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**A REPORT TO
BALLYMORE BUILDING (BARRIE) CORP.
C/O BALLYMORE HOMES**

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT

750 LOCKHART ROAD

CITY OF BARRIE

Reference No. 1706-E080

August 31, 2017

DISTRIBUTION

3 Copies - Ballymore Building (Barrie) Corp. c/o Ballymore Homes



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1.0 **EXECUTIVE SUMMARY**

Soil Engineers Ltd. (SEL) was retained by Ballymore Building (Barrie) Corp. c/o Ballymore Homes to carry out a Phase Two Environmental Site Assessment (Phase Two ESA), as defined by Ontario Regulation (O. Reg.) 153/04, as amended. The subject property is located at 750 Lockhart Road, in the City of Barrie (hereinafter referred to as “the subject site”).

The purpose of the Phase Two ESA was to determine the soil and groundwater quality at the subject site, as related to the environmental concerns identified in our Phase One Environmental Site Assessment (Phase One ESA).

The field work was performed at selected locations on the subject site. Soil and groundwater samples were collected and submitted for chemical analysis in accordance with the Ministry of the Environment and Climate Change (MOECC) Table 1, Full Depth Background Site Condition Standards, for residential/parkland/institutional/industrial/community/commercial use and for all textured soils (Table 1 Standards), as published in the “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” (EPA), dated April 15, 2011.

A review of the analytical test results of soil and groundwater samples indicates the tested parameters at the test locations meet the Table 1 Standards. Consequently, there are no contaminants identified at the subject site at a concentration above the applicable site condition standards (Table 1 Standards) during the Phase Two ESA.

Based on the findings of the Phase Two ESA, it is our opinion that the property is suitable for the proposed development. No further environmental investigation is recommended at this time.



2.0 INTRODUCTION

Soil Engineers Ltd. (SEL) was retained by Ballymore Building (Barrie) Corp. c/o Ballymore Homes to carry out a Phase Two Environmental Site Assessment (Phase Two ESA), as defined by Ontario Regulation (O. Reg.) 153/04, as amended by O. Regs. 366/05, 66/08, 511/09, 245/10, 179/11, 269/11 and 333/13, herein referred to as O. Reg. 153/04. The subject site is located at the north side of Lockhart Road, approximately 340 m east of the intersection at Lockhart Road and Yonge Street in the City of Barrie. It has the municipal address of 750 Lockhart Road, Barrie.

The purpose of the Phase Two ESA is to determine the soil and groundwater quality at the subject site, as related to the environmental concerns identified in our Phase One Environmental Site Assessment (Phase One ESA).

2.1 Site Description

The subject site, irregular in shape and approximately 26.69 ha (65.95 ac) in area, is located on the north side of Lockhart Road, approximately 340 m east of the intersection at Lockhart Road and Yonge Street in the City of Barrie. The municipal address of the subject site is 750 Lockhart Road, Barrie. The subject site is part of a Property Identification Number (PIN) 58092-0030 (LT). The legal description of the subject site, as described in the parcel register, is PT S 1/2 LT 16 CON 11 INNISFIL PT 1 51R20554 ; INNISFIL.

At the time of the site assessment, the subject site consisted of one (1) residential building, one (1) tractor storage shed, one (1) barn, one (1) metal storage trailer, and four (4) storage sheds located at the mid-southern section of the subject site. There were wooded areas in the middle and northeastern sections of the subject site. The remaining portions of the subject site consisted of farmland.

The subject site is located in a rural area within the City of Barrie. A roadway (Lockhart Road) was adjacent to the south of the subject site. The neighbouring properties in the surrounding the subject site consist mainly of residential properties to the northwest, east and south beyond



Lockhart Road, agricultural properties to the north and west beyond the railway tracks, undeveloped property to the northeast and east, and a transformer substation to the southwest.

The nearest watercourse was located to the northeast of the subject site. The ground surface was relatively flat with minor undulations, and the overall grade at the subject site generally descends towards the northeast.

2.2 **Property Ownership**

This Phase Two ESA was commissioned to address the environmental concerns in accordance with our proposal dated June 7, 2017 as approved on June 12, 2017 by Ms. Sharon L. Dionne of Ballymore Building (Barrie) Corp. c/o Ballymore Homes. Our client can be contacted at:

Ballymore Building (Barrie) Corp. c/o Ballymore Homes
12840 Yonge Street, Suite 200
Richmond Hill, Ontario
L4E 4H1
Attention: Ms. Sharon L. Dionne

2.3 **Current and Proposed Future Uses**

The subject site is used for agricultural and residential purposes. A residential development is being proposed for the subject site. It is anticipated that the new development will be provided with municipal services meeting urban standards.



2.4 Applicable Site Condition Standards

SEL has selected the applicable regulatory criteria from O. Reg. 153/04, as amended under the Environmental Protection Act, to assess the analytical data from the submitted soil and groundwater samples. The following information was used to select the appropriate criteria:

- The subject site is considered to be sensitive based on the definition set forth in Ontario Regulation 153/04 as amended, as the property is within/adjacent/part of an area of natural significance.
- The analytical testing indicated the pH of the tested soil samples is between 5 and 9.
- The property is not a shallow soil property, as bedrock was not encountered within 2.0 m below ground surface (mbgs) during the investigation.
- There was a watercourse within 30 m to the northeast and east of the subject site.
- The subject site is located in an agricultural area within the City of Barrie. Based on the information obtained from the Phase One ESA, there are six (6) domestic well records, one (1) test hole record, one (1) public supply record and one (1) abandoned supply well record within 250 m from the subject site.
- Full depth background criteria is to be used in this assessment.
- The intended property use of the subject site is residential.
- No grain size analysis has been performed and, therefore, coarse textured soils are automatically applied.

Based on the above evaluation, the Ministry of the Environment and Climate Change (MOECC) Table 1, Full Depth Background Site Condition Standards, for residential/ parkland/institutional/industrial/ commercial/community use and for all textured soils (Table 1 Standards), as published in the “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” (EPA), dated April 15, 2011, has been selected for evaluating the environmental conditions at the subject site.



3.0 **BACKGROUND**

3.1 **Physical Setting**

Based on the information obtained from our Phase One ESA, the general physical setting of the subject site is summarized below:

The subject site is located within a rural area in the City of Barrie. The neighbouring properties in the surrounding the subject site consist mainly of residential properties to the northwest, east and south beyond Lockhart Road, agricultural properties to the north and west beyond the railway tracks, undeveloped property to the northeast and east, and a transformer substation to the southwest.

A review of a Geological Map of the area, located at the Geological Survey of Canada website indicates that the site is underlain predominantly by the Newmarket Till, which consists of a sandy silt to silt matrix.

The ground surface was relatively flat with minor undulations, and the overall grade at the subject site generally descends towards the northeast. The subject site is located in the larger hydrogeological region known as Southern Ontario Lowlands. A watershed map provided by the Lake Simcoe Region Conservation Authority (LSRCA) shows the subject site is situated in the Hewitt's Creek watershed.

Based on the review of the County of Simcoe's and City of Barrie's Official Plans, and the Ontario Ministry of Natural Resources Natural Heritage Information Centre (HNIC) database files for ESAs and ANSIs within the Phase One Study Area, there is a provincial significant wetland located at the central section of the subject site, and adjacent to the east of the subject site. Furthermore, there was a watercourse located to the northeast and east of the subject site.



3.2 Past Investigations

The following our previous investigation reports for the subject site were reviewed as part of this Phase Two ESA:

- Preliminary Test Pit Investigation (Reference No. 1705-C123, dated June 22, 2017).
- Phase One Environmental Site Assessment (Reference No. 1706-E080, dated August 22, 2017).

Test Pit Investigation

Based on the information from the test pit investigation, ten (10) test pits were excavated to depths ranging from 1.2 mbgs to 3.3 mbgs. Topsoil fill and earth fill was encountered at five (5) test pit locations at the southeastern sections of the subject site.

Phase One Environmental Site Assessment (Phase One ESA) by SEL

The Phase One ESA identified the Potentially Contaminating Activities (PCAs) at the subject site and in the Phase One Study Area that may contribute to Areas of Potential Environmental Concern (APECs) at the subject site, based on records review, interviews and site reconnaissance. The findings of the Phase One ESA include the following potential environmental concerns.

- Use of pesticides for farming activities on the northwest and southern sections of the subject site.
- Presence of fill materials at the southeastern section of the subject site, based on the information obtained from our previous test pit investigation.



- Presence of heating fuel oil aboveground storage tank and a diesel aboveground storage tank on the southern section of the subject site.
- Presence of railway tracks to the west of the subject site.
- Presence of transformer electrical substation to the southwest of the subject site.



SCOPE OF THE INVESTIGATION

4.1 Overview of Site Investigation

The purpose of this investigation (Phase Two ESA) is to assess the soil and groundwater quality at the subject site, as related to the environmental concern raised in the findings of our Phase One ESA. This Phase Two ESA was conducted in general conformance with the CSA Standard Z769-00 and O. Reg. 153/04 as amended.

The scope of work for this investigation includes:

- Locate the underground and overhead utilities.
- Conduct a total of eleven (11) boreholes to depths ranging from 1.8 mbgs to 11.2 mbgs for geotechnical and environmental investigation, and conduct a total of eight (8) hand dug test pits to depths of 0.2 mbgs to 0.6 mbgs.
- Collect representative soil samples from the boreholes and test pits.
- Undertake field examination of the retrieved soil samples for visual and olfactory evidence of potential contamination.
- Undertake soil vapour measurements for the retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 ppm (parts per million by volume).
- Install monitoring wells in six (6) of the boreholes for groundwater sampling and testing.
- Conduct one groundwater monitoring round and collect groundwater samples for chemical testing.
- Carry out analytical testing program on selected soil samples and groundwater samples including quality assurance/quality control (QA/QC samples) for one or more of the following parameters: Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Organochlorine Pesticides (OCs), Polychlorinated Biphenyls (PCBs), Polycyclic Aromatic Hydrocarbons (PAHs), and/or Metals and/or Inorganic parameters.



- Review analytical testing results of submitted soil and groundwater samples using applicable Site Condition Standards.
- Prepare a Phase Two ESA report containing the findings of the investigation.

The rationale for the selection of borehole locations is presented in the Sampling and Analysis Plan, Appendix 'A'.

4.2 **Media Investigated**

Based on the findings of the Phase One ESA, soil and groundwater media were investigated during the Phase Two ESA in accordance with the Sampling and Analysis Plan provided in Appendix 'A'. No sediment sampling was conducted in this Phase Two ESA.

Boreholes were advanced using a conventional drill rig equipped with flight augers and split-spoon samplers. Soil samples were logged in the field and head space vapour screening was conducted for all retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 ppm (parts per million by volume).

Groundwater monitoring wells were installed in all the boreholes. The monitoring wells were constructed using 50 mm diameter flush-joint threaded PVC monitoring well supplies. They were completed with 3.0 m in length intake screen. Groundwater sampling was conducted using dedicated low-density polyethylene tubing and laboratory-supplied containers (prepared with preservative for the analysis being conducted). The samples that scheduled for analysis of metals were passed through a 0.45 micron filter as part of the sampling process.

4.3 **Phase One Conceptual Site Model**

A plan, illustrating the features of the subject site and surrounding areas within 250 m from the subject site boundaries including the locations of potentially contaminating activities (PCAs), is presented in Drawing No. 1.



4.4 **Deviations From Sampling and Analysis Plan**

No deviations from the sampling and analysis plan were encountered.

4.5 **Impediments**

No impediments were encountered during the investigation for the Phase Two ESA.



5.0 **INVESTIGATION METHOD**

5.1 **General**

The Phase Two ESA was carried out in accordance with the Sampling and Analysis Plan provided in Appendix 'A' and in accordance with the SEL Standard Operating Procedures.

The Phase Two ESA consisted of drilling eleven (11) boreholes, installation of monitoring wells in six (6) boreholes, field measurements, monitoring, and collection of soil samples from the drilled boreholes and groundwater samples from the installed monitoring wells for chemical analysis. The soil and groundwater samples were assessed for the potential contamination with respect to the APECs identified by our Phase One ESA.

The sampling and decontamination procedures were conducted in accordance with the "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", May 1996, revised December 1996, as amended by O. Reg. 511/09.

Laboratory analytical methods, protocols and procedures were carried out in accordance with the "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, in accordance with O. Reg. 511/09 and O. Reg. 269/11.

5.2 **Drilling and Excavating**

Prior to the field work, the underground utilities were located and marked out in the field by representatives of the major utility companies and a private locate (All Clear Locates Inc.).

The field work for this investigation was conducted on between July 21 and 27, 2017, and consisted of drilling eleven (11) boreholes (designated as BH1 to BH11) to depths of 1.8 m to 11.2 m below existing ground surface (mbgs) for geotechnical and environmental investigation. Six (6) of the boreholes (borehole locations BH1, BH5, BH7, BH8, BH9 and BH10) were completed as monitoring wells for groundwater observation, sampling and



testing. Also, eight (8) hand dug test pits were conducted to depths of 0.2 mbgs to 0.6 mbgs. The locations of the borehole/monitoring wells/test pits are shown on Drawing No. 2.

The boreholes were advanced using a conventional track-mounted drill rig, equipped with continuous flight augers and sampling rods, supplied by a specialist drilling contractor, DBW Drilling Inc. Soil samples from the boreholes were recovered at regular intervals, using split spoon sampler in conjunction with Standard Penetration Tests, for soil vapour measurement, soil classification and visual and olfactory observations.

Drilling equipment such as drill rigs, augers, drill pipes and drilling rods are decontaminated prior to initial use, between borehole locations and at the completion of drilling activities. The drilling equipment is manually scrubbed with a brush using a phosphate-free solution and power washed to remove any adhered soils, foreign material and potential contaminants. In addition, any sub-sampling equipment is decontaminated prior to each usage.

The field work was supervised by a Soil Engineers Ltd. environmental technician who recorded the findings and observations.

5.3 **Soil: Sampling**

Soil samples from the boreholes were retrieved at regular intervals, using a stainless split spoon sampler in conjunction with Standard Penetration Tests. Prior to recovering a sample, the sampling equipment was brushed clean using a solution of phosphate-free detergent and distilled water, and each discrete sample was handled by the sampler with new disposable gloves in order to avoid the risk of cross-contamination between the samples. Each soil sample was split with part of the sample sealed in a laboratory-prepared glass jar and stored in a cooler with ice, and the remainder of the sample sealed in a double sealable bag for vapour measurement and soil classification. A small amount of the soil sample was retrieved by a disposable 'T' shaped Terracore sampler and the soil samples from the Terracore sampler were stored in methanol vials for F1 and VOCs analyses.



The subsoil conditions at the borehole/monitoring well locations indicate a layer of topsoil followed by sandy silt till or sand or earth fill or topsoil fill at most of the borehole locations. The subject site is generally underlain by strata of silty sand, sand, silty clay till and sandy silt till at various depths and locations. Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs provided in Appendix 'B'.

Based on the soil vapour measurements and visual and olfactory observations, representative worst case soil samples from each borehole were selected and sent to the laboratory for chemical analyses.

5.4 **Field Screening Measurements**

The headspace vapour concentrations were measured using a portable RKI Eagle gas detector, TYPE 101 (Serial Number: E091015) set to include flammable gases with the exception of methane (methane elimination mode), and having a minimum detection level of 2 ppm (parts per million by volume). Prior to taking the measurements, the instrument was calibrated to hexane standards for both ppm and LEL according to the instruction manual for the instrument. Our technician was trained by the supplier for the proper calibration procedure. The instrument is calibrated or tuned up by the supplier (Pine Environmental Service Inc.) seasonally.

The results of the soil vapour measurements are presented in Borehole Logs, Appendix 'B'.

The representative worst case soil samples based on the soil vapour measurements and visual and olfactory observations were selected from each borehole and submitted to the laboratory for chemical analyses.

5.5 **Groundwater: Monitoring Well Installation**

A total of six (6) monitoring wells were installed at the subject site by DBW Drilling Inc. Three (3) of these monitoring wells were used for the Phase Two ESA. The monitoring wells were constructed using 50 mm diameter PVC screen, 3m in length at the bottom of



the boreholes. A PVC riser, capped at the top, was installed from the screen section above the top grade. A sand pack, consisting of clean silica sand, was placed around the screened zone with a bentonite seal placed above the sand pack. The top of each well was sealed with concrete to approximately 0.3 mbgs. At each monitoring well location, the above ground risers were protected by steel monument casings that have been sealed into ground with concrete. The monitoring well construction details are provided on the Borehole Logs in Appendix 'B' and in Table I.

The monitoring wells were instrumented with dedicated low-density polyethylene tubing to facilitate well development, purging and sampling requirements.

Groundwater development was performed following the drilling on July 27, 2017. The monitoring wells have been developed to remove any fluids that may have been introduced into the well during drilling and to remove particles that may have become entrained in the well and filter pack (three well casing volumes of groundwater in each well). Purged water was contained and stored at the Site for future disposal.

5.6 **Groundwater: Field Measurement of Water Quality Parameters**

Groundwater monitoring and purging was conducted at the subject site on July 28, 2017. Water level measurements and water temperature were taken using a water level meter (Dipper-T) equipped with a thermometer. Groundwater observations were recorded for colour, clarity, the presence or absence of any free product / surface sheen and any odours present during purging the wells. The water level measuring device was cleaned after each measurement using Alconox solution and water, followed by a distilled water rinse and a methanol rinse, in order to prevent cross-contamination between monitoring wells.

The records of water level measurement and field observation are presented in Table II.



5.7 **Groundwater: Sampling**

The well development was conducted on July 27, 2017. A minimum of 3 well casing volumes of groundwater from each well was purged to ensure potential contamination from drilling was flushed out of the system. Purge water was contained and stored on site for future disposal.

Groundwater sampling was conducted on July 28, 2017, after purging and allow the water to stabilize. The groundwater purging and sampling activities were carried out using dedicated low-density polyethylene tubing. Groundwater samples were collected into laboratory-supplied containers, prepared with preservative for the analysis being conducted. The samples scheduled for analysis of metals were passed through a 0.45 micron filter as part of the sampling process.

5.8 **Sediment: Sampling**

Sediment was not assessed as part of this investigation.

5.9 **Analytical Testing**

The soil and groundwater samples were analysed by Maxxam Analytics Inc (Maxxam) in Mississauga, Ontario. Maxxam is accredited by Canadian Association for Laboratory Accreditation (CALA) in accordance with ISO/IEC 17025:2005 – “General Requirements for the Competence of Testing and Calibration Laboratories” for all the parameters analysed during this investigation.

5.10 **Residue Management Procedures**

Excess soil generated from the drilling program for the investigation was stored at the subject site in metal barrels. Groundwater purged from the monitoring wells was stored in containers, using a separate container for each well. The metal barrels and containers are clearly marked and stored temporarily at the subject site for later disposal.



5.11 **Elevation Surveying**

The elevation at each of the borehole locations was surveyed using a grade laser surveying equipment. The elevations of the boreholes were established using a catch basin as a permanent benchmark (BM).

The elevations at the borehole and monitoring well locations are presented in the Table II and borehole logs in Appendix 'B'.

5.12 **Quality Assurance and Quality Control Measures**

The soil and ground water sampling and analysis plan provided in Appendix 'B' was prepared and executed based on the findings of our Phase One ESA.

The Phase Two ESA was carried out in accordance with the Sampling and Analysis Plan and in accordance with the SEL Standard Operating Procedures.

The sampling and decontamination procedures were conducted in accordance with the "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", May 1996, revised December 1996, as amended by O. Reg. 511/09.

Laboratory analytical methods, protocols and procedures were carried out in accordance with the "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, in accordance with O. Reg. 511/09 and O. Reg. 269/11.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by SEL.



SEL field sampling QA/QC protocols, applied to the investigation, are as follows:

- The collection of at least one field duplicate sample per site for every sampling media (where three or more such samples are collected).
- Where volatile organic chemical analysis is required, the collection of discrete samples directly into laboratory-prepared sample vials and immediate placement into a cooler with ice to maintain the temperature at less than 10 °C for transport to the laboratory.
- The use of dedicated equipment (bailers, Waterra tubing, etc.) for groundwater sampling at different monitors and the thorough cleaning of soil sampling equipment between sample sites.
- If trace organics in the collected samples are anticipated (organic chemicals with a concentration of less than 1 µg/g), precautions are made to avoid any possible cross-contamination (eliminating bare hand or latex glove contacts with the soil or water; soil sampling equipment used for the collection of trace organics are cleaned using a phosphate-free detergent and water, followed by a distilled water rinse and a methanol rinse between sampling sites).
- The inclusion of one trip blank for water samples per site (where three or more samples are collected) for VOC parameters; the bottles containing the trip blank are prepared by the laboratory; QA/QC samples are kept in the cooler on ice for the duration of the sampling event, and returned to the laboratory for analyses.

The results of the field duplicate and trip blank samples are discussed later in section 6 of this report.



6.0 **REVIEW AND EVALUATION**

6.1 **Geology**

Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs provided in Appendix 'B'. The field investigation has disclosed that beneath the surface course of topsoil was followed by sandy silt till or sand or earth fill or topsoil fill at most of the borehole locations. The subject site is generally underlain by strata of sandy silt till, sand, silty clay till and silty sand deposits at various depths and locations. No bedrock was encountered during the Phase Two ESA.

The descriptions of the strata, encountered at the borehole locations, are briefly discussed below.

Topsoil

At most of the borehole locations, topsoil was contacted at the ground surface. The topsoil layer extends to depths 0.60 m below grade surface (mbgs) at most of the borehole locations.

Topsoil Fill

At borehole location BH5, topsoil fill was encountered at the ground surface. The topsoil fill layer extends to a depth of 2.3 mbgs.

Earth Fill

At borehole locations BH2, BH6 and BH11, earth fill was encountered below the topsoil layer at depths ranging from 0.15 mbgs to 0.3 mbgs, and earth fill was also encountered at ground surface at borehole location BH3. The earth fill layer extends to depths ranging from 0.8 mbgs to 3.1 mbgs.

**Sandy Silt Till**

At borehole locations BH1, BH7 and BH9, sandy silt till was encountered below the topsoil layer at depths ranging from 0.13 mbgs to 0.35 mbgs. The sandy silt till was also encountered below the earth fill layer at borehole locations BH2, BH5, BH6 and BH11 at depths ranging from 0.8 mbgs to 3.1 mbgs. The sandy silt till extends to depths ranging from 1.2 mbgs to 9.3 mbgs. Borehole location BH11 was terminated at 1.8 mbgs at this layer.

Silty Clay Till

At borehole location BH8, silty clay till was encountered below the topsoil layer. The silty clay till layer extends to a depth of 7.6 mbgs.

Sand

At borehole locations BH1, BH2 and BH6, sand deposits were encountered below the sandy silt till layer at depths ranging from 3.1 mbgs to 4.0 mbgs. The sand deposits were also encountered beneath the earth fill layer or topsoil layer at borehole locations BH3 and BH4 to depths ranging from 0.35mbgs to 0.8 mbgs. At borehole locations BH7 and BH10, the sand deposits were encountered beneath the silty sand layer at depths ranging from 3.1 mbgs to 4.6 mbgs. The sand layer extends to a depth of 4.7 mbgs to 5.3 mbgs at borehole locations BH1 and BH4. Borehole locations BH2, BH3, BH6, BH7 and BH10 were terminated at this layer at depths ranging from 6.4 mbgs to 6.6 mbgs.

Silty Sand

At most of the borehole locations, silty sand deposits were encountered below the sand layer or sandy silt till layer at depths ranging from 3.1 mbgs to 9.3 mbgs. At borehole location BH10, the silty sand deposit was encountered beneath the topsoil layer at 0.2 mbgs. The silty sand layer at BH7 and BH10 extends at depths ranging from 3.1 mbgs to 4.6 mbgs. The boreholes (BH1, BH4, BH5, BH8 and BH9) were terminated at this layer at depths ranging from 5.8 mbgs to 11.2mbgs.



Hydrogeology

Upon the completion of the drilling, water levels were recorded at depths of 4.13 mbgs, 1.79 mbgs, and 2.56 mbgs at BH1, BH7 and BH10, respectively.

6.2 Groundwater: Elevations and Flow Direction

Six (6) monitoring wells were installed at selected borehole locations during the field investigation for the Phase Two ESA between July 24 and 27, 2017. Monitoring wells from borehole locations BH1, BH7 and BH10 were used for this Phase Two ESA. These monitoring wells were installed at depths ranging from 3.6 mbgs to 6.6 mbgs. Groundwater records were documented during the drilling of boreholes between 24 and 27, 2017, and during the groundwater development on July 27, 2017, and the groundwater monitoring/sampling around on July 28, 2017.

Upon the completion of the drilling, water levels were recorded at depths of 4.13 mbgs, 1.79 mbgs, and 2.56 mbgs at BH1, BH7 and BH10, respectively. On July 28, 2017, during groundwater monitoring round, water levels were recorded at depths of 4.20 mbgs, 1.50 mbgs and 2.60 mbgs in the monitoring wells at BH/MW1, BH/MW7 and BH/MW10, respectively. The corresponding water table elevation is 262.93 masl, 262.78 masl and 261.39 masl, respectively.

The ground elevations of the monitoring wells were surveyed using a grade laser surveying equipment. Water level measurements and water temperature were taken using a water level meter (Dipper-T). The top of the well casings were used as a reference point to determine the groundwater table. The measurements were reduced to static elevations based on the monitoring well survey data. Shallow groundwater levels were used to determine the flow direction. Based on the groundwater monitoring records, the groundwater flow direction appears to be to the north. No free product or surface sheen was observed in any of the monitoring wells.



The groundwater levels measured in the monitoring wells are summarized in Table II. The shallow groundwater contours and interpreted ground water flow direction are shown on Drawing No. 4.

6.3 **Groundwater: Hydraulic Gradients**

Based on the groundwater records, the horizontal hydraulic gradient for the investigated aquifer within the subject site is between 0.0006 and 0.005 m/m (average 0.002 m/m).

6.4 **Fine-Medium Soil Texture**

No grain size analysis was performed as part of the Phase Two ESA. Therefore, site condition standards for coarse textured soils were used in the assessment.

6.5 **Soil: Field Screening**

Head space vapour screening was conducted for all retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 ppm (parts per million by volume).

Soil vapour measurements ranged from non-detect to 45 ppmv were recorded for the soil samples, indicating insignificant combustible gases in the soil samples retrieved from the boreholes.

6.6 **Soil Quality**

Representative “worst case” soil sample from each borehole was selected based on the soil vapour measurements and visual and olfactory observations. The selected soil samples were submitted to the laboratory for chemical analyses of Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Organochlorine Pesticides (OCs), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), and/or Metals and/or Inorganic parameters.



The soil test results were reviewed using the Ministry of the Environment and Climate Change (MOECC) Table 1, Full Depth Background Site Condition Standards, for residential/parkland/institutional/industrial/community/commercial use and for all textured soils (Table 1 Standards), as published in the “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” (EPA), dated April 15, 2011.

Soil quality data containing results of the chemical analyses for the tested soil samples is presented in Table III. Maximum concentrations of the tested parameters in soil are presented in Table V.

The Certificates of Analyses for the soil samples are presented in Appendix ‘C’.

The findings of the soil test results are summarized below:

Petroleum Hydrocarbons (PHCs)

Five (5) original soil samples from the boreholes at BH1, BH3, BH7, BH10 and BH11 were submitted for analysis of PHCs. The test results indicate all the tested soil samples were below the laboratory reported detection limits and meet the Table 1 Standards.

Volatile Organic Compounds (VOCs)

Three (3) original soil samples and one duplicate sample from the boreholes at BH1, BH7 and BH10 were submitted for analysis of VOCs. The test results indicate all the tested soil samples were below the laboratory reported detection limits and meet the Table 1 Standards.

Polycyclic Aromatic Hydrocarbons (PAHs)

Three (3) original soil samples from the boreholes at BH1, BH7 and BH10 were submitted for analysis of PAHs. The test results indicate all the tested soil samples were below the laboratory reported detection limits and meet the Table 1 Standards.

**Polychlorinated Biphenyls (PCBs)**

Three (3) original soil sample from the borehole at BH1 were submitted for analysis of PCBs. The test results indicate all the tested soil samples were below the laboratory reported detection limits and meet the Table 1 Standards.

Organochlorine Pesticides (OCs)

Twelve (12) original soil samples and one (1) duplicate soil sample from the boreholes at BH1, BH2, BH6 and BH10, and from the test pits at TP1, TP2, TP3, TP4, TP5, TP6, TP8 and TP9 were submitted for analysis of OCs. The concentrations of the tested soil samples meet the Table 1 Standards.

Metals and/or Inorganics

Twelve (12) original soil samples and one (1) duplicate soil sample from the boreholes at BH1, BH2, BH3, BH5, BH6, BH7 and BH10, and from the test pits at TP1, TP2, TP3, TP5 and TP9 were submitted for analysis of Metals and/or Inorganic parameters.

The pH of nine (9) tested soil samples (representative samples from surface soil and subsurface soil) were found in the range of 5 to 9, which is within the limits for the use of the Generic criteria of O. Reg. 153/04, as amended.

The concentrations of metals and inorganics in the tested soil samples meet the Table 2 Standards.

6.7 Groundwater Quality

Groundwater samples collected from three (3) monitoring wells at the subject site were submitted to the laboratory for chemical analyses of Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs) and/or Metals and/or Inorganics.



The groundwater test results were reviewed using the Table 1, Full Depth Background Site Condition Standards, for All Types of Property Use and for coarse textured soils as published in the “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” (EPA), April 15, 2011 (Table 1 Standards).

Groundwater quality data containing results of the chemical analyses for the tested groundwater samples is presented in Table IV. Maximum concentrations of the tested parameters in groundwater are presented in Table VI.

The Certificates of Analyses for the groundwater samples are presented in Appendix ‘D’.

The findings of the groundwater test results are summarized below:

Petroleum Hydrocarbons (PHCs)

Three (3) original groundwater samples and one (1) duplicate groundwater sample from the monitoring wells located at BH1, BH7 and BH10 were submitted for analysis of PHCs. The test results indicate the tested groundwater samples were below the laboratory reported detection limits and meet the Table 1 Standards.

Volatile Organic Compounds (VOCs)

Three (3) original groundwater samples from the monitoring wells located at BH1, BH7 and BH10 and a trip blank sample were submitted for analysis of VOCs. The test results indicate that the tested groundwater samples and trip blank sample meet the Table 1 Standards.

**Polycyclic Aromatic Hydrocarbons (PAHs)**

Three (3) original groundwater samples from the monitoring wells from the monitoring wells located at BH1, BH7 and BH10 were submitted for analysis of PAHs. The test results indicate all the tested groundwater samples were below the laboratory reported detection limits and meet the Table 1 Standards.

Metals and Inorganics

Three (3) original groundwater samples and one (1) duplicate sample from the monitoring wells located at BH1, BH7 and BH10 were submitted for analysis of metals and/or inorganics. The test results indicate the concentrations of metals and inorganics in the tested groundwater samples meet the Table 1 Standards.

6.8 Sediment Quality

Sediment was not assessed as part of this investigation.

6.9 Quality Assurance and Quality Control Results

The Phase Two ESA was carried out in accordance with the Sampling and Analysis Plan and in accordance with the SEL Standard Operating Procedures.

The sampling and decontamination procedures were conducted in accordance with the “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario”, May 1996, revised December 1996, as amended by O. Reg. 511/09.

Laboratory analytical methods, protocols and procedures were carried out in accordance with the “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, in accordance with O. Reg. 511/09 and O. Reg. 269/11 (herein referred to as Analytical Protocol).



6.9.1 Field Quality Assurance/Quality Control Samples

As part of the QA/QC program for the Phase Two ESA, QC samples in the form of field duplicate and trip blank samples were analysed. Field duplicate samples were collected in the field for PHCs, Metals and OCs in soil and for Metals and PHCs in groundwater. One trip blank sample for VOCs was shipped with the batch of the groundwater samples submitted for analysis. Details of QC samples including their analysis results are presented below:

Field Duplicate

A total of three (3) field duplicate soil samples and two (2) field duplicate groundwater samples were collected and submitted for chemical analysis. Details of duplicate sampling and analysis are presented in the Table below:

Duplicate Sample ID	Original Sample ID	Media	Test Conducted
DUP S1	BH 10/7	Soil	PHCs
DUP S2	TP4		OCs
DUP S3	TP5		Metals
DUP-W1	MW7	Groundwater	PHCs
DUP-W2	MW10		Metals

The result of the analysis of the field duplicate samples is similar to the results for the original sample and relative percent differences for the detectable tested parameters are within acceptable range. However, the relative percent differences could not be calculated between the original and duplicate samples in the situation where the original and/or duplicate samples were below the reported laboratory detection limits.

Trip Blank

One trip blank sample was submitted to the laboratory for analysis of VOCs. The trip blank sample was found to be below the reported laboratory detection limits.

There was no issue with the trip blank that was shipped with the batch of the groundwater samples submitted for analysis.



The Certificates of Analysis for the QA/QC samples are included in Appendices 'C' and 'D'.

6.9.2 Sample Handling in Accordance with the Analytical Protocol

The samples analyzed as part of the Phase Two ESA were handled in accordance with the analytical protocol with respect to holding time, preservation method, storage requirement and sample container type.

