenaphthylene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6049061
Anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6049061
Benzo(a)anthracene	ug/g	<0.0050	0.0098	<0.0050	<0.0050	0.0050	6049061
Benzo(a)pyrene	ug/g	<0.0050	0.013	<0.0050	<0.0050	0.0050	6049061
Benzo(b/j)fluoranthene	ug/g	<0.0050	0.021	<0.0050	<0.0050	0.0050	6049061
Benzo(g,h,i)perylene	ug/g	<0.0050	0.015	<0.0050	<0.0050	0.0050	6049061
Benzo(k)fluoranthene	ug/g	<0.0050	0.0066	<0.0050	<0.0050	0.0050	6049061
Chrysene	ug/g	<0.0050	0.012	<0.0050	<0.0050	0.0050	6049061
Dibenz(a,h)anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6049061
Fluoranthene	ug/g	<0.0050	0.024	<0.0050	<0.0050	0.0050	6049061
Fluorene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6049061
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.012	<0.0050	<0.0050	0.0050	6049061
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6049061
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6049061
Naphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6049061
Phenanthrene	ug/g	<0.0050	0.0087	<0.0050	<0.0050	0.0050	6049061
Pyrene	ug/g	<0.0050	0.025	<0.0050	<0.0050	0.0050	6049061
Surrogate Recovery (%)							
D10-Anthracene	%	95	94	91	93		6049061
D14-Terphenyl (FS)	%	104	108	101	112		6049061
D8-Acenaphthylene	%	90	96	96	101		6049061

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		JHS254			JHS254			JHS257	JHS260		
Sampling Date		2019/03/27 11:30			2019/03/27 11:30			2019/03/27 12:50	2019/03/27 13:20		
COC Number		709705-01-01			709705-01-01			709705-01-01	709705-01-01		
	UNITS	**MW19-02 S1**	**RDL**	**QC Batch**	**MW19-02 S1 Lab-Dup**	**RDL**	**QC Batch**	**MW19-03 S3**	**MW19-04 S3**	**RDL**	**QC Batch**
Inorganics											
Moisture	%							11	17	1.0	6044034
BTEX & F1 Hydrocarbons											
Benzene	ug/g	<0.020	0.020	6056409	<0.020	0.020	6056409	<0.020	<0.020	0.020	6045547
Toluene	ug/g	<0.020	0.020	6056409	<0.020	0.020	6056409	<0.020	<0.020	0.020	6045547
Ethylbenzene	ug/g	<0.020	0.020	6056409	<0.020	0.020	6056409	<0.020	<0.020	0.020	6045547
o-Xylene	ug/g	<0.020	0.020	6056409	<0.020	0.020	6056409	<0.020	<0.020	0.020	6045547
p+m-Xylene	ug/g	<0.040	0.040	6056409	<0.040	0.040	6056409	<0.040	<0.040	0.040	6045547
Total Xylenes	ug/g	<0.040	0.040	6056409	<0.040	0.040	6056409	<0.040	<0.040	0.040	6045547
F1 (C6-C10)	ug/g	<10	10	6056409	<10	10	6056409	<10	<10	10	6045547
F1 (C6-C10) - BTEX	ug/g	<10	10	6056409	<10	10	6056409	<10	<10	10	6045547
F2-F4 Hydrocarbons											
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6058321				17	<10	10	6049040
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6058321				<50	<50	50	6049040
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6058321				<50	<50	50	6049040
Reached Baseline at C50	ug/g	Yes		6058321				Yes	Yes		6049040
Surrogate Recovery (%)											
1,4-Difluorobenzene	%	98		6056409	118		6056409	97	98		6045547
4-Bromofluorobenzene	%	104		6056409	119		6056409	95	94		6045547
D10-Ethylbenzene	%	87		6056409	85		6056409	109	122		6045547
D4-1,2-Dichloroethane	%	95		6056409	129		6056409	97	98		6045547
o-Terphenyl	%	106		6058321				91	95		6049040

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		JHS261			JHS263	JHS264			JHS265		
Sampling Date		2019/03/27 09:00			2019/03/27 13:35	2019/03/27 13:45			2019/03/27 11:10		
COC Number		709705-01-01			709705-01-01	709705-01-01			709705-01-01		
	UNITS	**MW19-05 S1**	**RDL**	**QC Batch**	**BH19-06 S2**	**BH19-07 S1**	**RDL**	**QC Batch**	**BH19-08 S1**	**RDL**	**QC Batch**
Inorganics											
Moisture	%				14	17	1.0	6044034			
BTEX & F1 Hydrocarbons											
Benzene	ug/g	<0.020	0.020	6045547	<0.020	<0.020	0.020	6045547	<0.020	0.020	6045547
Toluene	ug/g	<0.020	0.020	6045547	<0.020	<0.020	0.020	6045547	<0.020	0.020	6045547
Ethylbenzene	ug/g	<0.020	0.020	6045547	<0.020	<0.020	0.020	6045547	<0.020	0.020	6045547
o-Xylene	ug/g	<0.020	0.020	6045547	<0.020	<0.020	0.020	6045547	<0.020	0.020	6045547
p+m-Xylene	ug/g	<0.040	0.040	6045547	<0.040	<0.040	0.040	6045547	<0.040	0.040	6045547
Total Xylenes	ug/g	<0.040	0.040	6045547	<0.040	<0.040	0.040	6045547	<0.040	0.040	6045547
F1 (C6-C10)	ug/g	<10	10	6045547	<10	<10	10	6045547	<10	10	6045547
F1 (C6-C10) - BTEX	ug/g	<10	10	6045547	<10	<10	10	6045547	<10	10	6045547
F2-F4 Hydrocarbons											
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6049040	<10	<10	10	6049040	<10	10	6049040
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6049040	<50	<50	50	6049040	<50	50	6049040
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6049040	<50	<50	50	6049040	<50	50	6049040
Reached Baseline at C50	ug/g	Yes		6049040	Yes	Yes		6049040	Yes		6049040
Surrogate Recovery (%)											
1,4-Difluorobenzene	%	96		6045547	96	97		6045547	96		6045547
4-Bromofluorobenzene	%	95		6045547	95	96		6045547	94		6045547
D10-Ethylbenzene	%	108		6045547	113	108		6045547	111		6045547
D4-1,2-Dichloroethane	%	98		6045547	98	99		6045547	99		6045547
o-Terphenyl	%	93		6049040	93	91		6049040	93		6049040

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		JHS268		
Sampling Date		2019/03/27 12:50		
COC Number		709705-01-01		
	UNITS	**DUP19-03**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	14	1.0	6044034
BTEX & F1 Hydrocarbons				
Benzene	ug/g	<0.020	0.020	6045547
Toluene	ug/g	<0.020	0.020	6045547
Ethylbenzene	ug/g	<0.020	0.020	6045547
o-Xylene	ug/g	<0.020	0.020	6045547
p+m-Xylene	ug/g	<0.040	0.040	6045547
Total Xylenes	ug/g	<0.040	0.040	6045547
F1 (C6-C10)	ug/g	<10	10	6045547
F1 (C6-C10) - BTEX	ug/g	<10	10	6045547
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6049040
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	6049040
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	6049040
Reached Baseline at C50	ug/g	Yes		6049040
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	97		6045547
4-Bromofluorobenzene	%	95		6045547
D10-Ethylbenzene	%	120		6045547
D4-1,2-Dichloroethane	%	98		6045547
o-Terphenyl	%	95		6049040

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JHS252			JHS253			JHS254		
Sampling Date		2019/03/27 10:30			2019/03/27 10:40			2019/03/27 11:30		
COC Number		709705-01-01			709705-01-01			709705-01-01		
	UNITS	**MW19-01 S1**	**RDL**	**QC Batch**	**MW19-01 S3**	**RDL**	**QC Batch**	**MW19-02 S1**	**RDL**	**QC Batch**
Calculated Parameters										
Sodium Adsorption Ratio	N/A	0.19		6042344				0.32		6042344
Inorganics										
Conductivity	mS/cm	0.25	0.002	6050594				0.43	0.002	6050594
Moisture	%	18	1.0	6043752	11	1.0	6043752	12	1.0	6043752
Available (CaCl2) pH	pH	7.49		6047028				7.67		6047028
WAD Cyanide (Free)	ug/g	0.03	0.01	6043968				0.02	0.01	6043968

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		JHS256			JHS258			JHS259		
Sampling Date		2019/03/27 12:45			2019/03/27 13:10			2019/03/27 13:15		
COC Number		709705-01-01			709705-01-01			709705-01-01		
	UNITS	**MW19-03 S2**	**RDL**	**QC Batch**	**MW19-04 S1**	**RDL**	**QC Batch**	**MW19-04 S2**	**RDL**	**QC Batch**
Calculated Parameters										
Sodium Adsorption Ratio	N/A				0.95		6042344			
Inorganics										
Conductivity	mS/cm				0.25	0.002	6050594			
Moisture	%	16	1.0	6043752				20	1.0	6043752
Available (CaCl2) pH	pH	7.68		6047028	7.29		6047028			
WAD Cyanide (Free)	ug/g	<0.01	0.01	6043968	0.05	0.01	6043968			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JHS260	JHS261		JHS262			JHS262		
Sampling Date		2019/03/27 13:20	2019/03/27 09:00		2019/03/27 13:30			2019/03/27 13:30		
COC Number		709705-01-01	709705-01-01		709705-01-01			709705-01-01		
	UNITS	**MW19-04 S3**	**MW19-05 S1**	**QC Batch**	**BH19-06 S1**	**RDL**	**QC Batch**	**BH19-06 S1 Lab-Dup**	**RDL**	**QC Batch**
Calculated Parameters										
Sodium Adsorption Ratio	N/A				0.74		6042344			
Inorganics										
Conductivity	mS/cm				0.46	0.002	6050594	0.46	0.002	6050594
Available (CaCl2) pH	pH	7.77	7.22	6047028	7.71		6047028			
WAD Cyanide (Free)	ug/g				<0.01	0.01	6043968			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		JHS264	JHS265			JHS266			JHS267		
Sampling Date		2019/03/27 13:45	2019/03/27 11:10			2019/03/27 11:15			2019/03/27 10:40		
COC Number		709705-01-01	709705-01-01			709705-01-01			709705-01-01		
	UNITS	**BH19-07 S1**	**BH19-08 S1**	**RDL**	**QC Batch**	**BH19-08 S2**	**RDL**	**QC Batch**	**DUP19-01**	**RDL**	**QC Batch**
Calculated Parameters											
Sodium Adsorption Ratio	N/A	0.53	0.28		6042344						
Inorganics											
Conductivity	mS/cm	0.34	0.14	0.002	6050594						
Moisture	%					11	1.0	6043752	13	1.0	6043752
Available (CaCl2) pH	pH	7.28	7.67		6047028						
WAD Cyanide (Free)	ug/g					<0.01	0.01	6043968			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JHS269		JHS271		
Sampling Date		2019/03/27 09:00		2019/03/27 13:45		
COC Number		709705-01-01		709705-01-01		
	UNITS	**DUP19-05**	**QC Batch**	**DUP19-07**	**RDL**	**QC Batch**
Calculated Parameters						
Sodium Adsorption Ratio	N/A			0.61		6042344
Inorganics						
Conductivity	mS/cm			0.37	0.002	6050594
Available (CaCl2) pH	pH	7.51	6047028			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JHS252	JHS253			JHS253		
Sampling Date		2019/03/27 10:30	2019/03/27 10:40			2019/03/27 10:40		
COC Number		709705-01-01	709705-01-01			709705-01-01		
	UNITS	**MW19-01 S1**	**MW19-01 S3**	**RDL**	**QC Batch**	**MW19-01 S3 Lab-Dup**	**RDL**	**QC Batch**
Inorganics								
Chromium (VI)	ug/g	<0.2	<0.2	0.2	6048403			
Metals								
Acid Extractable Antimony (Sb)	ug/g	0.35	<0.20	0.20	6046357	<0.20	0.20	6046357
Acid Extractable Arsenic (As)	ug/g	6.1	5.5	1.0	6046357	5.6	1.0	6046357
Acid Extractable Barium (Ba)	ug/g	75	57	0.50	6046357	56	0.50	6046357
Acid Extractable Beryllium (Be)	ug/g	0.74	0.69	0.20	6046357	0.71	0.20	6046357
Acid Extractable Boron (B)	ug/g	7.9	10	5.0	6046357	9.9	5.0	6046357
Acid Extractable Cadmium (Cd)	ug/g	0.36	<0.10	0.10	6046357	<0.10	0.10	6046357
Acid Extractable Chromium (Cr)	ug/g	21	18	1.0	6046357	19	1.0	6046357
Acid Extractable Cobalt (Co)	ug/g	10	11	0.10	6046357	11	0.10	6046357
Acid Extractable Copper (Cu)	ug/g	40	36	0.50	6046357	35	0.50	6046357
Acid Extractable Lead (Pb)	ug/g	30	8.7	1.0	6046357	8.8	1.0	6046357
Acid Extractable Molybdenum (Mo)	ug/g	0.53	<0.50	0.50	6046357	<0.50	0.50	6046357
Acid Extractable Nickel (Ni)	ug/g	19	22	0.50	6046357	23	0.50	6046357
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	0.50	6046357	<0.50	0.50	6046357
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	0.20	6046357	<0.20	0.20	6046357
Acid Extractable Thallium (Tl)	ug/g	0.14	0.14	0.050	6046357	0.14	0.050	6046357
Acid Extractable Uranium (U)	ug/g	0.59	0.46	0.050	6046357	0.45	0.050	6046357
Acid Extractable Vanadium (V)	ug/g	30	26	5.0	6046357	26	5.0	6046357
Acid Extractable Zinc (Zn)	ug/g	68	53	5.0	6046357	53	5.0	6046357
Acid Extractable Mercury (Hg)	ug/g	<0.050	<0.050	0.050	6046357	<0.050	0.050	6046357