6.9.3 Certification of Results

Based on the review of the QA/QC sample results for the soil and groundwater samples of this investigation, the Chain of Custody forms and the laboratory Certificate of Analysis, it is certified that:

- All Certificates of Analysis or Analytical Reports received pursuant to Section 47(2) of O. Reg. 153/04, as amended, comply with Section 47(3) of O. Reg. 153/04, as amended.
- A Certificate of Analysis or Analytical Report was received for each sample submitted for analysis.
- Copies of all Certificates of Analysis are included in Appendices 'C' and 'D'.

6.9.4 Data Validation

The Analytical Protocol establishes Acceptance Limits for use when assessing the reliability of data reported by analytical laboratories including maximum holding times for the storage of samples/sample extracts between collection and analysis, analytical methods, field and/or laboratory quality assurance samples, recovery ranges for spiked samples and surrogates, Reporting Detection Limits (RDLs, mandatory maximum method detection limits) and precision required when analyzing laboratory replicate and spiked samples.



The review of the data in the Certificate of Analysis indicates:

- All samples/sample extracts were analyzed within their applicable holding times using approved analytical methods.
- No tested parameters were detected in any laboratory blank samples.
- The Reported Detection Limits were met for the tested parameters.
- The result of the laboratory duplicate samples is similar to the results for the original sample and relative percent differences for the detectable tested parameters are within the acceptable range.

6.9.5 Data Quality Objectives

In conclusion, the overall quality of field data did not affect decision making and the overall objectives of the investigation were met.

6.10 Phase Two Conceptual Site Model

The Phase Two Conceptual Site Model is based on the findings of the Phase One ESA and this Phase Two ESA.

6.10.1 Description and Assessment

The subject site, irregular in shape and approximately 26.69 ha (65.95 ac) in area, is located on the north side of Lockhart Road, approximately 340 m east of the intersection at Lockhart Road and Yonge Street in the City of Barrie. The municipal address of the subject site is 750 Lockhart Road, Barrie. The subject site is part of a Property Identification Number (PIN) 58092-0030 (LT). The legal description of the subject site, as described in the parcel register, is PT S 1/2 LT 16 CON 11 INNISFIL PT 1 51R20554 ; INNISFIL.



6.10.1.1 Areas where Potentially Contaminating Activity Has Occurred

The Phase One ESA determined the Potentially Contaminating Activities (PCAs) at the subject site and in the Phase One Study Area that may contribute to Areas of Potential Environmental Concern (APECs) for the soil and groundwater condition at the subject site, based on records review, interviews and site reconnaissance.

The areas of PCAs along with the corresponding list in Table 2 Schedule D of O. Reg. 153/04 are summarized below:

On-Site PCAs

- Use of pesticides for farming activities on the northwest and southern sections of the subject site. #40. Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications.
- Presence of fill materials at the southeastern section of the subject site, based on the information obtained from our previous test pit investigation #30. Importation of Fill Material of Unknown Quality.
- Presence of heating fuel oil aboveground storage tank and a diesel aboveground storage tank on the southern section of the subject site #28. Gasoline and associated products storage in fixed tanks.

Off-Site PCAs

- Presence of railway tracks to the west of the subject site. #46. Rail Yards, Tracks and Spurs
- Presence of transformer electrical substation to the southwest of the subject site. #18. Electricity Generation, Transformation and Power Stations

The locations of the PCAs are presented on Drawing No. 1.



6.10.1.2 Areas of Potential Environmental Concern

The Phase One ESA identified Areas of Potential Environmental Concern (APECs) at the subject site that may have been resulted from the PCAs listed above. The identified APECs include:

- | | |
|--------|---|
| APEC 1 | Potential soil impact at the northwestern section of the subject site due to use of pesticides for farming activities on the northwestern section of the subject site. |
| APEC 2 | Potential soil impact at the southern section of the subject site due to use of pesticides for farming activities on the southern section of the subject site. |
| APEC 3 | Potential impact at the southeastern section of the subject site due to presence of fill materials at the southeastern section of the subject site. |
| APEC 4 | Potential soil impact at the southern section of the subject site due to the presence of the heating fuel oil aboveground storage tank on the southern section of the subject site. |
| APEC 5 | Potential soil impact at the southern section of the subject site due to the presence of the diesel aboveground storage tank on the southern section of the subject site. |
| APEC 6 | Potential soil and/or groundwater impact at the western section of the subject site due to the presence of the railway tracks to the west of the subject site. |
| APEC 7 | Potential soil and/or groundwater impact at the southwestern section of the subject site due to the presence of the transformer substation to the southwest of the subject site. |

The locations of APECs are shown on Drawing No. 2.



6.10.1.3 Subsurface Structures and Utilities

The subject site contains one (1) residential building, one (1) tractor storage shed, one (1) barn, one (1) metal storage trailer, and four (4) storage sheds located at the mid-southern section of the subject site. The residential building is supplied with municipal electricity, water from a domestic well, and a septic system. The domestic well and septic system were observed at the southern section of the subject site. The tractor storage shed was supplied with hydro and water from the domestic well. The barn was supplied with electricity.

Since no contaminants are found at the subject site at a concentration above the applicable site condition standard, no subsurface structures or utilities with the potential to affect contaminants distribution or transport are identified at the subject site.

6.10.2 **Physical Setting**

6.10.2.1 Stratigraphy

A review of a Geological Map of the area, located at the Geological Survey of Canada website indicates that the site is underlain predominantly by Newmarket Till, which consists of a sandy silt to silt matrix.

The field investigation for this Phase Two ESA consisted of drilling eleven (11) boreholes to depths of 1.8 m to 11.2 m below existing ground surface (mbgs) for geotechnical and environmental investigation. The subsoil indicate a layer of topsoil followed by sandy silt till or sand or earth fill or topsoil fill at most of the borehole locations. The subject site is generally underlain by strata of sandy silt till, sand, silty clay till, and silty sand deposits at various depths and locations.

The borehole/monitoring well location plan is shown on Drawing No. 2. The location for the geologic cross-section of the soil stratigraphy at the subject site are presented on Drawing No. 3A. Geologic cross sections A-A' and B-B' are presented on Drawing No. 3B.



6.10.2.2 Hydrogeological Characteristics

The subject site is located in the larger hydrogeological region known as Southern Ontario Lowlands. A watershed map provided by the Lake Simcoe Region Conservation Authority (LSRCA) shows the subject site is situated in the Hewitt's Creek watershed. There was a watercourse to the northeast and east of the subject site within 30 m. The ground surface was relatively flat with minor undulations, and the overall grade at the subject site generally descends towards the northeast.

Six (6) monitoring wells were installed at borehole locations BH1, BH5, BH7, BH8, BH9 and BH10 to depths ranging from 3.6 mbgs to 11.2 mbgs. The monitoring wells at borehole locations BH1, BH7 and BH10 were investigated in this Phase Two ESA. Based on the groundwater records, the groundwater flow direction appears to be to the north. The shallow groundwater contours and interpreted groundwater flow direction are shown on Drawing No. 4.

Based on the groundwater records of the investigation for the Phase Two ESA, the horizontal hydraulic gradient for the investigated aquifer is between 0.0006 and 0.005 m/m (average 0.002 m/m).

6.10.2.3 Approximate Depth to Bedrock

Bedrock was not encountered at the subject site during the field investigation within the maximum drilling depth of 11.2 mbgs. According to the Ontario Geological Survey Bedrock Cross Section Viewer, the depth to bedrock at the subject site is approximately 124 mbgs.

6.10.2.4 Approximate Depth to Water Table

Based on the groundwater records for this investigation, depth to the water table at the subject site ranges from 1.50 mbgs to 4.20 mbgs.



6.10.2.5 Section 41 or 43.1 of the Regulation

The subject site is within/adjacent/part of an area of natural significance and the analytical testing indicated the pH of the tested soil samples is between 5 and 9. Therefore, Section 41 of the regulation (Site Condition Standards, Environmental Sensitive Areas) applies to the subject site.

The property is not a shallow soil property, as the bedrock was not encountered within 2 mbgs during the investigation. There was watercourses within 30 m of the subject site boundaries. Therefore, the Section 43.1 of the Regulation (Site Condition Standards, Shallow Soil Property or Water Body) applies to the subject site.

6.10.2.6 Soils Placed On, In or Under the Phase Two Property

The findings of our Phase One ESA and the field investigation of the Phase Two ESA indicated that fill materials were present at the southeastern sections of the subject site, and the fill material was assessed in the Phase Two ESA.

6.10.2.7 Proposed Building and Other Structures

A residential development is being proposed for the subject site. It is anticipated that the new development will be provided with municipal services meeting urban standards. The location of proposed building or any other structures was not known at the time of preparation of this report.

6.10.3 **Contamination In or Under the Phase Two Property**

Based on the findings of the Phase One ESA, contaminants of potential concern in soil and groundwater with respect to the identified Areas of Potential Environmental Concern (APECs) at the subject site were assessed during the Phase Two ESA.



Based on the information obtained from the Phase One ESA and Phase Two ESA, the Ministry of the Environment and Climate Change (MOECC) Table 1, Full Depth Background Site Condition Standards, for residential/parkland/institutional/industrial/community/commercial use and for all textured soils (Table 1 Standards), as published in the “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” (EPA), dated April 15, 2011 has been selected for assessing the soil and groundwater condition at the subject site.

6.10.3.1 Area Where Contaminants are Present

Soil and groundwater samples were collected during the Phase Two ESA and submitted for chemical analysis of one or more of the following parameters: Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), Organochlorine Pesticides (OCs), Polychlorinated Biphenyls (PCBs) and Metals and/or Inorganics.

A review of the analytical test results of soil and groundwater samples indicates the tested samples for the tested parameters meet the Table 1 Standards.

Consequently, there are no contaminants identified at the subject site at a concentration above the applicable site condition standards (Table 1 Standards) during the Phase Two ESA.

6.10.3.2 Distribution of Contaminants

No contaminants are identified at the subject site at a concentration above the applicable site condition standards.

6.10.3.3 Contaminant Medium

No contaminants are identified at the subject site at a concentration above applicable site condition standards.



6.10.3.4 Reasons for Discharge

No contaminants are identified at the subject site at a concentration above applicable site condition standards.

6.10.3.5 Migration of Contaminants

No contaminants are identified at the subject site at a concentration above applicable site condition standards.

6.10.4 Potential Exposure Pathways and Receptors

Since no contaminants are found at the subject site at a concentration above the applicable site condition standard (Table 1 Standards), no potential exposure pathways and receptors are identified.



7.0 CONCLUSIONS

The purpose of the Phase Two ESA was to determine the soil and groundwater quality at the subject site, as related to the following Areas of Potential Environmental Concerns (APECs) identified in our Phase One ESA:

- | | |
|--------|---|
| APEC 1 | Potential soil impact at the northwestern section of the subject site due to use of pesticides for farming activities on the northwestern section of the subject site. |
| APEC 2 | Potential soil impact at the southern section of the subject site due to use of pesticides for farming activities on the southern section of the subject site. |
| APEC 3 | Potential impact at the southeastern section of the subject site due to presence of fill materials at the southeastern section of the subject site. |
| APEC 4 | Potential soil impact at the southern section of the subject site due to the presence of the heating fuel oil aboveground storage tank on the southern section of the subject site. |
| APEC 5 | Potential soil impact at the southern section of the subject site due to the presence of the diesel aboveground storage tank on the southern section of the subject site. |
| APEC 6 | Potential soil and/or groundwater impact at the western section of the subject site due to the presence of the railway tracks to the west of the subject site. |
| APEC 7 | Potential soil and/or groundwater impact at the southwestern section of the subject site due to the presence of the transformer substation to the southwest of the subject site. |

The findings of the field investigation and analytical results of the Phase Two ESA are summarized below:



- The field investigation for this Phase Two ESA consisted of drilling three (3) boreholes (designated as BH1 to BH11) to depths ranging from 1.8 mbgs to 11.2 mbgs for geotechnical and environmental investigation, and conducting a total of eight (8) hand dug test pits to depths of 0.2 mbgs to 0.6 mbgs.
- Six (6) of the boreholes (designated as BH1, BH5, BH7, BH8, BH9 and BH10) were installed with monitoring wells for groundwater sampling and testing. The monitoring wells at borehole locations BH1, BH7 and BH10 were used for investigation in this Phase Two ESA.
- The subsoil conditions at the borehole/monitoring well locations indicate a layer of topsoil followed by sandy silt till or sand or earth fill or topsoil fill at most of the borehole locations. The subject site is generally underlain by strata of sandy silt till, sand, silty clay till and silty sand deposits at various depths and locations.
- The soil samples retrieved from the boreholes were examined for visual and olfactory evidence of potential contamination. No evidence of potential contamination was documented in any of the retrieved soil samples.
- Head space vapour screening was conducted for all retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 ppmv (parts per million by volume). Soil vapour measurements ranged from non-detect to 30 ppmv were recorded for the soil samples, indicating insignificant combustible gases in the soil samples retrieved from the boreholes.
- Based on the soil vapour measurements and visual and olfactory observations, representative “worst case” soil samples were selected from each borehole for chemical analyses of one or more of the following parameters: Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Organochlorine Pesticides (OCs), Polycyclic Aromatic Hydrocarbons (PAHs), and/or Metals and/or Inorganic parameters.
- Based on the available water table elevation, the horizontal hydraulic gradient for the investigated aquifer within the sandy silt till and silty sand deposits at the subject site is between 0.0006 and 0.005 m/m (average 0.002 m/m).
- No visible sheen or odours were recorded in the groundwater at the three monitoring wells installed at the subject site. Groundwater samples collected from the monitoring wells were submitted for analysis of one or more of the following parameters:



Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), and/or Metals and/or Inorganic parameters.

- As part of the QA/QC program for the investigation, QC samples in the form of field duplicate and trip blank samples were analysed. Field duplicate samples were collected in the field for PHCs, OCs and Metals in soil and for Metals and PHCs in groundwater. One trip blank for VOCs was shipped with the batch of the groundwater samples submitted for analysis.
- The analytical test results were reviewed using the Ministry of the Environment and Climate Change (MOECC) Table 1, Full Depth Background Site Condition Standards, for residential/parkland/institutional/industrial/community/commercial use and for all textured soils, as published in the “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” (EPA), dated April 15, 2011 (Table 1 Standards).
- The test results indicate that the tested parameters in the soil and groundwater samples at the test locations were found to be either below the laboratory detection limit and/or within the allowable concentrations in the applicable site condition standard for the parameters. All analysed soil and groundwater samples during the Phase Two ESA meet the Table 1 Standards.
- The result of the analysis of the duplicate samples is similar to the results for the original sample and relative percent differences for the detectable tested parameters are within acceptable range. However, the relative percent differences could not be calculated between the original and duplicate samples in the situation where the original and/or duplicate samples were below the reported laboratory detection limit.
- The result of the trip blank sample indicates that the sample was below the reported laboratory detection limit. There was no issue with the trip blank that was shipped with the batch of the groundwater samples submitted for analysis.

A review of the analytical test results of soil and groundwater samples indicates the tested parameters at the test locations meet the Table 1 Standards. Consequently, there are no contaminants identified at the subject site at a concentration above the applicable site condition standards (Table 1 Standards) during the Phase Two ESA.



Based on the findings of the Phase Two ESA, it is our opinion that the property is suitable for the proposed development. No further environmental investigation is recommended at this time.

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8.0 REFERENCES

MOECC. “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario”, May 1996, revised December 1996, as amended by O. Reg. 511/09.

MOECC. “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, in accordance with O. Reg. 511/09 and O. Reg. 269/11.

MOECC. “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” (EPA), April 15, 2011.



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TABLES

REFERENCE NO. 1706-E080



Table I – Monitoring Well Installation

Monitoring Well I.D.	Bottom of Monitoring Well (mbgs)	Screen Length (m)	Screen Interval (m)	Filter Pack (m)	Bentonite Plug (m)
BH/MW 1	5.3	3.0	2.3 — 5.3	1.7 — 5.3	0.0 — 1.7
BH/MW 7	3.6	3.0	0.6 — 3.6	0.45 — 3.6	0.0 — 0.45
BH/MW 10	6.6	3.0	3.6 — 6.6	2.6 — 3.6	0.0 — 2.6

Note: mbgs – meters below ground surface



Monitoring Well No.	Ground Elevation (masl)	Measured Groundwater Level		Field Observations		
		July 28, 2017				
		Depth (mbgs)	Elevation (m)	Odour	Colour	Sheen or Free Product
BH/MW 1	267.13	5.8	261.3	None	Silty	None
BH/MW 7	264.28	3.6	257.8	None	Silty	None
BH/MW 10	263.99	6.6	257.4	None	Silty	None

Note: mbgs = metres below ground surface
masl = metres above sea level



Soil Engineers Ltd.

SOIL CHEMICAL ANALYSIS - Volatile Organic Compound (VOC) Parameters

Table III

Project No. 1705-E080

Page 2 of 5

Sample ID Sample Date Laboratory ID Bore Hole No. Depth (mbsg)	RDL*	BH107 26-July-2017 EVZ571	BH7/5 27-July-2017 EVZ572	BH7/8 27-July-2017 EVZ576	DUP S1 26-July-2017 EVZ577	Ontario Regulation 153/04 Table 1 RPIICC Standards**
		10	7	1	10	
		6.1-6.6	3.1-3.4	5.6-5.8	1.6-1.9	
		<0.50	<0.50	<0.50	<0.50	
Acetone	0.5					0.5
Benzene	0.02	<0.020	<0.020	<0.020	<0.020	0.02
Bromodichloromethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Bromofom	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Bromomethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Carbon Tetrachloride	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Chlorobenzene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Chloroform	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Dibromochloromethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,2-Dichlorobenzene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,3-Dichlorobenzene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,4-Dichlorobenzene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,1-Dichloroethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,2-Dichloroethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,1-Dichloroethylene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Cis-1,2-Dichloroethylene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Trans-1,2-Dichloroethylene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,2-Dichloropropane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Cis-1,3-Dichloropropylene	0.03	<0.030	<0.030	<0.030	<0.030	0.05
Trans-1,3-Dichloropropylene	0.04	<0.040	<0.040	<0.040	<0.040	NV
Ethylbenzene	0.02	<0.020	<0.020	<0.020	<0.020	0.05
Ethylene Dibromide	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Methyl Ethyl Ketone	0.5	<0.50	<0.50	<0.50	<0.50	0.5
Methylene Chloride	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Methyl Isobutyl Ketone	0.5	<0.50	<0.50	<0.50	<0.50	0.5
Methyl-t-Butyl Ether	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Styrene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,1,1,2-Tetrachloroethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,1,2,2-Tetrachloroethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Toluene	0.02	<0.020	<0.020	<0.020	<0.020	0.05
Tetrachloroethylene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,1,1-Trichloroethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
1,1,2-Trichloroethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Trichloroethylene	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Vinyl Chloride	0.02	<0.020	<0.020	<0.020	<0.020	0.02
m-Xylene & p-Xylene	0.02	<0.020	<0.020	<0.020	<0.020	NV
o-Xylene	0.02	<0.020	<0.020	<0.020	<0.020	NV
Total Xylenes	0.02	<0.020	<0.020	<0.020	<0.020	0.05
Dichlorodifluoromethane	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Dioxane, 1,4-						0.2
Hexane(n)	0.05	<0.050	<0.050	<0.050	<0.050	0.05
Trichlorofluoromethane	0.05	<0.050	<0.050	<0.050	<0.050	0.25
1,3-Dichloropropene (Cis + trans)	0.05	<0.050	<0.050	<0.050	<0.050	0.05

Analysis by Maxxam Analytics, all results in ppm (µg/g) unless otherwise stated

* Analytical Reportable Detection Limits (RDLs) are shown except as indicated in brackets

** Standards shown are for Full Depth Background Site Condition Standards for Residential/Industrial/Commercial/Community property use (all textured soils)



Soil Engineers Ltd.

SOIL CHEMICAL ANALYSIS - Petroleum Hydrocarbon (PHC) Parameters

Table III

Project No. 1706-E080

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Sample ID	BH11/2	BH10/4	BH7/2	BH3/2	BH1/6	Ontario Regulation 153/04 Table 1 RPICC Standards**
Sample Date	26-July-2017	26-July-2017	27-July-2017	21-July-2017	27-July-2017	
Laboratory ID	EVZ567	EVZ570	EVZ573	EVZ574	EVZ575	
Borehole No.	11	10	7	3	1	
Depth (mbgs)	0.6-1.1	2.4-2.7	0.9-1.1	0.8-1.1	3.9-4.2	
Benzene	<0.020	<0.020	<0.020	<0.020	<0.020	0.02
Toluene	<0.020	<0.020	<0.020	<0.020	<0.020	0.2
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	<0.020	0.05
m/p xylenes	<0.040	<0.040	<0.040	<0.040	<0.040	NV
o xylene	<0.020	<0.020	<0.020	<0.020	<0.020	NV
Total Xylenes	<0.040	<0.040	<0.040	<0.040	<0.040	0.05
F1 (C6-C10)	<10	<10	<10	<10	<10	25
F1 (C6-C10) - BTEX	<10	<10	<10	<10	<10	25
F2 (C10-C16)	<10	<10	<10	<10	<10	10
F3 (C16-C34)	<50	<50	<50	<50	<50	240
F4 (C34-C50)	<50	<50	<50	<50	<50	120
Reached Baseline at C50	YES	YES	YES	YES	YES	NV
F4 Gravimetric	-	-	-	-	-	120

Analysis by Maxxam Analytics, all results in ppm (µg/g) unless otherwise stated

* Analytical Reportable Detection Limits (RDLs) are shown except as indicated in brackets.

** Standards shown are for Full Depth Background Site Condition Standards for Residential/Parkland/Institutional/Industrial/Commercial/Community property use (all textured soils)

SOIL CHEMICAL ANALYSIS - Polycyclic Aromatic Hydrocarbon (PAH) Parameters

Project No. 1706-E080

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Sample ID	RDL*	BH10/3 26-July-2017 EVZ569	BH7/2 27-July-2017 EVZ573	BH1/6 27-July-2017 EVZ575	Ontario Regulation 153/04 Table 1 RPIICC Standards**
Sample Date					
Laboratory ID					
Borehole No.					
Depth (mbgs)					
Acenaphthene	0.005	1.6-1.9 <0.0050	0.9-1.1 <0.0050	3.9-4.2 <0.0050	0.072
Acenaphthylene	0.005	<0.0050	<0.0050	<0.0050	0.093
Anthracene	0.005	<0.0050	<0.0050	<0.0050	0.16
Benzo(a)anthracene	0.005	<0.0050	<0.0050	<0.0050	0.36
Benzo(a)pyrene	0.005	<0.0050	<0.0050	<0.0050	0.3
Benzo(b)fluoranthene	0.005	<0.0050	<0.0050	<0.0050	0.47
Benzo(ghi)perylene	0.005	<0.0050	<0.0050	<0.0050	0.68
Benzo(k)fluoranthene	0.005	<0.0050	<0.0050	<0.0050	0.48
Chrysene	0.005	<0.0050	<0.0050	<0.0050	2.8
Dibenzo(a,h)anthracene	0.005	<0.0050	<0.0050	<0.0050	0.1
Fluoranthene	0.005	<0.0050	<0.0050	<0.0050	0.56
Indeno(1,2,3-cd)pyrene	0.005	<0.0050	<0.0050	<0.0050	0.12
1-Methylnaphthalene (	0.005	<0.0050	<0.0050	<0.0050	0.23
2-Methylnaphthalene (	0.005	<0.0050	<0.0050	<0.0050	0.59
Naphthalene	0.005	<0.0050	<0.0050	<0.0050	0.59
Phenanthrene	0.005	<0.0050	<0.0050	<0.0050	0.09
Pyrene	0.005	<0.0050	<0.0050	<0.0050	0.69
Methylnaphthalene, 2-(1-)					1
					0.59

Analysis by Maxxam Analytics, all results in ppm (µg/g) unless otherwise stated

* Analytical Reportable Detection Limits (RDLs) are shown except as indicated in brackets.

** Standards shown are for Full Depth Background Site Condition Standards for Residential/Parkland/Institutional/Commercial/Community property use (all textured soils)

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GROUND WATER CHEMICAL ANALYSIS - Metals and Inorganic Parameters

Project No. 1706-E080

Page 1 of 4

Sample ID Sample Date Laboratory ID Borehole No. Depth (mbgs)	RDL *	MW1		MW7		MW7 DUP 1		MW10		DUP-W2		Ontario Regulation 153/04 Table 1 Standards**
		28-July-2017		28-July-2017		28-July-2017		28-July-2017		28-July-2017		
		EVZ841		EVZ842		EVZ842 DUP 1		EVZ843		EVZ845		
		1		7		7		10		10		
		5.3		3.6		3.6		6.6		6.6		
Antimony	0.5	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	6	
Arsenic	1	<1.0	<1.0	<1.0	-	-	<1.0	<1.0	<1.0	<1.0	25	
Barium	2	52	20	20	-	-	43	43	51	51	1000	
Beryllium	0.5	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	4	
Boron	10	31	20	20	-	-	12	12	32	32	5000	
Cadmium	0.1	<0.10	<0.10	<0.10	-	-	<0.10	<0.10	<0.10	<0.10	2.7	
Chromium	5	<5.0	<5.0	<5.0	-	-	<5.0	<5.0	<5.0	<5.0	50	
Chromium VI	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	0.51	0.51	-	-	25	
Cobalt	0.5	0.88	<0.50	<0.50	-	-	<0.50	<0.50	0.92	0.92	3.8	
Copper	1	1.4	1.3	1.3	-	-	1.1	1.1	1.5	1.5	87	
Lead	0.5	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	10	
Mercury	0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-	-	0.29	
Molybdenum	0.5	4.3	1.8	1.8	-	-	<0.50	<0.50	4.1	4.1	70	
Nickel	1	1.9	<1.0	<1.0	-	-	<1.0	<1.0	1.9	1.9	100	
Sodium	-	-	-	-	-	-	-	-	-	-	490000	
Selenium	2	<2.0	<2.0	<2.0	-	-	<2.0	<2.0	<2.0	<2.0	10	
Silver	0.1	<0.10	<0.10	<0.10	-	-	<0.10	<0.10	<0.10	<0.10	1.5	
Thallium	0.05	<0.050	<0.050	<0.050	-	-	<0.050	<0.050	<0.050	<0.050	2	
Vanadium	0.5	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	6.2	
Zinc	5	<5.0	<5.0	<5.0	-	-	<5.0	<5.0	<5.0	<5.0	1100	
Cyanide, Free	1	<1	1	1	-	-	<1	<1	-	-	66	
Nitrate (mg/L)	-	-	-	-	-	-	-	-	-	-	NV	
Nitrite (mg/L)	-	-	-	-	-	-	-	-	-	-	NV	
Chloride (mg/L)	-	-	-	-	-	-	-	-	-	-	790	
Uranium	0.1	0.27	0.22	0.22	-	-	0.2	0.2	0.27	0.27	20	

Analysis by Maxxam Analytics, all results in ppm (µg/L) unless otherwise stated

* Analytical Reportable Detection Limits (RDLs) are shown except as indicated in brackets.

** Standards shown are for Full Depth Background Site Condition Standards for all types of property use (all textured soils)



Soil Engineers Ltd

Table IV

GROUND WATER CHEMICAL ANALYSIS - Volatile Organic Compound (VOC)

Parameters

Project No 1706-E080

Page 2 of 4

Sample ID Sample Date Laboratory ID Borehole No. Depth (mbgs)	RDL*	MW1		MW7	MW10		Ontario Regulation 153/04 Table 1 Standards**
		28-July-2017		28-July-2017	28-July-2017		
		EVZ841		EVZ842	EVZ843		
		1	7	10			
Acetone	10	5.3	3.6	6.6	6.6	2700	
Benzene	0.2	<10	<10	<10	<10	5	
Bromodichloromethane	0.5	<0.50	<0.50	<0.50	<0.50	16	
Bromoforn	1	<1.0	<1.0	<1.0	<1.0	25	
Bromomethane	0.5	<0.50	<0.50	<0.50	<0.50	0.89	
Carbon Tetrachloride	0.2	<0.20	<0.20	<0.20	<0.20	0.79	
Chlorobenzene	0.2	<0.20	<0.20	<0.20	<0.20	30	
Chloroform	0.2	<0.20	<0.20	<0.20	<0.20	2.4	
Dibromochloromethane	0.5	<0.50	<0.50	<0.50	<0.50	25	
1,2-Dichlorobenzene	0.5	<0.50	<0.50	<0.50	<0.50	3	
1,3-Dichlorobenzene	0.5	<0.50	<0.50	<0.50	<0.50	59	
1,4-Dichlorobenzene	0.5	<0.50	<0.50	<0.50	<0.50	1	
1,1-Dichloroethane	0.2	<0.20	<0.20	<0.20	<0.20	5	
1,2-Dichloroethane	0.5	<0.50	<0.50	<0.50	<0.50	1.6	
1,1-Dichloroethylene	0.2	<0.20	<0.20	<0.20	<0.20	1.6	
Cis-1,2-Dichloroethylene	0.5	<0.50	<0.50	<0.50	<0.50	1.6	
Trans-1,2-Dichloroethylene	0.5	<0.50	<0.50	<0.50	<0.50	1.6	
1,2-Dichloropropane	0.2	<0.20	<0.20	<0.20	<0.20	5	
Cis-1,3-Dichloropropylene	0.3	<0.30	<0.30	<0.30	<0.30	NV	
Trans-1,3-Dichloropropylene	0.4	<0.40	<0.40	<0.40	<0.40	NV	
Ethylbenzene	0.2	<0.20	<0.20	<0.20	<0.20	2.4	
Ethylene Dibromide	0.2	<0.20	<0.20	<0.20	<0.20	0.2	
Methyl Ethyl Ketone	10	<10	<10	<10	<10	1800	
Methylene Chloride	2	<2.0	<2.0	<2.0	<2.0	50	
Methyl Isobutyl Ketone	5	<5.0	<5.0	<5.0	<5.0	640	
Methyl-t-Butyl Ether	0.5	<0.50	<0.50	<0.50	<0.50	15	
Styrene	0.5	<0.50	<0.50	<0.50	<0.50	5.4	
1,1,1,2-Tetrachloroethane	0.5	<0.50	<0.50	<0.50	<0.50	1.1	
1,1,2,2-Tetrachloroethane	0.5	<0.50	<0.50	<0.50	<0.50	1	
Toluene	0.2	0.45	0.23	0.23	<0.20	24	
Tetrachloroethylene	0.2	<0.20	<0.20	<0.20	<0.20	1.6	
1,1,1-Trichloroethane	0.2	<0.20	<0.20	<0.20	<0.20	200	
1,1,2-Trichloroethane	0.5	<0.50	<0.50	<0.50	<0.50	4.7	
Trichloroethylene	0.2	<0.20	<0.20	<0.20	<0.20	1.6	
Vinyl Chloride	0.2	<0.20	<0.20	<0.20	<0.20	0.5	
m-Xylene & p-Xylene	0.2	<0.20	<0.20	<0.20	<0.20	NV	
o-Xylene	0.2	<0.20	<0.20	<0.20	<0.20	NV	
Total Xylenes	0.2	<0.20	<0.20	<0.20	<0.20	300	
Dichlorodifluoromethane	1	<1.0	<1.0	<1.0	<1.0	590	
Dioxane, 1,4-	-	-	-	-	-	50	
Hexane(n)	1	<1.0	<1.0	<1.0	<1.0	51	
Trichlorofluoromethane	0.5	<0.50	<0.50	<0.50	<0.50	150	
1,3-Dichloropropene (cis + trans)	0.5	<0.50	<0.50	<0.50	<0.50	0.5	

Analysis by Maxxam Analytics, all results in ppm (µg/L) unless otherwise stated

* Analytical Reportable Detection Limits (RDLs) are shown except as indicated in brackets.

** Standards shown are for Full Depth Background Site Condition Standards for all types of property use (all textured soils)

Analysis by Maxxam Analytics, all results in ppm (µg/L) unless otherwise stated

* Analytical Reportable Detection Limits (RDLs) are shown except as indicated in brackets.

** Standards shown are for Full Depth Background Site Condition Standards for all types of property use (all textured soils)



Soil Engineers Ltd

Table IV

GROUND WATER CHEMICAL ANALYSIS - Petroleum Hydrocarbon (PHC) Parameters

Project No. 1708-E080

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Sample ID	MW1	MW7	MW10	DUP-W1	Ontario Regulation 153/04 Table 1 Standards**
Sample Date	28-July-2017	28-July-2017	28-July-2017	28-July-2017	
Laboratory ID	EVZ841	EVZ842	EVZ843	EVZ844	
Bore Hole No.	1	7	10	7	
Depth (mbgs)	5.3	3.6	6.6	3.6	
Benzene	-	-	-	<0.20	5
Toluene	-	-	-	<0.20	24
Ethylbenzene	-	-	-	<0.20	2.4
m/p xylenes	-	-	-	<0.40	NV
o xylene	-	-	-	<0.20	NV
Total Xylenes	-	-	-	<0.40	300
F1 (C6-C10)	<25	<25	<25	<25	750
F1 (C6-C10) - BTEX	<25	<25	<25	<25	750
F2 (C10-C16)	<100	<100	<100	<100	150
F3 (C16-C34)	<200	<200	<200	<200	500
F4 (C34-C50)	<200	<200	<200	<200	500
Reached Baseline at C50	YES	YES	YES	YES	NV
F4 Gravimetric	-	-	-	-	500
Analysis by Maxxam Analytics, all results in ppm (µg/L) unless otherwise stated					
* Analytical Reportable Detection Limits (RDLs) are shown except as indicated in brackets.					
** Standards shown are for Full Depth Background Site Condition Standards for all types of property use (all textured soils)					



GROUND WATER CHEMICAL ANALYSIS - Polycyclic Aromatic Hydrocarbon (PAH) Parameters

Project No. 1706-E080

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Sample ID	RDL *	MW1	MW7	MW10	Ontario Regulation 153/04 Table 1 Standards**
Sample Date		28-July-2017	28-July-2017	28-July-2017	
Laboratory ID		EVZ841	EVZ842	EVZ843	
Bore Hole No.		1	7	10	
Depth (mbgs)		5.3	3.6	6.6	
Acenaphthene	0.05	<0.050	<0.050	<0.050	4.1
Acenaphthylene	0.05	<0.050	<0.050	<0.050	1
Anthracene	0.05	<0.050	<0.050	<0.050	2.4
Benzo(a)anthracene	0.05	<0.050	<0.050	<0.050	1
Benzo(a)pyrene	0.01	<0.010	<0.010	<0.010	0.01
Benzo(b,j)fluoranthene	0.05	<0.050	<0.050	<0.050	0.1
Benzo(ghi)perylene	0.05	<0.050	<0.050	<0.050	0.2
Benzo(k)fluoranthene	0.05	<0.050	<0.050	<0.050	0.1
Chrysene	0.05	<0.050	<0.050	<0.050	0.1
Dibenzo(a,h)anthracene	0.05	<0.050	<0.050	<0.050	0.2
Fluoranthene	0.05	<0.050	<0.050	<0.050	0.41
Fluorene	0.05	<0.050	<0.050	<0.050	120
Indeno(1,2,3-cd)pyrene	0.05	<0.050	<0.050	<0.050	0.2
1-Methylnaphthalene (SEE FOOTNOTES)	0.05	<0.050	<0.050	<0.050	3.2
2-Methylnaphthalene (SEE FOOTNOTES)	0.05	<0.050	<0.050	<0.050	3.2
Naphthalene	0.05	<0.050	<0.050	<0.050	11
Phenanthrene	0.03	<0.030	<0.030	<0.030	1
Pyrene	0.05	<0.050	<0.050	<0.050	4.1
Methylnaphthalene, 2-(1-)	0.071	<0.071	<0.071	<0.071	3.2

Analysis by Maxxam Analytics, all results in ppm (µg/L) unless otherwise stated

* Analytical Reportable Detection Limits (RDLs) are shown except as indicated in brackets.

** Standards shown are for Full Depth Background Site Condition Standards for all types of property use (all textured soils)



Summary of Metals and Inorganics

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
Antimony	ug/g	<0.20	-	-
Arsenic	ug/g	1.8	TP3	0.2-0.6
Boron	ug/g	5.7	BH5/4	2.4-2.8
Barium	ug/g	93	BH5/4	2.4-2.8
Beryllium	ug/g	0.57	TP5	0.2-0.6
Cadmium	ug/g	0.23	TP3	0.2-0.6
Chromium	ug/g	22	TP5	0.2-0.6
Cobalt	ug/g	7.4	TP5	0.2-0.6
Copper	ug/g	11	TP5	0.2-0.6
Lead	ug/g	11	TP3	0.2-0.6
Molybdenum	ug/g	0.78	BH2/1B	0.9-1.1
Nickel	ug/g	13	TP5	0.2-0.6
Selenium	ug/g	<0.5	-	-
Silver	ug/g	<0.2	-	-
Thallium	ug/g	0.11	BH5/4, TP5	2.4-2.8, 0.2-0.6
Uranium	ug/g	0.52	TP5	0.2-0.6
Vanadium	ug/g	37	TP5	0.2-0.6
Zinc	ug/g	43	TP5	0.2-0.6
Boron (Hot Water Soluble)	ug/g	0.49	TP2	0.2-0.6
Chromium VI	ug/g	<0.20	-	-
Soluble Calcium	mg/L	74.9	BH7/1	0.1-0.4
Soluble Sodium	mg/L	<5	-	-
Soluble Magnesium	mg/L	5.3	BH7/1	0.1-0.4
Sodium Adsorption Ratio	NA	0.85	BH1/6	3.9-4.2
Conductivity	mS/cm	0.30	TP5	0.2-0.6

**Table V** – Maximum Concentration (Soil)**Summary of VOCs**

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
1,3-Dichloropropene (cis+trans)	µg/g	<0.050	-	-
Acetone	µg/g	<0.50	-	-
Benzene	µg/g	<0.020	-	-
Bromodichloromethane	µg/g	<0.050	-	-
Bromoform	µg/g	<0.050	-	-
Bromomethane	µg/g	<0.050	-	-
Carbon Tetrachloride	µg/g	<0.050	-	-
Chlorobenzene	µg/g	<0.050	-	-
Chloroform	µg/g	<0.050	-	-
Dibromochloromethane	µg/g	<0.050	-	-
1,2-Dichlorobenzene	µg/g	<0.050	-	-
1,3-Dichlorobenzene	µg/g	<0.050	-	-
1,4-Dichlorobenzene	µg/g	<0.050	-	-
Dichlorodifluoromethane	µg/g	<0.050	-	-
1,1-Dichloroethane	µg/g	<0.050	-	-
1,2-Dichloroethane	µg/g	<0.050	-	-
1,1-Dichloroethylene	µg/g	<0.050	-	-
cis-1,2-Dichloroethylene	µg/g	<0.050	-	-
trans-1,2-Dichloroethylene	µg/g	<0.050	-	-
1,2-Dichloropropane	µg/g	<0.050	-	-
cis-1,2-Dichloropropene	µg/g	<0.030	-	-
trans-1,3-Dichloropropene	µg/g	<0.040	-	-
Ethylbenzene	µg/g	<0.020	-	-
Ethylene Dibromide	µg/g	<0.050	-	-
Hexane	µg/g	<0.050	-	-
Methylene Chloride	µg/g	<0.050	-	-
Methyl Ethyl Ketone	µg/g	<0.50	-	-
Methyl Isobutyl Ketone	µg/g	<0.50	-	-
Methyl t-butyl ether (MTBE)	µg/g	<0.050	-	-
Styrene	µg/g	<0.050	-	-
1,1,1,2-Tetrachloroethane	µg/g	<0.050	-	-
1,1,2,2-Tetrachloroethane	µg/g	<0.050	-	-
Tetrachlorethylene	µg/g	<0.050	-	-
Toluene	µg/g	<0.02	-	-



Reference No. 1706-E080

Table V – Maximum Concentration (Soil)

Page 3 of 5

1,1,1-Trichloroethane	µg/g	<0.050	-	-
1,1,2-Trichloroethane	µg/g	<0.050	-	-
Trichloroethylene	µg/g	<0.050	-	-
Trichlorofluoromethane	µg/g	<0.050	-	-
Vinyl Chloride	µg/g	<0.02	-	-
p+m-Xylene	µg/g	<0.02	-	-
o-Xylene	µg/g	<0.02	-	-
Total Xylenes	µg/g	<0.02	-	-

Summary of CCME F1-F4 and PHCs

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
Benzene	µg/g	<0.020	-	-
Toluene	µg/g	<0.020	-	-
Ethylbenzene	µg/g	<0.020	-	-
o-Xylene	µg/g	<0.020	-	-
p+m -Xylene	µg/g	<0.040	-	-
Total Xylenes	µg/g	<0.040	-	-
F1 (C6-C10)	µg/g	<10	-	-
F1 (C6-C10) -BTX	µg/g	<10	-	-
F2 (C10-C16)	µg/g	<10	-	-
F3 (C16-C34)	µg/g	<50	-	-
F4 (C34-C50)	µg/g	<50	-	-



Summary of PAHs

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
Acenaphthene	µg/g	<0.03	-	-
Acenaphthylene	µg/g	<0.05	-	-
Anthracene	µg/g	<0.03	-	-
Benzo(a)anthracene	µg/g	<0.05	-	-
Benzo(a)pyrene	µg/g	<0.05	-	-
Benzo(b/j)fluoranthene	µg/g	<0.1	-	-
Benzo(ghi)perylene	µg/g	<0.1	-	-
Benzo(k)fluoranthene	µg/g	<0.03	-	-
Chrysene	µg/g	<0.05	-	-
Dibenzo(a,h)anthracene	µg/g	<0.05	-	-
Fluoranthene	µg/g	<0.05	-	-
Fluorene	µg/g	<0.03	-	-
Indeno(1,2,3-cd)pyrene	µg/g	<0.08	-	-
1-Methylnaphthalene	µg/g	<0.03	-	-
2-Methylnaphthalene	µg/g	<0.03	-	-
Naphthalene	µg/g	<0.03	-	-
Phenanthrene	µg/g	<0.05	-	-
Pyrene	µg/g	<0.05	-	-

Summary of PCBs

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
Aroclor 1242	µg/g	<0.010	-	-
Aroclor 1248	µg/g	<0.010	-	-
Aroclor 1254	µg/g	<0.010	-	-
Aroclor 1260	µg/g	<0.010	-	-
Total PCB	µg/g	<0.010	-	-
Moisture	%	<0.010	-	-



Summary of OCPs

Parameters	Unit	Maximum Concentration	Sample ID	Sample Depth
Aldrin	µg/g	<0.002	-	-
Chlordane (alpha)	µg/g	<0.002	-	-
Chlordane (gamma)	µg/g	<0.002	-	-
Chlordane (total)	µg/g	<0.002	-	-
o,p DDD	µg/g	<0.002	-	-
p,p-DDD	µg/g	<0.002	-	-
o,p-DDD + p,p-DDD	µg/g	<0.002	-	-
o,p DDE	µg/g	0.0034	TP8	0.2-0.6
p,p-DDE	µg/g	<0.002	-	-
o,p-DDD + p,p-DDE	µg/g	0.0034	TP8	0.2-0.6
op-DDT	µg/g	<0.002	-	-
pp-DDT	µg/g	0.0022	TP8	0.2-0.6
o,p-DDT + p,p-DDT	µg/g	0.0022	TP8	0.2-0.6
Dieldrin	µg/g	<0.002	-	-
Endosulphan I	µg/g	<0.002	-	-
Endosulphan II	µg/g	<0.002	-	-
Total Endosulphan	µg/g	<0.002	-	-
Endrin	µg/g	<0.002	-	-
Heptachlor	µg/g	<0.002	-	-
Heptachlor Epoxide	µg/g	<0.002	-	-
Lindane	µg/g	<0.002	-	-
Methoxychlor	µg/g	<0.005	-	-
Total PCB	µg/g	-	-	-
Hexachlorobenzene	µg/g	<0.002	-	-
Hexachlorobutadiene	µg/g	<0.002	-	-
Hexachloroethane	µg/g	<0.002	-	-



Summary of Metals and Inorganics

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
Antimony	µg/L	<0.50	-	-
Arsenic	µg/L	<1.0	-	-
Barium	µg/L	52	BH/MW1	5.8
Beryllium	µg/L	<0.50	-	-
Boron	µg/L	31	BH/MW1	5.8
Cadmium	µg/L	<0.10	-	-
Chromium	µg/L	<5.0	-	-
Cobalt	µg/L	0.88	BH/MW1	5.8
Copper	µg/L	1.4	BH/MW1	5.8
Lead	µg/L	<0.50	-	-
Molybdenum	µg/L	4.3	BH/MW1	5.8
Nickel	µg/L	1.9	BH/MW1	5.8
Selenium	µg/L	<2.0	-	-
Silver	µg/L	<0.10	-	-
Thallium	µg/L	<0.050	-	-
Uranium	µg/L	0.27	BH/MW1	5.8
Vanadium	µg/L	<0.50	-	-
Zinc	µg/L	<5.0	-	-
Mercury	µg/L	<0.1	-	-
Chromium IV	µg/L	0.51	BH/MW10	6.6
WAD Cyanide (Free)	µg/L	1	BH/MW7	3.6

**Table VI** – Maximum Concentration (Groundwater)

1,1,1-Trichloroethane	µg/g	<0.050	-	-
1,1,2-Trichloroethane	µg/g	<0.050	-	-
Trichloroethylene	µg/g	<0.050	-	-
Trichlorofluoromethane	µg/g	<0.050	-	-
Vinyl Chloride	µg/g	<0.02	-	-
p+m-Xylene	µg/g	<0.02	-	-
o-Xylene	µg/g	<0.02	-	-
Total Xylenes	µg/g	<0.02	-	-

Summary of CCME F1-F4, PHCs

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
Benzene	µg/g	<0.020	-	-
Toluene	µg/g	<0.020	-	-
Ethylbenzene	µg/g	<0.020	-	-
o-Xylene	µg/g	<0.020	-	-
p+m -Xylene	µg/g	<0.040	-	-
Total Xylenes	µg/g	<0.040	-	-
F1 (C6-C10)	µg/g	<10	-	-
F1 (C6-C10) -BTEX	µg/g	<10	-	-
F2 (C10-C16)	µg/g	<10	-	-
F3 (C16-C34)	µg/g	<50	-	-
F4 (C34-C50)	µg/g	<50	-	-



Summary of Metals and Inorganics

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
Antimony	µg/L	<0.50	-	-
Arsenic	µg/L	<1.0	-	-
Barium	µg/L	52	BH/MW1	5.8
Beryllium	µg/L	<0.50	-	-
Boron	µg/L	31	BH/MW1	5.8
Cadmium	µg/L	<0.10	-	-
Chromium	µg/L	<5.0	-	-
Cobalt	µg/L	0.88	BH/MW1	5.8
Copper	µg/L	1.4	BH/MW1	5.8
Lead	µg/L	<0.50	-	-
Molybdenum	µg/L	4.3	BH/MW1	5.8
Nickel	µg/L	1.9	BH/MW1	5.8
Selenium	µg/L	<2.0	-	-
Silver	µg/L	<0.10	-	-
Thallium	µg/L	<0.050	-	-
Uranium	µg/L	0.27	BH/MW1	5.8
Vanadium	µg/L	<0.50	-	-
Zinc	µg/L	<5.0	-	-
Mercury	µg/L	<0.1	-	-
Chromium IV	µg/L	0.51	BH/MW10	6.6
WAD Cyanide (Free)	µg/L	1	BH/MW7	3.6

**Table VI – Maximum Concentration (Groundwater)****Summary of VOCs**

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
1,3-Dichloropropene (cis+trans)	µg/g	<0.050	-	-
Acetone	µg/g	<0.50	-	-
Benzene	µg/g	<0.020	-	-
Bromodichloromethane	µg/g	<0.050	-	-
Bromoform	µg/g	<0.050	-	-
Bromomethane	µg/g	<0.050	-	-
Carbon Tetrachloride	µg/g	<0.050	-	-
Chlorobenzene	µg/g	<0.050	-	-
Chloroform	µg/g	<0.050	-	-
Dibromochloromethane	µg/g	<0.050	-	-
1,2-Dichlorobenzene	µg/g	<0.050	-	-
1,3-Dichlorobenzene	µg/g	<0.050	-	-
1,4-Dichlorobenzene	µg/g	<0.050	-	-
Dichlorodifluoromethane	µg/g	<0.050	-	-
1,1-Dichloroethane	µg/g	<0.050	-	-
1,2-Dichloroethane	µg/g	<0.050	-	-
1,1-Dichloroethylene	µg/g	<0.050	-	-
cis-1,2-Dichloroethylene	µg/g	<0.050	-	-
trans-1,2-Dichloroethylene	µg/g	<0.050	-	-
1,2-Dichloropropane	µg/g	<0.050	-	-
cis-1,2-Dichloropropene	µg/g	<0.030	-	-
trans-1,3-Dichloropropene	µg/g	<0.040	-	-
Ethylbenzene	µg/g	<0.020	-	-
Ethylene Dibromide	µg/g	<0.050	-	-
Hexane	µg/g	<0.050	-	-
Methylene Chloride	µg/g	<0.050	-	-
Methyl Ethyl Ketone	µg/g	<0.50	-	-
Methyl Isobutyl Ketone	µg/g	<0.50	-	-
Methyl t-butyl ether (MTBE)	µg/g	<0.050	-	-
Styrene	µg/g	<0.050	-	-
1,1,1,2-Tetrachloroethane	µg/g	<0.050	-	-
1,1,2,2-Tetrachloroethane	µg/g	<0.050	-	-
Tetrachlorethylene	µg/g	<0.050	-	-
Toluene	µg/g	0.45	BH/MW1	5.8



Reference No. 1706-E080

Table VI – Maximum Concentration (Groundwater)

Page 3 of 4

1,1,1-Trichloroethane	µg/g	<0.050	-	-
1,1,2-Trichloroethane	µg/g	<0.050	-	-
Trichloroethylene	µg/g	<0.050	-	-
Trichlorofluoromethane	µg/g	<0.050	-	-
Vinyl Chloride	µg/g	<0.02	-	-
p+m-Xylene	µg/g	<0.02	-	-
o-Xylene	µg/g	<0.02	-	-
Total Xylenes	µg/g	<0.02	-	-

Summary of CCME F1-F4, PHCs

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
Benzene	µg/g	<0.020	-	-
Toluene	µg/g	<0.020	-	-
Ethylbenzene	µg/g	<0.020	-	-
o-Xylene	µg/g	<0.020	-	-
p+m -Xylene	µg/g	<0.040	-	-
Total Xylenes	µg/g	<0.040	-	-
F1 (C6-C10)	µg/g	<10	-	-
F1 (C6-C10) -BTX	µg/g	<10	-	-
F2 (C10-C16)	µg/g	<10	-	-
F3 (C16-C34)	µg/g	<50	-	-
F4 (C34-C50)	µg/g	<50	-	-

**Table VI** – Maximum Concentration (Groundwater)**Summary of PAHs**

Parameter	Unit	Maximum Concentration	Sample ID	Sampling Depth (m)
Acenaphthene	µg/L	<0.2	-	-
Acenaphthylene	µg/L	<0.2	-	-
Anthracene	µg/L	<0.05	-	-
Benzo(a)anthracene	µg/L	<0.05	-	-
Benzo(a)pyrene	µg/L	<0.01	-	-
Benzo(b/j)fluoranthene	µg/L	<0.05	-	-
Benzo(ghi)perylene	µg/L	<0.05	-	-
Benzo(k)fluoranthene	µg/L	<0.05	-	-
Chrysene	µg/L	<0.05	-	-
Dibenzo(a,h)anthracene	µg/L	<0.1	-	-
Fluoranthene	µg/L	<0.2	-	-
Fluorene	µg/L	<0.2	-	-
Indeno(1,2,3-cd)pyrene	µg/L	<0.1	-	-
1-Methylnaphthalene	µg/L	<0.2	-	-
2-Methylnaphthalene	µg/L	<0.2	-	-
Naphthalene	µg/L	<0.2	-	-
Phenanthrene	µg/L	<0.1	-	-
Pyrene	µg/L	<0.05	-	-
Methylnaphthalene, 2-(1-)	µg/L	<0.28	-	-



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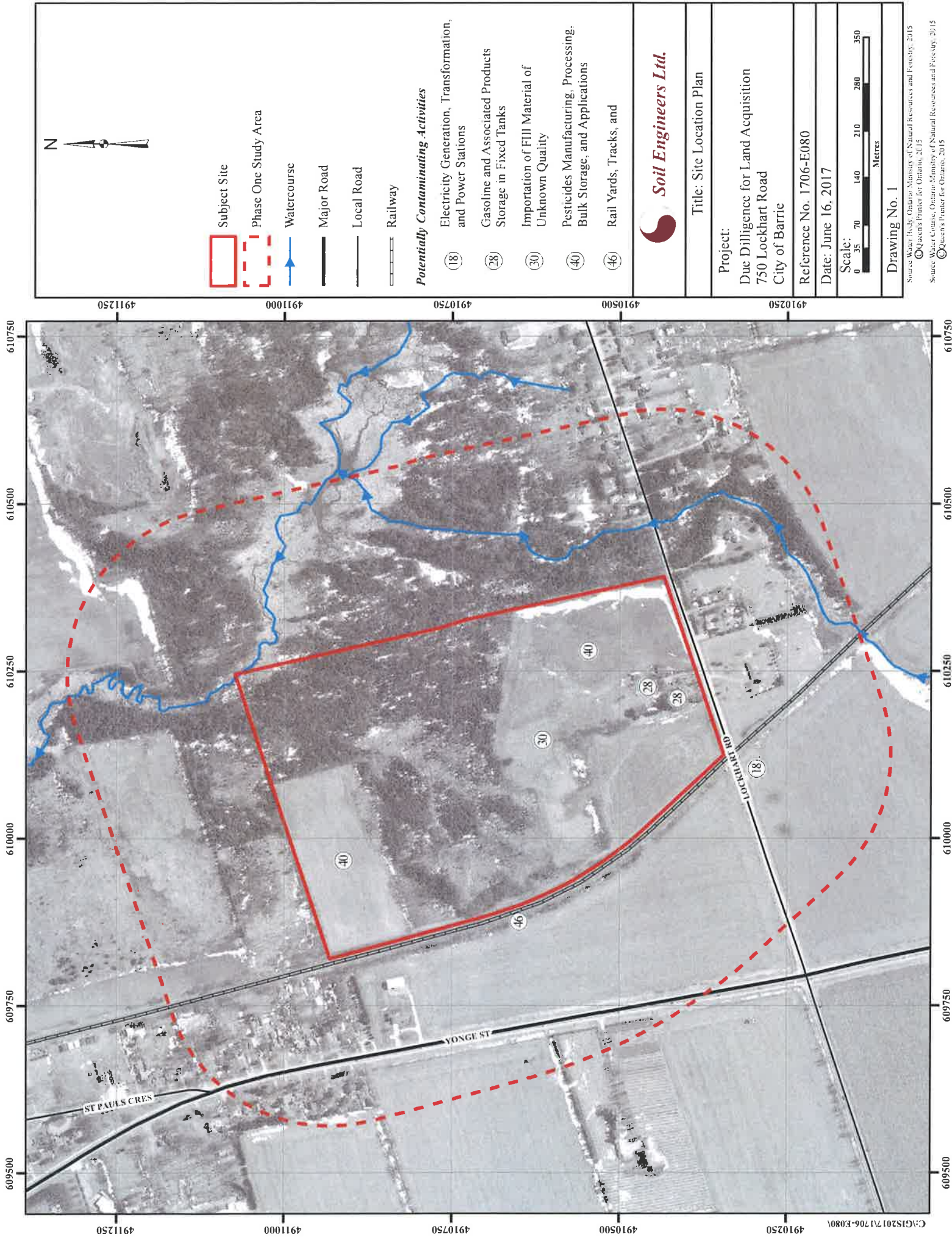
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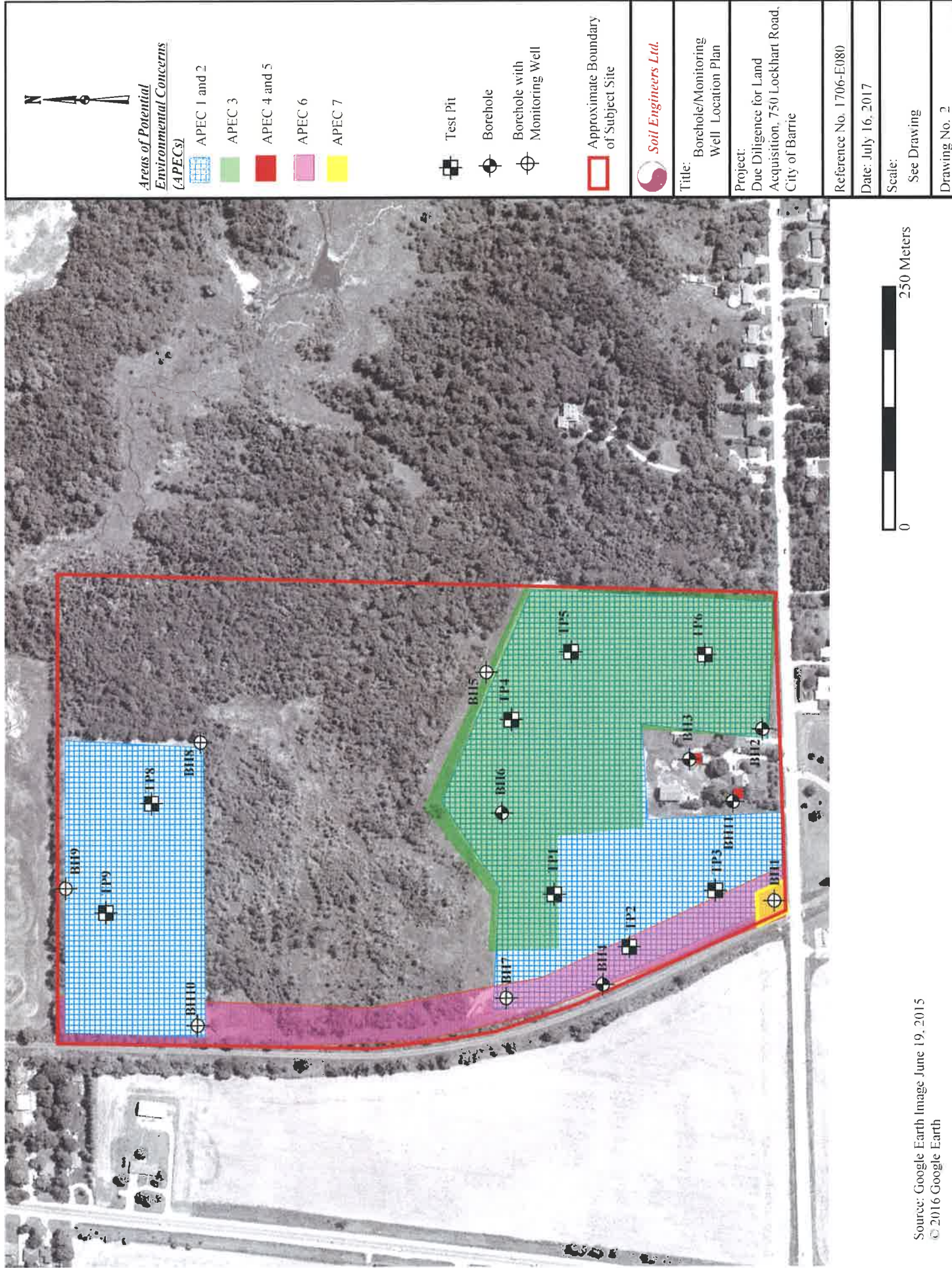
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DRAWINGS

REFERENCE NO. 1706-E080

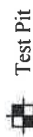






A — A'

Geological
Cross Section



Test Pit



Borehole



Borehole with
Monitoring Well

Approximate Boundary
of Subject Site



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Title:

Geological Cross Section
Location Plan

Project:

Due Diligence for Land
Acquisition, 750 Lockhart Road,
City of Barrie

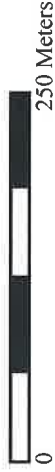
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Date: July 16, 2017

Scale:

See Drawing

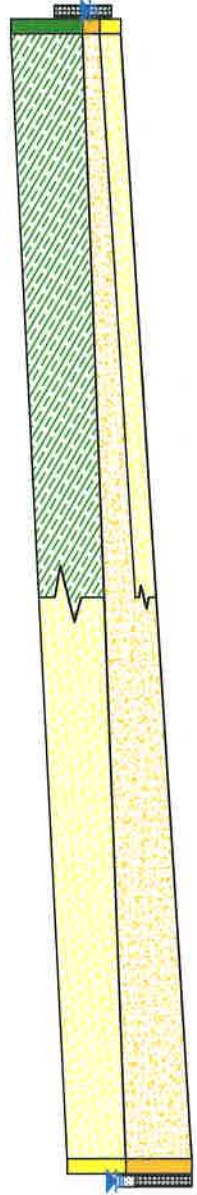
Drawing No. 3A



North
A

268.0 m
266.0 m
264.0 m
262.0 m
260.0 m
258.0 m
256.0 m
254.0 m

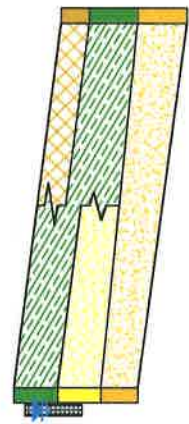
Elevation (masl)



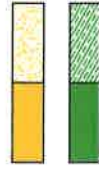
SECTION A-A'

East
B
268.0 m
266.0 m
264.0 m
262.0 m
260.0 m
258.0 m
256.0 m
254.0 m

Elevation (masl)



SECTION B-B'



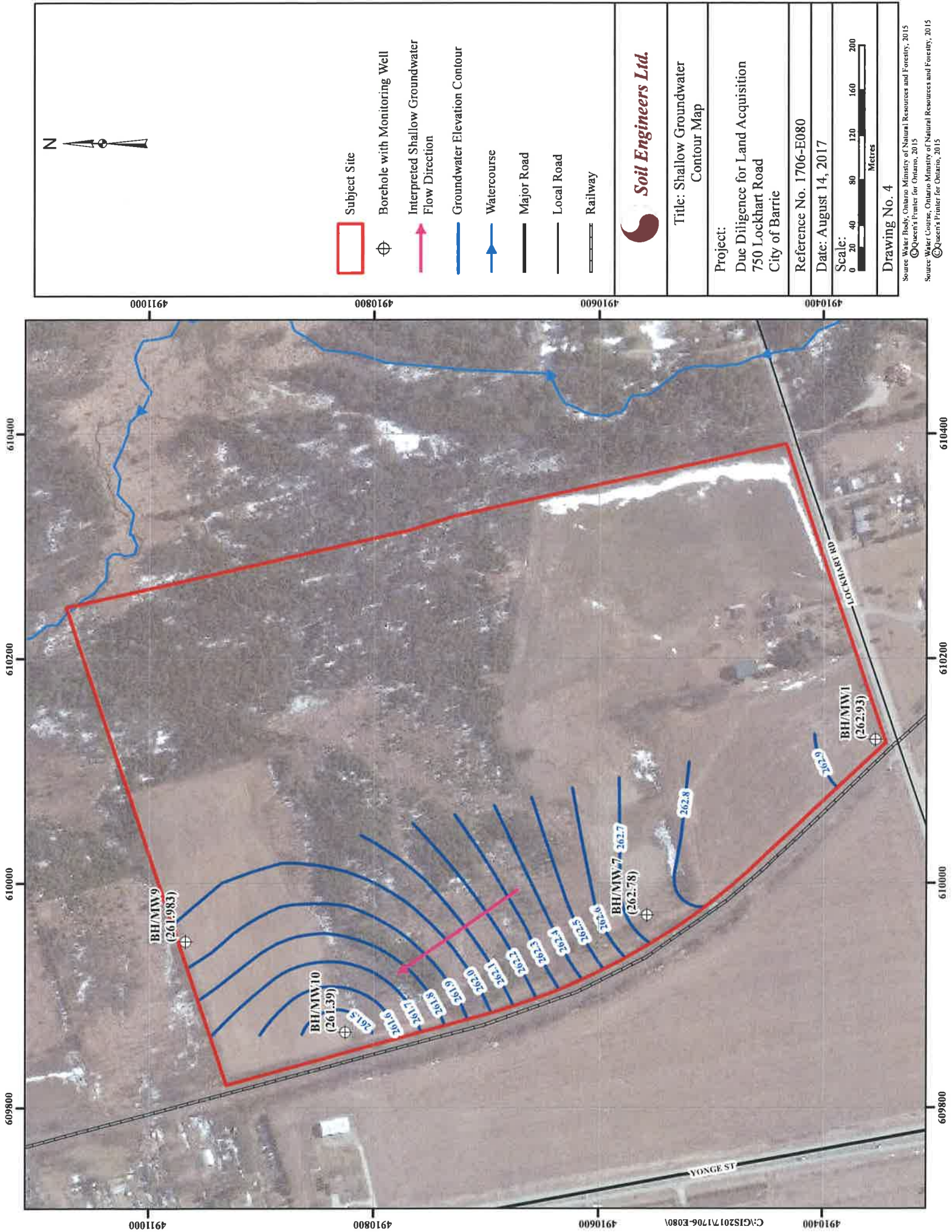
Sand
Sandy Silt, Till

Earth, Fill
Silty Sand



Water Table
Sand Backfill
Screen

Title		Geological Cross-Sections A-A' and B-B'	
Project:		Due Diligence for Land Acquisition 750 Lockhart Road City of Barrie	
Reference No:	Date:	Scale: V	Drawing No.
1706-E080	August 11, 2017	1:400	3B



- Subject Site
- Borehole with Monitoring Well
- Interpreted Shallow Groundwater Flow Direction
- Groundwater Elevation Contour
- Watercourse
- Major Road
- Local Road
- Railway



Soil Engineers Ltd.

Title: Shallow Groundwater Contour Map

Project:
Due Diligence for Land Acquisition
750 Lockhart Road
City of Barrie

Reference No. 1706-E080

Date: August 14, 2017



Drawing No. 4

Source: Water Body, Ontario Ministry of Natural Resources and Forestry, 2015
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Source: Water Course, Ontario Ministry of Natural Resources and Forestry, 2015
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APPENDIX 'A'

SAMPLING AND ANALYSIS PLAN

REFERENCE NO. 1706-E080



This Sampling and Analysis Plan is prepared for a Phase Two Environmental Site Assessment (Phase Two ESA) as defined by Ontario Regulation (O. Reg.) 153/04, as amended. The subject site is located at 750 Lockhart Road in the City of Barrie (hereinafter referred to as “the subject site”).