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JHS254	JHS256	JHS259	JHS262	JHS266		
Sampling Date		2019/03/27 11:30	2019/03/27 12:45	2019/03/27 13:15	2019/03/27 13:30	2019/03/27 11:15		
COC Number		709705-01-01	709705-01-01	709705-01-01	709705-01-01	709705-01-01		
	UNITS	**MW19-02 S1**	**MW19-03 S2**	**MW19-04 S2**	**BH19-06 S1**	**BH19-08 S2**	**RDL**	**QC Batch**
Inorganics								
Chromium (VI)	ug/g	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	6048403
Metals								
Acid Extractable Antimony (Sb)	ug/g	0.22	0.28	<0.20	<0.20	<0.20	0.20	6046357
Acid Extractable Arsenic (As)	ug/g	6.5	11	4.1	5.5	3.7	1.0	6046357
Acid Extractable Barium (Ba)	ug/g	130	99	130	120	64	0.50	6046357
Acid Extractable Beryllium (Be)	ug/g	0.74	0.74	0.80	0.88	0.61	0.20	6046357
Acid Extractable Boron (B)	ug/g	9.0	8.2	8.2	9.5	9.0	5.0	6046357
Acid Extractable Cadmium (Cd)	ug/g	0.77	0.19	0.21	0.13	<0.10	0.10	6046357
Acid Extractable Chromium (Cr)	ug/g	20	23	26	27	17	1.0	6046357
Acid Extractable Cobalt (Co)	ug/g	9.8	14	11	12	10	0.10	6046357
Acid Extractable Copper (Cu)	ug/g	38	39	23	34	37	0.50	6046357
Acid Extractable Lead (Pb)	ug/g	38	16	9.7	9.4	6.3	1.0	6046357
Acid Extractable Molybdenum (Mo)	ug/g	0.64	<0.50	<0.50	0.51	<0.50	0.50	6046357
Acid Extractable Nickel (Ni)	ug/g	21	29	19	27	21	0.50	6046357
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6046357
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6046357
Acid Extractable Thallium (Tl)	ug/g	0.13	0.13	0.15	0.17	0.14	0.050	6046357
Acid Extractable Uranium (U)	ug/g	0.61	0.50	0.75	0.87	0.48	0.050	6046357
Acid Extractable Vanadium (V)	ug/g	30	34	35	39	25	5.0	6046357
Acid Extractable Zinc (Zn)	ug/g	78	57	100	58	43	5.0	6046357
Acid Extractable Mercury (Hg)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	6046357

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JHS267		
Sampling Date		2019/03/27 10:40		
COC Number		709705-01-01		
	UNITS	**DUP19-01**	**RDL**	**QC Batch**
Inorganics				
Chromium (VI)	ug/g	<0.2	0.2	6048403
Metals				
Acid Extractable Antimony (Sb)	ug/g	0.37	0.20	6046357
Acid Extractable Arsenic (As)	ug/g	10	1.0	6046357
Acid Extractable Barium (Ba)	ug/g	61	0.50	6046357
Acid Extractable Beryllium (Be)	ug/g	0.76	0.20	6046357
Acid Extractable Boron (B)	ug/g	11	5.0	6046357
Acid Extractable Cadmium (Cd)	ug/g	<0.10	0.10	6046357
Acid Extractable Chromium (Cr)	ug/g	19	1.0	6046357
Acid Extractable Cobalt (Co)	ug/g	13	0.10	6046357
Acid Extractable Copper (Cu)	ug/g	53	0.50	6046357
Acid Extractable Lead (Pb)	ug/g	10	1.0	6046357
Acid Extractable Molybdenum (Mo)	ug/g	0.57	0.50	6046357
Acid Extractable Nickel (Ni)	ug/g	26	0.50	6046357
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	6046357
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	6046357
Acid Extractable Thallium (Tl)	ug/g	0.13	0.050	6046357
Acid Extractable Uranium (U)	ug/g	0.52	0.050	6046357
Acid Extractable Vanadium (V)	ug/g	27	5.0	6046357
Acid Extractable Zinc (Zn)	ug/g	57	5.0	6046357
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	6046357

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

TEST SUMMARY

Maxxam ID: JHS252
Sample ID: MW19-01 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	TECH	6043968	2019/03/29	2019/04/01	Barbara Kalbasi Esfahani
Conductivity	AT	6050594	2019/04/03	2019/04/03	Kazzandra Adeva
Hexavalent Chromium in Soil by IC	IC/SPEC	6048403	2019/04/02	2019/04/03	Sally Norouz
Strong Acid Leachable Metals by ICPMS	ICP/MS	6046357	2019/04/01	2019/04/01	Daniel Teclu
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6044017	2019/03/29	2019/03/30	Li Peng
OC Pesticides Summed Parameters	CALC	6042953	N/A	2019/03/30	Automated Statchk
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6042344	N/A	2019/04/03	Automated Statchk

Maxxam ID: JHS253
Sample ID: MW19-01 S3
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hexavalent Chromium in Soil by IC	IC/SPEC	6048403	2019/04/02	2019/04/03	Sally Norouz
Strong Acid Leachable Metals by ICPMS	ICP/MS	6046357	2019/04/01	2019/04/01	Daniel Teclu
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang

Maxxam ID: JHS253 Dup
Sample ID: MW19-01 S3
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	6046357	2019/04/01	2019/04/01	Daniel Teclu

Maxxam ID: JHS254
Sample ID: MW19-02 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6055278	N/A	2019/04/09	Automated Statchk
Free (WAD) Cyanide	TECH	6043968	2019/03/29	2019/04/01	Barbara Kalbasi Esfahani
Conductivity	AT	6050594	2019/04/03	2019/04/03	Kazzandra Adeva
Hexavalent Chromium in Soil by IC	IC/SPEC	6048403	2019/04/02	2019/04/03	Sally Norouz
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6056409	N/A	2019/04/05	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6058321	2019/04/08	2019/04/09	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6046357	2019/04/01	2019/04/01	Daniel Teclu
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6044017	2019/03/29	2019/03/30	Li Peng
OC Pesticides Summed Parameters	CALC	6042953	N/A	2019/03/30	Automated Statchk
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6058330	2019/04/08	2019/04/09	Mitesh Raj
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6042344	N/A	2019/04/03	Automated Statchk

TEST SUMMARY

Maxxam ID: JHS254 Dup
Sample ID: MW19-02 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6056409	N/A	2019/04/05	Georgeta Rusu

Maxxam ID: JHS255
Sample ID: MW19-03 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6044017	2019/03/29	2019/03/30	Li Peng
OC Pesticides Summed Parameters	CALC	6042953	N/A	2019/03/30	Automated Statchk

Maxxam ID: JHS256
Sample ID: MW19-03 S2
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	TECH	6043968	2019/03/29	2019/04/01	Barbara Kalbasi Esfahani
Hexavalent Chromium in Soil by IC	IC/SPEC	6048403	2019/04/02	2019/04/03	Sally Norouz
Strong Acid Leachable Metals by ICPMS	ICP/MS	6046357	2019/04/01	2019/04/01	Daniel Teclu
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas

Maxxam ID: JHS257
Sample ID: MW19-03 S3
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6042896	N/A	2019/04/03	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6045547	N/A	2019/04/01	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6049040	2019/04/02	2019/04/03	Prabhjot Gulati
Moisture	BAL	6044034	N/A	2019/03/29	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6049061	2019/04/02	2019/04/03	Mitesh Raj

Maxxam ID: JHS258
Sample ID: MW19-04 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	TECH	6043968	2019/03/29	2019/04/01	Barbara Kalbasi Esfahani
Conductivity	AT	6050594	2019/04/03	2019/04/03	Kazzandra Adeva
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6044017	2019/03/29	2019/03/30	Li Peng
OC Pesticides Summed Parameters	CALC	6042953	N/A	2019/03/30	Automated Statchk
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6042344	N/A	2019/04/03	Automated Statchk

TEST SUMMARY

Maxxam ID: JHS259
Sample ID: MW19-04 S2
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hexavalent Chromium in Soil by IC	IC/SPEC	6048403	2019/04/02	2019/04/03	Sally Norouz
Strong Acid Leachable Metals by ICPMS	ICP/MS	6046357	2019/04/01	2019/04/01	Daniel Teclu
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang

Maxxam ID: JHS260
Sample ID: MW19-04 S3
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6042896	N/A	2019/04/03	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6045547	N/A	2019/04/01	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6049040	2019/04/02	2019/04/03	Prabhjot Gulati
Moisture	BAL	6044034	N/A	2019/03/29	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6049061	2019/04/02	2019/04/03	Mitesh Raj
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas

Maxxam ID: JHS261
Sample ID: MW19-05 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6042896	N/A	2019/04/03	Automated Statchk
Hot Water Extractable Boron	ICP	6058338	2019/04/08	2019/04/08	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	6056479	2019/04/05	2019/04/08	Barbara Kalbasi Esfahani
Conductivity	AT	6058242	2019/04/08	2019/04/08	Kazzandra Adeva
Hexavalent Chromium in Soil by IC	IC/SPEC	6060088	2019/04/09	2019/04/09	Sally Norouz
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6045547	N/A	2019/04/01	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6049040	2019/04/02	2019/04/03	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6058365	2019/04/08	2019/04/08	Daniel Teclu
Moisture	BAL	6044034	N/A	2019/03/29	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6058218	2019/04/08	2019/04/08	Li Peng
OC Pesticides Summed Parameters	CALC	6055768	N/A	2019/04/08	Automated Statchk
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6049061	2019/04/02	2019/04/03	Mitesh Raj
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6055328	N/A	2019/04/09	Automated Statchk

Maxxam ID: JHS262
Sample ID: BH19-06 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	TECH	6043968	2019/03/29	2019/04/01	Barbara Kalbasi Esfahani
Conductivity	AT	6050594	2019/04/03	2019/04/03	Kazzandra Adeva
Hexavalent Chromium in Soil by IC	IC/SPEC	6048403	2019/04/02	2019/04/03	Sally Norouz
Strong Acid Leachable Metals by ICPMS	ICP/MS	6046357	2019/04/01	2019/04/01	Daniel Teclu

TEST SUMMARY

Maxxam ID: JHS262
Sample ID: BH19-06 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6044017	2019/03/29	2019/03/30	Li Peng
OC Pesticides Summed Parameters	CALC	6042953	N/A	2019/03/30	Automated Statchk
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6042344	N/A	2019/04/03	Automated Statchk

Maxxam ID: JHS262 Dup
Sample ID: BH19-06 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	6050594	2019/04/03	2019/04/03	Kazzandra Adeva

Maxxam ID: JHS263
Sample ID: BH19-06 S2
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6042896	N/A	2019/04/03	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6045547	N/A	2019/04/01	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6049040	2019/04/02	2019/04/03	Prabhjot Gulati
Moisture	BAL	6044034	N/A	2019/03/29	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6049061	2019/04/02	2019/04/03	Mitesh Raj

Maxxam ID: JHS264
Sample ID: BH19-07 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6042896	N/A	2019/04/03	Automated Statchk
Hot Water Extractable Boron	ICP	6058338	2019/04/08	2019/04/08	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	6056479	2019/04/05	2019/04/08	Barbara Kalbasi Esfahani
Conductivity	AT	6050594	2019/04/03	2019/04/03	Kazzandra Adeva
Hexavalent Chromium in Soil by IC	IC/SPEC	6060088	2019/04/09	2019/04/09	Sally Norouz
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6045547	N/A	2019/04/01	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6049040	2019/04/02	2019/04/03	Prabhjot Gulati
Strong Acid Leachable Metals by ICPMS	ICP/MS	6058365	2019/04/08	2019/04/08	Daniel Teclu
Moisture	BAL	6044034	N/A	2019/03/29	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6058218	2019/04/08	2019/04/08	Li Peng
OC Pesticides Summed Parameters	CALC	6055768	N/A	2019/04/08	Automated Statchk
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6049061	2019/04/02	2019/04/03	Mitesh Raj
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6042344	N/A	2019/04/03	Automated Statchk

TEST SUMMARY

Maxxam ID: JHS265
Sample ID: BH19-08 S1
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6042896	N/A	2019/04/03	Automated Statchk
Conductivity	AT	6050594	2019/04/03	2019/04/03	Kazzandra Adeva
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6045547	N/A	2019/04/01	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6049040	2019/04/02	2019/04/03	Prabhjot Gulati
Moisture	BAL	6044034	N/A	2019/03/29	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6044017	2019/03/29	2019/03/30	Li Peng
OC Pesticides Summed Parameters	CALC	6042953	N/A	2019/03/30	Automated Statchk
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6049061	2019/04/02	2019/04/03	Mitesh Raj
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas
Sodium Adsorption Ratio (SAR)	CALC/MET	6042344	N/A	2019/04/03	Automated Statchk

Maxxam ID: JHS266
Sample ID: BH19-08 S2
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	TECH	6043968	2019/03/29	2019/04/01	Barbara Kalbasi Esfahani
Hexavalent Chromium in Soil by IC	IC/SPEC	6048403	2019/04/02	2019/04/03	Sally Norouz
Strong Acid Leachable Metals by ICPMS	ICP/MS	6046357	2019/04/01	2019/04/01	Daniel Teclu
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang

Maxxam ID: JHS267
Sample ID: DUP19-01
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hexavalent Chromium in Soil by IC	IC/SPEC	6048403	2019/04/02	2019/04/03	Sally Norouz
Strong Acid Leachable Metals by ICPMS	ICP/MS	6046357	2019/04/01	2019/04/01	Daniel Teclu
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang

Maxxam ID: JHS268
Sample ID: DUP19-03
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6042896	N/A	2019/04/03	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6045547	N/A	2019/04/01	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6049040	2019/04/02	2019/04/03	Prabhjot Gulati
Moisture	BAL	6044034	N/A	2019/03/29	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6049061	2019/04/02	2019/04/03	Mitesh Raj

TEST SUMMARY

Maxxam ID: JHS269
Sample ID: DUP19-05
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	6047028	2019/04/02	2019/04/02	Gnana Thomas

Maxxam ID: JHS270
Sample ID: DUP19-06
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	6043752	N/A	2019/03/29	Min Yang
OC Pesticides (Selected) & PCB	GC/ECD	6044017	2019/03/29	2019/03/30	Li Peng
OC Pesticides Summed Parameters	CALC	6042953	N/A	2019/03/30	Automated Statchk

Maxxam ID: JHS271
Sample ID: DUP19-07
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/03/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	6050594	2019/04/03	2019/04/03	Kazzandra Adeva
Sodium Adsorption Ratio (SAR)	CALC/MET	6042344	N/A	2019/04/03	Automated Statchk

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.3°C

Cooler custody seal was present and intact.
OC Pesticide Analysis: Due to the sample matrix, some samples required dilution. Detection limits were adjusted accordingly.
BTEX & F1 Analysis: Samples were extracted on "2019-04-05."

Revised Report (2019/04/12): Additional analyses included as per client request.

Revised Report (2019/04/16): Sieve, Graph and Testure included for samples MW19-01 S1 and BH19-06 S2, as per client request.