The Sampling and Analysis Plan is prepared based on the findings our Phase One Environmental Site Assessment (Phase One ESA, Reference No. 1706-E080).

1) **OBJECTIVE**

The objective of the Phase Two ESA was to determine the soil and groundwater quality at the subject site, as related to the following Areas of Potential Environmental Concerns (APECs) identified in our Phase One ESA:

- | | |
|--------|---|
| APEC 1 | Potential soil impact at the northwestern section of the subject site due to use of pesticides for farming activities on the northwestern section of the subject site. |
| APEC 2 | Potential soil impact at the southern section of the subject site due to use of pesticides for farming activities on the southern section of the subject site. |
| APEC 3 | Potential impact at the southeastern section of the subject site due to presence of fill materials at the southeastern section of the subject site. |
| APEC 4 | Potential soil impact at the southern section of the subject site due to the presence of the heating fuel oil aboveground storage tank on the southern section of the subject site. |
| APEC 5 | Potential soil impact at the southern section of the subject site due to the presence of the diesel aboveground storage tank on the southern section of the subject site. |
| APEC 6 | Potential soil and/or groundwater impact at the western section of the subject site due to the presence of the railway tracks to the west of the subject site. |



APEC 7 Potential soil and/or groundwater impact at the southwestern section of the subject site due to the presence of the transformer substation to the southwest of the subject site.



2) **SCOPE OF WORK**

The scope of work for the Phase Two ESA includes:

- Locate the underground and overhead utilities.
- Conduct a total of eleven (11) boreholes to depths ranging from 1.8 m below ground surface (bgs) to 6.6 m bgs for geotechnical and environmental investigation.
- Conduct a total of eight (8) hand dug test pits to depths to 0.6 m bgs.
- Collect representative soil samples from the boreholes and test pits.
- Undertake field examination of the retrieved soil samples for visual and olfactory evidence of potential contamination.
- Undertake soil vapour measurements for the retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 ppm (parts per million by volume).
- Install environmental monitoring wells in three (3) of the boreholes for groundwater sampling and testing.
- Conduct one groundwater monitoring round and collect groundwater samples for chemical testing.
- Carry out analytical testing program on selected soil samples and groundwater samples including quality assurance/quality control (QA/QC samples) for one or more of the following parameters: Organochlorine Pesticides (OCs), Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), and Metals and/or Inorganics.
- Review analytical testing results of submitted soil and groundwater samples using applicable Site Condition Standards.
- Prepare a Phase Two ESA report containing the findings of the investigation.



3) **RATIONALE OF SAMPLING LOCATION**

The rationale for the selection of the borehole/monitoring well locations is presented in the table below:

Areas of Potential Environmental Concerns (APECs)	Sample Location ID
APEC 1 and 2	TP1, TP2, TP3, TP4, TP5, TP6, TP8, TP9, and BH10
APEC 3	TP1, TP4, TP5, TP6, BH2, BH5 and BH6
APEC 4	BH11
APEC 5	BH3
APEC 6	BH1, BH7, BH10
APEC 7	BH10

The location of the boreholes, test pits and monitoring wells for the Phase Two ESA is shown in Drawing No. 2.



4) **SOIL AND GROUNDWATER SAMPLES (INCLUDING QA/QC SAMPLES) ANALYTICAL SCHEDULE**

A summary of soil and groundwater samples (including QA/QC samples) to be submitted is presented in the table below:

Test Pit/ Borehole	Metals and/or Inorganics	PHCs + BTEX	PAHs	VOC	OCs	PCBs
BH 1	1	1	1	1	-	1
BH 2	1	-	-	-	1	-
BH 3	1	1	-	-	-	-
BH 5	1	-	-	-	-	-
BH 6	1	-	-	-	1	-
BH 7	1	1	1	1	-	-
BH10	1	1	1	1	1	-
TP1	1	-	-	-	1	-
TP2	1	-	-	-	1	-
TP3	1	-	-	-	1	-
TP4	1	-	-	-	1	-
TP5	1	-	-	-	1	-
TP6	1	-	-	-	1	-
TP8	1	-	-	-	1	-
TP9	1	-	-	-	1	-
Duplicate Soil Sample	1	-	-	1	1	-

Borehole/ Monitoring Well	Metals and/or Inorganics	PHC+ BTEX	PAHs	VOC
MW1	1	1	1	1
MW7	1	1	1	1
MW10	1	1	1	1
Duplicate GW Sample	1	1	-	-
Trip Blank	-	-	-	1



5) **SOIL AND GROUNDWATER SAMPLING PROCEDURES**

Soil Engineers Ltd.'s (SEL) Standard Operation Procedures (SOPs) will be followed throughout the field investigation (sampling, decontamination of equipment, observation and documentation) including the field QA/QC program. SEL SOPs are presented in Section 7 of this sampling and analysis plan.

6) **DATA QUALITY OBJECTIVES**

Sampling and decontamination procedures including QA/QC program should be carried out in accordance with:

- SEL SOPs, as presented in Section 7.
- The "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", May 1996, revised December 1996, the Ministry of the Environment (MOE) Guidance Manual, as amended by O. Reg. 511/09.

Laboratory analytical methods, protocols and procedures should be carried out in accordance with the "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, in accordance with O. Reg. 511/09 and O. Reg. 269/11.



7) **STANDARD OPERATING PROCEDURES (SOPs)**

7.1) **Borehole Drilling**

The purpose of borehole drilling is to provide access to subsurface soils at specified locations and depths. Soil borings also allow for installation of groundwater monitoring wells.

7.1.1) **Underground Utilities**

Prior to drilling, the public utility service (One Call) and private utility services are contacted. The underground utility services are located and marked out in the field.

7.1.2) **Drilling Methods**

Direct Push Drilling (i.e. Geoprobe, Powerprobe, Pionjar, etc.)

The direct push drilling machine is a hydraulically powered hammer/ram sampling device. The unit is designed so that the weight of the vehicle provides the majority of downward force. The hydraulics, with the aid of a percussion hammer, push lengths of specially modified 54 mm (2.125 inch) outside diameter (OD), hardened steel rod into the ground. The rod is advanced to target sampling depth is reached. The steel rod has been specially modified for specific types of sample collection.

Flight-Auger Drilling

The flight-auger drilling machine is a hydraulically powered feed and retract system that provides 28,275 pounds (12,826 kg) of retract force and 18,650 pounds (8,460 kg) of down pressure. The 183 cm (72 inch) stroke, hydraulic vertical drive system has no chains or cables which can stretch. It is equipped with hollow-stem augers. It is extended to pre-determined sampling intervals using conventional drilling methods, at which time a decontaminated 51 mm split-spoon sampler is extended ahead of the lead



auger to collect a soil sample. The split-spoon sampler is then brought to surface and opened, exposing the soil core sample.

Hand Dug Test Pit

The hand-dug test pits were hand-dug using shovel. Prior to digging and sampling at each test pit location, the shovel was brushed clean using a solution of phosphate-free detergent and distilled water.

7.1.3) Occupational Health and Safety

Prior to drilling, the site is inspected to ensure that no potentially hazardous material is present near/around the drilling area. Safety procedures are reviewed and a safety check of the equipment is conducted including locating the emergency stop button on the drill rig, checking personal protective equipment (hard hats, safety shoes, eye/ear protection), locating the first aid kit and confirming the location of the nearest hospital, and verifying the standard procedure in case of injury.

7.1.4) Drilling Spoils

Excess soil generated during sampling and drilling procedure is stored at the site in metal barrels. If the analytical results indicate the soil is contaminated, a licensed disposal company is notified to collect the barrels of soil for proper disposal.

7.1.5) Borehole Abandonment

After drilling, logging and/or sampling, boreholes will be backfilled by the method described below:

- Bentonite is thoroughly mixed into the grout within the specified percentage range. The tremie grout is usually placed into the hole; however, for selected boreholes (e.g., shallow borings well above the water table) at certain sites, the



grout may be allowed to free fall, taking care to ensure the grout does not bridge and form gaps or voids in the grout column.

- The volume of the borehole is calculated and compared to the grout volume used during grouting to aid in verifying that bridging did not occur.
- When using a tremie to place grout in the borehole, the bottom of the tremie is submerged into the grout column and withdrawn slowly as the hole fills with grout. If allowing the grout to free fall (and not using a tremie), the grout is poured slowly into the boring. The rise of the grout column is visually monitored or sounded with a weighted tape.
- If the method used to drill the boring utilized a drive casing, the casing is slowly extracted during grouting such that the bottom of the casing does not come above the top of the grout column.
- During the grouting process, no contaminating material (oil, grease, or fuels from gloves, pumps, hoses, et. al) is permitted to enter the grout mix and personnel wear personal protective equipment as specified in the Project Health and Safety Plan.
- Following grouting, barriers are placed over grouted boreholes as the grout is likely to settle in time, creating a physical hazard. Grouted boreholes typically require at least a second visit to 'top off' the hole.
- The surface hole condition should match the pre-drilling condition (asphalt, concrete, or smoothed flush with native surface), unless otherwise specified in the project work plans.

7.1.6) Subsurface Obstruction

Where refusal to drilling occurs due to rock, foundation or underground services, the borehole is relocated within 2.0 m downstream from the original borehole location.



7.2) Soil Sampling

7.2.1) Introduction

Soil sampling is conducted in accordance with the “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, May 1996” as revised December 1996 (MOE Guidance Manual) and as amended by O. Reg. 366/05, 66/08, 511/09, 245/10, 179/11, 269/11 and 333/13. The sampling procedures are described herein.

Drilling Rig Decontamination

Geoprobe

One-time use Shelby tube (thin-walled) samples are recovered from the boreholes in clear disposable PVC liners to prevent cross-contamination.

CME 55

Drilling equipment such as drill rigs, augers, drill pipes, drilling rods and split-spoons are decontaminated prior to initial use, between borehole locations and at the completion of drilling activities. The drilling equipment is manually scrubbed with a brush using a phosphate-free solution and thoroughly steam cleaned and/or power washed to remove any foreign material and potential contaminants.

In addition, the split-spoon sampler and any sub-sampling equipment is decontaminated prior to each usage. Various solutions are used for sampling equipment decontamination as described below:

- Phosphate-free soap solution (i.e., Alconox), tap water and distilled water are used for suspected petroleum hydrocarbon soil sampling.
- A reagent-grade methanol solution and distilled water are used for suspected VOCs soil sampling. The reinstate waste is collected.



- Reagent-grade 10% nitric acid solution and distilled water are used for suspected metals soil sampling. The reinstatement waste will be collected.

7.2.2) Sample Logging and Field Screening

Samples are typically collected at 1.5 m intervals in the overburden. Tactile examination of the samples is made to classify the soil, and a log is recorded for each borehole detailing the physical characteristics of the soil including colour, soil type, structure, and any observed staining or odour. The organic vapour readings, the moisture content of the samples as determined in the laboratory, the groundwater and cave-in levels measured at the time of investigation, and the groundwater monitoring well construction details are given on the borehole logs.

7.2.3) Field Screening and Calibration Procedures

The soil samples are classified based on physical characteristics including colour, soil type, moisture, and visible observation of staining and/or odour. In addition, the organic vapour reading for each soil sample is determined using a gas detector. Based on the overall soil physical characteristics, representative soil sample are selected for chemical analysis.

The organic vapour readings are measured using a portable RKI Eagle gas detector, TYPE 101 (Serial Number: E091015) set to include all gases, and having a minimum detection of 2 ppm. Prior to measurement, the detector is calibrated using a Hexane 40% LEL gas. The allowable range of calibration is 38% to 42%.

7.2.4) Soil Sampling

The soil from the disposable sampler liner is handled using new disposable gloves in order to avoid the risk of cross-contamination between the samples. Sufficient amounts of the soil samples are placed into clean glass jars with Teflon lined lids for analyses for



Polychlorinated Biphenyls, Polyaromatic Hydrocarbons, moisture content, medium to heavy PHCs, and Metals and Inorganics.

Small amounts of the soil samples are collected using a disposable 'T'-shaped Terracore sampler and stored in methanol or sodium bisulfate vials for light PHCs (CCME F1) and VOCs analysis, respectively; the remainder of the samples is placed into a sealable bag for vapour measurement and soil classification. The samples are stored in an insulated container with ice after sampling and during shipment to the laboratory.

The minimum requirements for the number, type and frequency of field quality control are given below:

- i. Field Blanks: Field blank samples for VOCs analysis are prepared to confirm that no contamination takes place during the soil sampling procedure.
- ii. Field Duplicates: At least 1 field duplicate sample is collected and submitted for laboratory analysis for every 10 soil samples that are collected to ensure the soil sampling technique is accurate.

7.3) **Well Installation and Groundwater Sampling**

7.3.1) Introduction

The well installation procedures are described herein.

7.3.2) Screen and Riser Pipe

Monitoring wells are constructed from individually wrapped 38 or 50 mm inside diameter (ID) schedule 40 polyvinyl chloride (PVC) flush threaded casing equipped with O-rings. The screen consists of casing material which is factory slotted (slot width = 0.25 mm) to permit the entry of water into the well. The bottom of the screens are equipped with threaded end caps. The appropriate number of risers are coupled with the screen section(s) via threaded joints to construct the well. The top of the wells are tightly



capped using a locking well cap, which prevents the infiltration of surface water and foreign material into the well and also provides security. A watertight, traffic-rated protective casing is installed over each monitoring well within a concrete pad extending approximately 0.5 m bgs. No PVC cements or other solvent based cements are used in the construction of the monitoring wells.

7.3.3) Well Materials Decontamination

Dedicated sampling equipment, such as submersible pumps, are decontaminated prior to installation inside monitoring wells.

Where factory-cleaned, hermetically sealed materials are used, no decontamination is conducted.

Setting Screen, Riser Casings and Filter Materials

At total depth, the soil cuttings are removed through circulation or rapidly spinning the augers prior to constructing the well. The drill pipe and bit or centre bit boring is removed. The well construction materials are then installed inside the open borehole or through the centre of the drive casing or augers.

After the monitoring well assembly is lowered to the bottom of the borehole, the filter pack is added until its height is approximately two feet above the top of the screen, and placement is verified. The filter pack is then surged using a surge block or swab in order to settle the pack material and reduce the possibility of bridging.

Setting Seals and Grouting

Once the top of the filter pack is verified to be in the correct position, a bentonite seal is placed above the filter pack. The seal is allowed to hydrate for at least one hour before proceeding with the grouting operation.



After hydration of the bentonite seal, grout is then pumped through a tremie pipe and filled from the top of the bentonite seal upward. The bottom of the tremie pipe should be maintained below the top of the grout to prevent free fall and bridging. When using drive casing or hollow-stem auger techniques, the drive casing/augers should be raised in incremental intervals, keeping the bottom of the drive casing/augers below the top of the grout. Grouting will cease when the grout level has risen to within approximately one to two feet of the ground surface, depending on the surface completion type (flush-mount versus above-ground). Grout levels are monitored to assure that grout taken into the formation is replaced by additional grout.

Capping the Wells

For above-ground completions, the protective steel casing will be centered on the well casing and inserted into the grouted annulus. Prior to installation, a 2-inch deep temporary spacer may be placed between the PVC well cap and the bottom of the protective casing cover to keep the protective casing from settling onto the well cap. A minimum of 24 hours after grouting should elapse before installation of the concrete pad and steel guard posts for above-ground completions, or street boxes or vaults for flush mount completions. For above-ground completions, a concrete pad, usually 3-foot by 3-foot by 4-inch thick, is constructed at ground surface around the protective steel casing. The concrete is sloped away from the protective casing to promote surface drainage from the well.

For flush-mount (or subgrade) completions, a street box or vault is set and cemented in position. The top of the street box or vault will be raised slightly above grade and the cement sloped to grade to promote surface drainage away from the well.



7.3.4) Documentation of Monitoring Well Configuration

The following information is recorded:

- Length of well screen
- Total depth of well boring
- Depth from ground surface to top of grout or bentonite plug in bottom of borehole (if present)
- Depth to base of well string
- Depth to top and bottom of well screen



Soil Engineers Ltd.

CONSULTING ENGINEERS

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APPENDIX 'B'

BOREHOLE LOGS

REFERENCE NO. 1706-E080

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger
(Hollow Stem)**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 27, 2017

El. (masl) Depth (mbgs)	SOIL DESCRIPTION	SAMPLES				Depth Scale (mbgs)	Penetration Resistance (blows/30 cm)		REMARKS	WATER LEVEL
		Number	Type	Gas Reading	N-Value		10	30		
267.13 0.0	Ground Surface 33 cm TOPSOIL					0				
	Brown, loose to very dense SANDY SILT TILL traces of clay and gravel <u>ploughed</u>	1	DO	0	4	0				
		2	DO	0	13	1				
		3	DO	0	22	2				
		4	DO	0	45	3				
		5	DO	0	64	4				
263.3 3.8	Brown, dense, wet SAND fine to coarse grained traces of silt and gravel	6	DO	0	49	5				
262.4 4.7	Brown, very dense, wet SILTY SAND	7A 7B	DO	0	85/23	6				
		8	DO	0	66	7				
261.3 5.8	END OF BOREHOLE Installed 51 mm standpipe to 5.3 m. Bentonite seal from 0.0 to 1.7 m. Sand backfill from 1.7 to 5.3 m. 3.0 m screen from 2.3 to 5.3 m. Provided with monument protective casing.									

**Soil Engineers Ltd.**

W.L. @ 4.20 mbgs on July 28, 2017

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 2

FIGURE NO.: 2

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 21, 2017

El. (masl) Depth (mbgs)	SOIL DESCRIPTION	SAMPLES				Depth Scale (mbgs)	X Penetration Resistance (blows/30 cm) 10 30 50 70 90 ● Gas Reading (ppm) 20 60 100 140 180		REMARKS	WATER LEVEL
		Number	Type	Gas Reading	N-Value					
266.80 0.0	Ground Surface 23 cm TOPSOIL					0				
266.0 0.8	EARTH FILL brown sand occ. gravel and rock fragments Brown, compact to very dense SANDY SILT TILL traces of clay and gravel	1	DO	0	28	0		X	BH2/A: OCs BH2/B: M&I	
		2A	DO	0	18	1		X		
		2B								
		3	DO	0	55	2		X		
		4	DO	0	50/15	3				
263.7 3.1	Brown, very dense SAND fine to coarse grained a trace of gravel wet below 4.6 m	5	DO	0	50	3		X		
						4				
		6	DO	0	55	5		X		
						6				
260.2 6.6	END OF BOREHOLE	7	DO	0	45	7		X		

**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 21, 2017

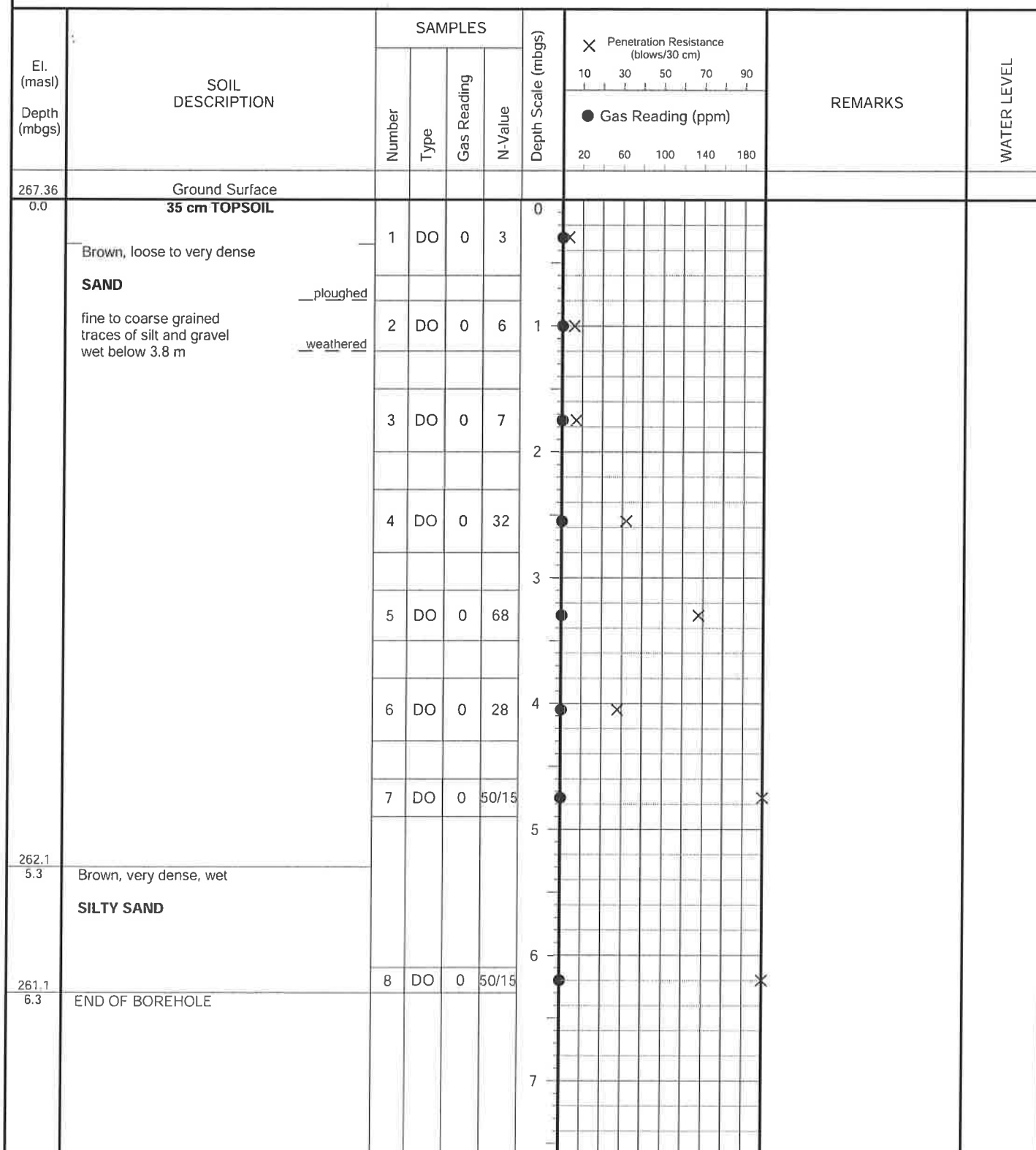
El. (masl) Depth (mbgs)	SOIL DESCRIPTION	SAMPLES				Depth Scale (mbgs)	× Penetration Resistance (blows/30 cm) ● Gas Reading (ppm)	REMARKS	WATER LEVEL
		Number	Type	Gas Reading	N-Value				
265.26 0.0	Ground Surface					0			
264.5 0.8	EARTH FILL dark brown sand occ. topsoil inclusions, gravel and rock fragments	1	DO	0	2	0	×	BH3/2: BTEX, PHCs, M&I	
	Brown, compact to very dense	2	DO	0	18	1	×		
	SAND fine to coarse grained a trace of gravel wet below 2.3 m	3	DO	0	32	2	×		
		4	DO	0	35	3	×		
		5	DO	0	34	4	×		
		6	DO	0	50/15	5	×		
		7	DO	0	50/15	6	×		
258.9 6.4	END OF BOREHOLE					7			

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JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 4

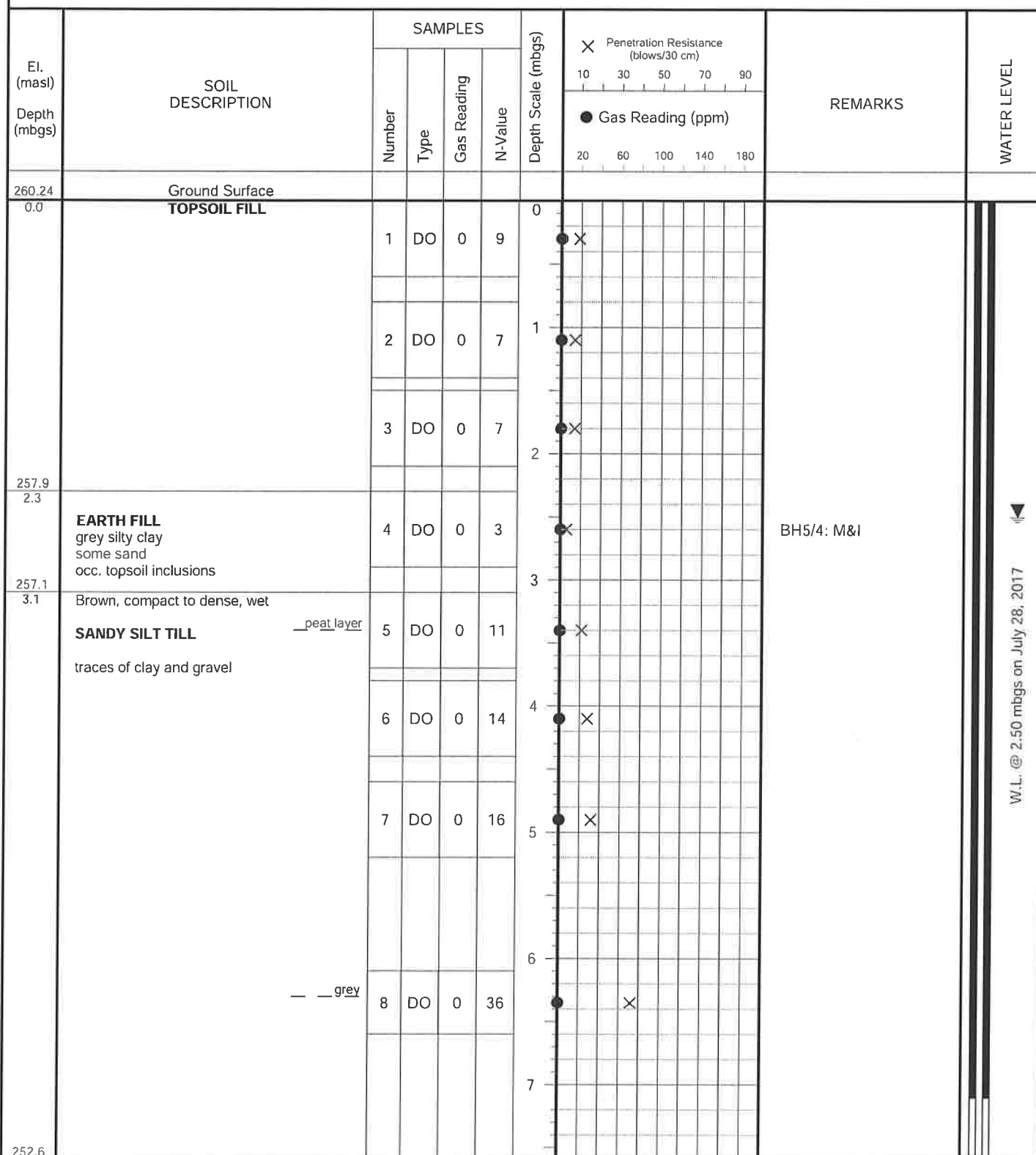
FIGURE NO.: 4

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 27, 2017**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 5

FIGURE NO.: 5

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger
(Hollow Stem)**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 24, 2017**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 5

FIGURE NO.: 5

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger
(Hollow Stem)**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 24, 2017

El. (masl) Depth (mbgs)	SOIL DESCRIPTION	SAMPLES				Depth Scale (mbgs)	X Penetration Resistance (blows/30 cm) ● Gas Reading (ppm)	REMARKS	WATER LEVEL
		Number	Type	Gas Reading	N-Value				
7.6	Brown, compact to dense, wet SANDY SILT TILL traces of clay and gravel	9	DO	0	45	8	X		
250.9 9.3	Dense, wet SILTY SAND occ. sand seams	10	DO	0	30	9	X		
						10			
						11	X		
249.0 11.2	END OF BOREHOLE Installed 51 mm standpipe to 10.7 m. Bentonite seal from 0.0 to 7.1 m. Sand backfill from 7.1 to 10.7 m. 3.0 m screen from 7.7 to 10.7 m. Provided with monument protective casing.					12			
						13			
						14			
						15			

**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 6

FIGURE NO.: 6

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 21, 2017

El. (masl) Depth (mbgs)	SOIL DESCRIPTION	SAMPLES				Depth Scale (mbgs)	X Penetration Resistance (blows/30 cm) 10 30 50 70 90 ● Gas Reading (ppm) 20 60 100 140 180		REMARKS	WATER LEVEL
		Number	Type	Gas Reading	N-Value					
261.85 0.0	Ground Surface 30 cm TOPSOIL					0				
	EARTH FILL brown to grey silty sand to silty clay occ. topsoil and rootlet inclusions	1	DO	0	6	0	●	X	BH6/1: OCs	
		2	DO	0	2	1	●	X	BH6/2: M&I	
260.4 1.5	Brown, loose to compact, wet SANDY SILT TILL traces of clay and gravel	3	DO	0	6	2	●	X		
		4	DO	0	8	3	●	X		
		5	DO	0	27	4	●	X		
257.9 4.0	Brown, compact to dense, wet SAND fine grained a trace of silt	6	DO	0	29	5	●	X		
		7	DO	0	39	6	●	X		
255.3 6.6	END OF BOREHOLE					7				

**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 7

FIGURE NO.: 7

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger
(Hollow Stem)**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 27, 2017

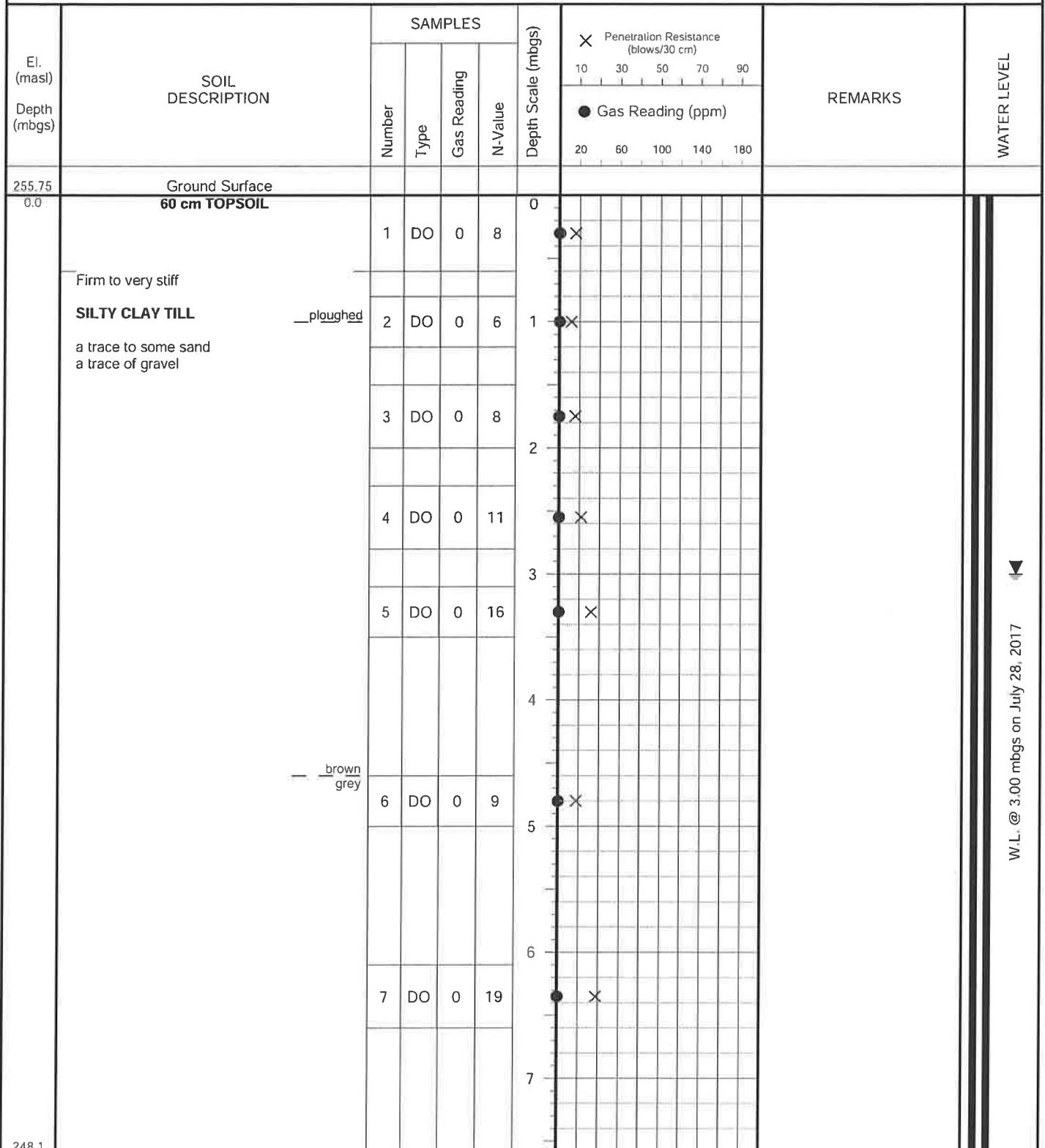
El. (masl) Depth (mbgs)	SOIL DESCRIPTION	SAMPLES				Depth Scale (mbgs)	X Penetration Resistance (blows/30 cm) ● Gas Reading (ppm)	REMARKS	WATER LEVEL
		Number	Type	Gas Reading	N-Value				
264.28 0.0	Ground Surface					0			
	13 cm TOPSOIL								
	Brown, very loose to compact	1	DO	0	3	0		BH7/1: M&I	
	SANDY SILT TILL								
	traces of clay and gravel wet below 1.0 m	2	DO	0	5	1		BH7/2: PHCs, BTEX, PAHs	
	<u>weathered</u>								
		3	DO	0	30	2			
262.0 2.3	Brown, very dense, wet								
	SILTY SAND	4	DO	0	26	3			
		5	DO	0	63	4		BH7/5: VOCs	
259.7 4.6	Brown, very dense, wet	6	DO	0	53	5			
	SAND								
	fine to coarse grained a trace of silt								
257.8 6.5	END OF BOREHOLE	7	DO	0	34/25	6			
	Installed 51 mm standpipe to 3.6 m. Bentonite seal from 0.0 to 0.45 m. Sand backfill from 0.45 to 3.6 m. 3.0 m screen from 0.6 to 3.6 m. Provided with monument protective casing.					7			