Sample JHS252 [MW19-01 S1] : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Sample JHS265 [BH19-08 S1] : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**UNITS**	**Value (%)**	**QC Limits**
6044017	2,4,5,6-Tetrachloro-m-xylene	2019/03/30	97	50 - 130	77	50 - 130	78	%		
6044017	Decachlorobiphenyl	2019/03/30	130	50 - 130	111	50 - 130	119	%		
6045547	1,4-Difluorobenzene	2019/04/01	97	60 - 140	98	60 - 140	97	%		
6045547	4-Bromofluorobenzene	2019/04/01	96	60 - 140	98	60 - 140	97	%		
6045547	D10-Ethylbenzene	2019/04/01	133	60 - 140	100	60 - 140	110	%		
6045547	D4-1,2-Dichloroethane	2019/04/01	98	60 - 140	101	60 - 140	99	%		
6049040	o-Terphenyl	2019/04/02	101	60 - 130	92	60 - 130	94	%		
6049061	D10-Anthracene	2019/04/03	94	50 - 130	96	50 - 130	91	%		
6049061	D14-Terphenyl (FS)	2019/04/03	97	50 - 130	99	50 - 130	100	%		
6049061	D8-Acenaphthylene	2019/04/03	92	50 - 130	98	50 - 130	94	%		
6056409	1,4-Difluorobenzene	2019/04/05	126	60 - 140	108	60 - 140	98	%		
6056409	4-Bromofluorobenzene	2019/04/05	104	60 - 140	87	60 - 140	109	%		
6056409	D10-Ethylbenzene	2019/04/05	90	60 - 140	76	60 - 140	95	%		
6056409	D4-1,2-Dichloroethane	2019/04/05	121	60 - 140	97	60 - 140	104	%		
6058218	2,4,5,6-Tetrachloro-m-xylene	2019/04/08	72	50 - 130	82	50 - 130	72	%		
6058218	Decachlorobiphenyl	2019/04/08	116	50 - 130	128	50 - 130	120	%		
6058321	o-Terphenyl	2019/04/09	99	60 - 130	100	60 - 130	115	%		
6058330	D10-Anthracene	2019/04/09	84	50 - 130	89	50 - 130	90	%		
6058330	D14-Terphenyl (FS)	2019/04/09	66	50 - 130	74	50 - 130	79	%		
6058330	D8-Acenaphthylene	2019/04/09	74	50 - 130	81	50 - 130	76	%		
6043752	Moisture	2019/03/29							1.1	20
6043968	WAD Cyanide (Free)	2019/04/01	109	75 - 125	104	80 - 120	<0.01	ug/g	26	35
6044017	a-Chlordane	2019/04/02	107	50 - 130	84	50 - 130	<0.0020	ug/g	NC	40
6044017	Aldrin	2019/04/02	93	50 - 130	77	50 - 130	<0.0020	ug/g	NC	40
6044017	Aroclor 1242	2019/04/02					<0.015	ug/g	NC	40
6044017	Aroclor 1248	2019/04/02					<0.015	ug/g	NC	40
6044017	Aroclor 1254	2019/04/02					<0.015	ug/g	7.3	40
6044017	Aroclor 1260	2019/04/02					<0.015	ug/g	NC	40
6044017	Dieldrin	2019/04/02	112	50 - 130	96	50 - 130	<0.0020	ug/g	NC	40
6044017	Endosulfan I (alpha)	2019/04/02	82	50 - 130	84	50 - 130	<0.0020	ug/g	NC	40
6044017	Endosulfan II (beta)	2019/04/02	102	50 - 130	85	50 - 130	<0.0020	ug/g	NC	40
6044017	Endrin	2019/04/02	99	50 - 130	82	50 - 130	<0.0020	ug/g	NC	40

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6044017	g-Chlordane	2019/04/02	100	50 - 130	79	50 - 130	<0.0020	ug/g	NC	40
6044017	Heptachlor epoxide	2019/04/02	98	50 - 130	79	50 - 130	<0.0020	ug/g	NC	40
6044017	Heptachlor	2019/04/02	74	50 - 130	70	50 - 130	<0.0020	ug/g	NC	40
6044017	Hexachlorobenzene	2019/04/02	106	50 - 130	75	50 - 130	<0.0020	ug/g	NC	40
6044017	Hexachlorobutadiene	2019/03/30	89	50 - 130	85	50 - 130	<0.0020	ug/g		
6044017	Hexachloroethane	2019/03/30	69	50 - 130	69	50 - 130	<0.0020	ug/g		
6044017	Lindane	2019/04/02	97	50 - 130	76	50 - 130	<0.0020	ug/g	NC	40
6044017	Methoxychlor	2019/04/02	109	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40
6044017	o,p-DDD	2019/04/02	121	50 - 130	98	50 - 130	<0.0020	ug/g	NC	40
6044017	o,p-DDE	2019/04/02	117	50 - 130	97	50 - 130	<0.0020	ug/g	NC	40
6044017	o,p-DDT	2019/04/02	118	50 - 130	90	50 - 130	<0.0020	ug/g	NC	40
6044017	p,p-DDD	2019/04/02	116	50 - 130	96	50 - 130	<0.0020	ug/g	NC	40
6044017	p,p-DDE	2019/04/02	102	50 - 130	102	50 - 130	<0.0020	ug/g	NC	40
6044017	p,p-DDT	2019/04/02	112	50 - 130	79	50 - 130	<0.0020	ug/g	NC	40
6044034	Moisture	2019/03/29							3.9	20
6045547	Benzene	2019/04/01	122	60 - 140	101	60 - 140	<0.020	ug/g	NC	50
6045547	Ethylbenzene	2019/04/01	133	60 - 140	102	60 - 140	<0.020	ug/g	NC	50
6045547	F1 (C6-C10) - BTEX	2019/04/01					<10	ug/g	NC	30
6045547	F1 (C6-C10)	2019/04/01	121	60 - 140	97	80 - 120	<10	ug/g	NC	30
6045547	o-Xylene	2019/04/01	131	60 - 140	99	60 - 140	<0.020	ug/g	NC	50
6045547	p+m-Xylene	2019/04/01	129	60 - 140	99	60 - 140	<0.040	ug/g	NC	50
6045547	Toluene	2019/04/01	131	60 - 140	103	60 - 140	<0.020	ug/g	NC	50
6045547	Total Xylenes	2019/04/01					<0.040	ug/g	NC	50
6046357	Acid Extractable Antimony (Sb)	2019/04/01	92	75 - 125	98	80 - 120	<0.20	ug/g	NC	30
6046357	Acid Extractable Arsenic (As)	2019/04/01	102	75 - 125	101	80 - 120	<1.0	ug/g	1.9	30
6046357	Acid Extractable Barium (Ba)	2019/04/01	NC	75 - 125	103	80 - 120	<0.50	ug/g	1.8	30
6046357	Acid Extractable Beryllium (Be)	2019/04/01	104	75 - 125	97	80 - 120	<0.20	ug/g	3.3	30
6046357	Acid Extractable Boron (B)	2019/04/01	101	75 - 125	99	80 - 120	<5.0	ug/g	3.9	30
6046357	Acid Extractable Cadmium (Cd)	2019/04/01	102	75 - 125	97	80 - 120	<0.10	ug/g	NC	30
6046357	Acid Extractable Chromium (Cr)	2019/04/01	105	75 - 125	102	80 - 120	<1.0	ug/g	1.6	30
6046357	Acid Extractable Cobalt (Co)	2019/04/01	102	75 - 125	101	80 - 120	<0.10	ug/g	3.2	30
6046357	Acid Extractable Copper (Cu)	2019/04/01	NC	75 - 125	99	80 - 120	<0.50	ug/g	2.4	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6046357	Acid Extractable Lead (Pb)	2019/04/01	101	75 - 125	100	80 - 120	<1.0	ug/g	2.2	30
6046357	Acid Extractable Mercury (Hg)	2019/04/01	92	75 - 125	85	80 - 120	<0.050	ug/g	NC	30
6046357	Acid Extractable Molybdenum (Mo)	2019/04/01	101	75 - 125	99	80 - 120	<0.50	ug/g	NC	30
6046357	Acid Extractable Nickel (Ni)	2019/04/01	101	75 - 125	98	80 - 120	<0.50	ug/g	1.5	30
6046357	Acid Extractable Selenium (Se)	2019/04/01	106	75 - 125	102	80 - 120	<0.50	ug/g	NC	30
6046357	Acid Extractable Silver (Ag)	2019/04/01	100	75 - 125	97	80 - 120	<0.20	ug/g	NC	30
6046357	Acid Extractable Thallium (Tl)	2019/04/01	100	75 - 125	98	80 - 120	<0.050	ug/g	3.8	30
6046357	Acid Extractable Uranium (U)	2019/04/01	99	75 - 125	97	80 - 120	<0.050	ug/g	1.7	30
6046357	Acid Extractable Vanadium (V)	2019/04/01	NC	75 - 125	102	80 - 120	<5.0	ug/g	0.044	30
6046357	Acid Extractable Zinc (Zn)	2019/04/01	NC	75 - 125	106	80 - 120	<5.0	ug/g	0.37	30
6047028	Available (CaCl2) pH	2019/04/02			100	97 - 103			1.1	N/A
6048403	Chromium (VI)	2019/04/03	63 (2)	70 - 130	88	80 - 120	<0.2	ug/g	NC	35
6049040	F2 (C10-C16 Hydrocarbons)	2019/04/02	94	50 - 130	84	80 - 120	<10	ug/g	NC	30
6049040	F3 (C16-C34 Hydrocarbons)	2019/04/02	100	50 - 130	88	80 - 120	<50	ug/g	NC	30
6049040	F4 (C34-C50 Hydrocarbons)	2019/04/02	109	50 - 130	95	80 - 120	<50	ug/g	NC	30
6049061	1-Methylnaphthalene	2019/04/03	104	50 - 130	111	50 - 130	<0.0050	ug/g	NC	40
6049061	2-Methylnaphthalene	2019/04/03	96	50 - 130	99	50 - 130	<0.0050	ug/g	NC	40
6049061	Acenaphthene	2019/04/03	95	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40
6049061	Acenaphthylene	2019/04/03	95	50 - 130	93	50 - 130	<0.0050	ug/g	NC	40
6049061	Anthracene	2019/04/03	79	50 - 130	78	50 - 130	<0.0050	ug/g	NC	40
6049061	Benzo(a)anthracene	2019/04/03	102	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
6049061	Benzo(a)pyrene	2019/04/03	99	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
6049061	Benzo(b/j)fluoranthene	2019/04/03	98	50 - 130	100	50 - 130	<0.0050	ug/g	NC	40
6049061	Benzo(g,h,i)perylene	2019/04/03	101	50 - 130	100	50 - 130	<0.0050	ug/g	NC	40
6049061	Benzo(k)fluoranthene	2019/04/03	96	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
6049061	Chrysene	2019/04/03	97	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40
6049061	Dibenz(a,h)anthracene	2019/04/03	107	50 - 130	102	50 - 130	<0.0050	ug/g	NC	40
6049061	Fluoranthene	2019/04/03	100	50 - 130	101	50 - 130	<0.0050	ug/g	NC	40
6049061	Fluorene	2019/04/03	100	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
6049061	Indeno(1,2,3-cd)pyrene	2019/04/03	105	50 - 130	105	50 - 130	<0.0050	ug/g	NC	40
6049061	Naphthalene	2019/04/03	87	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
6049061	Phenanthrene	2019/04/03	91	50 - 130	91	50 - 130	<0.0050	ug/g	NC	40

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6049061	Pyrene	2019/04/03	98	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40
6050594	Conductivity	2019/04/03			102	90 - 110	<0.002	mS/cm	0.65	10
6056409	Benzene	2019/04/05	107	60 - 140	83	60 - 140	<0.020	ug/g	NC	50
6056409	Ethylbenzene	2019/04/05	86	60 - 140	85	60 - 140	<0.020	ug/g	NC	50
6056409	F1 (C6-C10) - BTEX	2019/04/05					<10	ug/g	NC	30
6056409	F1 (C6-C10)	2019/04/05	75	60 - 140	98	80 - 120	<10	ug/g	NC	30
6056409	o-Xylene	2019/04/05	90	60 - 140	71	60 - 140	<0.020	ug/g	NC	50
6056409	p+m-Xylene	2019/04/05	91	60 - 140	70	60 - 140	<0.040	ug/g	NC	50
6056409	Toluene	2019/04/05	102	60 - 140	86	60 - 140	<0.020	ug/g	NC	50
6056409	Total Xylenes	2019/04/05					<0.040	ug/g	NC	50
6056479	WAD Cyanide (Free)	2019/04/08	99	75 - 125	96	80 - 120	<0.01	ug/g	NC	35
6058218	a-Chlordane	2019/04/08	89	50 - 130	84	50 - 130	<0.0020	ug/g	NC	40
6058218	Aldrin	2019/04/08	72	50 - 130	78	50 - 130	<0.0020	ug/g	NC	40
6058218	Aroclor 1242	2019/04/08					<0.015	ug/g	NC	40
6058218	Aroclor 1248	2019/04/08					<0.015	ug/g	NC	40
6058218	Aroclor 1254	2019/04/08					<0.015	ug/g	NC	40
6058218	Aroclor 1260	2019/04/08					<0.015	ug/g	NC	40
6058218	Dieldrin	2019/04/08	96	50 - 130	93	50 - 130	<0.0020	ug/g	NC	40
6058218	Endosulfan I (alpha)	2019/04/08	88	50 - 130	81	50 - 130	<0.0020	ug/g	NC	40
6058218	Endosulfan II (beta)	2019/04/08	97	50 - 130	88	50 - 130	<0.0020	ug/g	NC	40
6058218	Endrin	2019/04/08	83	50 - 130	80	50 - 130	<0.0020	ug/g	NC	40
6058218	g-Chlordane	2019/04/08	80	50 - 130	77	50 - 130	<0.0020	ug/g	NC	40
6058218	Heptachlor epoxide	2019/04/08	74	50 - 130	73	50 - 130	<0.0020	ug/g	NC	40
6058218	Heptachlor	2019/04/08	85	50 - 130	97	50 - 130	<0.0020	ug/g	NC	40
6058218	Hexachlorobenzene	2019/04/08	90	50 - 130	98	50 - 130	<0.0020	ug/g	NC	40
6058218	Hexachlorobutadiene	2019/04/08	66	50 - 130	96	50 - 130	<0.0020	ug/g	NC	40
6058218	Hexachloroethane	2019/04/08	52	50 - 130	85	50 - 130	<0.0020	ug/g	NC	40
6058218	Lindane	2019/04/08	79	50 - 130	78	50 - 130	<0.0020	ug/g	NC	40
6058218	Methoxychlor	2019/04/08	119	50 - 130	117	50 - 130	<0.0050	ug/g	NC	40
6058218	o,p-DDD	2019/04/08	105	50 - 130	98	50 - 130	<0.0020	ug/g	NC	40
6058218	o,p-DDE	2019/04/08	86	50 - 130	97	50 - 130	<0.0020	ug/g	NC	40
6058218	o,p-DDT	2019/04/08	99	50 - 130	107	50 - 130	<0.0020	ug/g	NC	40

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6058218	p,p-DDD	2019/04/08	87	50 - 130	86	50 - 130	<0.0020	ug/g	NC	40
6058218	p,p-DDE	2019/04/08	115	50 - 130	118	50 - 130	<0.0020	ug/g	NC	40
6058218	p,p-DDT	2019/04/08	112	50 - 130	110	50 - 130	<0.0020	ug/g	NC	40
6058242	Conductivity	2019/04/08			104	90 - 110	<0.002	mS/cm	3.7	10
6058321	F2 (C10-C16 Hydrocarbons)	2019/04/09	95	50 - 130	94	80 - 120	<10	ug/g	NC	30
6058321	F3 (C16-C34 Hydrocarbons)	2019/04/09	94	50 - 130	93	80 - 120	<50	ug/g	NC	30
6058321	F4 (C34-C50 Hydrocarbons)	2019/04/09	97	50 - 130	96	80 - 120	<50	ug/g	NC	30
6058330	1-Methylnaphthalene	2019/04/09	89	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40
6058330	2-Methylnaphthalene	2019/04/09	80	50 - 130	83	50 - 130	<0.0050	ug/g	NC	40
6058330	Acenaphthene	2019/04/09	75	50 - 130	80	50 - 130	<0.0050	ug/g	NC	40
6058330	Acenaphthylene	2019/04/09	74	50 - 130	78	50 - 130	<0.0050	ug/g	NC	40
6058330	Anthracene	2019/04/09	69	50 - 130	73	50 - 130	<0.0050	ug/g	NC	40
6058330	Benzo(a)anthracene	2019/04/09	83	50 - 130	86	50 - 130	<0.0050	ug/g	NC	40
6058330	Benzo(a)pyrene	2019/04/09	83	50 - 130	87	50 - 130	<0.0050	ug/g	NC	40
6058330	Benzo(b/j)fluoranthene	2019/04/09	89	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
6058330	Benzo(g,h,i)perylene	2019/04/09	58	50 - 130	60	50 - 130	<0.0050	ug/g	NC	40
6058330	Benzo(k)fluoranthene	2019/04/09	87	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40
6058330	Chrysene	2019/04/09	84	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40
6058330	Dibenz(a,h)anthracene	2019/04/09	64	50 - 130	64	50 - 130	<0.0050	ug/g	NC	40
6058330	Fluoranthene	2019/04/09	69	50 - 130	72	50 - 130	<0.0050	ug/g	NC	40
6058330	Fluorene	2019/04/09	79	50 - 130	79	50 - 130	<0.0050	ug/g	NC	40
6058330	Indeno(1,2,3-cd)pyrene	2019/04/09	73	50 - 130	70	50 - 130	<0.0050	ug/g	NC	40
6058330	Naphthalene	2019/04/09	76	50 - 130	81	50 - 130	<0.0050	ug/g	NC	40
6058330	Phenanthrene	2019/04/09	77	50 - 130	78	50 - 130	<0.0050	ug/g	NC	40
6058330	Pyrene	2019/04/09	69	50 - 130	73	50 - 130	<0.0050	ug/g	NC	40
6058338	Hot Water Ext. Boron (B)	2019/04/08	103	75 - 125	99	75 - 125	<0.050	ug/g	14	40
6058365	Acid Extractable Antimony (Sb)	2019/04/09	95	75 - 125	102	80 - 120	<0.20	ug/g	24	30
6058365	Acid Extractable Arsenic (As)	2019/04/09	NC	75 - 125	98	80 - 120	<1.0	ug/g	1.2	30
6058365	Acid Extractable Barium (Ba)	2019/04/09	97	75 - 125	96	80 - 120	<0.50	ug/g	0.036	30
6058365	Acid Extractable Beryllium (Be)	2019/04/09	98	75 - 125	99	80 - 120	<0.20	ug/g	NC	30
6058365	Acid Extractable Boron (B)	2019/04/09	97	75 - 125	99	80 - 120	<5.0	ug/g	NC	30
6058365	Acid Extractable Cadmium (Cd)	2019/04/09	101	75 - 125	100	80 - 120	<0.10	ug/g	9.1	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6058365	Acid Extractable Chromium (Cr)	2019/04/09	NC	75 - 125	98	80 - 120	<1.0	ug/g	0.93	30
6058365	Acid Extractable Cobalt (Co)	2019/04/09	97	75 - 125	99	80 - 120	<0.10	ug/g	2.9	30
6058365	Acid Extractable Copper (Cu)	2019/04/09	NC	75 - 125	98	80 - 120	<0.50	ug/g	6.2	30
6058365	Acid Extractable Lead (Pb)	2019/04/09	102	75 - 125	100	80 - 120	<1.0	ug/g	2.0	30
6058365	Acid Extractable Mercury (Hg)	2019/04/09	92	75 - 125	99	80 - 120	<0.050	ug/g	NC	30
6058365	Acid Extractable Molybdenum (Mo)	2019/04/09	101	75 - 125	101	80 - 120	<0.50	ug/g	NC	30
6058365	Acid Extractable Nickel (Ni)	2019/04/09	NC	75 - 125	100	80 - 120	<0.50	ug/g	3.8	30
6058365	Acid Extractable Selenium (Se)	2019/04/09	102	75 - 125	101	80 - 120	<0.50	ug/g	NC	30
6058365	Acid Extractable Silver (Ag)	2019/04/09	98	75 - 125	100	80 - 120	<0.20	ug/g	NC	30
6058365	Acid Extractable Thallium (Tl)	2019/04/09	97	75 - 125	98	80 - 120	<0.050	ug/g	8.7	30
6058365	Acid Extractable Uranium (U)	2019/04/09	99	75 - 125	95	80 - 120	<0.050	ug/g	3.4	30
6058365	Acid Extractable Vanadium (V)	2019/04/09	NC	75 - 125	98	80 - 120	<5.0	ug/g	1.8	30
6058365	Acid Extractable Zinc (Zn)	2019/04/09	NC	75 - 125	100	80 - 120	<5.0	ug/g	5.5	30
6060088	Chromium (VI)	2019/04/09	64 (2)	70 - 130	87	80 - 120	<0.2	ug/g	NC	35

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The sample was reanalyzed with the same results.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Anastassia Hamanov, Scientific Specialist

Brad Newman, Scientific Service Specialist

Eva

CHARTERED
Eva Pranjic
CHEMIST

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel (905) 817-5700 Toll-free 800-563-6266 Fax (905) 817-5777 www.maxxam.ca

28-Mar-19 14:02
Antonella Brasil
B980920
JCC ENV-1147

Page 1 of 2

Bottle Order #: 709705

COC #: C#709705-01-01

Project Manager: Antonella Brasil

INVOICE TO:

Company Name: #3103 Pinchin Ltd
Attention: Accounts Payable
Address: 2470 Milltower Crt
Mississauga ON L5N 7W5
Tel: (905) 363-0678 Fax: (905) 363-0681
Email: ap@pinchin.com

REPORT TO:

Company Name:
Attention: Michael Birch Craig Kelly
Address:
Tel: Fax:
Email: mbirch@pinchin.com; cxkelly@pinchin.com

PROJECT INFORMATION:

Quotation #: A70927
P.O. #:
Project: 230989.001
Project Name: Phase TWO ESA
Site #: 131 Eglinton Ave E.
Sampled By: William Martyniw

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
☐ Table 1 ☐ Res/Park ☐ Medium/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☑ For RSC
☐ Table ____

Other Regulations
☐ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558 ☐ Storm Sewer Bylaw
☐ MISA Municipality ____
☐ PWQO
☐ Other ____

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ____

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ____ Time Required: ____ ☐
Rush Confirmation Number: ____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Free (WAD) Cyanide	Strong Acid Leachable Metals by ICPMS	Conductivity	SAR - ICP Metals	Hexavalent Chromium in Soil by IC	O.Reg 153 PAHs (Soil)	O.Reg 153 Petroleum Hydrocarbons (Soil)	O.Reg 153 OC Pesticides (Soil)	PH	BTEX	# of Bottles	Comments
1		MW19-01 S1	19/3/27	10:30	Soil		✓	✓	✓	✓	✓			✓	✓		4	
2		MW19-01 S3		10:40				✓			✓						1	
3		MW19-02 S1		11:30			✓	✓	✓	✓	✓			✓	✓		3	Limited Soil to sample
4		MW19-03 S1		12:40										✓			1	
5		MW19-03 S2		12:45			✓	✓			✓				✓		2	
6		MW19-03 S3		12:50								✓	✓			✓	5	
7		MW19-04 S1		13:10			✓		✓	✓				✓	✓		3	
8		MW19-04 S2		13:15				✓			✓						1	
9		MW19-04 S3		13:20								✓	✓		✓	✓	6	
10		MW19-05 S1		9:00								✓	✓		✓	✓	6	

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
W. Martyniw	19/3/28	14:00	COLENE WAKIDA	~~2019/03/27~~ ~~2019/03/08~~	14:02	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	1/0/3 ice	Present	✓	
		Intact	✓	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

2019/03/28

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 2 of 2

INVOICE TO:

Company Name: #3103 Pinchin Ltd
Attention: Accounts Payable
Address: 2470 Milltower Crt
Mississauga ON L5N 7W5
Tel: (905) 363-0678 Fax: (905) 363-0681
Email: ap@pinchin.com

REPORT TO:

Company Name:
Attention: Michael Birch Craig Kelly
Address:
Tel: Fax:
Email: mbirch@pinchin.com; cxkelly@pinchin.com

PROJECT INFORMATION:

Quotation #: A70927
P.O. #:
Project: 230989.001
Project Name: Phase TWO ESA
Site #: 131 Eglinton Ave E
Sampled By: William Martyniw

Laboratory Use Only:

Maxxam Job #:
Bottle Order #: 709705
COC #: C#709705-02-01
Project Manager: Antonella Brasil

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

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☐ Table 2 ☐ Ind/Comm ☐ Coarse
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☐ Table ___

Other Regulations

☐ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558 ☐ Storm Sewer Bylaw
☐ MISA Municipality ___
☐ PWQO
☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

Turnaround Time (TAT) Required:
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Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
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Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Free (WAD) Cyanide	Strong Acid Leachable Metals by ICPMS	Conductivity	SAR - ICP Metals	Hexavalent Chromium in Soil by IC	O Reg 153 PAHs (Soil)	O.Reg 153 Petroleum Hydrocarbons (Soil)	O.Reg 153 OC Pesticides (Soil)	pH	BTEX	# of Bottles	Comments
1		BH19-06 S1	19/3/27	13:30	Soil		✓	✓	✓	✓	✓			✓	✓		4	
2		BH19-06 S2		13:35								✓	✓			✓	5	
3		BH19-07 S1		13:45					✓	✓		✓	✓		✓	✓	5	
4		BH19-08 S1		11:10					✓	✓		✓	✓	✓	✓	✓	7	
5		BH19-08 S2		11:15			✓	✓			✓						2	
6		DUP 19-01		10:40				✓			✓						1	
7		DUP 19-03		12:50								✓	✓			✓	5	
8		DUP 19-05		9:08											✓		1	
9		DUP 19-06		13:30										✓			1	
10		DUP 19-07		13:45					✓	✓							1	

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
W. Martyniw	19/3/28	14:00	COLINE WIKITAO	~~2019/03/27~~	14:02	
				2019/03/28		

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	1/0/3 ice	Present	✓	
		Intact	✓	

White: Maxxa Yellow: Client

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

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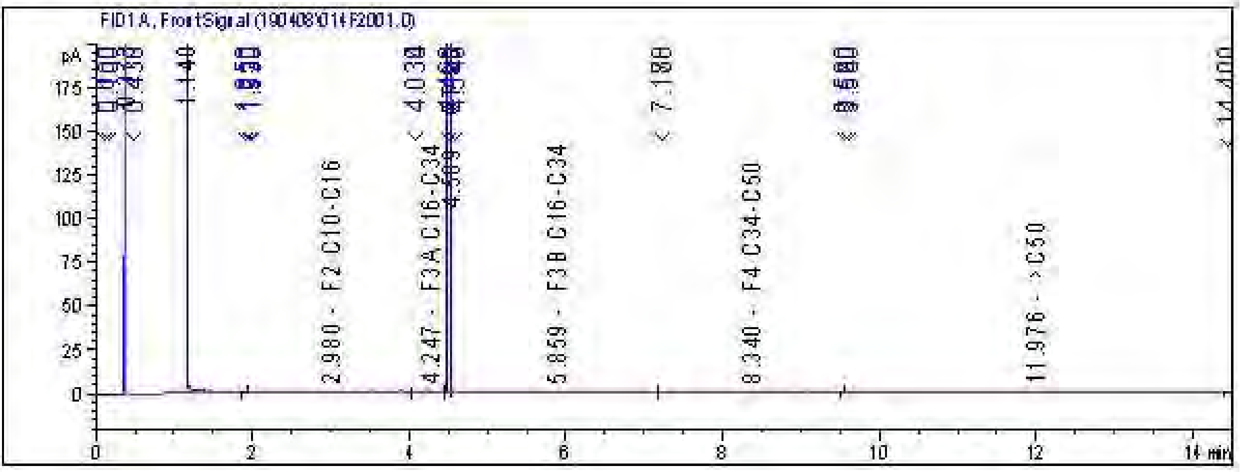
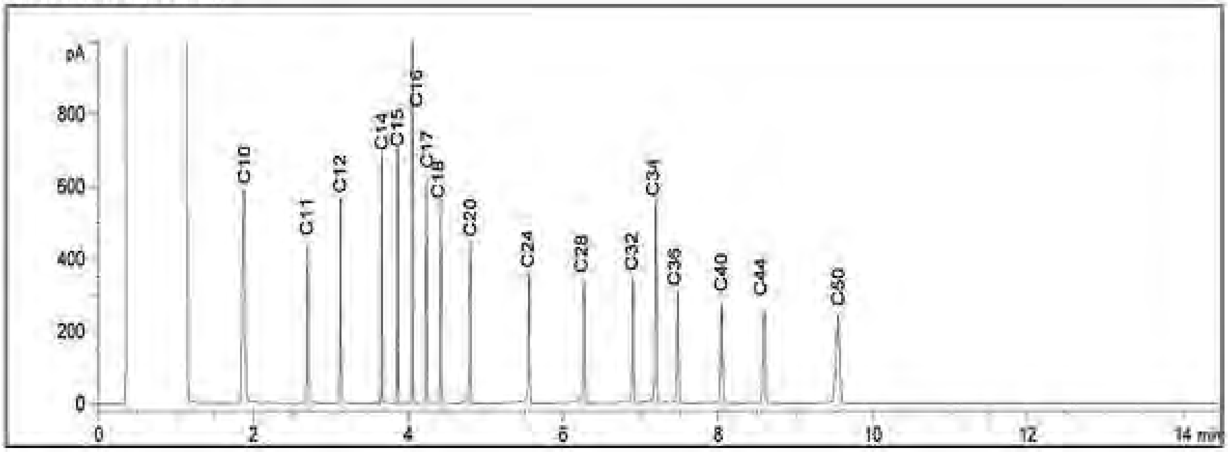
SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