**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 8

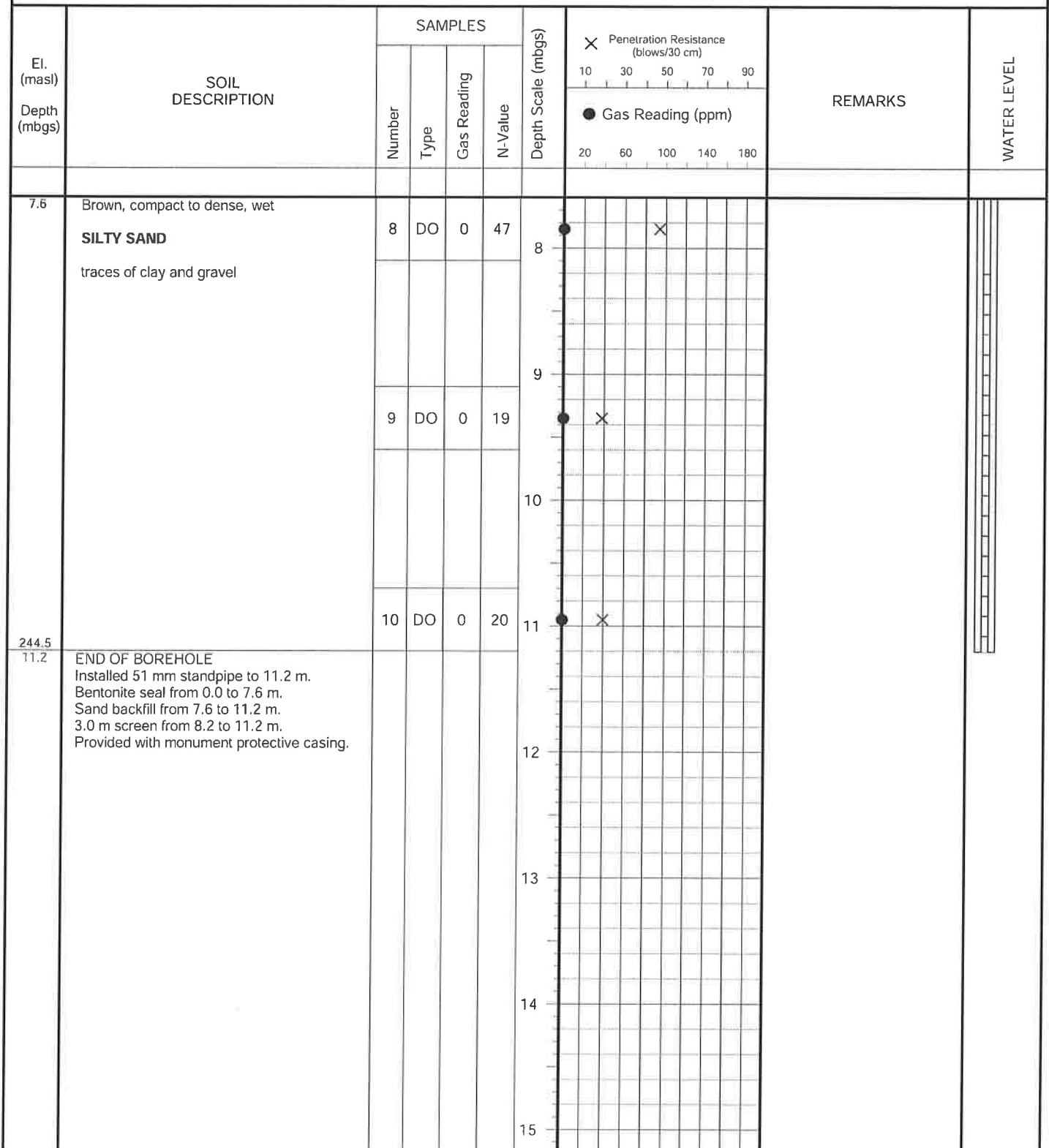
FIGURE NO.: 8

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger
(Hollow Stem)**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 25, 2017**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 8

FIGURE NO.: 8

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger
(Hollow Stem)**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 25, 2017**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 9

FIGURE NO.: 9

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger
(Hollow Stem)**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 26, 2017

El. (masl) Depth (mbgs)	SOIL DESCRIPTION	SAMPLES				Depth Scale (mbgs)	X Penetration Resistance (blows/30 cm) ● Gas Reading (ppm)	REMARKS	WATER LEVEL
		Number	Type	Gas Reading	N-Value				
261.98 0.0	Ground Surface 35 cm TOPSOIL					0			
	Brown, compact to dense	1	DO	0	10	0	● X		
	SANDY SILT TILL								
	traces of clay and gravel <u>polished</u>	2	DO	0	10	1	● X		
	<u>weathered</u>								
		3	DO	0	40	2	● X		
		4	DO	0	27	3	● X		
258.9 3.1	Brown, very loose to very dense, wet	5	DO	0	33	4	● X		
	SILTY SAND								
	<u>disturbed</u>	6	DO	0	3	5	● X		
		7	DO	0	55	6	● X		
255.4 6.6	END OF BOREHOLE Installed 51 mm standpipe to 6.1 m. Bentonite seal from 0.0 to 2.4 m. Sand backfill from 2.4 to 6.1 m. 3.0 m screen from 3.1 to 6.1 m. Provided with monument protective casing.					7			

W.L. @ 1.87 mbgs on July 28, 2017

**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 10

FIGURE NO.: 10

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger
(Hollow Stem)**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:** July 26, 2017

El. (masl) Depth (mbgs)	SOIL DESCRIPTION	SAMPLES				Depth Scale (mbgs)	X Penetration Resistance (blows/30 cm) 10 30 50 70 90 ● Gas Reading (ppm) 20 60 100 140 180		REMARKS	WATER LEVEL
		Number	Type	Gas Reading	N-Value					
263.99 0.0	Ground Surface									
	20 cm TOPSOIL									
	Brown, loose to compact, wet	1A				0			BH10/1A: OCs	
		1B	DO	0	4				BH10/1B: M&I	
	SILTY SAND									
	fine grained									
	some silt									
	occ. topsoil and rootlet inclusions	2	DO	0	4	1				
	— <u>ploughed</u>									
	— <u>weathered</u>									
		3	DO	0	30	2			BH10/3: PAHs	
		4	DO	0	16				BH10/4: PHCs	
260.9 3.1	Brown, dense to very dense, wet	5	DO	0	38	3				
	SAND									
	fine to medium grained									
	a trace to some silt									
		6	DO	0	37	5				
		7	DO	0	52	6			BH10/7: VOCs	
257.4 6.6	END OF BOREHOLE					7				
	Installed 51 mm standpipe to 6.6 m.									
	Bentonite seal from 0.0 to 2.6 m.									
	Sand backfill from 2.6 to 6.6 m.									
	3.0 m screen from 3.6 to 6.6 m.									
	Provided with monument protective casing.									

W.L. @ 2.60 mbgs on July 28, 2017

**Soil Engineers Ltd.**

JOB NO.: 1706-E080

LOG OF BOREHOLE NO.: 11

FIGURE NO.: 11

PROJECT DESCRIPTION: Due Diligence for Land Acquisition**METHOD OF BORING:** Flight Auger
(Hollow Stem)**PROJECT LOCATION:** 750 Lockhart Road, City of Barrie**DRILLING DATE:**

El. (masl) Depth (mbgs)	SOIL DESCRIPTION	SAMPLES				Depth Scale (mbgs)	× Penetration Resistance (blows/30 cm) ● Gas Reading (ppm)	REMARKS	WATER LEVEL
		Number	Type	Gas Reading	N-Value				
264.05 0.0	Ground Surface					0			
	15 cm TOPSOIL								
	Brown, moist	1	DO	0		0		BH11/2: M&I, PHCs	
	EARTH, FILL a trace of gravel	2	DO	2		1			
262.8 1.2	Moist	3	DO	0		2			
	SANDY SILT, TILL								
262.2 1.8	END OF BOREHOLE					3			
						4			
						5			
						6			
						7			

**Soil Engineers Ltd.**



Soil Engineers Ltd.

CONSULTING ENGINEERS

GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

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APPENDIX 'C'

CERTIFICATES OF ANALYSIS (SOIL SAMPLES)

REFERENCE NO. 1706-E080

Your Project #: 1706-E080

Attention: Samiya Tabassum

Soil Engineers Ltd
90 West Beaver Creek Road
Unit 100
Richmond Hill, ON
CANADA L4B 1E7

Your C.O.C. #: 621084-01-01, C#619364-01-01, C#620061-02-01

Report Date: 2017/08/09

Report #: R4640191

Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7G3963

Received: 2017/08/01, 14:20

Sample Matrix: Soil

Samples Received: 30

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	3	N/A	2017/08/08	CAM SOP-00301	EPA 8270D m
Hot Water Extractable Boron	15	2017/08/04	2017/08/04	CAM SOP-00408	R153 Ana. Prot. 2011
1,3-Dichloropropene Sum	4	N/A	2017/08/04		EPA 8260C m
Free (WAD) Cyanide	1	2017/08/03	2017/08/04	CAM SOP-00457	OMOE E3015 m
Free (WAD) Cyanide	14	2017/08/04	2017/08/05	CAM SOP-00457	OMOE E3015 m
Conductivity	11	2017/08/08	2017/08/08	CAM SOP-00414	OMOE E3530 v1 m
Hexavalent Chromium in Soil by IC (1)	1	2017/08/03	2017/08/03	CAM SOP-00436	EPA 3060/7199 m
Hexavalent Chromium in Soil by IC (1)	3	2017/08/03	2017/08/04	CAM SOP-00436	EPA 3060/7199 m
Hexavalent Chromium in Soil by IC (1)	11	2017/08/04	2017/08/04	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	5	N/A	2017/08/03	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	5	2017/08/04	2017/08/04	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS	15	2017/08/04	2017/08/08	CAM SOP-00447	EPA 6020B m
Moisture	1	N/A	2017/08/02	CAM SOP-00445	Carter 2nd ed 51.2 m
Moisture	23	N/A	2017/08/03	CAM SOP-00445	Carter 2nd ed 51.2 m
Moisture	6	N/A	2017/08/04	CAM SOP-00445	Carter 2nd ed 51.2 m
OC Pesticides (Selected) & PCB (4)	7	2017/08/02	2017/08/08	CAM SOP-00307	SW846 8081, 8082
OC Pesticides (Selected) & PCB (4)	5	2017/08/04	2017/08/05	CAM SOP-00307	SW846 8081, 8082
OC Pesticides Summed Parameters	1	N/A	2017/08/03	CAM SOP-00307	EPA 8081/8082 m
OC Pesticides Summed Parameters	11	N/A	2017/08/04	CAM SOP-00307	EPA 8081/8082 m
PAH Compounds in Soil by GC/MS (SIM)	2	2017/08/04	2017/08/04	CAM SOP-00318	EPA 8270D m
PAH Compounds in Soil by GC/MS (SIM)	1	2017/08/05	2017/08/05	CAM SOP-00318	EPA 8270D m
Polychlorinated Biphenyl in Soil	1	2017/08/04	2017/08/04	CAM SOP-00309	EPA 8082A m
pH CaCl2 EXTRACT	11	2017/08/04	2017/08/04	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	11	N/A	2017/08/08	CAM SOP-00102	EPA 6010C
SAR - ICP Metals	11	2017/08/08	2017/08/08	CAM SOP-00408	EPA 6010D m
Volatile Organic Compounds in Soil	3	N/A	2017/08/03	CAM SOP-00228	EPA 8260C m
Volatile Organic Compounds in Soil	1	N/A	2017/08/04	CAM SOP-00228	EPA 8260C m

Your Project #: 1706-E080

Attention: Samiya Tabassum

Soil Engineers Ltd
90 West Beaver Creek Road
Unit 100
Richmond Hill, ON
CANADA L4B 1E7

Your C.O.C. #: 621084-01-01, C#619364-01-01, C#620061-02-01

Report Date: 2017/08/09

Report #: R4640191

Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7G3963

Received: 2017/08/01, 14:20

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.

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.

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.

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



Ashton Gibson
Project Manager
09 Aug 2017 14:53:11

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

=====

Your Project #: 1706-E080

Attention: Samiya Tabassum

Soil Engineers Ltd
90 West Beaver Creek Road
Unit 100
Richmond Hill, ON
CANADA L4B 1E7

Your C.O.C. #: 621084-01-01, C#619364-01-01, C#620061-02-01

Report Date: 2017/08/09

Report #: R4640191

Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7G3963

Received: 2017/08/01, 14:20

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 (SOIL)

Maxxam ID		EVZ567	EVZ574	EVZ574		EVZ575		
Sampling Date		2017/07/26 16:00	2017/07/21 13:15	2017/07/21 13:15		2017/07/27 13:00		
COC Number		621084-01-01	621084-01-01	621084-01-01		621084-01-01		
	UNITS	BH11/2	BH3/2	BH3/2 Lab-Dup	QC Batch	BH1/6	RDL	QC Batch
Calculated Parameters								
Sodium Adsorption Ratio	N/A	0.24	0.29		5100626	0.85		5101702
Inorganics								
Conductivity	mS/cm	0.12	0.082		5107604	0.090	0.002	5107604
Moisture	%		4.4		5105660	13	1.0	5104177
Available (CaCl ₂) pH	pH	7.73	7.88	7.94	5105954	7.88		5105694
WAD Cyanide (Free)	ug/g	ND	ND	ND	5105591	ND	0.01	5104762
Metals								
Soluble Calcium (Ca)	mg/L	28.2	19.3		5107603	8.5	0.5	5107603
Soluble Magnesium (Mg)	mg/L	2.5	1.6		5107603	0.8	0.5	5107603
Soluble Sodium (Na)	mg/L	ND	ND		5107603	10	5	5107603
Inorganics								
Chromium (VI)	ug/g	ND	ND	ND	5105643	ND	0.2	5103539
Metals								
Hot Water Ext. Boron (B)	ug/g	0.15	0.057		5106256	ND	0.050	5106203
Acid Extractable Antimony (Sb)	ug/g	ND	ND	ND	5106480	ND	0.20	5106266
Acid Extractable Arsenic (As)	ug/g	ND	ND	ND	5106480	ND	1.0	5106266
Acid Extractable Barium (Ba)	ug/g	46	16	16	5106480	19	0.50	5106266
Acid Extractable Beryllium (Be)	ug/g	0.23	ND	ND	5106480	ND	0.20	5106266
Acid Extractable Boron (B)	ug/g	ND	ND	ND	5106480	ND	5.0	5106266
Acid Extractable Cadmium (Cd)	ug/g	ND	ND	ND	5106480	ND	0.10	5106266
Acid Extractable Chromium (Cr)	ug/g	12	7.7	7.9	5106480	7.8	1.0	5106266
Acid Extractable Cobalt (Co)	ug/g	3.6	2.1	2.4	5106480	2.8	0.10	5106266
Acid Extractable Copper (Cu)	ug/g	7.5	3.3	3.1	5106480	4.9	0.50	5106266
Acid Extractable Lead (Pb)	ug/g	6.5	1.5	1.4	5106480	1.6	1.0	5106266
Acid Extractable Molybdenum (Mo)	ug/g	ND	ND	ND	5106480	ND	0.50	5106266
Acid Extractable Nickel (Ni)	ug/g	6.6	3.9	3.8	5106480	4.3	0.50	5106266
Acid Extractable Selenium (Se)	ug/g	ND	ND	ND	5106480	ND	0.50	5106266
Acid Extractable Silver (Ag)	ug/g	ND	ND	ND	5106480	ND	0.20	5106266
Acid Extractable Thallium (Tl)	ug/g	0.061	ND	ND	5106480	ND	0.050	5106266
Acid Extractable Uranium (U)	ug/g	0.33	0.25	0.21	5106480	0.27	0.050	5106266
Acid Extractable Vanadium (V)	ug/g	24	19	19	5106480	19	5.0	5106266
Acid Extractable Zinc (Zn)	ug/g	26	11	11	5106480	9.8	5.0	5106266
Acid Extractable Mercury (Hg)	ug/g	ND	ND	ND	5106480	ND	0.050	5106266
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								
Lab-Dup = Laboratory Initiated Duplicate								
ND = Not detected								

O.REG 153 METALS & INORGANICS PKG (SOIL)

Maxxam ID		EVZ580	EVZ582	EVZ583	EVZ586		
Sampling Date		2017/07/27 09:50	2017/07/21 11:05	2017/07/21 15:00	2017/07/28		
COC Number		C#619364-01-01	C#619364-01-01	C#619364-01-01	C#619364-01-01		
	UNITS	BH7/1	BH2/1B	BH6/2	DUP S3	RDL	QC Batch
Calculated Parameters							
Sodium Adsorption Ratio	N/A	0.15	0.29	0.22	0.19		5100626
Inorganics							
Conductivity	mS/cm	0.20	0.11	0.20	0.30	0.002	5107604
Moisture	%	15	5.1	24	12	1.0	5105660
Available (CaCl2) pH	pH	7.44	7.76	7.39	7.40		5105954
WAD Cyanide (Free)	ug/g	0.02	ND	0.02	ND	0.01	5105591
Metals							
Soluble Calcium (Ca)	mg/L	74.9	20.0	35.0	52.1	0.5	5107603
Soluble Magnesium (Mg)	mg/L	5.3	1.3	1.8	1.6	0.5	5107603
Soluble Sodium (Na)	mg/L	ND	ND	ND	ND	5	5107603
Inorganics							
Chromium (VI)	ug/g	ND	ND	ND	ND	0.2	5105643
Metals							
Hot Water Ext. Boron (B)	ug/g	0.47	0.14	0.27	0.38	0.050	5106256
Acid Extractable Antimony (Sb)	ug/g	ND	ND	ND	ND	0.20	5106480
Acid Extractable Arsenic (As)	ug/g	ND	ND	ND	1.2	1.0	5106480
Acid Extractable Barium (Ba)	ug/g	44	28	57	84	0.50	5106480
Acid Extractable Beryllium (Be)	ug/g	0.20	ND	0.29	0.54	0.20	5106480
Acid Extractable Boron (B)	ug/g	ND	ND	ND	ND	5.0	5106480
Acid Extractable Cadmium (Cd)	ug/g	ND	ND	ND	0.18	0.10	5106480
Acid Extractable Chromium (Cr)	ug/g	9.9	11	14	20	1.0	5106480
Acid Extractable Cobalt (Co)	ug/g	2.9	3.2	4.0	6.9	0.10	5106480
Acid Extractable Copper (Cu)	ug/g	5.8	4.4	7.2	11	0.50	5106480
Acid Extractable Lead (Pb)	ug/g	3.2	3.5	4.1	8.0	1.0	5106480
Acid Extractable Molybdenum (Mo)	ug/g	ND	0.78	ND	ND	0.50	5106480
Acid Extractable Nickel (Ni)	ug/g	5.8	5.5	7.4	13	0.50	5106480
Acid Extractable Selenium (Se)	ug/g	ND	ND	ND	ND	0.50	5106480
Acid Extractable Silver (Ag)	ug/g	ND	ND	ND	ND	0.20	5106480
Acid Extractable Thallium (Tl)	ug/g	ND	0.067	0.065	0.11	0.050	5106480
Acid Extractable Uranium (U)	ug/g	0.33	0.28	0.32	0.49	0.050	5106480
Acid Extractable Vanadium (V)	ug/g	20	21	26	33	5.0	5106480
Acid Extractable Zinc (Zn)	ug/g	18	21	24	40	5.0	5106480
Acid Extractable Mercury (Hg)	ug/g	ND	ND	ND	ND	0.050	5106480
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected							

O.REG 153 METALS & INORGANICS PKG (SOIL)

Maxxam ID		EVZ588	EVZ588	EVZ589	EVZ591		
Sampling Date		2017/07/28 16:00	2017/07/28 16:00	2017/07/21 09:00	2017/07/28 17:00		
COC Number		C#620061-02-01	C#620061-02-01	C#620061-02-01	C#620061-02-01		
	UNITS	TP1	TP1 Lab-Dup	TP2	TP5	RDL	QC Batch
Calculated Parameters							
Sodium Adsorption Ratio	N/A	0.19		0.22	0.18		5100626
Inorganics							
Conductivity	mS/cm	0.18	0.17	0.21	0.30	0.002	5107604
Available (CaCl ₂) pH	pH	7.40		6.01	7.44		5105954
WAD Cyanide (Free)	ug/g	0.01		0.04	ND	0.01	5105591
Metals							
Soluble Calcium (Ca)	mg/L	52.4	56.0	34.9	55.2	0.5	5107603
Soluble Magnesium (Mg)	mg/L	1.5	1.7	1.7	1.6	0.5	5107603
Soluble Sodium (Na)	mg/L	ND	ND	ND	ND	5	5107603
Inorganics							
Chromium (VI)	ug/g	ND		ND	ND	0.2	5105643
Metals							
Hot Water Ext. Boron (B)	ug/g	0.47		0.49	0.42	0.050	5106203
Acid Extractable Antimony (Sb)	ug/g	ND		ND	ND	0.20	5106266
Acid Extractable Arsenic (As)	ug/g	ND		1.7	1.4	1.0	5106266
Acid Extractable Barium (Ba)	ug/g	48		51	85	0.50	5106266
Acid Extractable Beryllium (Be)	ug/g	0.26		0.36	0.57	0.20	5106266
Acid Extractable Boron (B)	ug/g	ND		ND	5.3	5.0	5106266
Acid Extractable Cadmium (Cd)	ug/g	0.10		0.21	0.14	0.10	5106266
Acid Extractable Chromium (Cr)	ug/g	12		14	22	1.0	5106266
Acid Extractable Cobalt (Co)	ug/g	3.6		4.9	7.4	0.10	5106266
Acid Extractable Copper (Cu)	ug/g	6.9		6.9	11	0.50	5106266
Acid Extractable Lead (Pb)	ug/g	7.0		9.2	8.2	1.0	5106266
Acid Extractable Molybdenum (Mo)	ug/g	ND		ND	ND	0.50	5106266
Acid Extractable Nickel (Ni)	ug/g	7.1		8.0	13	0.50	5106266
Acid Extractable Selenium (Se)	ug/g	ND		ND	ND	0.50	5106266
Acid Extractable Silver (Ag)	ug/g	ND		ND	ND	0.20	5106266
Acid Extractable Thallium (Tl)	ug/g	0.054		0.088	0.11	0.050	5106266
Acid Extractable Uranium (U)	ug/g	0.34		0.40	0.52	0.050	5106266
Acid Extractable Vanadium (V)	ug/g	25		30	37	5.0	5106266
Acid Extractable Zinc (Zn)	ug/g	26		34	43	5.0	5106266
Acid Extractable Mercury (Hg)	ug/g	ND		ND	ND	0.050	5106266
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
Lab-Dup = Laboratory Initiated Duplicate							
ND = Not detected							

O.REG 153 METALS & INORGANICS PKG (SOIL)

Maxxam ID		EVZ875		
Sampling Date		2017/07/27 13:00		
COC Number		C#619364-01-01		
	UNITS	BH1/5	RDL	QC Batch
Calculated Parameters				
Sodium Adsorption Ratio	N/A	0.40		5101702
Inorganics				
Conductivity	mS/cm	0.090	0.002	5107604
Moisture	%	9.4	1.0	5105660
Available (CaCl ₂) pH	pH	7.94		5105694
WAD Cyanide (Free)	ug/g	ND	0.01	5105591
Metals				
Soluble Calcium (Ca)	mg/L	10.7	0.5	5107603
Soluble Magnesium (Mg)	mg/L	0.6	0.5	5107603
Soluble Sodium (Na)	mg/L	ND	5	5107603
Inorganics				
Chromium (VI)	ug/g	ND	0.2	5104157
Metals				
Hot Water Ext. Boron (B)	ug/g	ND	0.050	5106256
Acid Extractable Antimony (Sb)	ug/g	ND	0.20	5106480
Acid Extractable Arsenic (As)	ug/g	ND	1.0	5106480
Acid Extractable Barium (Ba)	ug/g	23	0.50	5106480
Acid Extractable Beryllium (Be)	ug/g	ND	0.20	5106480
Acid Extractable Boron (B)	ug/g	ND	5.0	5106480
Acid Extractable Cadmium (Cd)	ug/g	ND	0.10	5106480
Acid Extractable Chromium (Cr)	ug/g	7.7	1.0	5106480
Acid Extractable Cobalt (Co)	ug/g	2.1	0.10	5106480
Acid Extractable Copper (Cu)	ug/g	4.1	0.50	5106480
Acid Extractable Lead (Pb)	ug/g	1.5	1.0	5106480
Acid Extractable Molybdenum (Mo)	ug/g	ND	0.50	5106480
Acid Extractable Nickel (Ni)	ug/g	3.7	0.50	5106480
Acid Extractable Selenium (Se)	ug/g	ND	0.50	5106480
Acid Extractable Silver (Ag)	ug/g	ND	0.20	5106480
Acid Extractable Thallium (Tl)	ug/g	ND	0.050	5106480
Acid Extractable Uranium (U)	ug/g	0.27	0.050	5106480
Acid Extractable Vanadium (V)	ug/g	18	5.0	5106480
Acid Extractable Zinc (Zn)	ug/g	9.5	5.0	5106480
Acid Extractable Mercury (Hg)	ug/g	ND	0.050	5106480
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				
ND = Not detected				

O.REG 153 METALS PACKAGE (SOIL)

Maxxam ID		EVZ568		EVZ587	EVZ587	EVZ594		
Sampling Date		2017/07/26 12:15		2017/07/21 09:30	2017/07/21 09:30	2017/07/26 11:20		
COC Number		621084-01-01		C#620061-02-01	C#620061-02-01	C#620061-02-01		
	UNITS	BH10/1B	QC Batch	TP3	TP3 Lab-Dup	TP9	RDL	QC Batch
Inorganics								
Moisture	%	7.7	5104240				1.0	5104240
Chromium (VI)	ug/g	ND	5104803	ND		ND	0.2	5105643
Metals								
Hot Water Ext. Boron (B)	ug/g	0.10	5106203	0.30	0.33	0.36	0.050	5106203
Acid Extractable Antimony (Sb)	ug/g	ND	5106266	ND		ND	0.20	5106266
Acid Extractable Arsenic (As)	ug/g	ND	5106266	1.8		1.3	1.0	5106266
Acid Extractable Barium (Ba)	ug/g	27	5106266	63		50	0.50	5106266
Acid Extractable Beryllium (Be)	ug/g	0.25	5106266	0.43		0.36	0.20	5106266
Acid Extractable Boron (B)	ug/g	ND	5106266	ND		ND	5.0	5106266
Acid Extractable Cadmium (Cd)	ug/g	ND	5106266	0.23		0.14	0.10	5106266
Acid Extractable Chromium (Cr)	ug/g	11	5106266	15		15	1.0	5106266
Acid Extractable Cobalt (Co)	ug/g	3.4	5106266	5.1		4.8	0.10	5106266
Acid Extractable Copper (Cu)	ug/g	2.9	5106266	6.9		5.5	0.50	5106266
Acid Extractable Lead (Pb)	ug/g	3.0	5106266	11		7.8	1.0	5106266
Acid Extractable Molybdenum (Mo)	ug/g	ND	5106266	ND		ND	0.50	5106266
Acid Extractable Nickel (Ni)	ug/g	5.1	5106266	8.7		7.9	0.50	5106266
Acid Extractable Selenium (Se)	ug/g	ND	5106266	ND		ND	0.50	5106266
Acid Extractable Silver (Ag)	ug/g	ND	5106266	ND		ND	0.20	5106266
Acid Extractable Thallium (Tl)	ug/g	ND	5106266	0.095		0.079	0.050	5106266
Acid Extractable Uranium (U)	ug/g	0.30	5106266	0.46		0.45	0.050	5106266
Acid Extractable Vanadium (V)	ug/g	27	5106266	32		32	5.0	5106266
Acid Extractable Zinc (Zn)	ug/g	17	5106266	42		30	5.0	5106266
Acid Extractable Mercury (Hg)	ug/g	ND	5106266	ND		ND	0.050	5106266
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected								

O.REG 153 METALS PACKAGE (SOIL)

Maxxam ID		EV2595		
Sampling Date		2017/07/26 11:00		
COC Number		C#620061-02-01		
	UNITS	BH5/4	RDL	QC Batch
Inorganics				
Moisture	%	12	1.0	5104240
Chromium (VI)	ug/g	ND	0.2	5104803
Metals				
Hot Water Ext. Boron (B)	ug/g	0.27	0.050	5106203
Acid Extractable Antimony (Sb)	ug/g	ND	0.20	5106266
Acid Extractable Arsenic (As)	ug/g	ND	1.0	5106266
Acid Extractable Barium (Ba)	ug/g	93	0.50	5106266
Acid Extractable Beryllium (Be)	ug/g	0.44	0.20	5106266
Acid Extractable Boron (B)	ug/g	5.7	5.0	5106266
Acid Extractable Cadmium (Cd)	ug/g	0.10	0.10	5106266
Acid Extractable Chromium (Cr)	ug/g	19	1.0	5106266
Acid Extractable Cobalt (Co)	ug/g	6.2	0.10	5106266
Acid Extractable Copper (Cu)	ug/g	10	0.50	5106266
Acid Extractable Lead (Pb)	ug/g	6.5	1.0	5106266
Acid Extractable Molybdenum (Mo)	ug/g	ND	0.50	5106266
Acid Extractable Nickel (Ni)	ug/g	11	0.50	5106266
Acid Extractable Selenium (Se)	ug/g	ND	0.50	5106266
Acid Extractable Silver (Ag)	ug/g	ND	0.20	5106266
Acid Extractable Thallium (Tl)	ug/g	0.11	0.050	5106266
Acid Extractable Uranium (U)	ug/g	0.46	0.050	5106266
Acid Extractable Vanadium (V)	ug/g	34	5.0	5106266
Acid Extractable Zinc (Zn)	ug/g	31	5.0	5106266
Acid Extractable Mercury (Hg)	ug/g	ND	0.050	5106266
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected				

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		EVZ581	EVZ584	EVZ585		EVZ587		
Sampling Date		2017/07/21 11:00	2017/07/21 14:45	2017/07/26 12:00		2017/07/21 09:30		
COC Number		C#619364-01-01	C#619364-01-01	C#619364-01-01		C#620061-02-01		
	UNITS	BH2/1A	BH6/1	BH10/1A	QC Batch	TP3	RDL	QC Batch
Inorganics								
Moisture	%	10	18	9.6	5104240	11	1.0	5104185
Calculated Parameters								
Chlordane (Total)	ug/g	ND	ND	ND	5100836	ND	0.0020	5100836
o,p-DDD + p,p-DDD	ug/g	ND	ND	ND	5100836	ND	0.0020	5100836
o,p-DDE + p,p-DDE	ug/g	ND	ND	ND	5100836	ND	0.0020	5100836
o,p-DDT + p,p-DDT	ug/g	ND	ND	ND	5100836	ND	0.0020	5100836
Total Endosulfan	ug/g	ND	ND	ND	5100836	ND	0.0020	5100836
Pesticides & Herbicides								
Aldrin	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
a-Chlordane	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
g-Chlordane	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
o,p-DDD	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
p,p-DDD	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
o,p-DDE	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
p,p-DDE	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
o,p-DDT	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
p,p-DDT	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Dieldrin	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Lindane	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Endosulfan I (alpha)	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Endosulfan II (beta)	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Endrin	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Heptachlor	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Heptachlor epoxide	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Hexachlorobenzene	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Hexachlorobutadiene	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Hexachloroethane	ug/g	ND	ND	ND	5102548	ND	0.0020	5106229
Methoxychlor	ug/g	ND	ND	ND	5102548	ND	0.0050	5106229
Surrogate Recovery (%)								
2,4,5,6-Tetrachloro-m-xylene	%	102	88	61	5102548	85		5106229
Decachlorobiphenyl	%	111	122	88	5102548	99		5106229
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								
ND = Not detected								