Client ID: MW19-02 S1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: **C6 - C12**
Varsol: **C8 - C12**
Kerosene: **C8 - C16**

Diesel: **C10 - C24**
Fuel Oils: **C6 - C32**
Motor Oils: **C16 - C50**

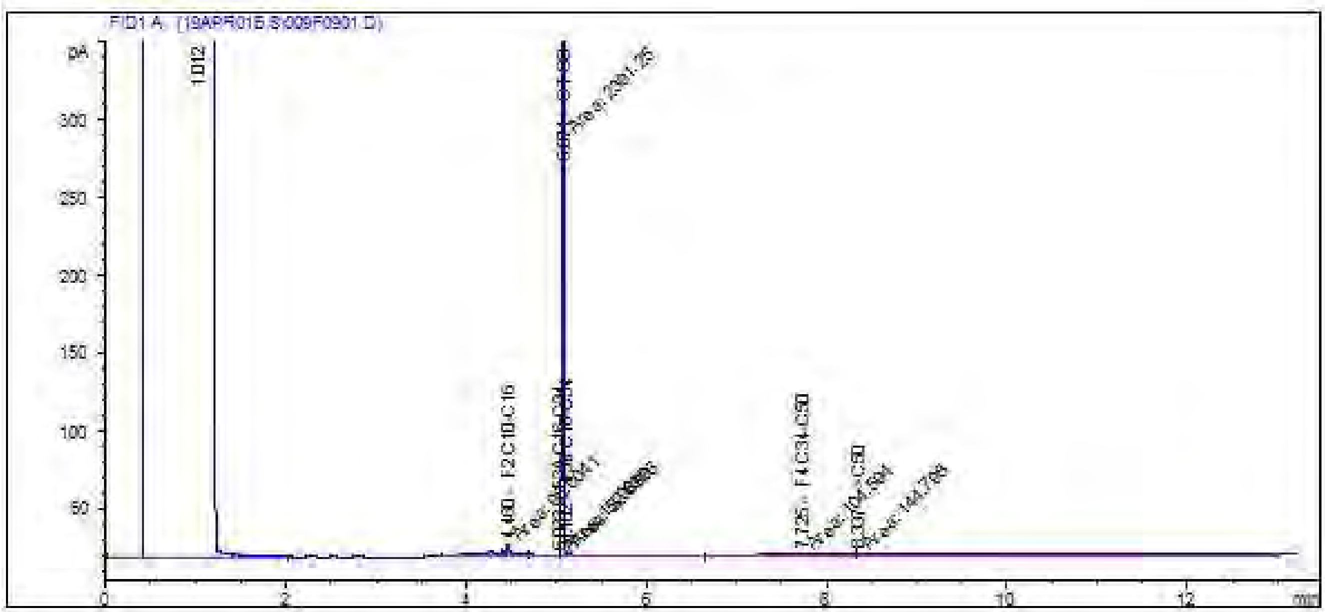
Jet Fuels: **C6 - C16**
Creosote: **C10 - C26**
Asphalt: **C18 - C50+**

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

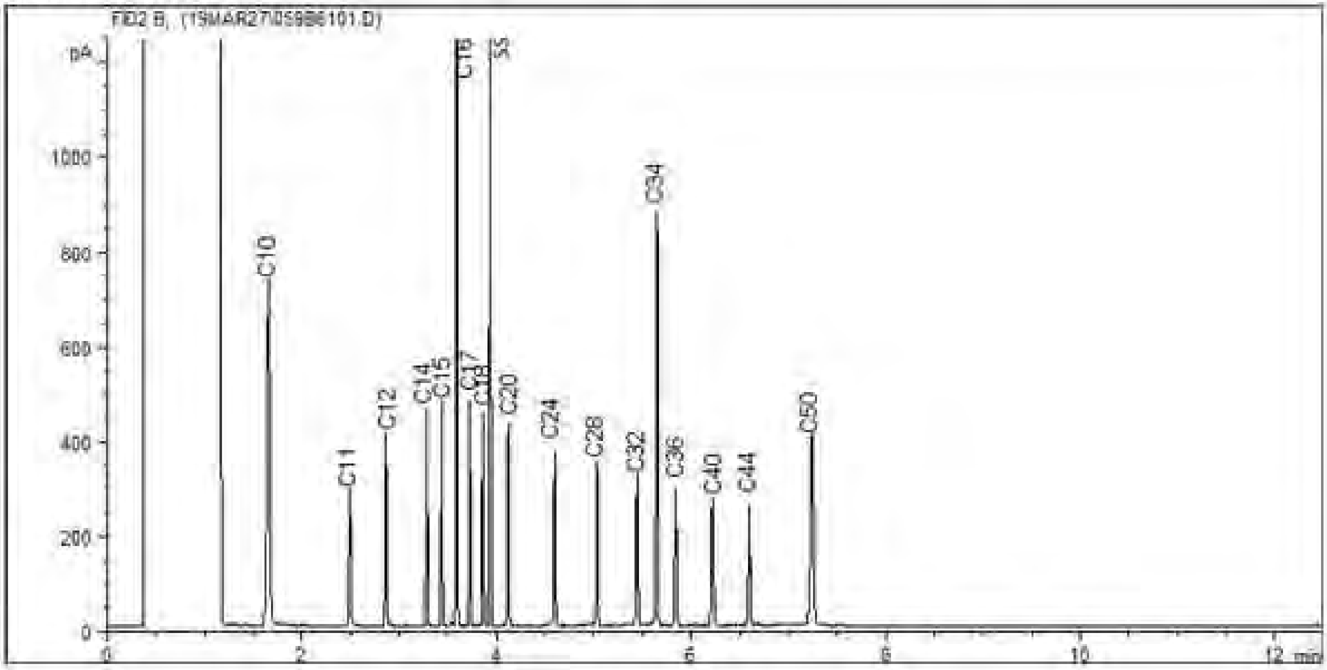
Maxxam Job #: B980920
Report Date: 2019/04/16
Maxxam Sample: JHS257

Pinchin Ltd
Client Project #: 230989.001
Project name: PHASE TWO ESA / 131 EGLINGTON AVE.E
Client ID: MW19-03 S3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C6 - C12
Varsol: C8 - C12
Kerosene: C8 - C16

Diesel: C10 - C24
Fuel Oils: C6 - C32
Motor Oils: C16 - C50

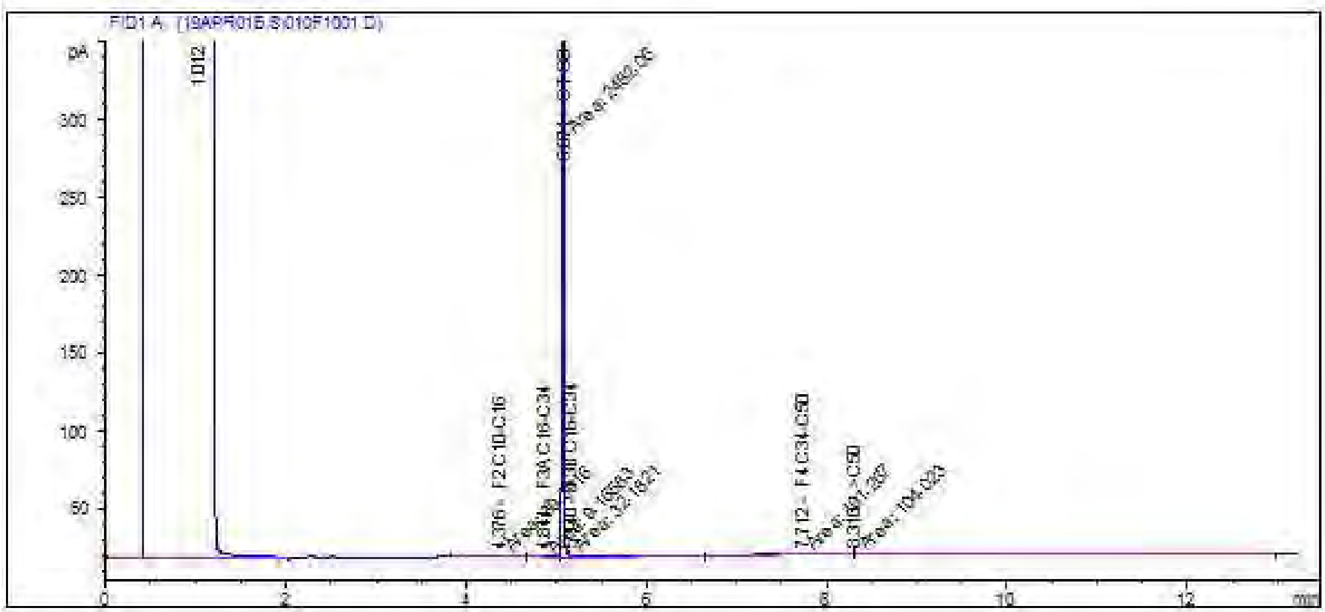
Jet Fuels: C6 - C16
Creosote: C10 - C26
Asphalt: C18 - C50+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

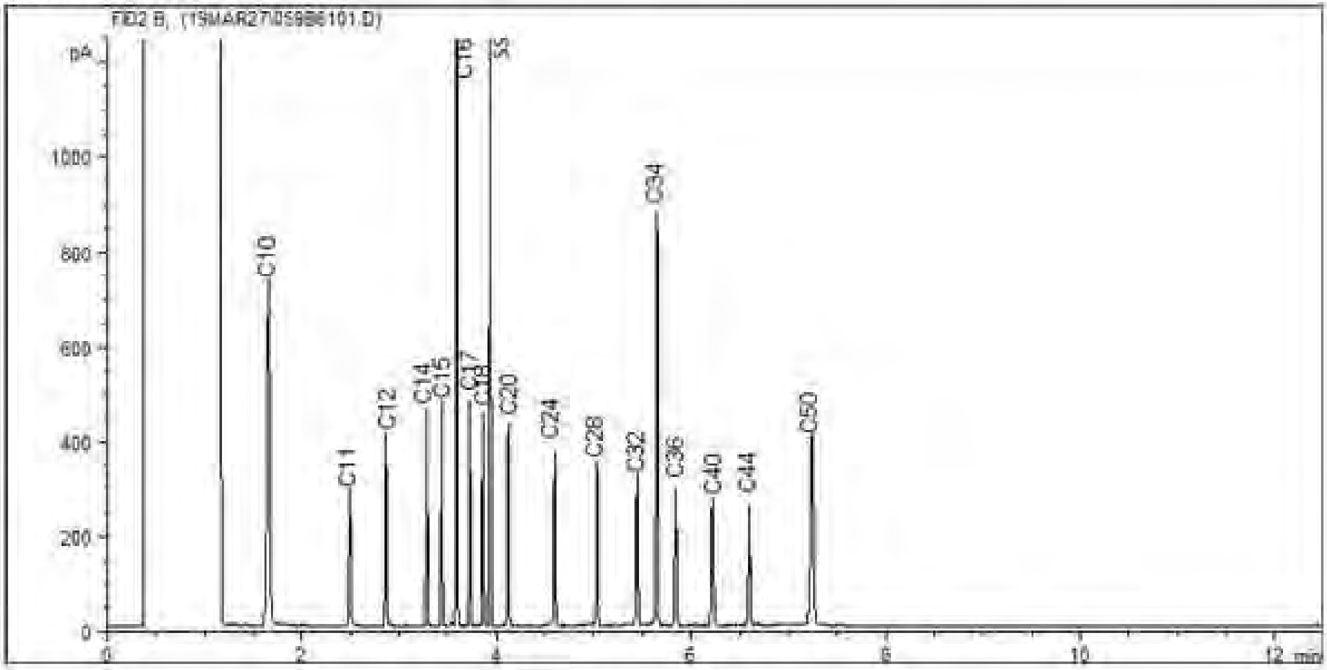
Maxxam Job #: B980920
Report Date: 2019/04/16
Maxxam Sample: JHS260

Pinchin Ltd
Client Project #: 230989.001
Project name: PHASE TWO ESA / 131 EGLINGTON AVE.E
Client ID: MW19-04 S3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

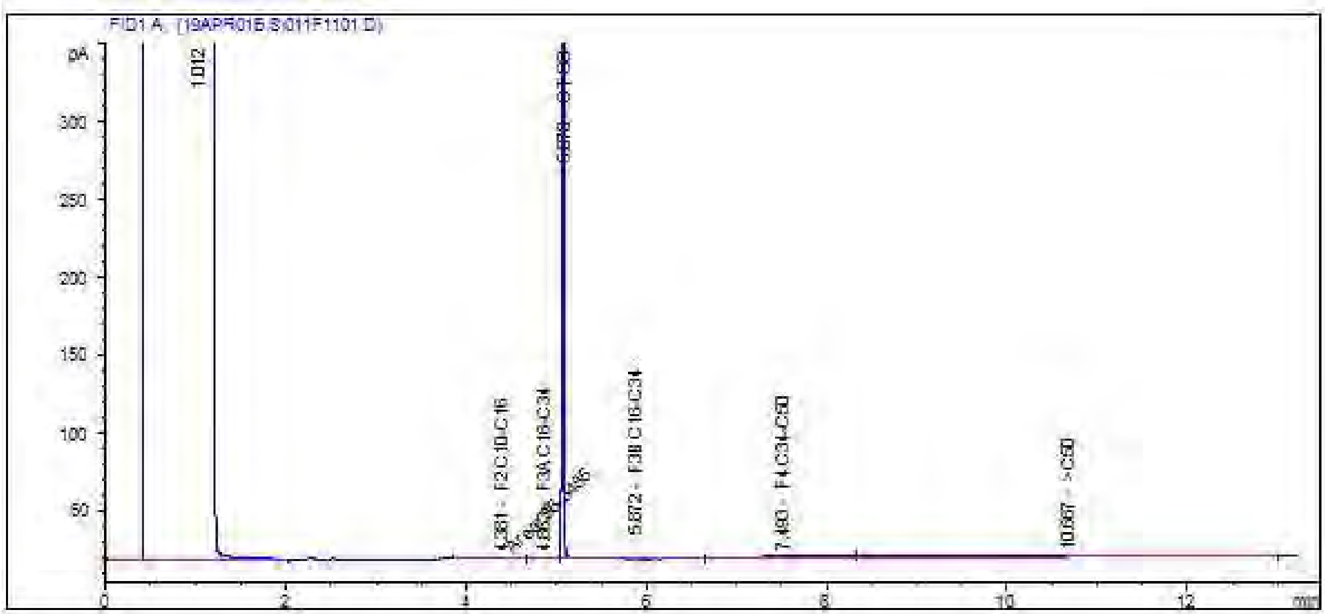
Gasoline: C6 - C12	Diesel: C10 - C24	Jet Fuels: C6 - C16
Varsol: C8 - C12	Fuel Oils: C6 - C32	Creosote: C10 - C26
Kerosene: C8 - C16	Motor Oils: C16 - C50	Asphalt: C18 - C50+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

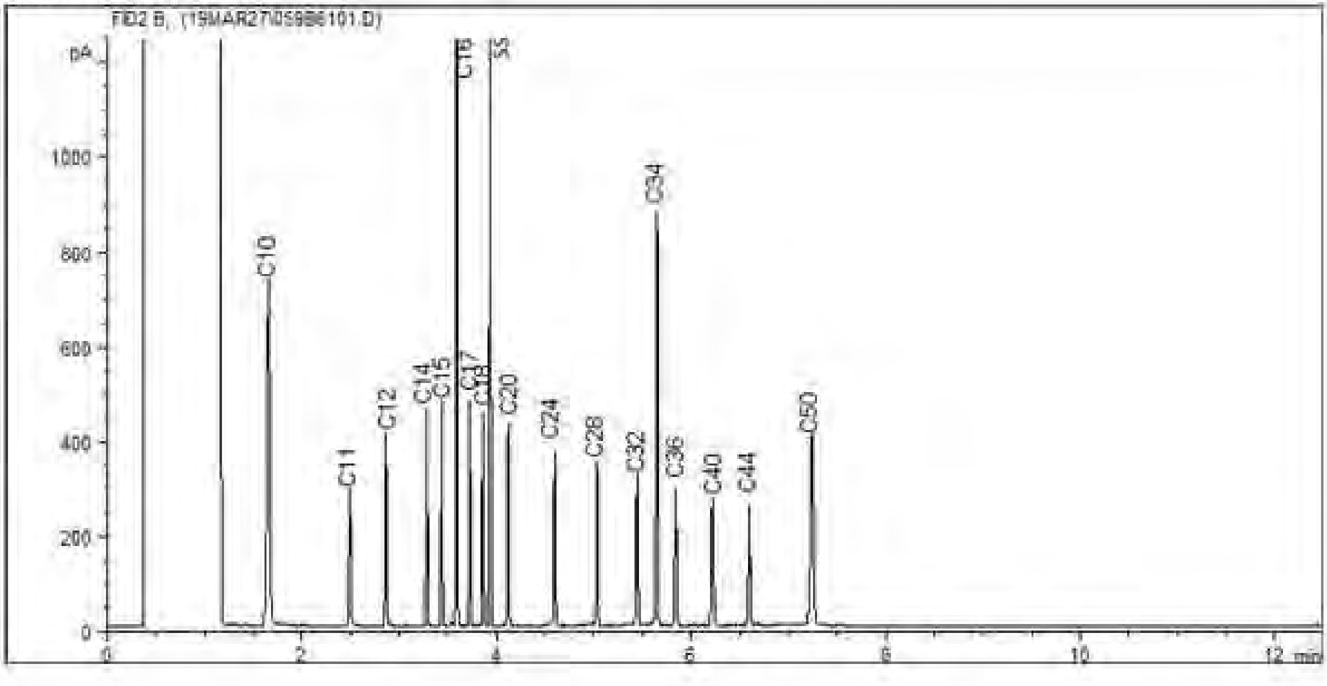
Maxxam Job #: B980920
Report Date: 2019/04/16
Maxxam Sample: JHS261

Pinchin Ltd
Client Project #: 230989.001
Project name: PHASE TWO ESA / 131 EGLINGTON AVE.E
Client ID: MW19-05 S1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C6 - C12
Varsol: C8 - C12
Kerosene: C8 - C16

Diesel: C10 - C24
Fuel Oils: C6 - C32
Motor Oils: C16 - C50

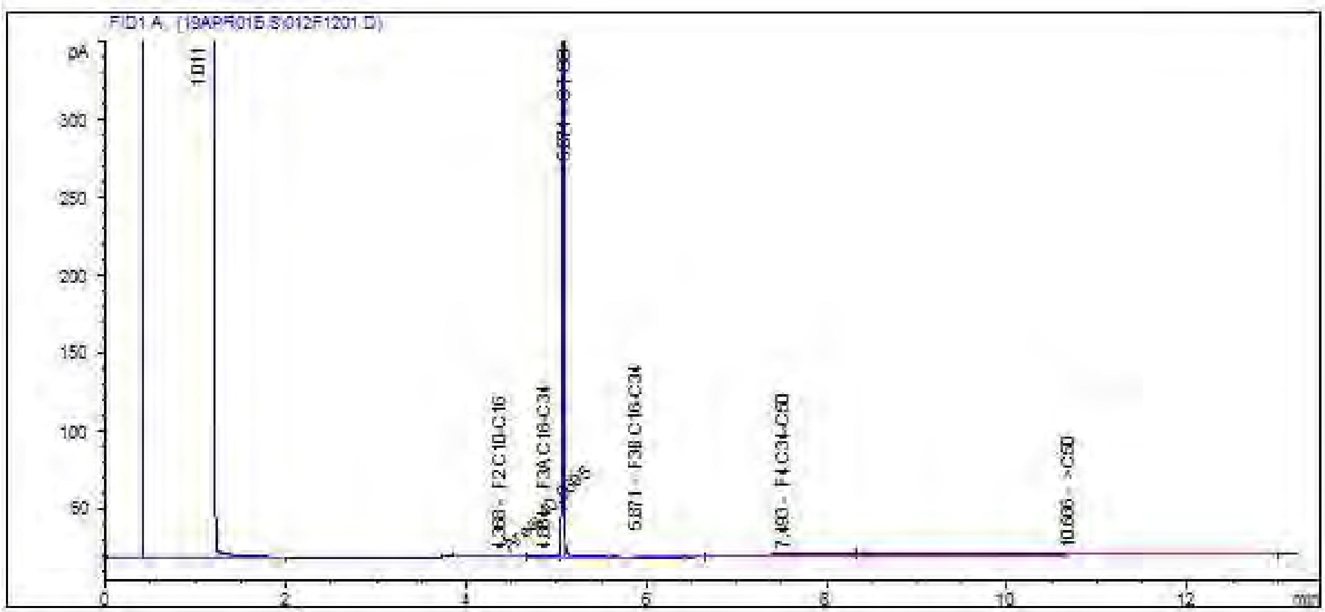
Jet Fuels: C6 - C16
Creosote: C10 - C26
Asphalt: C18 - C50+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

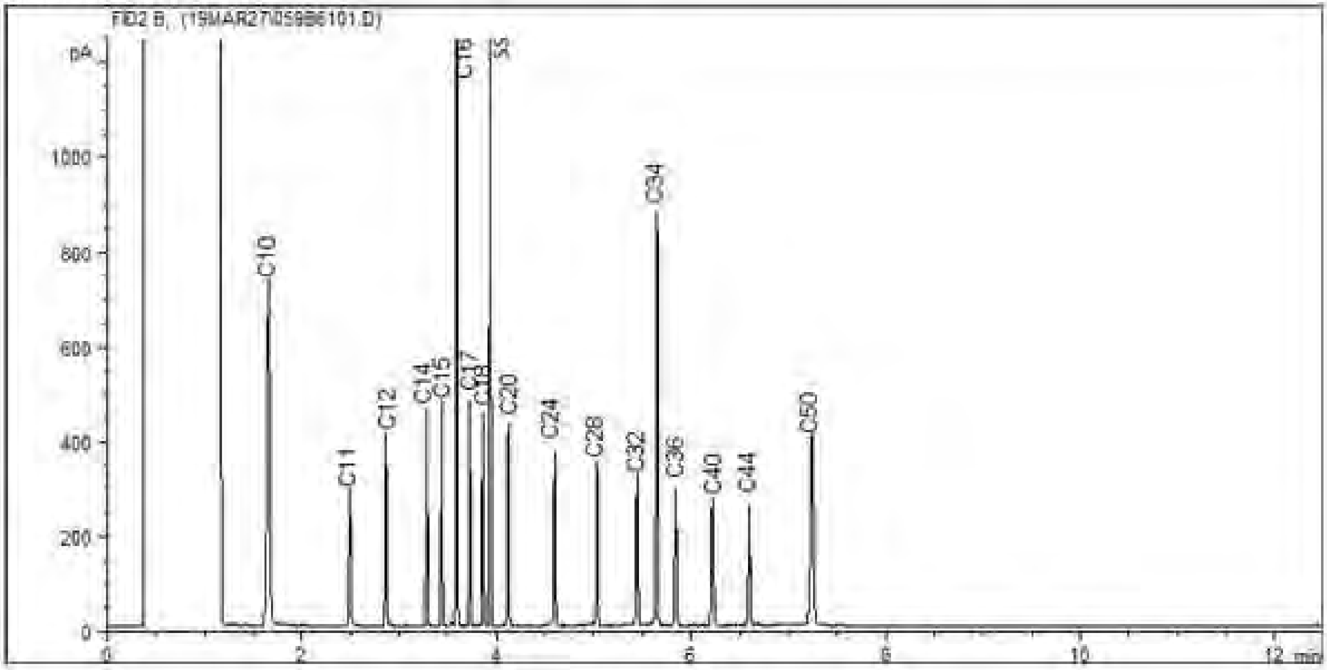
Maxxam Job #: B980920
Report Date: 2019/04/16
Maxxam Sample: JHS263

Pinchin Ltd
Client Project #: 230989.001
Project name: PHASE TWO ESA / 131 EGLINGTON AVE.E
Client ID: BH19-06 S2

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C6 - C12
Varsol: C8 - C12
Kerosene: C8 - C16

Diesel: C10 - C24
Fuel Oils: C6 - C32
Motor Oils: C16 - C50

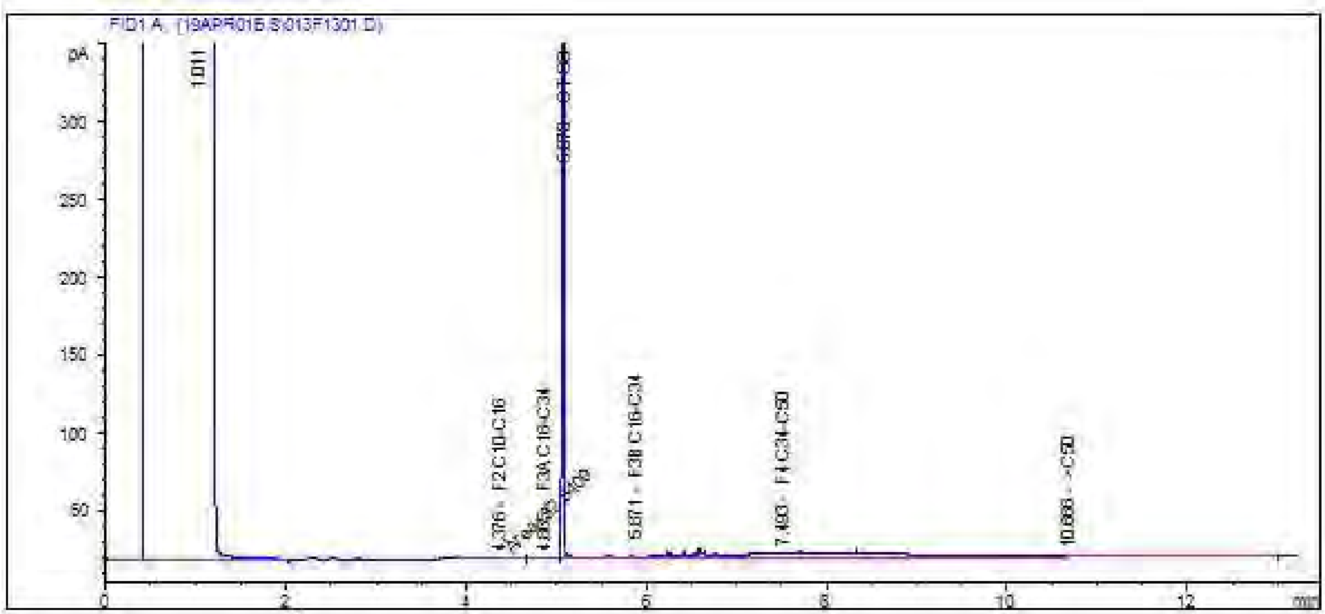
Jet Fuels: C6 - C16
Creosote: C10 - C26
Asphalt: C18 - C50+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