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		EVZ587		EVZ588	EVZ589	EVZ589		
Sampling Date		2017/07/21 09:30		2017/07/28 16:00	2017/07/21 09:00	2017/07/21 09:00		
COC Number		C#620061-02-01		C#620061-02-01	C#620061-02-01	C#620061-02-01		
	UNITS	TP3 Lab-Dup	QC Batch	TP1	TP2	TP2 Lab-Dup	RDL	QC Batch
Inorganics								
Moisture	%	11	5104185	15	13		1.0	5104240
Calculated Parameters								
Chlordane (Total)	ug/g		5100836	ND	ND		0.0020	5100836
o,p-DDD + p,p-DDD	ug/g		5100836	ND	ND		0.0020	5100836
o,p-DDE + p,p-DDE	ug/g		5100836	ND	ND		0.0020	5100836
o,p-DDT + p,p-DDT	ug/g		5100836	ND	ND		0.0020	5100836
Total Endosulfan	ug/g		5100836	ND	ND		0.0020	5100836
Pesticides & Herbicides								
Aldrin	ug/g		5106229	ND	ND	ND	0.0020	5106229
a-Chlordane	ug/g		5106229	ND	ND	ND	0.0020	5106229
g-Chlordane	ug/g		5106229	ND	ND	ND	0.0020	5106229
o,p-DDD	ug/g		5106229	ND	ND	ND	0.0020	5106229
p,p-DDD	ug/g		5106229	ND	ND	ND	0.0020	5106229
o,p-DDE	ug/g		5106229	ND	ND	ND	0.0020	5106229
p,p-DDE	ug/g		5106229	ND	ND	ND	0.0020	5106229
o,p-DDT	ug/g		5106229	ND	ND	ND	0.0020	5106229
p,p-DDT	ug/g		5106229	ND	ND	ND	0.0020	5106229
Dieldrin	ug/g		5106229	ND	ND	ND	0.0020	5106229
Lindane	ug/g		5106229	ND	ND	ND	0.0020	5106229
Endosulfan I (alpha)	ug/g		5106229	ND	ND	ND	0.0020	5106229
Endosulfan II (beta)	ug/g		5106229	ND	ND	ND	0.0020	5106229
Endrin	ug/g		5106229	ND	ND	ND	0.0020	5106229
Heptachlor	ug/g		5106229	ND	ND	ND	0.0020	5106229
Heptachlor epoxide	ug/g		5106229	ND	ND	ND	0.0020	5106229
Hexachlorobenzene	ug/g		5106229	ND	ND	ND	0.0020	5106229
Hexachlorobutadiene	ug/g		5106229	ND	ND	ND	0.0020	5106229
Hexachloroethane	ug/g		5106229	ND	ND	ND	0.0020	5106229
Methoxychlor	ug/g		5106229	ND	ND	ND	0.0050	5106229
Surrogate Recovery (%)								
2,4,5,6-Tetrachloro-m-xylene	%		5106229	94	89	99		5106229
Decachlorobiphenyl	%		5106229	111	96	92		5106229
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected								

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		EVZ590		EVZ591		EVZ592	EVZ593		
Sampling Date		2017/07/28 16:30		2017/07/28 17:00		2017/07/21 10:30	2017/07/26 11:00		
COC Number		C#620061-02-01		C#620061-02-01		C#620061-02-01	C#620061-02-01		
	UNITS	TP4	QC Batch	TP5	QC Batch	TP6	TP8	RDL	QC Batch
Inorganics									
Moisture	%	9.8	5104240	11	5104240	16	9.7	1.0	5104240
Calculated Parameters									
Chlordane (Total)	ug/g	ND	5100836	ND	5100836	ND	ND	0.0020	5100836
o,p-DDD + p,p-DDD	ug/g	ND	5100836	ND	5100836	ND	ND	0.0020	5100836
o,p-DDE + p,p-DDE	ug/g	ND	5100836	ND	5100836	ND	0.0034	0.0020	5100836
o,p-DDT + p,p-DDT	ug/g	ND	5100836	ND	5100836	ND	0.0022	0.0020	5100836
Total Endosulfan	ug/g	ND	5100836	ND	5100836	ND	ND	0.0020	5100836
Pesticides & Herbicides									
Aldrin	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
a-Chlordane	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
g-Chlordane	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
o,p-DDD	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
p,p-DDD	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
o,p-DDE	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
p,p-DDE	ug/g	ND	5102548	ND	5106229	ND	0.0034	0.0020	5102548
o,p-DDT	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
p,p-DDT	ug/g	ND	5102548	ND	5106229	ND	0.0022	0.0020	5102548
Dieldrin	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Lindane	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Endosulfan I (alpha)	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Endosulfan II (beta)	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Endrin	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Heptachlor	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Heptachlor epoxide	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Hexachlorobenzene	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Hexachlorobutadiene	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Hexachloroethane	ug/g	ND	5102548	ND	5106229	ND	ND	0.0020	5102548
Methoxychlor	ug/g	ND	5102548	ND	5106229	ND	ND	0.0050	5102548
Surrogate Recovery (%)									
2,4,5,6-Tetrachloro-m-xylene	%	84	5102548	86	5106229	99	84		5102548
Decachlorobiphenyl	%	116	5102548	90	5106229	111	107		5102548
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
ND = Not detected									

O.REG 153 OC PESTICIDES (SOIL)

Maxxam ID		EVZ594		EVZ596		
Sampling Date		2017/07/26 11:20		2017/07/28		
COC Number		C#620061-02-01		C#620061-02-01		
	UNITS	TP9	QC Batch	DUP S2	RDL	QC Batch
Inorganics						
Moisture	%	10	5104240	12	1.0	5104240
Calculated Parameters						
Chlordane (Total)	ug/g	ND	5100836	ND	0.0020	5100836
o,p-DDD + p,p-DDD	ug/g	ND	5100836	ND	0.0020	5100836
o,p-DDE + p,p-DDE	ug/g	ND	5100836	ND	0.0020	5100836
o,p-DDT + p,p-DDT	ug/g	ND	5100836	ND	0.0020	5100836
Total Endosulfan	ug/g	ND	5100836	ND	0.0020	5100836
Pesticides & Herbicides						
Aldrin	ug/g	ND	5106229	ND	0.0020	5102548
α-Chlordane	ug/g	ND	5106229	ND	0.0020	5102548
γ-Chlordane	ug/g	ND	5106229	ND	0.0020	5102548
o,p-DDD	ug/g	ND	5106229	ND	0.0020	5102548
p,p-DDD	ug/g	ND	5106229	ND	0.0020	5102548
o,p-DDE	ug/g	ND	5106229	ND	0.0020	5102548
p,p-DDE	ug/g	ND	5106229	ND	0.0020	5102548
o,p-DDT	ug/g	ND	5106229	ND	0.0020	5102548
p,p-DDT	ug/g	ND	5106229	ND	0.0020	5102548
Dieldrin	ug/g	ND	5106229	ND	0.0020	5102548
Lindane	ug/g	ND	5106229	ND	0.0020	5102548
Endosulfan I (alpha)	ug/g	ND	5106229	ND	0.0020	5102548
Endosulfan II (beta)	ug/g	ND	5106229	ND	0.0020	5102548
Endrin	ug/g	ND	5106229	ND	0.0020	5102548
Heptachlor	ug/g	ND	5106229	ND	0.0020	5102548
Heptachlor epoxide	ug/g	ND	5106229	ND	0.0020	5102548
Hexachlorobenzene	ug/g	ND	5106229	ND	0.0020	5102548
Hexachlorobutadiene	ug/g	ND	5106229	ND	0.0020	5102548
Hexachloroethane	ug/g	ND	5106229	ND	0.0020	5102548
Methoxychlor	ug/g	ND	5106229	ND	0.0050	5102548
Surrogate Recovery (%)						
2,4,5,6-Tetrachloro-m-xylene	%	89	5106229	96		5102548
Decachlorobiphenyl	%	90	5106229	107		5102548
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected						

O.REG 153 PAHS (SOIL)

Maxxam ID		EVZ569	EVZ569		EVZ573		EVZ575		
Sampling Date		2017/07/26 12:30	2017/07/26 12:30		2017/07/27 10:00		2017/07/27 13:00		
COC Number		621084-01-01	621084-01-01		621084-01-01		621084-01-01		
	UNITS	BH10/3	BH10/3 Lab-Dup	QC Batch	BH7/2	QC Batch	BH1/6	RDL	QC Batch
Inorganics									
Moisture	%	14	14	5102631		5102631		1.0	5102631
Calculated Parameters									
Methylnaphthalene, 2-(1-)	ug/g	ND		5100497	ND	5100497	ND	0.0071	5101701
Polyaromatic Hydrocarbons									
Acenaphthene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Acenaphthylene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Anthracene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Benzo(a)anthracene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Benzo(a)pyrene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Benzo(b,j)fluoranthene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Benzo(g,h,i)perylene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Benzo(k)fluoranthene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Chrysene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Dibenz(a,h)anthracene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Fluoranthene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Fluorene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Indeno(1,2,3-cd)pyrene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
1-Methylnaphthalene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
2-Methylnaphthalene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Naphthalene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Phenanthrene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Pyrene	ug/g	ND	ND	5107490	ND	5105996	ND	0.0050	5105996
Surrogate Recovery (%)									
D10-Anthracene	%	87	91	5107490	98	5105996	95		5105996
D14-Terphenyl (FS)	%	76	80	5107490	94	5105996	91		5105996
D8-Acenaphthylene	%	81	85	5107490	93	5105996	89		5105996
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected									

O.REG 153 PAHS (SOIL)

Maxxam ID		EVZ575		
Sampling Date		2017/07/27 13:00		
COC Number		621084-01-01		
	UNITS	BH1/6 Lab-Dup	RDL	QC Batch
Polyaromatic Hydrocarbons				
Acenaphthene	ug/g	ND	0.0050	5105996
Acenaphthylene	ug/g	ND	0.0050	5105996
Anthracene	ug/g	ND	0.0050	5105996
Benzo(a)anthracene	ug/g	ND	0.0050	5105996
Benzo(a)pyrene	ug/g	ND	0.0050	5105996
Benzo(b/j)fluoranthene	ug/g	ND	0.0050	5105996
Benzo(g,h,i)perylene	ug/g	ND	0.0050	5105996
Benzo(k)fluoranthene	ug/g	ND	0.0050	5105996
Chrysene	ug/g	ND	0.0050	5105996
Dibenz(a,h)anthracene	ug/g	ND	0.0050	5105996
Fluoranthene	ug/g	ND	0.0050	5105996
Fluorene	ug/g	ND	0.0050	5105996
Indeno(1,2,3-cd)pyrene	ug/g	ND	0.0050	5105996
1-Methylnaphthalene	ug/g	ND	0.0050	5105996
2-Methylnaphthalene	ug/g	ND	0.0050	5105996
Naphthalene	ug/g	ND	0.0050	5105996
Phenanthrene	ug/g	ND	0.0050	5105996
Pyrene	ug/g	ND	0.0050	5105996
Surrogate Recovery (%)				
D10-Anthracene	%	98		5105996
D14-Terphenyl (FS)	%	92		5105996
D8-Acenaphthylene	%	91		5105996
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected				

O.REG 153 PCBS (SOIL)

Maxxam ID		EVZ579		
Sampling Date		2017/07/27 13:10		
COC Number		C#619364-01-01		
	UNITS	BH1/7A	RDL	QC Batch
Inorganics				
Moisture	%	16	1.0	5104240
PCBs				
Aroclor 1242	ug/g	ND	0.010	5106230
Aroclor 1248	ug/g	ND	0.010	5106230
Aroclor 1254	ug/g	ND	0.010	5106230
Aroclor 1260	ug/g	ND	0.010	5106230
Total PCB	ug/g	ND	0.010	5106230
Surrogate Recovery (%)				
Decachlorobiphenyl	%	70		5106230
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				
ND = Not detected				

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		EVZ567	EVZ567		EVZ570		EVZ573		
Sampling Date		2017/07/26 16:00	2017/07/26 16:00		2017/07/26 13:00		2017/07/27 10:00		
COC Number		621084-01-01	621084-01-01		621084-01-01		621084-01-01		
	UNITS	BH11/2	BH11/2 Lab-Dup	QC Batch	BH10/4	QC Batch	BH7/2	RDL	QC Batch
Inorganics									
Moisture	%	7.8	8.0	5104462	16	5104383	19	1.0	5104383
BTEX & F1 Hydrocarbons									
Benzene	ug/g	ND		5102991	ND	5102991	ND	0.020	5102991
Toluene	ug/g	ND		5102991	ND	5102991	ND	0.020	5102991
Ethylbenzene	ug/g	ND		5102991	ND	5102991	ND	0.020	5102991
o-Xylene	ug/g	ND		5102991	ND	5102991	ND	0.020	5102991
p+m-Xylene	ug/g	ND		5102991	ND	5102991	ND	0.040	5102991
Total Xylenes	ug/g	ND		5102991	ND	5102991	ND	0.040	5102991
F1 (C6-C10)	ug/g	ND		5102991	ND	5102991	ND	10	5102991
F1 (C6-C10) - BTEX	ug/g	ND		5102991	ND	5102991	ND	10	5102991
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	ND	ND	5105560	ND	5105560	ND	10	5105990
F3 (C16-C34 Hydrocarbons)	ug/g	ND	ND	5105560	ND	5105560	ND	50	5105990
F4 (C34-C50 Hydrocarbons)	ug/g	ND	ND	5105560	ND	5105560	ND	50	5105990
Reached Baseline at C50	ug/g	Yes	Yes	5105560	Yes	5105560	Yes		5105990
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	100		5102991	101	5102991	101		5102991
4-Bromofluorobenzene	%	102		5102991	100	5102991	101		5102991
D10-Ethylbenzene	%	91		5102991	86	5102991	90		5102991
D4-1,2-Dichloroethane	%	100		5102991	99	5102991	100		5102991
o-Terphenyl	%	103	102	5105560	103	5105560	92		5105990
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected									

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		EVZ574		EVZ575	EVZ575		
Sampling Date		2017/07/21 13:15		2017/07/27 13:00	2017/07/27 13:00		
COC Number		621084-01-01		621084-01-01	621084-01-01		
	UNITS	BH3/2	QC Batch	BH1/6	BH1/6 Lab-Dup	RDL	QC Batch
BTEX & F1 Hydrocarbons							
Benzene	ug/g	ND	5102991	ND		0.020	5102991
Toluene	ug/g	ND	5102991	ND		0.020	5102991
Ethylbenzene	ug/g	ND	5102991	ND		0.020	5102991
o-Xylene	ug/g	ND	5102991	ND		0.020	5102991
p+m-Xylene	ug/g	ND	5102991	ND		0.040	5102991
Total Xylenes	ug/g	ND	5102991	ND		0.040	5102991
F1 (C6-C10)	ug/g	ND	5102991	ND		10	5102991
F1 (C6-C10) · BTEX	ug/g	ND	5102991	ND		10	5102991
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/g	ND	5105560	ND	ND	10	5105990
F3 (C16-C34 Hydrocarbons)	ug/g	ND	5105560	ND	ND	50	5105990
F4 (C34-C50 Hydrocarbons)	ug/g	ND	5105560	ND	ND	50	5105990
Reached Baseline at C50	ug/g	Yes	5105560	Yes	Yes		5105990
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	101	5102991	101			5102991
4-Bromofluorobenzene	%	100	5102991	100			5102991
D10-Ethylbenzene	%	91	5102991	93			5102991
D4-1,2-Dichloroethane	%	100	5102991	100			5102991
o-Terphenyl	%	107	5105560	95	94		5105990
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected							

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		EVZ571	EVZ572	EVZ576	EVZ577		
Sampling Date		2017/07/26 14:30	2017/07/27 10:15	2017/07/27 13:15			
COC Number		621084-01-01	621084-01-01	621084-01-01	C#619364-01-01		
	UNITS	BH10/7	BH7/5	BH1/8	DUP S1	RDL	QC Batch
Inorganics							
Moisture	%	17	15	16	15	1.0	5104177
Calculated Parameters							
1,3-Dichloropropene (cis+trans)	ug/g	ND	ND	ND	ND	0.050	5099682
Volatile Organics							
Acetone (2-Propanone)	ug/g	ND	ND	ND	ND	0.50	5102506
Benzene	ug/g	ND	ND	ND	ND	0.020	5102506
Bromodichloromethane	ug/g	ND	ND	ND	ND	0.050	5102506
Bromoform	ug/g	ND	ND	ND	ND	0.050	5102506
Bromomethane	ug/g	ND	ND	ND	ND	0.050	5102506
Carbon Tetrachloride	ug/g	ND	ND	ND	ND	0.050	5102506
Chlorobenzene	ug/g	ND	ND	ND	ND	0.050	5102506
Chloroform	ug/g	ND	ND	ND	ND	0.050	5102506
Dibromochloromethane	ug/g	ND	ND	ND	ND	0.050	5102506
1,2-Dichlorobenzene	ug/g	ND	ND	ND	ND	0.050	5102506
1,3-Dichlorobenzene	ug/g	ND	ND	ND	ND	0.050	5102506
1,4-Dichlorobenzene	ug/g	ND	ND	ND	ND	0.050	5102506
Dichlorodifluoromethane (FREON 12)	ug/g	ND	ND	ND	ND	0.050	5102506
1,1-Dichloroethane	ug/g	ND	ND	ND	ND	0.050	5102506
1,2-Dichloroethane	ug/g	ND	ND	ND	ND	0.050	5102506
1,1-Dichloroethylene	ug/g	ND	ND	ND	ND	0.050	5102506
cis-1,2-Dichloroethylene	ug/g	ND	ND	ND	ND	0.050	5102506
trans-1,2-Dichloroethylene	ug/g	ND	ND	ND	ND	0.050	5102506
1,2-Dichloropropane	ug/g	ND	ND	ND	ND	0.050	5102506
cis-1,3-Dichloropropene	ug/g	ND	ND	ND	ND	0.030	5102506
trans-1,3-Dichloropropene	ug/g	ND	ND	ND	ND	0.040	5102506
Ethylbenzene	ug/g	ND	ND	ND	ND	0.020	5102506
Ethylene Dibromide	ug/g	ND	ND	ND	ND	0.050	5102506
Hexane	ug/g	ND	ND	ND	ND	0.050	5102506
Methylene Chloride(Dichloromethane)	ug/g	ND	ND	ND	ND	0.050	5102506
Methyl Ethyl Ketone (2-Butanone)	ug/g	ND	ND	ND	ND	0.50	5102506
Methyl Isobutyl Ketone	ug/g	ND	ND	ND	ND	0.50	5102506
Methyl t-butyl ether (MTBE)	ug/g	ND	ND	ND	ND	0.050	5102506
Styrene	ug/g	ND	ND	ND	ND	0.050	5102506
1,1,1,2-Tetrachloroethane	ug/g	ND	ND	ND	ND	0.050	5102506
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected							

O.REG 153 VOCs BY HS (SOIL)

Maxxam ID		EVZ571	EVZ572	EVZ576	EVZ577		
Sampling Date		2017/07/26 14:30	2017/07/27 10:15	2017/07/27 13:15			
COC Number		621084-01-01	621084-01-01	621084-01-01	C#619364-01-01		
	UNITS	BH10/7	BH7/5	BH1/8	DUP S1	RDL	QC Batch
1,1,2,2-Tetrachloroethane	ug/g	ND	ND	ND	ND	0.050	5102506
Tetrachloroethylene	ug/g	ND	ND	ND	ND	0.050	5102506
Toluene	ug/g	ND	ND	ND	ND	0.020	5102506
1,1,1-Trichloroethane	ug/g	ND	ND	ND	ND	0.050	5102506
1,1,2-Trichloroethane	ug/g	ND	ND	ND	ND	0.050	5102506
Trichloroethylene	ug/g	ND	ND	ND	ND	0.050	5102506
Trichlorofluoromethane (FREON 11)	ug/g	ND	ND	ND	ND	0.050	5102506
Vinyl Chloride	ug/g	ND	ND	ND	ND	0.020	5102506
p+m-Xylene	ug/g	ND	ND	ND	ND	0.020	5102506
o-Xylene	ug/g	ND	ND	ND	ND	0.020	5102506
Total Xylenes	ug/g	ND	ND	ND	ND	0.020	5102506
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	97	96	96	95		5102506
D10-o-Xylene	%	90	86	93	80		5102506
D4-1,2-Dichloroethane	%	92	92	94	93		5102506
D8-Toluene	%	100	100	100	100		5102506
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected							

RESULTS OF ANALYSES OF SOIL

Maxxam ID		EVZ568	EVZ587	EVZ594	EVZ595		
Sampling Date		2017/07/26 12:15	2017/07/21 09:30	2017/07/26 11:20	2017/07/26 11:00		
COC Number		621084-01-01	C#620061-02-01	C#620061-02-01	C#620061-02-01		
	UNITS	BH10/1B	TP3	TP9	BH5/4	RDL	QC Batch
Inorganics							
WAD Cyanide (Free)	ug/g	ND	0.01	0.02	ND	0.01	5105591
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected							

Maxxam Job #: B7G3963
Report Date: 2017/08/09

Soil Engineers Ltd
Client Project #: 1706-E080

TEST SUMMARY

Maxxam ID: EVZ567
Sample ID: BH11/2
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106256	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5102991	N/A	2017/08/03	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5105560	2017/08/04	2017/08/04	Barbara Wowk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106480	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5104462	N/A	2017/08/03	Valentina Kaftani
pH CaCl2 EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5100626	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ567 Dup
Sample ID: BH11/2
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5105560	2017/08/04	2017/08/04	Barbara Wowk
Moisture	BAL	5104462	N/A	2017/08/03	Valentina Kaftani

Maxxam ID: EVZ568
Sample ID: BH10/1B
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106203	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Hexavalent Chromium in Soil by IC	IC/SPEC	5104803	2017/08/03	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106266	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani

Maxxam ID: EVZ569
Sample ID: BH10/3
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5100497	N/A	2017/08/08	Automated Statchk
Moisture	BAL	5102631	N/A	2017/08/02	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5107490	2017/08/05	2017/08/05	Lingyun Feng

Maxxam ID: EVZ569 Dup
Sample ID: BH10/3
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5102631	N/A	2017/08/02	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5107490	2017/08/05	2017/08/05	Lingyun Feng

TEST SUMMARY

Maxxam ID: EVZ570
Sample ID: BH10/4
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5102991	N/A	2017/08/03	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5105560	2017/08/04	2017/08/04	Barbara Wowk
Moisture	BAL	5104383	N/A	2017/08/03	Chun Yan

Maxxam ID: EVZ571
Sample ID: BH10/7
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5099682	N/A	2017/08/04	Automated Statchk
Moisture	BAL	5104177	N/A	2017/08/03	Valentina Kaftani
Volatile Organic Compounds in Soil	GC/MS	5102506	N/A	2017/08/03	Anna Gabrielyan

Maxxam ID: EVZ572
Sample ID: BH7/5
Matrix: Soil

Collected: 2017/07/27
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5099682	N/A	2017/08/04	Automated Statchk
Moisture	BAL	5104177	N/A	2017/08/03	Valentina Kaftani
Volatile Organic Compounds in Soil	GC/MS	5102506	N/A	2017/08/03	Anna Gabrielyan

Maxxam ID: EVZ573
Sample ID: BH7/2
Matrix: Soil

Collected: 2017/07/27
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5100497	N/A	2017/08/08	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5102991	N/A	2017/08/03	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5105990	2017/08/04	2017/08/04	Atoosa Keshavarz
Moisture	BAL	5104383	N/A	2017/08/03	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5105996	2017/08/04	2017/08/04	Jett Wu

Maxxam ID: EVZ574
Sample ID: BH3/2
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106256	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5102991	N/A	2017/08/03	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5105560	2017/08/04	2017/08/04	Barbara Wowk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106480	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5105660	N/A	2017/08/04	Nimarta Singh
pH CaCl2 EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar

TEST SUMMARY

Maxxam ID: EVZ574
Sample ID: BH3/2
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sodium Adsorption Ratio (SAR)	CALC/MET	5100626	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ574 Dup
Sample ID: BH3/2
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106480	2017/08/04	2017/08/08	Daniel Teclu
pH CaCl2 EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar

Maxxam ID: EVZ575
Sample ID: BH1/6
Matrix: Soil

Collected: 2017/07/27
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5101701	N/A	2017/08/08	Automated Statchk
Hot Water Extractable Boron	ICP	5106203	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5104762	2017/08/03	2017/08/04	Xuanhong Qiu
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5103539	2017/08/03	2017/08/03	Sally Coughlin
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5102991	N/A	2017/08/03	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5105990	2017/08/04	2017/08/04	Atoosa Keshavarz
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106266	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5104177	N/A	2017/08/03	Valentina Kaftani
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5105996	2017/08/04	2017/08/04	Jett Wu
pH CaCl2 EXTRACT	AT	5105694	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5101702	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ575 Dup
Sample ID: BH1/6
Matrix: Soil

Collected: 2017/07/27
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5105990	2017/08/04	2017/08/04	Atoosa Keshavarz
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5105996	2017/08/04	2017/08/04	Jett Wu

Maxxam ID: EVZ576
Sample ID: BH1/8
Matrix: Soil

Collected: 2017/07/27
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5099682	N/A	2017/08/04	Automated Statchk
Moisture	BAL	5104177	N/A	2017/08/03	Valentina Kaftani

TEST SUMMARY

Maxxam ID: EVZ576
Sample ID: BH1/8
Matrix: Soil

Collected: 2017/07/27
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds in Soil	GC/MS	5102506	N/A	2017/08/03	Anna Gabrielyan

Maxxam ID: EVZ577
Sample ID: DUP S1
Matrix: Soil

Collected:
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5099682	N/A	2017/08/04	Automated Statchk
Moisture	BAL	5104177	N/A	2017/08/03	Valentina Kaftani
Volatile Organic Compounds in Soil	GC/MS	5102506	N/A	2017/08/04	Anna Gabrielyan

Maxxam ID: EVZ579
Sample ID: BH1/7A
Matrix: Soil

Collected: 2017/07/27
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
Polychlorinated Biphenyl in Soil	GC/ECD	5106230	2017/08/04	2017/08/04	Dawn Alarie

Maxxam ID: EVZ580
Sample ID: BH7/1
Matrix: Soil

Collected: 2017/07/27
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106256	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106480	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5105660	N/A	2017/08/04	Nimarta Singh
pH CaCl2 EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5100626	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ581
Sample ID: BH2/1A
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5102548	2017/08/02	2017/08/08	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk

Maxxam Job #: B7G3963
Report Date: 2017/08/09

Soil Engineers Ltd
Client Project #: 1706-E080

TEST SUMMARY

Maxxam ID: EVZ582
Sample ID: BH2/1B
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106256	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106480	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5105660	N/A	2017/08/04	Nimarta Singh
pH CaCl ₂ EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5100626	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ583
Sample ID: BH6/2
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106256	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106480	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5105660	N/A	2017/08/04	Nimarta Singh
pH CaCl ₂ EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5100626	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ584
Sample ID: BH6/1
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5102548	2017/08/02	2017/08/08	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk

Maxxam ID: EVZ585
Sample ID: BH10/1A
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5102548	2017/08/02	2017/08/08	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk

TEST SUMMARY

Maxxam ID: EVZ586
Sample ID: DUP S3
Matrix: Soil

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106256	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106480	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5105660	N/A	2017/08/04	Nimarta Singh
pH CaCl2 EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5100626	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ587
Sample ID: TP3
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106203	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106266	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5104185	N/A	2017/08/03	Chun Yan
OC Pesticides (Selected) & PCB	GC/ECD	5106229	2017/08/04	2017/08/05	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/03	Automated Statchk

Maxxam ID: EVZ587 Dup
Sample ID: TP3
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106203	2017/08/04	2017/08/04	Jolly John
Moisture	BAL	5104185	N/A	2017/08/03	Chun Yan

Maxxam ID: EVZ588
Sample ID: TP1
Matrix: Soil

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106203	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106266	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5106229	2017/08/04	2017/08/05	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk
pH CaCl2 EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5100626	N/A	2017/08/08	Automated Statchk

Maxxam Job #: B7G3963
Report Date: 2017/08/09

Soil Engineers Ltd
Client Project #: 1706-E080

TEST SUMMARY

Maxxam ID: EVZ588
Sample ID: TP1
Matrix: Soil

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ588 Dup
Sample ID: TP1
Matrix: Soil

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ589
Sample ID: TP2
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106203	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106266	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5106229	2017/08/04	2017/08/05	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk
pH CaCl2 EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5100626	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ589 Dup
Sample ID: TP2
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
OC Pesticides (Selected) & PCB	GC/ECD	5106229	2017/08/04	2017/08/05	Mahmudul Khan

Maxxam ID: EVZ590
Sample ID: TP4
Matrix: Soil

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5102548	2017/08/02	2017/08/08	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk

TEST SUMMARY

Maxxam ID: EVZ591
Sample ID: TP5
Matrix: Soil

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106203	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106266	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5106229	2017/08/04	2017/08/05	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk
pH CaCl2 EXTRACT	AT	5105954	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5100626	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

Maxxam ID: EVZ592
Sample ID: TP6
Matrix: Soil

Collected: 2017/07/21
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5102548	2017/08/02	2017/08/08	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk

Maxxam ID: EVZ593
Sample ID: TP8
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5102548	2017/08/02	2017/08/08	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk

Maxxam ID: EVZ594
Sample ID: TP9
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106203	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Hexavalent Chromium in Soil by IC	IC/SPEC	5105643	2017/08/04	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106266	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5106229	2017/08/04	2017/08/05	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk

TEST SUMMARY

Maxxam ID: EVZ595
Sample ID: BH5/4
Matrix: Soil

Collected: 2017/07/26
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106203	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Hexavalent Chromium in Soil by IC	IC/SPEC	5104803	2017/08/03	2017/08/04	Sally Coughlin
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106266	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani

Maxxam ID: EVZ596
Sample ID: DUP S2
Matrix: Soil

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5104240	N/A	2017/08/03	Valentina Kaftani
OC Pesticides (Selected) & PCB	GC/ECD	5102548	2017/08/02	2017/08/08	Mahmudul Khan
OC Pesticides Summed Parameters	CALC	5100836	N/A	2017/08/04	Automated Statchk

Maxxam ID: EVZ875
Sample ID: BH1/5
Matrix: Soil

Collected: 2017/07/27
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5106256	2017/08/04	2017/08/04	Jolly John
Free (WAD) Cyanide	TECH	5105591	2017/08/04	2017/08/05	Louise Harding
Conductivity	AT	5107604	2017/08/08	2017/08/08	Neil Dassanayake
Hexavalent Chromium in Soil by IC	IC/SPEC	5104157	2017/08/03	2017/08/04	Manoj Kumar Gera
Strong Acid Leachable Metals by ICPMS	ICP/MS	5106480	2017/08/04	2017/08/08	Daniel Teclu
Moisture	BAL	5105660	N/A	2017/08/04	Nimarta Singh
pH CaCl2 EXTRACT	AT	5105694	2017/08/04	2017/08/04	Tahir Anwar
Sodium Adsorption Ratio (SAR)	CALC/MET	5101702	N/A	2017/08/08	Automated Statchk
SAR - ICP Metals	ICP	5107603	2017/08/08	2017/08/08	Jolly John

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C
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Sample EVZ567 [BH11/2] : 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 EVZ574 [BH3/2] : 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 EVZ580 [BH7/1] : 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 EVZ582 [BH2/1B] : 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 EVZ583 [BH6/2] : 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 EVZ586 [DUP S3] : 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 EVZ588 [TP1] : 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 EVZ589 [TP2] : 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 EVZ591 [TP5] : 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 EVZ875 [BH1/5] : 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

Soil Engineers Ltd
Client Project #: 1706-E080

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5102506	4-Bromofluorobenzene	2017/08/03	99	60 - 140	100	60 - 140	98	%		
5102506	D10-o-Xylene	2017/08/03	88	60 - 130	105	60 - 130	96	%		
5102506	D4-1,2-Dichloroethane	2017/08/03	91	60 - 140	96	60 - 140	96	%		
5102506	D8-Toluene	2017/08/03	105	60 - 140	102	60 - 140	98	%		
5102548	2,4,5,6-Tetrachloro-m-xylene	2017/08/03	85	50 - 130	78	50 - 130	82	%		
5102548	Decachlorobiphenyl	2017/08/03	108	50 - 130	103	50 - 130	117	%		
5102991	1,4-Difluorobenzene	2017/08/02	99	60 - 140	101	60 - 140	100	%		
5102991	4-Bromofluorobenzene	2017/08/02	101	60 - 140	100	60 - 140	100	%		
5102991	D10-Ethylbenzene	2017/08/02	93	60 - 140	89	60 - 140	86	%		
5102991	D4-1,2-Dichloroethane	2017/08/02	98	60 - 140	101	60 - 140	100	%		
5105560	o-Terphenyl	2017/08/04	105	60 - 130	99	60 - 130	102	%		
5105990	o-Terphenyl	2017/08/04	107	60 - 130	105	60 - 130	94	%		
5105996	D10-Anthracene	2017/08/04	89	50 - 130	91	50 - 130	94	%		
5105996	D14-Terphenyl (FS)	2017/08/04	83	50 - 130	86	50 - 130	88	%		
5105996	D8-Acenaphthylene	2017/08/04	86	50 - 130	88	50 - 130	87	%		
5106229	2,4,5,6-Tetrachloro-m-xylene	2017/08/05	92	50 - 130	84	50 - 130	89	%		
5106229	Decachlorobiphenyl	2017/08/05	96	50 - 130	79	50 - 130	116	%		
5106230	Decachlorobiphenyl	2017/08/04	67	60 - 130	78	60 - 130	80	%		
5107490	D10-Anthracene	2017/08/05	83	50 - 130	90	50 - 130	88	%		
5107490	D14-Terphenyl (FS)	2017/08/05	75	50 - 130	79	50 - 130	80	%		
5107490	D8-Acenaphthylene	2017/08/05	82	50 - 130	86	50 - 130	87	%		
5102506	1,1,1,2-Tetrachloroethane	2017/08/03	100	60 - 140	104	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,1,1-Trichloroethane	2017/08/03	94	60 - 140	95	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,1,2,2-Tetrachloroethane	2017/08/03	92	60 - 140	107	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,1,2-Trichloroethane	2017/08/03	92	60 - 140	101	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,1-Dichloroethane	2017/08/03	100	60 - 140	104	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,1-Dichloroethylene	2017/08/03	109	60 - 140	109	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,2-Dichlorobenzene	2017/08/03	96	60 - 140	99	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,2-Dichloroethane	2017/08/03	87	60 - 140	96	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,2-Dichloropropane	2017/08/03	92	60 - 140	99	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,3-Dichlorobenzene	2017/08/03	102	60 - 140	102	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	1,4-Dichlorobenzene	2017/08/03	102	60 - 140	103	60 - 130	ND, RDL=0.050	ug/g	NC	50