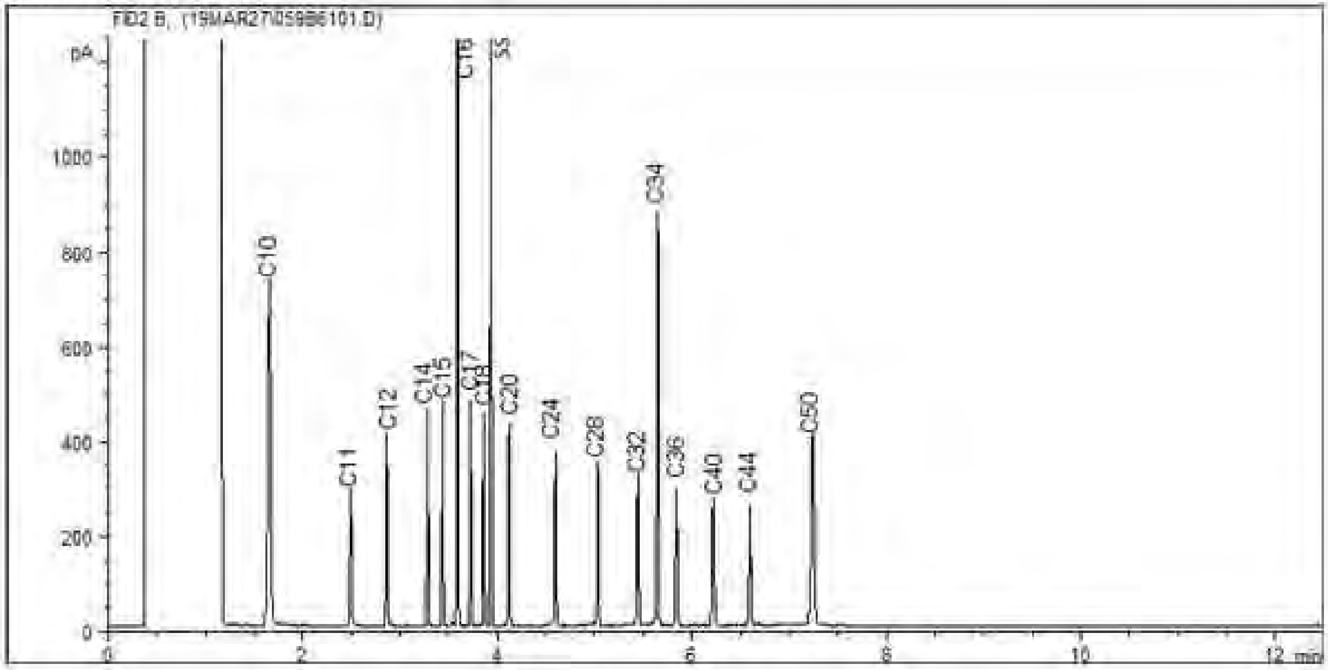
Maxxam Job #: B980920
Report Date: 2019/04/16
Maxxam Sample: JHS264

Pinchin Ltd
Client Project #: 230989.001
Project name: PHASE TWO ESA / 131 EGLINGTON AVE.E
Client ID: BH19-07 S1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C6 - C12
Varsol: C8 - C12
Kerosene: C8 - C16

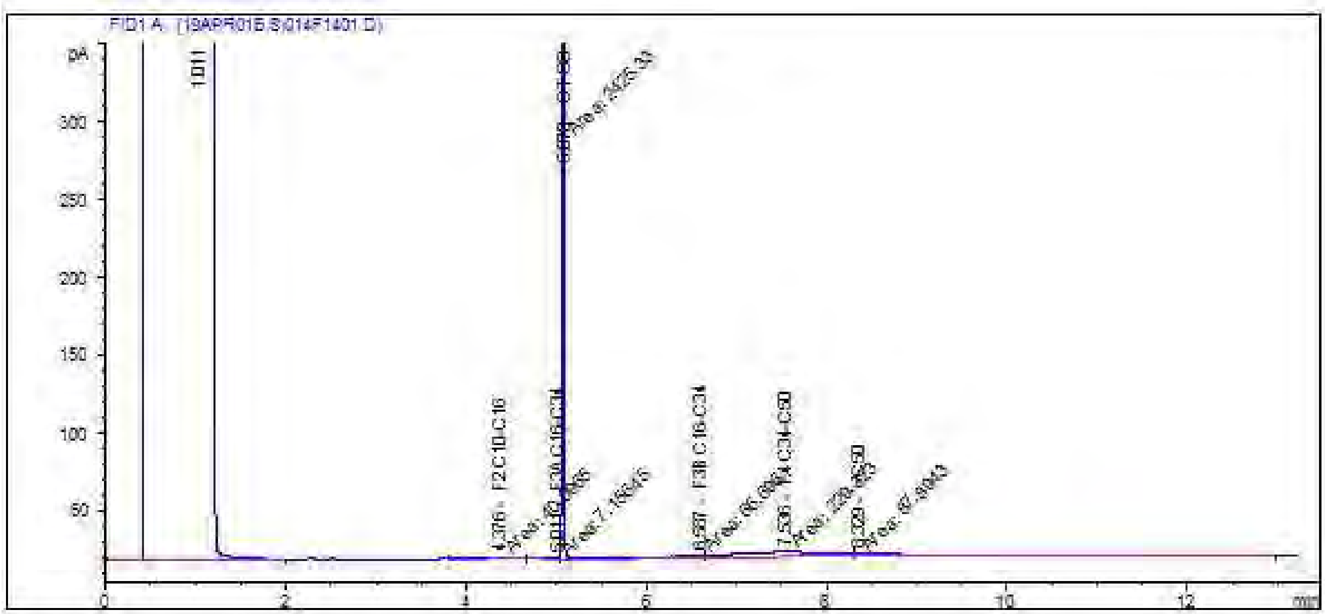
Diesel: C10 - C24
Fuel Oils: C6 - C32
Motor Oils: C16 - C50

Jet Fuels: C6 - C16
Creosote: C10 - C26
Asphalt: C18 - C50+

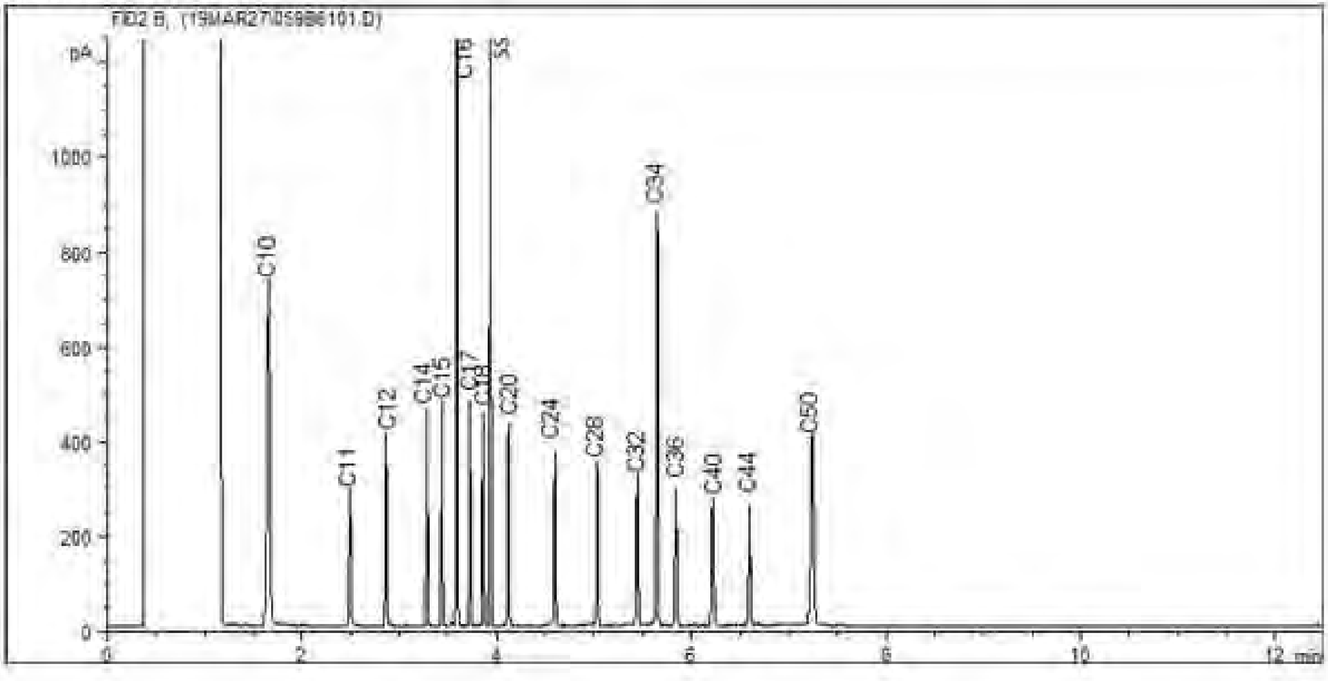
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Client ID: BH19-08 S1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

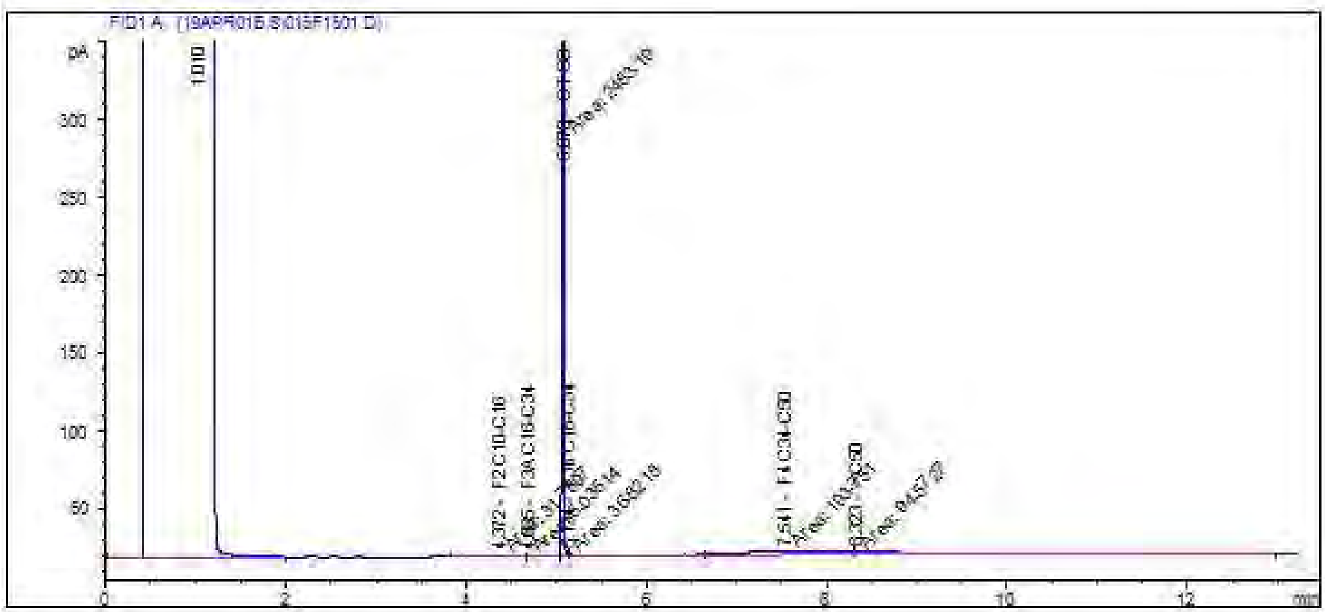
Gasoline: C6 - C12	Diesel: C10 - C24	Jet Fuels: C6 - C16
Varsol: C8 - C12	Fuel Oils: C6 - C32	Creosote: C10 - C26
Kerosene: C8 - C16	Motor Oils: C16 - C50	Asphalt: C18 - C50+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

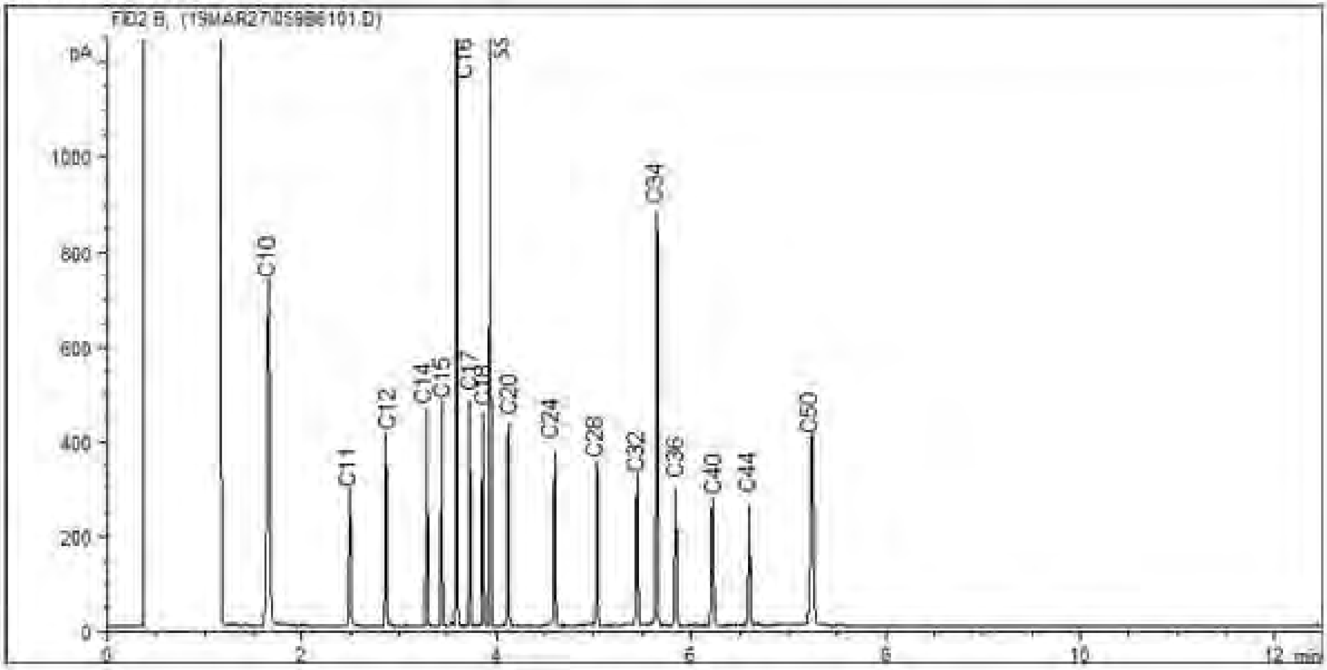
Maxxam Job #: B980920
Report Date: 2019/04/16
Maxxam Sample: JHS268

Pinchin Ltd
Client Project #: 230989.001
Project name: PHASE TWO ESA / 131 EGLINGTON AVE.E
Client ID: DUP19-03

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



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Varsol: C8 - C12
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Motor Oils: C16 - C50

Jet Fuels: C6 - C16
Creosote: C10 - C26
Asphalt: C18 - C50+

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Grain Size Analysis Report

Client Sample ID: MW19-01 S1 (JH252)
Maxxam Sample ID: VN0442-01
Maxxam Job #: B926843

Tot. Sample Wt (g)*: 10.04
> 2 mm Sample Wt (g)*: 0.88
* Dry mass based on Sieve Aliquot