QUALITY ASSURANCE REPORT(CONT'D)

Soil Engineers Ltd
Client Project #: 1706-E080

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5102506	Acetone (2-Propanone)	2017/08/03	91	60 - 140	109	60 - 140	ND, RDL=0.50	ug/g	NC	50
5102506	Benzene	2017/08/03	101	60 - 140	105	60 - 130	ND, RDL=0.020	ug/g	NC	50
5102506	Bromodichloromethane	2017/08/03	89	60 - 140	96	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Bromoform	2017/08/03	94	60 - 140	107	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Bromomethane	2017/08/03	98	60 - 140	102	60 - 140	ND, RDL=0.050	ug/g	NC	50
5102506	Carbon Tetrachloride	2017/08/03	95	60 - 140	95	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Chlorobenzene	2017/08/03	99	60 - 140	102	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Chloroform	2017/08/03	93	60 - 140	97	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	cis-1,2-Dichloroethylene	2017/08/03	93	60 - 140	99	60 - 130	ND, RDL=0.050	ug/g	3-3	50
5102506	cis-1,3-Dichloropropene	2017/08/03	95	60 - 140	101	60 - 130	ND, RDL=0.030	ug/g	NC	50
5102506	Dibromochloromethane	2017/08/03	96	60 - 140	106	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Dichlorodifluoromethane (FREON 12)	2017/08/03	95	60 - 140	94	60 - 140	ND, RDL=0.050	ug/g	NC	50
5102506	Ethylbenzene	2017/08/03	103	60 - 140	103	60 - 130	ND, RDL=0.020	ug/g	NC	50
5102506	Ethylene Dibromide	2017/08/03	97	60 - 140	109	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Hexane	2017/08/03	113	60 - 140	111	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Methyl Ethyl Ketone (2-Butanone)	2017/08/03	94	60 - 140	117	60 - 140	ND, RDL=0.50	ug/g	NC	50
5102506	Methyl Isobutyl Ketone	2017/08/03	88	60 - 140	109	60 - 130	ND, RDL=0.50	ug/g	NC	50
5102506	Methyl t-butyl ether (MTBE)	2017/08/03	93	60 - 140	99	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Methylene Chloride(Dichloromethane)	2017/08/03	97	60 - 140	104	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	o-Xylene	2017/08/03	99	60 - 140	101	60 - 130	ND, RDL=0.020	ug/g	NC	50
5102506	p+m-Xylene	2017/08/03	106	60 - 140	106	60 - 130	ND, RDL=0.020	ug/g	NC	50
5102506	Styrene	2017/08/03	100	60 - 140	104	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Tetrachloroethylene	2017/08/03	98	60 - 140	96	60 - 130	ND, RDL=0.050	ug/g	4.5	50
5102506	Toluene	2017/08/03	101	60 - 140	102	60 - 130	ND, RDL=0.020	ug/g	2.6	50
5102506	Total Xylenes	2017/08/03					ND, RDL=0.020	ug/g	NC	50
5102506	trans-1,2-Dichloroethylene	2017/08/03	100	60 - 140	102	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	trans-1,3-Dichloropropene	2017/08/03	104	60 - 140	107	60 - 130	ND, RDL=0.040	ug/g	NC	50
5102506	Trichloroethylene	2017/08/03	94	60 - 140	97	60 - 130	ND, RDL=0.050	ug/g	5.4	50
5102506	Trichlorofluoromethane (FREON 11)	2017/08/03	98	60 - 140	96	60 - 130	ND, RDL=0.050	ug/g	NC	50
5102506	Vinyl Chloride	2017/08/03	99	60 - 140	100	60 - 130	ND, RDL=0.020	ug/g	7.0	50
5102548	a-Chlordane	2017/08/03	98	50 - 130	89	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Aldrin	2017/08/03	86	50 - 130	84	50 - 130	ND, RDL=0.0020	ug/g	NC	40

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QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5102548	Dieldrin	2017/08/03	118	50 - 130	111	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Endosulfan I (alpha)	2017/08/03	86	50 - 130	83	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Endosulfan II (beta)	2017/08/03	114	50 - 130	102	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Endrin	2017/08/03	111	50 - 130	105	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	g-Chlordane	2017/08/03	92	50 - 130	91	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Heptachlor epoxide	2017/08/03	103	50 - 130	103	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Heptachlor	2017/08/03	77	50 - 130	95	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Hexachlorobenzene	2017/08/03	87	50 - 130	81	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Hexachlorobutadiene	2017/08/03	88	50 - 130	92	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Hexachloroethane	2017/08/03	67	50 - 130	70	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Lindane	2017/08/03	90	50 - 130	86	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	Methoxychlor	2017/08/03	171 (1)	50 - 130	163 (2)	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5102548	o,p-DDD	2017/08/03	116	50 - 130	111	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	o,p-DDE	2017/08/03	92	50 - 130	88	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	o,p-DDT	2017/08/03	109	50 - 130	104	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	p,p-DDD	2017/08/03	115	50 - 130	106	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	p,p-DDE	2017/08/03	98	50 - 130	92	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102548	p,p-DDT	2017/08/03	119	50 - 130	113	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5102631	Moisture	2017/08/02							0.74	20
5102991	Benzene	2017/08/02	90	60 - 140	94	60 - 140	ND, RDL=0.020	ug/g	NC	50
5102991	Ethylbenzene	2017/08/02	94	60 - 140	97	60 - 140	ND, RDL=0.020	ug/g	NC	50
5102991	F1 (C6-C10) - BTEX	2017/08/02					ND, RDL=10	ug/g	NC	30
5102991	F1 (C6-C10)	2017/08/02	91	60 - 140	93	80 - 120	ND, RDL=10	ug/g	NC	30
5102991	o-Xylene	2017/08/02	96	60 - 140	99	60 - 140	ND, RDL=0.020	ug/g	NC	50
5102991	p+m-Xylene	2017/08/02	88	60 - 140	91	60 - 140	ND, RDL=0.040	ug/g	NC	50
5102991	Toluene	2017/08/02	88	60 - 140	92	60 - 140	ND, RDL=0.020	ug/g	NC	50
5102991	Total Xylenes	2017/08/02					ND, RDL=0.040	ug/g	NC	50
5103539	Chromium (VI)	2017/08/03	90	75 - 125	91	80 - 120	ND, RDL=0.2	ug/g	1.4	35
5104157	Chromium (VI)	2017/08/04	22 (3)	75 - 125	95	80 - 120	ND, RDL=0.2	ug/g	NC	35
5104177	Moisture	2017/08/03							1.1	20
5104185	Moisture	2017/08/03							1.9	20
5104240	Moisture	2017/08/03							1.1	20

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QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5104383	Moisture	2017/08/03							2.4	20
5104462	Moisture	2017/08/03							2.5	20
5104762	WAD Cyanide (Free)	2017/08/04	98	75 - 125	99	80 - 120	ND, RDL=0.01	ug/g	NC	35
5104803	Chromium (VI)	2017/08/04	76	75 - 125	89	80 - 120	ND, RDL=0.2	ug/g	NC	35
5105560	F2 (C10-C16 Hydrocarbons)	2017/08/04	93	50 - 130	88	80 - 120	ND, RDL=10	ug/g	NC	30
5105560	F3 (C16-C34 Hydrocarbons)	2017/08/04	99	50 - 130	93	80 - 120	ND, RDL=50	ug/g	NC	30
5105560	F4 (C34-C50 Hydrocarbons)	2017/08/04	101	50 - 130	94	80 - 120	ND, RDL=50	ug/g	NC	30
5105591	WAD Cyanide (Free)	2017/08/05	97	75 - 125	91	80 - 120	ND, RDL=0.01	ug/g	NC	35
5105643	Chromium (VI)	2017/08/04	88	75 - 125	89	80 - 120	ND, RDL=0.2	ug/g	NC	35
5105660	Moisture	2017/08/04							0	20
5105694	Available (CaCl2) pH	2017/08/04			99	97 - 103			0.29	N/A
5105954	Available (CaCl2) pH	2017/08/04			99	97 - 103			0.65	N/A
5105990	F2 (C10-C16 Hydrocarbons)	2017/08/04	114	50 - 130	105	80 - 120	ND, RDL=10	ug/g	NC	30
5105990	F3 (C16-C34 Hydrocarbons)	2017/08/04	109	50 - 130	100	80 - 120	ND, RDL=50	ug/g	NC	30
5105990	F4 (C34-C50 Hydrocarbons)	2017/08/04	112	50 - 130	102	80 - 120	ND, RDL=50	ug/g	NC	30
5105996	1-Methylnaphthalene	2017/08/04	89	50 - 130	101	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	2-Methylnaphthalene	2017/08/04	84	50 - 130	97	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Acenaphthene	2017/08/04	84	50 - 130	90	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Acenaphthylene	2017/08/04	82	50 - 130	87	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Anthracene	2017/08/04	77	50 - 130	80	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Benzo(a)anthracene	2017/08/04	94	50 - 130	99	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Benzo(a)pyrene	2017/08/04	94	50 - 130	100	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Benzo(b,j)fluoranthene	2017/08/04	91	50 - 130	103	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Benzo(g,h,i)perylene	2017/08/04	86	50 - 130	92	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Benzo(k)fluoranthene	2017/08/04	95	50 - 130	97	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Chrysene	2017/08/04	92	50 - 130	97	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Dibenz(a,h)anthracene	2017/08/04	82	50 - 130	86	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Fluoranthene	2017/08/04	94	50 - 130	100	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Fluorene	2017/08/04	86	50 - 130	92	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Indeno(1,2,3-cd)pyrene	2017/08/04	83	50 - 130	89	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Naphthalene	2017/08/04	70	50 - 130	86	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5105996	Phenanthrene	2017/08/04	86	50 - 130	92	50 - 130	ND, RDL=0.0050	ug/g	NC	40

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QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5105996	Pyrene	2017/08/04	96	50 - 130	101	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5106203	Hot Water Ext. Boron (B)	2017/08/04	108	75 - 125	104	75 - 125	ND, RDL=0.050	ug/g	12	40
5106229	a-Chlordane	2017/08/05	100	50 - 130	97	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Aldrin	2017/08/05	101	50 - 130	97	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Dieldrin	2017/08/05	102	50 - 130	122	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Encosulfan I (alpha)	2017/08/05	117	50 - 130	88	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Encosulfan II (beta)	2017/08/05	113	50 - 130	102	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Endrin	2017/08/05	101	50 - 130	104	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	g-Chlordane	2017/08/05	96	50 - 130	93	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Heptachlor epoxide	2017/08/05	120	50 - 130	109	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Heptachlor	2017/08/05	93	50 - 130	113	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Hexachlorobenzene	2017/08/05	86	50 - 130	101	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Hexachlorobutadiene	2017/08/05	72	50 - 130	87	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Hexachloroethane	2017/08/05	60	50 - 130	71	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Lindane	2017/08/05	96	50 - 130	87	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	Methoxychlor	2017/08/05	180 (4)	50 - 130	167 (2)	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5106229	o,p-DDD	2017/08/05	115	50 - 130	112	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	o,p-DDE	2017/08/05	99	50 - 130	102	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	o,p-DDT	2017/08/05	109	50 - 130	116	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	p,p-DDD	2017/08/05	113	50 - 130	109	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	p,p-DDE	2017/08/05	116	50 - 130	58	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106229	p,p-DDT	2017/08/05	127	50 - 130	115	50 - 130	ND, RDL=0.0020	ug/g	NC	40
5106230	Aroclor 1242	2017/08/04					ND, RDL=0.010	ug/g	NC	50
5106230	Aroclor 1248	2017/08/04					ND, RDL=0.010	ug/g	NC	50
5106230	Aroclor 1254	2017/08/04					ND, RDL=0.010	ug/g	NC	50
5106230	Aroclor 1260	2017/08/04	68	60 - 130	87	60 - 130	ND, RDL=0.010	ug/g	NC	50
5106230	Total PCB	2017/08/04	68	60 - 130	87	60 - 130	ND, RDL=0.010	ug/g	NC	50
5106256	Hot Water Ext. Boron (B)	2017/08/04	104	75 - 125	99	75 - 125	ND, RDL=0.050	ug/g	3.4	40
5106266	Acid Extractable Antimony (Sb)	2017/08/09	98	75 - 125	99	80 - 120	ND, RDL=0.20	ug/g	5.4	30
5106266	Acid Extractable Arsenic (As)	2017/08/09	105	75 - 125	106	80 - 120	ND, RDL=1.0	ug/g	8.2	30
5106266	Acid Extractable Barium (Ba)	2017/08/09	NC	75 - 125	98	80 - 120	ND, RDL=0.50	ug/g	1.6	30
5106266	Acid Extractable Beryllium (Be)	2017/08/09	101	75 - 125	101	80 - 120	ND, RDL=0.20	ug/g	1.2	30

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QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5106266	Acid Extractable Boron (B)	2017/08/09	91	75 - 125	97	80 - 120	ND, RDL=5.0	ug/g	1.3	30
5106266	Acid Extractable Cadmium (Cd)	2017/08/09	101	75 - 125	102	80 - 120	ND, RDL=0.10	ug/g	9.8	30
5106266	Acid Extractable Chromium (Cr)	2017/08/09	103	75 - 125	105	80 - 120	ND, RDL=1.0	ug/g	1.9	30
5106266	Acid Extractable Cobalt (Co)	2017/08/09	100	75 - 125	104	80 - 120	ND, RDL=0.10	ug/g	5.4	30
5106266	Acid Extractable Copper (Cu)	2017/08/09	96	75 - 125	104	80 - 120	ND, RDL=0.50	ug/g	3.5	30
5106266	Acid Extractable Lead (Pb)	2017/08/09	NC	75 - 125	103	80 - 120	ND, RDL=1.0	ug/g	109 (2)	30
5106266	Acid Extractable Mercury (Hg)	2017/08/09	92	75 - 125	95	80 - 120	ND, RDL=0.050	ug/g	NC	30
5106266	Acid Extractable Molybdenum (Mo)	2017/08/09	103	75 - 125	101	80 - 120	ND, RDL=0.50	ug/g	9.3	30
5106266	Acid Extractable Nickel (Ni)	2017/08/09	97	75 - 125	105	80 - 120	ND, RDL=0.50	ug/g	3.3	30
5106266	Acid Extractable Selenium (Se)	2017/08/09	99	75 - 125	102	80 - 120	ND, RDL=0.50	ug/g	NC	30
5106266	Acid Extractable Silver (Ag)	2017/08/09	101	75 - 125	103	80 - 120	ND, RDL=0.20	ug/g	NC	30
5106266	Acid Extractable Thallium (Tl)	2017/08/09	97	75 - 125	104	80 - 120	ND, RDL=0.050	ug/g	0.16	30
5106266	Acid Extractable Uranium (U)	2017/08/09	97	75 - 125	101	80 - 120	ND, RDL=0.050	ug/g	3.6	30
5106266	Acid Extractable Vanadium (V)	2017/08/09	98	75 - 125	103	80 - 120	ND, RDL=5.0	ug/g	0.35	30
5106266	Acid Extractable Zinc (Zn)	2017/08/09	NC	75 - 125	101	80 - 120	ND, RDL=5.0	ug/g	5.3	30
5106480	Acid Extractable Antimony (Sb)	2017/08/08	101	75 - 125	104	80 - 120	ND, RDL=0.20	ug/g	NC	30
5106480	Acid Extractable Arsenic (As)	2017/08/08	98	75 - 125	105	80 - 120	ND, RDL=1.0	ug/g	NC	30
5106480	Acid Extractable Barium (Ba)	2017/08/08	96	75 - 125	102	80 - 120	ND, RDL=0.50	ug/g	1.6	30
5106480	Acid Extractable Beryllium (Be)	2017/08/08	98	75 - 125	99	80 - 120	ND, RDL=0.20	ug/g	NC	30
5106480	Acid Extractable Boron (B)	2017/08/08	95	75 - 125	93	80 - 120	ND, RDL=5.0	ug/g	NC	30
5106480	Acid Extractable Cadmium (Cd)	2017/08/08	97	75 - 125	103	80 - 120	ND, RDL=0.10	ug/g	NC	30
5106480	Acid Extractable Chromium (Cr)	2017/08/08	99	75 - 125	98	80 - 120	ND, RDL=1.0	ug/g	2.2	30
5106480	Acid Extractable Cobalt (Co)	2017/08/08	99	75 - 125	99	80 - 120	ND, RDL=0.10	ug/g	11	30
5106480	Acid Extractable Copper (Cu)	2017/08/08	93	75 - 125	103	80 - 120	ND, RDL=0.50	ug/g	4.5	30
5106480	Acid Extractable Lead (Pb)	2017/08/08	101	75 - 125	102	80 - 120	ND, RDL=1.0	ug/g	14	30
5106480	Acid Extractable Mercury (Hg)	2017/08/08	96	75 - 125	93	80 - 120	ND, RDL=0.050	ug/g	NC	30
5106480	Acid Extractable Molybdenum (Mo)	2017/08/08	99	75 - 125	102	80 - 120	ND, RDL=0.50	ug/g	NC	30
5106480	Acid Extractable Nickel (Ni)	2017/08/08	99	75 - 125	99	80 - 120	ND, RDL=0.50	ug/g	4.1	30
5106480	Acid Extractable Selenium (Se)	2017/08/08	98	75 - 125	95	80 - 120	ND, RDL=0.50	ug/g	NC	30
5106480	Acid Extractable Silver (Ag)	2017/08/08	99	75 - 125	103	80 - 120	ND, RDL=0.20	ug/g	NC	30
5106480	Acid Extractable Thallium (Tl)	2017/08/08	101	75 - 125	103	80 - 120	ND, RDL=0.050	ug/g	NC	30
5106480	Acid Extractable Uranium (U)	2017/08/08	102	75 - 125	103	80 - 120	ND, RDL=0.050	ug/g	14	30

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QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5106480	Acid Extractable Vanadium (V)	2017/08/08	95	75 - 125	99	80 - 120	ND, RDL=5.0	ug/g	1.1	30
5106480	Acid Extractable Zinc (Zn)	2017/08/08	101	75 - 125	102	80 - 120	ND, RDL=5.0	ug/g	4.2	30
5107490	1-Methylnaphthalene	2017/08/05	98	50 - 130	104	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	2-Methylnaphthalene	2017/08/05	93	50 - 130	99	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Acenaphthene	2017/08/05	84	50 - 130	92	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Acenaphthylene	2017/08/05	89	50 - 130	96	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Anthracene	2017/08/05	79	50 - 130	84	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Benzo(a)anthracene	2017/08/05	92	50 - 130	97	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Benzo(a)pyrene	2017/08/05	91	50 - 130	97	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Benzo(b,j)fluoranthene	2017/08/05	81	50 - 130	84	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Benzo(g,h,i)perylene	2017/08/05	78	50 - 130	85	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Benzo(k)fluoranthene	2017/08/05	86	50 - 130	92	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Chrysene	2017/08/05	88	50 - 130	93	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Dibenz(a,h)anthracene	2017/08/05	84	50 - 130	88	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Fluoranthene	2017/08/05	85	50 - 130	91	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Fluorene	2017/08/05	84	50 - 130	90	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Indeno(1,2,3-cd)pyrene	2017/08/05	80	50 - 130	87	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Naphthalene	2017/08/05	78	50 - 130	83	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Phenanthrene	2017/08/05	82	50 - 130	90	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107490	Pyrene	2017/08/05	90	50 - 130	96	50 - 130	ND, RDL=0.0050	ug/g	NC	40
5107603	Soluble Calcium (Ca)	2017/08/08			104	80 - 120	ND, RDL=0.5	mg/L	6.8	30
5107603	Soluble Magnesium (Mg)	2017/08/08			103	80 - 120	ND, RDL=0.5	mg/L	8.9	30
5107603	Soluble Sodium (Na)	2017/08/08			97	80 - 120	ND, RDL=5	mg/L	NC	30

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QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5107604	Conductivity	2017/08/08			100	90 - 110	ND, RDL=0.002	mS/cm	1.6	10

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 $\leq 2 \times$ RDL).

(1) The recovery was above the upper control limit. This may represent a high bias in some results for this specific analyte. For results that were not detected (ND), this potential bias has no impact.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(3) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The matrix spike was reanalyzed to confirm result.

(4) The recovery was above the upper control limit. This may represent a high bias in some results for flagged analytes. For results that were not detected (ND), this potential bias has no impact.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ewa P.


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.

MAXAM

Maxam Analytics International Corporation

5500 Corporate Road, Suite 200, Dallas, TX 75249-1500

TEL: 972.571.5700 FAX: 972.571.5701 WWW.MAXAM.COM

CHAIN OF CUSTODY RECORD

REPORT TO: **Samuel L. Williams**

Company Name: **Samuel L. Williams**

Address: **30 West Beaver Creek Road Unit 100**

City: **Richmond Hill ON L4B 1E7**

Phone: **(416) 754-4515 x1005**

Email: **maxam@maxam.com**

Project Information:

Maxam Job #: **B40922**

Project Name: **1706-1080**

Project Manager: **Aracelia Bassi**

COG #: **0000000000**

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXAM DRINKING WATER CHAIN OF CUSTODY

Preparation (5.1, 2011)

Table 1: ☐ Metals and ☐ Volatiles

Table 2: ☐ Metals and ☐ Volatiles

Table 3: ☐ Metals and ☐ Volatiles

Table 4: ☐ Metals and ☐ Volatiles

Field Filtered (Please check)

☒ Yes ☐ No

Metals / Hg / Cr / V

Field Filtered (Please check)

☒ Yes ☐ No

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

☒ Regular (Standard) TAT

☐ Standard TAT - 5-7 Working days for most soils

☐ Priority TAT - 2-3 Working days for most soils

☐ Job Specific TAT (if applies to entire submission)

☐ Rush Combination (Rush)

Sample ID	Date Sampled	Time Sampled	Location	Matrix	Field Filtered	Metals / Hg / Cr / V	Field Filtered	Analysis Requested	Time to Lab	Time to Report	Time to Delivery	Time to Project	Time to Client
T13	July 24	4:00 PM	SOIL	SOIL	☒	☒	☒	Regular (Standard) TAT	2/4/12	2/4/12	2/4/12	2/4/12	2/4/12
T14	July 24	4:30 PM	SOIL	SOIL	☒	☒	☒	Regular (Standard) TAT	2/4/12	2/4/12	2/4/12	2/4/12	2/4/12
T15	July 24	5:00 PM	SOIL	SOIL	☒	☒	☒	Regular (Standard) TAT	2/4/12	2/4/12	2/4/12	2/4/12	2/4/12
T16	July 24	5:30 PM	SOIL	SOIL	☒	☒	☒	Regular (Standard) TAT	2/4/12	2/4/12	2/4/12	2/4/12	2/4/12
T17	July 24	6:00 PM	SOIL	SOIL	☒	☒	☒	Regular (Standard) TAT	2/4/12	2/4/12	2/4/12	2/4/12	2/4/12
T18	July 24	6:30 PM	SOIL	SOIL	☒	☒	☒	Regular (Standard) TAT	2/4/12	2/4/12	2/4/12	2/4/12	2/4/12
T19	July 24	7:00 PM	SOIL	SOIL	☒	☒	☒	Regular (Standard) TAT	2/4/12	2/4/12	2/4/12	2/4/12	2/4/12
T20	July 24	7:30 PM	SOIL	SOIL	☒	☒	☒	Regular (Standard) TAT	2/4/12	2/4/12	2/4/12	2/4/12	2/4/12

RECEIVED BY (Signature/Print)

DATE/TIME

TIME

RECEIVED BY (Signature/Print)

DATE/TIME

TIME

UNLESS OTHERWISE ADVISED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS A DECLARATION OF THE ACCURACY OF THE INFORMATION PROVIDED AND THE RESPONSIBILITY OF THE SIGNER 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 DUE TO THE PACKAGE INFORMATION CAN BE VIEWED AT: HTTP://MAXAM.COM/CONTENT/UPLOADED/CONTAINER-PDF

MAXAM ANALYTICS INTERNATIONAL CORPORATION

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#400451



Soil Engineers Ltd.

CONSULTING ENGINEERS

GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

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TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 684-4242	TEL: (905) 440-2040	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 684-8522	FAX: (905) 725-1315	FAX: (905) 542-2769

APPENDIX 'D'

CERTIFICATE OF ANALYSIS (GROUNDWATER SAMPLES)

REFERENCE NO. 1706-E080

Your Project #: 1706-E080
Your C.O.C. #: 81107

Attention: Samuel Lee

Soil Engineers Ltd
90 West Beaver Creek Road
Unit 100
Richmond Hill, ON
CANADA L4B 1E7

Report Date: 2017/08/08
Report #: R4638949
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7G4018

Received: 2017/08/01, 14:20

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	3	N/A	2017/08/08	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	3	N/A	2017/08/04		EPA 8260C m
1,3-Dichloropropene Sum	1	N/A	2017/08/05		EPA 8260C m
Chromium (VI) in Water	3	N/A	2017/08/03	CAM SOP-00436	EPA 7199 m
Free (WAD) Cyanide	3	N/A	2017/08/08	CAM SOP-00457	OMOE E3015 m
Petroleum Hydro. CCME F1 & BTEX in Water	1	N/A	2017/08/04	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	4	2017/08/04	2017/08/08	CAM SOP-00316	CCME PHC-CWS m
Mercury	3	2017/08/02	2017/08/03	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS	4	N/A	2017/08/03	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM)	3	2017/08/04	2017/08/05	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs	3	N/A	2017/08/03	CAM SOP-00230	EPA 8260C m
Volatile Organic Compounds in Water	1	N/A	2017/08/04	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.

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.

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.

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 #: 1706-E080
Your C.O.C. #: 81107

Attention: Samuel Lee

Soil Engineers Ltd
90 West Beaver Creek Road
Unit 100
Richmond Hill, ON
CANADA L4B 1E7

Report Date: 2017/08/08
Report #: R4638949
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7G4018

Received: 2017/08/01, 14:20

* 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.

Encryption Key



Ashton Gibson
Project Manager
08 Aug 2017 17:15:17

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

=====

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RESULTS OF ANALYSES OF WATER

Maxxam ID			EVZ841	EVZ841	EVZ842	EVZ843		
Sampling Date			2017/07/28 19:45	2017/07/28 19:45	2017/07/28 18:00	2017/07/28 16:45		
COC Number			81107	81107	81107	81107		
	UNITS	Criteria	MW1	MW1 Lab-Dup	MW7	MW10	RDL	QC Batch

Inorganics

WAD Cyanide (Free)	ug/L	5	ND	ND	1	ND	1	5105749
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RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)

Table 1: Full Depth Background Site Condition Standards

Ground Water - All Types of Property Uses

ND = Not detected

O.REG 153 DISSOLVED ICPMS METALS (WATER)

Maxxam ID			EVZ845		
Sampling Date			2017/07/28		
COC Number			81107		
	UNITS	Criteria	DUP-W2	RDL	QC Batch
Metals					
Dissolved Antimony (Sb)	ug/L	1.5	ND	0.50	5100899
Dissolved Arsenic (As)	ug/L	13	ND	1.0	5100899
Dissolved Barium (Ba)	ug/L	610	51	2.0	5100899
Dissolved Beryllium (Be)	ug/L	0.5	ND	0.50	5100899
Dissolved Boron (B)	ug/L	1700	32	10	5100899
Dissolved Cadmium (Cd)	ug/L	0.5	ND	0.10	5100899
Dissolved Chromium (Cr)	ug/L	11	ND	5.0	5100899
Dissolved Cobalt (Co)	ug/L	3.8	0.92	0.50	5100899
Dissolved Copper (Cu)	ug/L	5	1.5	1.0	5100899
Dissolved Lead (Pb)	ug/L	1.9	ND	0.50	5100899
Dissolved Molybdenum (Mo)	ug/L	23	4.1	0.50	5100899
Dissolved Nickel (Ni)	ug/L	14	1.9	1.0	5100899
Dissolved Selenium (Se)	ug/L	5	ND	2.0	5100899
Dissolved Silver (Ag)	ug/L	0.3	ND	0.10	5100899
Dissolved Thallium (Tl)	ug/L	0.5	ND	0.050	5100899
Dissolved Uranium (U)	ug/L	8.9	0.27	0.10	5100899
Dissolved Vanadium (V)	ug/L	3.9	ND	0.50	5100899
Dissolved Zinc (Zn)	ug/L	160	ND	5.0	5100899
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Ground Water - All Types of Property Uses ND = Not detected					

O.REG 153 METALS PACKAGE (WATER)

Maxxam ID			EVZ841	EVZ842	EVZ842	EVZ843		
Sampling Date			2017/07/28 19:45	2017/07/28 18:00	2017/07/28 18:00	2017/07/28 16:45		
COC Number			81107	81107	81107	81107		
	UNITS	Criteria	MW1	MW7	MW7 Lab-Dup	MW10	RDL	QC Batch
Metals								
Chromium (VI)	ug/L	25	ND	ND	ND	0.51	0.50	5102544
Mercury (Hg)	ug/L	0.1	ND	ND		ND	0.1	5102118
Dissolved Antimony (Sb)	ug/L	1.5	ND	ND		ND	0.50	5100899
Dissolved Arsenic (As)	ug/L	13	ND	ND		ND	1.0	5100899
Dissolved Barium (Ba)	ug/L	610	52	20		43	2.0	5100899
Dissolved Beryllium (Be)	ug/L	0.5	ND	ND		ND	0.50	5100899
Dissolved Boron (B)	ug/L	1700	31	20		12	10	5100899
Dissolved Cadmium (Cd)	ug/L	0.5	ND	ND		ND	0.10	5100899
Dissolved Chromium (Cr)	ug/L	11	ND	ND		ND	5.0	5100899
Dissolved Cobalt (Co)	ug/L	3.8	0.88	ND		ND	0.50	5100899
Dissolved Copper (Cu)	ug/L	5	1.4	1.3		1.1	1.0	5100899
Dissolved Lead (Pb)	ug/L	1.9	ND	ND		ND	0.50	5100899
Dissolved Molybdenum (Mo)	ug/L	23	4.3	1.8		ND	0.50	5100899
Dissolved Nickel (Ni)	ug/L	14	1.9	ND		ND	1.0	5100899
Dissolved Selenium (Se)	ug/L	5	ND	ND		ND	2.0	5100899
Dissolved Silver (Ag)	ug/L	0.3	ND	ND		ND	0.10	5100899
Dissolved Thallium (Tl)	ug/L	0.5	ND	ND		ND	0.050	5100899
Dissolved Uranium (U)	ug/L	8.9	0.27	0.22		0.20	0.10	5100899
Dissolved Vanadium (V)	ug/L	3.9	ND	ND		ND	0.50	5100899
Dissolved Zinc (Zn)	ug/L	160	ND	ND		ND	5.0	5100899
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Ground Water - All Types of Property Uses ND = Not detected								

O.REG 153 PAHS (WATER)

Maxxam ID			EVZ841	EVZ842	EVZ843		
Sampling Date			2017/07/28 19:45	2017/07/28 18:00	2017/07/28 16:45		
COC Number			81107	81107	81107		
	UNITS	Criteria	MW1	MW7	MW10	RDL	QC Batch
Calculated Parameters							
Methylnaphthalene, 2-(1-)	ug/L	2	ND	ND	ND	0.071	5099687
Polyaromatic Hydrocarbons							
Acenaphthene	ug/L	4.1	ND	ND	ND	0.050	5106260
Acenaphthylene	ug/L	1	ND	ND	ND	0.050	5106260
Anthracene	ug/L	0.1	ND	ND	ND	0.050	5106260
Benzo(a)anthracene	ug/L	0.2	ND	ND	ND	0.050	5106260
Benzo(a)pyrene	ug/L	0.01	ND	ND	ND	0.010	5106260
Benzo(b,j)fluoranthene	ug/L	0.1	ND	ND	ND	0.050	5106260
Benzo(g,h,i)perylene	ug/L	0.2	ND	ND	ND	0.050	5106260
Benzo(k)fluoranthene	ug/L	0.1	ND	ND	ND	0.050	5106260
Chrysene	ug/L	0.1	ND	ND	ND	0.050	5106260
Dibenz(a,h)anthracene	ug/L	0.2	ND	ND	ND	0.050	5106260
Fluoranthene	ug/L	0.4	ND	ND	ND	0.050	5106260
Fluorene	ug/L	120	ND	ND	ND	0.050	5106260
Indeno(1,2,3-cd)pyrene	ug/L	0.2	ND	ND	ND	0.050	5106260
1-Methylnaphthalene	ug/L	2	ND	ND	ND	0.050	5106260
2-Methylnaphthalene	ug/L	2	ND	ND	ND	0.050	5106260
Naphthalene	ug/L	7	ND	ND	ND	0.050	5106260
Phenanthrene	ug/L	0.1	ND	ND	ND	0.030	5106260
Pyrene	ug/L	0.2	ND	ND	ND	0.050	5106260
Surrogate Recovery (%)							
D10-Anthracene	%	-	105	104	109		5106260
D14-Terphenyl (FS)	%	-	75	62	76		5106260
D8-Acenaphthylene	%	-	101	97	100		5106260
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Ground Water - All Types of Property Uses ND = Not detected							