Batch # (Sieve): 9381999
Batch # (Hydro): 9382048

Analysis Date (Sieve): 2019/04/15
Analysis Date (Hydro): 2019/04/15

	Description	Particle Size (mm)	Percent Passing
Sieve	Sieve 4	4.750	98.3
	Sieve 10	2.000	91.2
	Sieve 20	0.850	87.6
	Sieve 40	0.425	83.8
	Sieve 100	0.150	72.8
	Sieve 200	0.075	63.7
Hydrometer	R1min	0.0476	46.4
	R3min	0.0281	39.8
	R10min	0.0151	31.0
	R30min	0.0089	26.5
	R90min	0.0053	21.0
	R270min	0.0032	17.7
	R1080min	0.0015	13.3

Grain Size Proportion (%)**:

	Min (mm)	Max (mm)	Percentage
Sand	0.050	2.000	47.5
Silt	0.002	0.050	36.6
Clay	-	0.002	16.0

** Calculations based only on sub 2 mm fraction.
Compatible with USDA and Canadian Soil Triangles

Soil Classification***:

Based on the entire sample

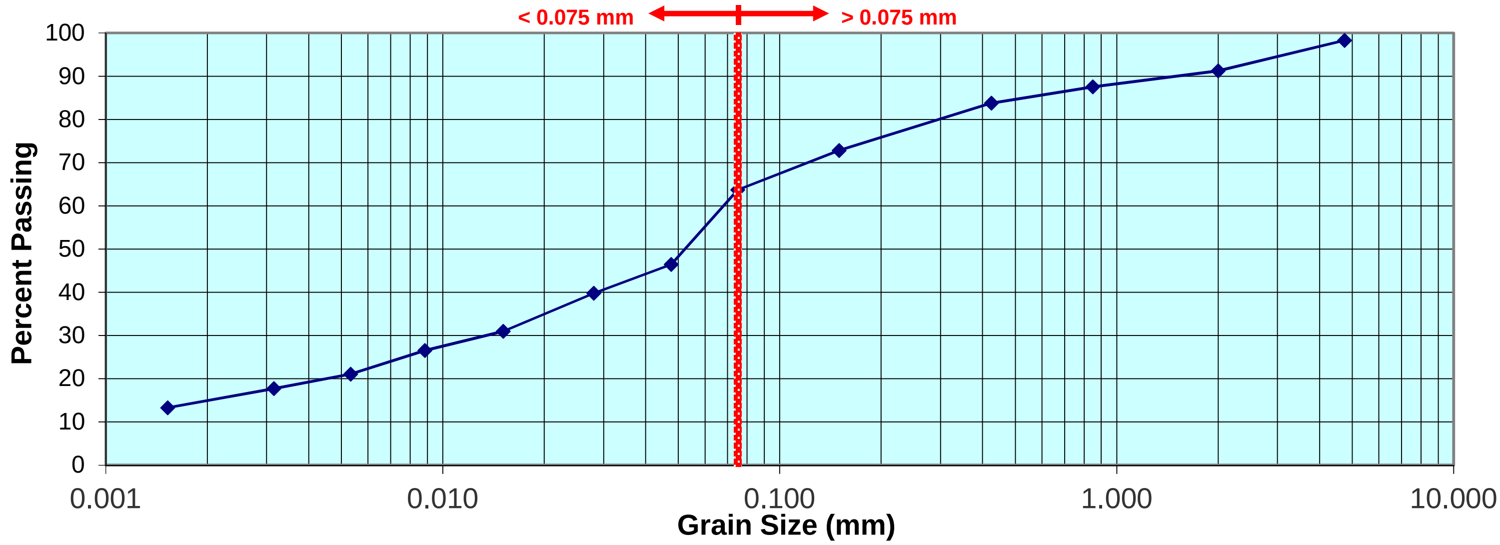
Percentage (by mass) less than 0.075 mm = 63.7
Classification = Fine Textured Soil

Based on the < 2 mm fraction **

Percentage (by mass) less than 0.075 mm = 69.8
Classification = Fine Textured Soil

**** Grain size analysis performed to classify the soil material according to the criteria prescribed in Section 42.2 of Ontario Regulation 153/04 as amended by Ontario Regulation 511/09, and conducted in accordance with test procedures outlined in ASTM D422.

CLAY	SILT			SAND			GRAVEL	
< 0.002 mm	Fine 0.002 - 0.0063 mm	Medium 0.0063 - 0.02 mm	Coarse 0.02 - 0.05 mm	Fine 0.05 - 0.2 mm	Medium 0.2 - 0.63 mm	Coarse 0.63 - 2 mm	Fine 2 - 6.3 mm	Med > 6.3



*** ON Regulation 153/04 requires coarse:fine determination on the < 2 mm fraction. Other jurisdictions may require the entire sample, thus both classifications are provided

Note: Clay/Silt/Sand/Gravel Graphic above Graph: Sand | Silt | Clay fractions in accordance with USDA and Canadian System of Soil Classification. Sub fractions in accordance with the British (BSI) system for information purposes.

Maxxam

Grain Size Analysis Report

Client Sample ID: BH19-06 S2 (JHS263)
Maxxam Sample ID: VN0443-01
Maxxam Job #: B926843

Tot. Sample Wt (g)*: 11.52
> 2 mm Sample Wt (g)*: 2.80
* Dry mass based on Sieve Aliquot

Batch # (Sieve): 9381999
Batch # (Hydro): 9382048

Analysis Date (Sieve): 2019/04/15
Analysis Date (Hydro): 2019/04/15

	Description	Particle Size (mm)	Percent Passing
Sieve	Sieve 4	4.750	78.3
	Sieve 10	2.000	75.7
	Sieve 20	0.850	73.7
	Sieve 40	0.425	71.3
	Sieve 100	0.150	64.6
	Sieve 200	0.075	61.7
Hydrometer	R1min	0.0442	61.8
	R3min	0.0257	58.9
	R10min	0.0139	51.0
	R30min	0.0082	45.1
	R90min	0.0050	39.2
	R270min	0.0030	33.4
	R1080min	0.0015	24.5

Grain Size Proportion (%)**:

	Min (mm)	Max (mm)	Percentage
Sand	0.050	2.000	18.4
Silt	0.002	0.050	45.2
Clay	-	0.002	36.5

** Calculations based only on sub 2 mm fraction.
Compatible with USDA and Canadian Soil Triangles

Soil Classification***:

Based on the entire sample

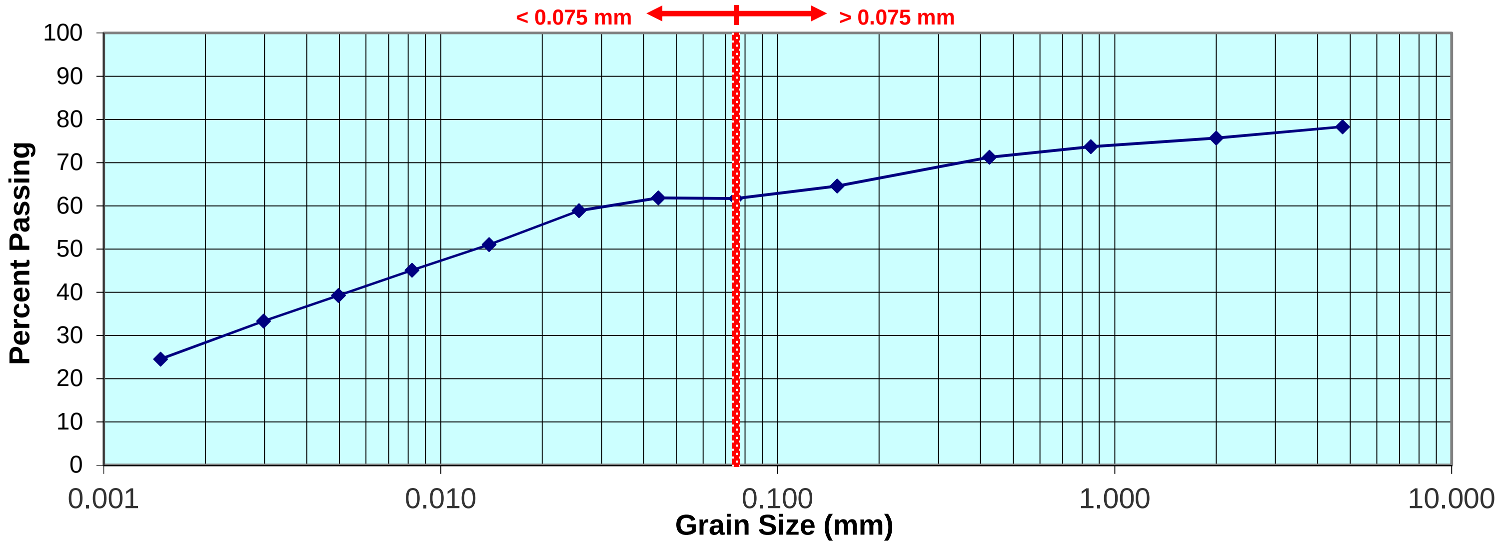
Percentage (by mass) less than 0.075 mm = 61.7
Classification = Fine Textured Soil

Based on the < 2 mm fraction ****

Percentage (by mass) less than 0.075 mm = 81.5
Classification = Fine Textured Soil

**** Grain size analysis performed to classify the soil material according to the criteria prescribed in Section 42.2 of Ontario Regulation 153/04 as amended by Ontario Regulation 511/09, and conducted in accordance with test procedures outlined in ASTM D422.

CLAY	SILT			SAND			GRAVEL	
< 0.002 mm	Fine 0.002 - 0.0063 mm	Medium 0.0063 - 0.02 mm	Coarse 0.02 - 0.05 mm	Fine 0.05 - 0.2 mm	Medium 0.2 - 0.63 mm	Coarse 0.63 - 2 mm	Fine 2 - 6.3 mm	Med > 6.3



*** ON Regulation 153/04 requires coarse:fine determination on the < 2 mm fraction. Other jurisdictions may require the entire sample, thus both classifications are provided

Note: Clay/Silt/Sand/Gravel Graphic above Graph: Sand | Silt | Clay fractions in accordance with USDA and Canadian System of Soil Classification. Sub fractions in accordance with the British (BSI) system for information purposes.

Grain Size Analysis Report (QA-SRM)

Sieve Batch #: 9381999
Hydrometer Batch #: 9382048

Standard Reference Material

			Acceptance Limits	
	Fraction	**% Recovery**	**Minimum**	**Maximum**
Sieve	**> 0.075 mm**	99	75	125
	< 0.075 mm	101	75	125
Hydrometer	**Sand**	101	75	125
	Silt	101	75	125
	Clay	96	75	125

Your Project #: 230989.001
Site Location: PHASE TWO ESA / 131 EGLINTON AVE. E.
Your C.O.C. #: 705704-17-01

Attention: Michael Birch

Pinchin Ltd
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5

Report Date: 2019/04/24
Report #: R5682143
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B999737
Received: 2019/04/16, 14:14

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Strong Acid Leachable Metals by ICPMS	2	2019/04/18	2019/04/18	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam’s profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total Cover Pages : 1

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JLR033	JLR034		
Sampling Date		2019/03/27 13:45	2019/03/27 13:45		
COC Number		705704-17-01	705704-17-01		
	UNITS	**BH19-07 S1 A**	**BH19-07 S1 B**	**RDL**	**QC Batch**
Metals					
Acid Extractable Barium (Ba)	ug/g	23	20	0.50	6077067

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

TEST SUMMARY

Maxxam ID: JLR033
Sample ID: BH19-07 S1 A
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/04/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	6077067	2019/04/18	2019/04/18	Viviana Canzonieri

Maxxam ID: JLR034
Sample ID: BH19-07 S1 B
Matrix: Soil

Collected: 2019/03/27
Shipped:
Received: 2019/04/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	6077067	2019/04/18	2019/04/18	Viviana Canzonieri

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C

Cooler custody seal was present and intact .

Revised Report (2019/04/24) : Site address changed to Phase Two ESA / 131 Eglinton Ave. E., as per client request.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6077067	Acid Extractable Barium (Ba)	2019/04/18	NC	75 - 125	98	80 - 120	<0.50	ug/g	1.4	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

FUNDAMENTAL LABORATORY ACCEPTANCE GUIDELINE

Maxxam Job #:	B999737
Date Received:	2019/04/16
Your C.O.C. #:	705704-17-01
Your Project #:	230989.001
Maxxam Project Manager:	Antonella Brasil
Quote #:	B82222

Invoice To:
Pinchin Ltd
ATTN: Accounts Payable
2470 Milltower Crt
Mississauga, ON
CANADA L5N 7W5
Client Contact:
Michael Birch

No discrepancies noted.

Report Comments

Received Date:	**2019/04/16**	**Time:**	**14:14**	**By:**	
Inspected Date:		**Time:**		**By:**	
FLAG Created Date:		**Time:**		**By:**	

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Eva Pranjic

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 1 of 1

IMMEDIATE

INVOICE TO:

Company Name: #3103 Pinchin Ltd
Attention: Accounts Payable
Address: 2470 Milltower Crt
Mississauga ON L5N 7W5
Tel: (905) 363-0678 Fax: (905) 363-0681
Email: ap@pinchin.com

REPORT TO:

Company Name:
Attention: Michael Birch, Craig Kelly
Address:
Tel: Fax:
Email: mbirch@pinchin.com ckelly@pinchin.com

PROJECT INFORMATION:

Quotation #: ~~B82222~~ A70927
P.O. #:
Project: ~~200923.002~~ 230989.001
Project Name: Phase TWO ESA
Site #: 131 Eglinton Ave. W
Sampled By: William Martyniw

Laboratory Use Only:

Maxxam Job #:	Bottle Order #:
	705704
COC #:	Project Manager:
C#705704-17-01	Antonella Brasil

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)

☐ Table 1 ☐ Res/Park ☐ Medium/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☑ For RSC
☐ Table ___

Other Regulations

☐ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558 ☐ Storm Sewer Bylaw
☐ MISA Municipality ________
☐ PWQO
☐ Other ________

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ______

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ________ Time Required: ____ ☐
Rush Confirmation Number: ________ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Barium Only										# of Bottles	Comments
1		BH19-07 S1A	19/3/27	13:45	Soil		✓										1	
2		BH19-07 S1B	19/3/27	13:45	Soil		✓										1	
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

16-Apr-19 14:14
Antonella Brasil
B999737
GK1 ENV-748

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
W Martyniw	19/4/16	14:10		2019/04/16	14:14	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	5/5/5	Present	✓	
		Intact		

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client