O.REG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID			EVZ844		
Sampling Date			2017/07/28		
COC Number			81107		
	UNITS	Criteria	DUP-W1	RDL	QC Batch
BTEX & F1 Hydrocarbons					
Benzene	ug/L	0.5	ND	0.20	5104752
Toluene	ug/L	0.8	ND	0.20	5104752
Ethylbenzene	ug/L	0.5	ND	0.20	5104752
o-Xylene	ug/L	-	ND	0.20	5104752
p+m-Xylene	ug/L	-	ND	0.40	5104752
Total Xylenes	ug/L	72	ND	0.40	5104752
F1 (C6-C10)	ug/L	420	ND	25	5104752
F1 (C6-C10) - BTEX	ug/L	420	ND	25	5104752
F2-F4 Hydrocarbons					
F2 (C10-C16 Hydrocarbons)	ug/L	150	ND	100	5106279
F3 (C16-C34 Hydrocarbons)	ug/L	500	ND	200	5106279
F4 (C34-C50 Hydrocarbons)	ug/L	500	ND	200	5106279
Reached Baseline at C50	ug/L	-	Yes		5106279
Surrogate Recovery (%)					
1,4-Difluorobenzene	%	-	104		5104752
4-Bromofluorobenzene	%	-	96		5104752
D10-Ethylbenzene	%	-	95		5104752
D4-1,2-Dichloroethane	%	-	104		5104752
o-Terphenyl	%	-	95		5106279
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Ground Water - All Types of Property Uses ND = Not detected					

O.REG 153 VOCS BY HS & F1-F4 (WATER)

Maxxam ID			EVZ841	EVZ342	EVZ843		
Sampling Date			2017/07/28 19:45	2017/07/28 18:00	2017/07/28 16:45		
COC Number			81107	81107	81107		
	UNITS	Criteria	MW1	MW7	MW10	RDL	QC Batch
Calculated Parameters							
1,3-Dichloropropene (cis+trans)	ug/L	0.5	ND	ND	ND	0.50	5099688
Volatile Organics							
Acetone (2-Propanone)	ug/L	2700	ND	ND	ND	10	5100510
Benzene	ug/L	0.5	ND	ND	ND	0.20	5100510
Bromodichloromethane	ug/L	2	ND	ND	ND	0.50	5100510
Bromoform	ug/L	5.0	ND	ND	ND	1.0	5100510
Bromomethane	ug/L	0.89	ND	ND	ND	0.50	5100510
Carbon Tetrachloride	ug/L	0.2	ND	ND	ND	0.20	5100510
Chlorobenzene	ug/L	0.5	ND	ND	ND	0.20	5100510
Chloroform	ug/L	2	ND	ND	ND	0.20	5100510
Dibromochloromethane	ug/L	2	ND	ND	ND	0.50	5100510
1,2-Dichlorobenzene	ug/L	0.5	ND	ND	ND	0.50	5100510
1,3-Dichlorobenzene	ug/L	0.5	ND	ND	ND	0.50	5100510
1,4-Dichlorobenzene	ug/L	0.5	ND	ND	ND	0.50	5100510
Dichlorodifluoromethane (FREON 12)	ug/L	590	ND	ND	ND	1.0	5100510
1,1-Dichloroethane	ug/L	0.5	ND	ND	ND	0.20	5100510
1,2-Dichloroethane	ug/L	0.5	ND	ND	ND	0.50	5100510
1,1-Dichloroethylene	ug/L	0.5	ND	ND	ND	0.20	5100510
cis-1,2-Dichloroethylene	ug/L	1.6	ND	ND	ND	0.50	5100510
trans-1,2-Dichloroethylene	ug/L	1.6	ND	ND	ND	0.50	5100510
1,2-Dichloropropane	ug/L	0.5	ND	ND	ND	0.20	5100510
cis-1,3-Dichloropropene	ug/L	0.5	ND	ND	ND	0.30	5100510
trans-1,3-Dichloropropene	ug/L	0.5	ND	ND	ND	0.40	5100510
Ethylbenzene	ug/L	0.5	ND	ND	ND	0.20	5100510
Ethylene Dibromide	ug/L	0.2	ND	ND	ND	0.20	5100510
Hexane	ug/L	5	ND	ND	ND	1.0	5100510
Methylene Chloride(Dichloromethane)	ug/L	5	ND	ND	ND	2.0	5100510
Methyl Ethyl Ketone (2-Butanone)	ug/L	400	ND	ND	ND	10	5100510
Methyl Isobutyl Ketone	ug/L	640	ND	ND	ND	5.0	5100510
Methyl t-butyl ether (MTBE)	ug/L	15	ND	ND	ND	0.50	5100510
Styrene	ug/L	0.5	ND	ND	ND	0.50	5100510
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Ground Water - All Types of Property Uses ND = Not detected							

O.REG 153 VOCS BY HS & F1-F4 (WATER)

Maxxam ID			EVZ841	EVZ842	EVZ843		
Sampling Date			2017/07/28 19:45	2017/07/28 18:00	2017/07/28 16:45		
COC Number			81107	81107	81107		
	UNITS	Criteria	MW1	MW7	MW10	RDL	QC Batch
1,1,1,2-Tetrachloroethane	ug/L	1.1	ND	ND	ND	0.50	5100510
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND	ND	ND	0.50	5100510
Tetrachloroethylene	ug/L	0.5	ND	ND	ND	0.20	5100510
Toluene	ug/L	0.8	0.45	0.23	ND	0.20	5100510
1,1,1-Trichloroethane	ug/L	0.5	ND	ND	ND	0.20	5100510
1,1,2-Trichloroethane	ug/L	0.5	ND	ND	ND	0.50	5100510
Trichloroethylene	ug/L	0.5	ND	ND	ND	0.20	5100510
Trichlorofluoromethane (FREON 11)	ug/L	150	ND	ND	ND	0.50	5100510
Vinyl Chloride	ug/L	0.5	ND	ND	ND	0.20	5100510
p+m-Xylene	ug/L	-	ND	ND	ND	0.20	5100510
o-Xylene	ug/L	-	ND	ND	ND	0.20	5100510
Total Xylenes	ug/L	72	ND	ND	ND	0.20	5100510
F1 (C6-C10)	ug/L	420	ND	ND	ND	25	5100510
F1 (C6-C10) - BTEX	ug/L	420	ND	ND	ND	25	5100510
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/L	150	ND	ND	ND	100	5106253
F3 (C16-C34 Hydrocarbons)	ug/L	500	ND	ND	ND	200	5106253
F4 (C34-C50 Hydrocarbons)	ug/L	500	ND	ND	ND	200	5106253
Reached Baseline at C50	ug/L	-	Yes	Yes	Yes		5106253
Surrogate Recovery (%)							
o-Terphenyl	%	-	96	97	98		5106253
4-Bromofluorobenzene	%	-	89	90	89		5100510
D4-1,2-Dichloroethane	%	-	114	116	116		5100510
D8-Toluene	%	-	95	94	94		5100510
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Ground Water - All Types of Property Uses ND = Not detected							

O.REG 153 VOCS BY HS (WATER)

Maxxam ID			EVZ846		
Sampling Date					
COC Number			81107		
	UNITS	Criteria	TRIP BLANK	RDL	QC Batch
Calculated Parameters					
1,3-Dichloropropene (cis+trans)	ug/L	0.5	ND	0.50	5099688
Volatile Organics					
Acetone (2-Propanone)	ug/L	2700	ND	10	5084458
Benzene	ug/L	0.5	ND	0.20	5084458
Bromodichloromethane	ug/L	2	ND	0.50	5084458
Bromoform	ug/L	5.0	ND	1.0	5084458
Bromomethane	ug/L	0.89	ND	0.50	5084458
Carbon Tetrachloride	ug/L	0.2	ND	0.20	5084458
Chlorobenzene	ug/L	0.5	ND	0.20	5084458
Chloroform	ug/L	2	ND	0.20	5084458
Dibromochloromethane	ug/L	2	ND	0.50	5084458
1,2-Dichlorobenzene	ug/L	0.5	ND	0.50	5084458
1,3-Dichlorobenzene	ug/L	0.5	ND	0.50	5084458
1,4-Dichlorobenzene	ug/L	0.5	ND	0.50	5084458
Dichlorodifluoromethane (FREON 12)	ug/L	590	ND	1.0	5084458
1,1-Dichloroethane	ug/L	0.5	ND	0.20	5084458
1,2-Dichloroethane	ug/L	0.5	ND	0.50	5084458
1,1-Dichloroethylene	ug/L	0.5	ND	0.20	5084458
cis-1,2-Dichloroethylene	ug/L	1.6	ND	0.50	5084458
trans-1,2-Dichloroethylene	ug/L	1.6	ND	0.50	5084458
1,2-Dichloropropane	ug/L	0.5	ND	0.20	5084458
cis-1,3-Dichloropropene	ug/L	0.5	ND	0.30	5084458
trans-1,3-Dichloropropene	ug/L	0.5	ND	0.40	5084458
Ethylbenzene	ug/L	0.5	ND	0.20	5084458
Ethylene Dibromide	ug/L	0.2	ND	0.20	5084458
Hexane	ug/L	5	ND	1.0	5084458
Methylene Chloride(Dichloromethane)	ug/L	5	ND	2.0	5084458
Methyl Ethyl Ketone (2-Butanone)	ug/L	400	ND	10	5084458
Methyl Isobutyl Ketone	ug/L	640	ND	5.0	5084458
Methyl t-butyl ether (MTBE)	ug/L	15	ND	0.50	5084458
Styrene	ug/L	0.5	ND	0.50	5084458
1,1,1,2-Tetrachloroethane	ug/L	1.1	ND	0.50	5084458
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)					
Table 1: Full Depth Background Site Condition Standards					
Ground Water - All Types of Property Uses					
ND = Not detected					

O.REG 153 VOCS BY HS (WATER)

Maxxam ID			EVZ846		
Sampling Date					
COC Number			81107		
	UNITS	Criteria	TRIP BLANK	RDL	QC Batch
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND	0.50	5084458
Tetrachloroethylene	ug/L	0.5	ND	0.20	5084458
Toluene	ug/L	0.8	ND	0.20	5084458
1,1,1-Trichloroethane	ug/L	0.5	ND	0.20	5084458
1,1,2-Trichloroethane	ug/L	0.5	ND	0.50	5084458
Trichloroethylene	ug/L	0.5	ND	0.20	5084458
Trichlorofluoromethane (FREON 11)	ug/L	150	ND	0.50	5084458
Vinyl Chloride	ug/L	0.5	ND	0.20	5084458
p+m-Xylene	ug/L	-	ND	0.20	5084458
o-Xylene	ug/L	-	ND	0.20	5084458
Total Xylenes	ug/L	72	ND	0.20	5084458
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	-	96		5084458
D4-1,2-Dichloroethane	%	-	108		5084458
D8-Toluene	%	-	97		5084458
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Ground Water - All Types of Property Uses ND = Not detected					

Maxxam Job #: B7G4018
Report Date: 2017/08/08

Soil Engineers Ltd
Client Project #: 1706-E080
Sampler Initials: PC

TEST SUMMARY

Maxxam ID: EVZ841
Sample ID: MW1
Matrix: Water

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5099687	N/A	2017/08/08	Automated Statchk
1,3-Dichloropropene Sum	CALC	5099688	N/A	2017/08/04	Automated Statchk
Chromium (VI) in Water	IC	5102544	N/A	2017/08/03	Lang Le
Free (WAD) Cyanide	SKAL/CN	5105749	N/A	2017/08/08	Xuanhong Qiu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5106253	2017/08/04	2017/08/08	Zhiyue (Frank) Zhu
Mercury	CV/AA	5102118	2017/08/02	2017/08/03	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5100899	N/A	2017/08/03	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5106260	2017/08/04	2017/08/05	Jett Wu
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5100510	N/A	2017/08/03	Karen Hughes

Maxxam ID: EVZ841 Dup
Sample ID: MW1
Matrix: Water

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	SKAL/CN	5105749	N/A	2017/08/08	Xuanhong Qiu

Maxxam ID: EVZ842
Sample ID: MW7
Matrix: Water

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5099687	N/A	2017/08/08	Automated Statchk
1,3-Dichloropropene Sum	CALC	5099688	N/A	2017/08/04	Automated Statchk
Chromium (VI) in Water	IC	5102544	N/A	2017/08/03	Lang Le
Free (WAD) Cyanide	SKAL/CN	5105749	N/A	2017/08/08	Xuanhong Qiu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5106253	2017/08/04	2017/08/08	Zhiyue (Frank) Zhu
Mercury	CV/AA	5102118	2017/08/02	2017/08/03	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5100899	N/A	2017/08/03	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5106260	2017/08/04	2017/08/05	Jett Wu
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5100510	N/A	2017/08/03	Karen Hughes

Maxxam ID: EVZ842 Dup
Sample ID: MW7
Matrix: Water

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chromium (VI) in Water	IC	5102544	N/A	2017/08/03	Lang Le

Maxxam ID: EVZ843
Sample ID: MW10
Matrix: Water

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5099687	N/A	2017/08/08	Automated Statchk
1,3-Dichloropropene Sum	CALC	5099688	N/A	2017/08/04	Automated Statchk

Maxxam Job #: B7G4018
Report Date: 2017/08/08

Soil Engineers Ltd
Client Project #: 1706-E080
Sampler Initials: PC

TEST SUMMARY

Maxxam ID: EVZ843
Sample ID: MW10
Matrix: Water

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chromium (VI) in Water	IC	5102544	N/A	2017/08/03	Lang Le
Free (WAD) Cyanide	SKAL/CN	5105749	N/A	2017/08/08	Xuanhong Qiu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5106253	2017/08/04	2017/08/08	Zhiyue (Frank) Zhu
Mercury	CV/AA	5102118	2017/08/02	2017/08/03	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5100899	N/A	2017/08/03	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5106260	2017/08/04	2017/08/05	Jett Wu
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5100510	N/A	2017/08/03	Karen Hughes

Maxxam ID: EVZ844
Sample ID: DUP-W1
Matrix: Water

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5104752	N/A	2017/08/04	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5106279	2017/08/04	2017/08/08	Zhiyue (Frank) Zhu

Maxxam ID: EVZ845
Sample ID: DUP-W2
Matrix: Water

Collected: 2017/07/28
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	5100899	N/A	2017/08/03	Arefa Dabhad

Maxxam ID: EVZ846
Sample ID: TRIP BLANK
Matrix: Water

Collected:
Shipped:
Received: 2017/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5099688	N/A	2017/08/05	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	5084458	N/A	2017/08/04	Manpreet Sarao

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.0°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

Soil Engineers Ltd
Client Project #: 1706-E080
Sampler Initials: PC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5084458	4-Bromofluorobenzene	2017/08/04	101	70 - 130	100	70 - 130	115	%		
5084458	D4-1,2-Dichloroethane	2017/08/04	104	70 - 130	101	70 - 130	102	%		
5084458	D8-Toluene	2017/08/04	101	70 - 130	102	70 - 130	97	%		
5100510	4-Bromofluorobenzene	2017/08/03	100	70 - 130	99	70 - 130	94	%		
5100510	D4-1,2-Dichloroethane	2017/08/03	105	70 - 130	103	70 - 130	105	%		
5100510	D8-Toluene	2017/08/03	102	70 - 130	104	70 - 130	95	%		
5104752	1,4-Difluorobenzene	2017/08/04	103	70 - 130	102	70 - 130	103	%		
5104752	4-Bromofluorobenzene	2017/08/04	96	70 - 130	97	70 - 130	97	%		
5104752	D10-Ethylbenzene	2017/08/04	94	70 - 130	94	70 - 130	94	%		
5104752	D4-1,2-Dichloroethane	2017/08/04	102	70 - 130	106	70 - 130	107	%		
5106253	o-Terphenyl	2017/08/08	100	60 - 130	100	60 - 130	99	%		
5106260	D10-Anthracene	2017/08/04	106	50 - 130	101	50 - 130	100	%		
5106260	D14-Terphenyl (FS)	2017/08/04	88	50 - 130	83	50 - 130	81	%		
5106260	D8-Acenaphthylene	2017/08/04	108	50 - 130	97	50 - 130	93	%		
5106279	o-Terphenyl	2017/08/08	96	60 - 130	103	60 - 130	99	%		
5084458	1,1,1,2-Tetrachloroethane	2017/08/04	110	70 - 130	108	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	1,1,1-Trichloroethane	2017/08/04	100	70 - 130	99	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	1,1,2,2-Tetrachloroethane	2017/08/04	108	70 - 130	104	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	1,1,2-Trichloroethane	2017/08/04	109	70 - 130	104	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	1,1-Dichloroethane	2017/08/04	106	70 - 130	104	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	1,1-Dichloroethylene	2017/08/04	111	70 - 130	110	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	1,2-Dichlorobenzene	2017/08/04	100	70 - 130	98	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	1,2-Dichloroethane	2017/08/04	107	70 - 130	101	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	1,2-Dichloropropane	2017/08/04	101	70 - 130	98	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	1,3-Dichlorobenzene	2017/08/04	101	70 - 130	101	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	1,4-Dichlorobenzene	2017/08/04	101	70 - 130	101	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	Acetone (2-Propanone)	2017/08/04	100	60 - 140	93	60 - 140	ND, RDL=10	ug/L	NC	30
5084458	Benzene	2017/08/04	106	70 - 130	104	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	Bromodichloromethane	2017/08/04	103	70 - 130	99	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	Bromoform	2017/08/04	114	70 - 130	109	70 - 130	ND, RDL=1.0	ug/L	NC	30
5084458	Bromomethane	2017/08/04	102	60 - 140	101	60 - 140	ND, RDL=0.50	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

Soil Engineers Ltd
Client Project #: 1706-E080
Sampler Initials: PC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5084458	Carbon Tetrachloride	2017/08/04	100	70 - 130	100	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	Chlorobenzene	2017/08/04	101	70 - 130	100	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	Chloroform	2017/08/04	102	70 - 130	99	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	cis-1,2-Dichloroethylene	2017/08/04	101	70 - 130	98	70 - 130	ND, RDL=0.50	ug/L	8.8	30
5084458	cis-1,3-Dichloropropene	2017/08/04	109	70 - 130	101	70 - 130	ND, RDL=0.30	ug/L	NC	30
5084458	Dibromochloromethane	2017/08/04	109	70 - 130	106	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	Dichlorodifluoromethane (FREON 12)	2017/08/04	98	60 - 140	99	60 - 140	ND, RDL=1.0	ug/L	NC	30
5084458	Ethylbenzene	2017/08/04	101	70 - 130	101	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	Ethylene Dibromide	2017/08/04	110	70 - 130	105	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	Hexane	2017/08/04	110	70 - 130	110	70 - 130	ND, RDL=1.0	ug/L	NC	30
5084458	Methyl Ethyl Ketone (2-Butanone)	2017/08/04	106	60 - 140	99	60 - 140	ND, RDL=10	ug/L	NC	30
5084458	Methyl Isobutyl Ketone	2017/08/04	109	70 - 130	102	70 - 130	ND, RDL=5.0	ug/L	NC	30
5084458	Methyl t-butyl ether (MTBE)	2017/08/04	100	70 - 130	97	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	Methylene Chloride(Dichloromethane)	2017/08/04	93	70 - 130	91	70 - 130	ND, RDL=2.0	ug/L	NC	30
5084458	o-Xylene	2017/08/04	100	70 - 130	100	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	p+m-Xylene	2017/08/04	103	70 - 130	103	70 - 130	ND, RDL=0.20	ug/L	5.8	30
5084458	Styrene	2017/08/04	101	70 - 130	100	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	Tetrachloroethylene	2017/08/04	97	70 - 130	98	70 - 130	ND, RDL=0.20	ug/L	NC	30
5084458	Toluene	2017/08/04	100	70 - 130	98	70 - 130	ND, RDL=0.20	ug/L	8.1	30
5084458	Total Xylenes	2017/08/04					ND, RDL=0.20	ug/L	5.8	30
5084458	trans-1,2-Dichloroethylene	2017/08/04	105	70 - 130	103	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	trans-1,3-Dichloropropene	2017/08/04	117	70 - 130	107	70 - 130	ND, RDL=0.40	ug/L	NC	30
5084458	Trichloroethylene	2017/08/04	102	70 - 130	98	70 - 130	ND, RDL=0.20	ug/L	6.5	30
5084458	Trichlorofluoromethane (FREON 11)	2017/08/04	102	70 - 130	102	70 - 130	ND, RDL=0.50	ug/L	NC	30
5084458	Vinyl Chloride	2017/08/04	103	70 - 130	103	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	1,1,1,2-Tetrachloroethane	2017/08/03	104	70 - 130	105	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	1,1,1-Trichloroethane	2017/08/03	95	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	1,1,2,2-Tetrachloroethane	2017/08/03	103	70 - 130	101	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	1,1,2-Trichloroethane	2017/08/03	101	70 - 130	101	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	1,1-Dichloroethane	2017/08/03	105	70 - 130	106	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	1,1-Dichloroethylene	2017/08/03	108	70 - 130	109	70 - 130	ND, RDL=0.20	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

Soil Engineers Ltd
Client Project #: 1706-E080
Sampler Initials: PC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5100510	1,2-Dichlorobenzene	2017/08/03	97	70 - 130	97	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	1,2-Dichloroethane	2017/08/03	98	70 - 130	97	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	1,2-Dichloropropane	2017/08/03	94	70 - 130	93	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	1,3-Dichlorobenzene	2017/08/03	102	70 - 130	101	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	1,4-Dichlorobenzene	2017/08/03	102	70 - 130	101	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	Acetone (2-Propanone)	2017/08/03	105	60 - 140	103	60 - 140	ND, RDL=10	ug/L	6.1	30
5100510	Benzene	2017/08/03	101	70 - 130	100	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	Bromodichloromethane	2017/08/03	97	70 - 130	96	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	Bromoform	2017/08/03	103	70 - 130	101	70 - 130	ND, RDL=1.0	ug/L	NC	30
5100510	Bromomethane	2017/08/03	102	60 - 140	100	60 - 140	ND, RDL=0.50	ug/L	NC	30
5100510	Carbon Tetrachloride	2017/08/03	96	70 - 130	97	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	Chlorobenzene	2017/08/03	97	70 - 130	98	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	Chloroform	2017/08/03	96	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	cis-1,2-Dichloroethylene	2017/08/03	97	70 - 130	97	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	cis-1,3-Dichloropropene	2017/08/03	95	70 - 130	91	70 - 130	ND, RDL=0.30	ug/L	NC	30
5100510	Dibromochloromethane	2017/08/03	102	70 - 130	102	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	Dichlorodifluoromethane (FREON 12)	2017/08/03	112	60 - 140	113	60 - 140	ND, RDL=1.0	ug/L	NC	30
5100510	Ethylbenzene	2017/08/03	95	70 - 130	97	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	Ethylene Dibromide	2017/08/03	104	70 - 130	103	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	F1 (C6-C10) - BTEX	2017/08/03					ND, RDL=25	ug/L	NC	30
5100510	F1 (C6-C10)	2017/08/03	102	60 - 140	105	60 - 140	ND, RDL=25	ug/L	NC	30
5100510	Hexane	2017/08/03	107	70 - 130	108	70 - 130	ND, RDL=1.0	ug/L	NC	30
5100510	Methyl Ethyl Ketone (2-Butanone)	2017/08/03	99	60 - 140	97	60 - 140	ND, RDL=10	ug/L	NC	30
5100510	Methyl Isobutyl Ketone	2017/08/03	90	70 - 130	89	70 - 130	ND, RDL=5.0	ug/L	NC	30
5100510	Methyl t-butyl ether (MTBE)	2017/08/03	95	70 - 130	95	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	Methylene Chloride(Dichloromethane)	2017/08/03	102	70 - 130	101	70 - 130	ND, RDL=2.0	ug/L	NC	30
5100510	o-Xylene	2017/08/03	96	70 - 130	99	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	p+m-Xylene	2017/08/03	97	70 - 130	99	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	Styrene	2017/08/03	96	70 - 130	98	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	Tetrachloroethylene	2017/08/03	96	70 - 130	97	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	Toluene	2017/08/03	96	70 - 130	98	70 - 130	ND, RDL=0.20	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

Soil Engineers Ltd
Client Project #: 1706-E080
Sampler Initials: PC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5100510	Total Xylenes	2017/08/03					ND, RDL=0.20	ug/L	NC	30
5100510	trans-1,2-Dichloroethylene	2017/08/03	101	70 - 130	101	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	trans-1,3-Dichloropropene	2017/08/03	105	70 - 130	100	70 - 130	ND, RDL=0.40	ug/L	NC	30
5100510	Trichloroethylene	2017/08/03	94	70 - 130	94	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100510	Trichlorofluoromethane (FREON 11)	2017/08/03	101	70 - 130	102	70 - 130	ND, RDL=0.50	ug/L	NC	30
5100510	Vinyl Chloride	2017/08/03	104	70 - 130	105	70 - 130	ND, RDL=0.20	ug/L	NC	30
5100899	Dissolved Antimony (Sb)	2017/08/03	108	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	NC	20
5100899	Dissolved Arsenic (As)	2017/08/03	105	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	NC	20
5100899	Dissolved Barium (Ba)	2017/08/03	101	80 - 120	104	80 - 120	ND, RDL=2.0	ug/L	1.3	20
5100899	Dissolved Beryllium (Be)	2017/08/03	102	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L	NC	20
5100899	Dissolved Boron (B)	2017/08/03	NC	80 - 120	97	80 - 120	ND, RDL=10	ug/L	3.0	20
5100899	Dissolved Cadmium (Cd)	2017/08/03	104	80 - 120	101	80 - 120	ND, RDL=0.10	ug/L	NC	20
5100899	Dissolved Chromium (Cr)	2017/08/03	99	80 - 120	95	80 - 120	ND, RDL=5.0	ug/L	NC	20
5100899	Dissolved Cobalt (Co)	2017/08/03	103	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L	3.6	20
5100899	Dissolved Copper (Cu)	2017/08/03	102	80 - 120	104	80 - 120	ND, RDL=1.0	ug/L	1.2	20
5100899	Dissolved Lead (Pb)	2017/08/03	98	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	NC	20
5100899	Dissolved Molybdenum (Mo)	2017/08/03	106	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	1.2	20
5100899	Dissolved Nickel (Ni)	2017/08/03	99	80 - 120	98	80 - 120	ND, RDL=1.0	ug/L	5.3	20
5100899	Dissolved Selenium (Se)	2017/08/03	103	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L	NC	20
5100899	Dissolved Silver (Ag)	2017/08/03	90	80 - 120	97	80 - 120	ND, RDL=0.10	ug/L	NC	20
5100899	Dissolved Thallium (Tl)	2017/08/03	98	80 - 120	101	80 - 120	ND, RDL=0.050	ug/L	NC	20
5100899	Dissolved Uranium (U)	2017/08/03	98	80 - 120	99	80 - 120	ND, RDL=0.10	ug/L	2.0	20
5100899	Dissolved Vanadium (V)	2017/08/03	102	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L	NC	20
5100899	Dissolved Zinc (Zn)	2017/08/03	101	80 - 120	101	80 - 120	ND, RDL=5.0	ug/L	NC	20
5102118	Mercury (Hg)	2017/08/03	108	75 - 125	99	80 - 120	ND, RDL=0.1	ug/L	NC	20
5102544	Chromium (VI)	2017/08/03	100	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L	NC	20
5104752	Benzene	2017/08/04	102	70 - 130	100	70 - 130	ND, RDL=0.20	ug/L	NC	30
5104752	Ethylbenzene	2017/08/04	99	70 - 130	98	70 - 130	ND, RDL=0.20	ug/L	NC	30
5104752	F1 (C6-C10) - BTEX	2017/08/04					ND, RDL=25	ug/L	NC	30
5104752	F1 (C6-C10)	2017/08/04	87	70 - 130	91	70 - 130	ND, RDL=25	ug/L	NC	30
5104752	o-Xylene	2017/08/04	102	70 - 130	99	70 - 130	ND, RDL=0.20	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

Soil Engineers Ltd
Client Project #: 1706-E080
Sampler Initials: PC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5104752	p+m-Xylene	2017/08/04	98	70 - 130	96	70 - 130	ND, RDL=0.40	ug/L	NC	30
5104752	Toluene	2017/08/04	95	70 - 130	93	70 - 130	ND, RDL=0.20	ug/L	NC	30
5104752	Total Xylenes	2017/08/04					ND, RDL=0.40	ug/L	NC	30
5105749	WAD Cyanide (Free)	2017/08/08	109	80 - 120	107	80 - 120	ND, RDL=1	ug/L	NC	20
5106253	F2 (C10-C16 Hydrocarbons)	2017/08/08	107	50 - 130	103	60 - 130	ND, RDL=100	ug/L	NC	30
5106253	F3 (C16-C34 Hydrocarbons)	2017/08/08	106	50 - 130	103	60 - 130	ND, RDL=200	ug/L	NC	30
5106253	F4 (C34-C50 Hydrocarbons)	2017/08/08	103	50 - 130	99	60 - 130	ND, RDL=200	ug/L	NC	30
5106260	1-Methylnaphthalene	2017/08/04	107	50 - 130	105	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	2-Methylnaphthalene	2017/08/04	104	50 - 130	102	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Acenaphthene	2017/08/04	109	50 - 130	102	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Acenaphthylene	2017/08/04	115	50 - 130	106	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Anthracene	2017/08/04	99	50 - 130	92	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Benzo(a)anthracene	2017/08/04	120	50 - 130	106	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Benzo(a)pyrene	2017/08/04	104	50 - 130	87	50 - 130	ND, RDL=0.010	ug/L	NC	30
5106260	Benzo(b,j)fluoranthene	2017/08/04	99	50 - 130	80	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Benzo(g,h,i)perylene	2017/08/04	84	50 - 130	78	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Benzo(k)fluoranthene	2017/08/04	91	50 - 130	78	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Chrysene	2017/08/04	111	50 - 130	95	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Dibenz(a,h)anthracene	2017/08/04	92	50 - 130	78	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Fluoranthene	2017/08/04	118	50 - 130	112	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Fluorene	2017/08/04	115	50 - 130	107	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Indeno(1,2,3-cd)pyrene	2017/08/04	94	50 - 130	82	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Naphthalene	2017/08/04	95	50 - 130	92	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106260	Phenanthrene	2017/08/04	110	50 - 130	106	50 - 130	ND, RDL=0.030	ug/L	NC	30
5106260	Pyrene	2017/08/04	121	50 - 130	116	50 - 130	ND, RDL=0.050	ug/L	NC	30
5106279	F2 (C10-C16 Hydrocarbons)	2017/08/08	95	50 - 130	98	60 - 130	ND, RDL=100	ug/L	NC	30
5106279	F3 (C16-C34 Hydrocarbons)	2017/08/08	95	50 - 130	101	60 - 130	ND, RDL=200	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

Soil Engineers Ltd
Client Project #: 1706-E080
Sampler Initials: PC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5106279	F4 (C34-C50 Hydrocarbons)	2017/08/08	95	50 - 130	102	60 - 130	ND, RDL=200	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).



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.

Exceedence Summary Table – Reg153/04 T1-GW

Result Exceedences

Sample ID	Maxxam ID	Parameter	Criteria	Result	DL	Units
No Exceedences						
The exceedence summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.						

**Soil Engineers Ltd.****ASPHALT MIX ANALYSIS**

Reference: 1607-M114
 Job Name: Cachet Developments (Orangeville)
 Type of Mix: HL-3 Sample No.: 1
 Sampled By: Cathy
 Location of Sample: North Limit of Pond Access Road
 Date Sampled: August 8, 2017 Date Tested: August 17, 2017
 Producing Contractor: Aecon
 Paving Contractor: Aecon

Sieve Size	Percent Passing					OPSS* HL-3
	Job Mix Formula	Tolerance on Job Mix Formula			Sample	
		Acceptable	Borderline	Rejectable		
16 mm (5/8")	100.0				100.0	100
13.2 mm (1/2")	99.4				98.1	98-100
9.5 mm (3/8")	85.5	<5.0	5.0 to 7.5	>7.5	83.2	75-90
4.75 mm (#4)	59.8	<5.0	5.0 to 7.5	>7.5	57.8	50-60
2.36 mm (#8)	50.7				49.1	36-60
1.18 mm (#16)	42.7				41.1	25-58
600 μm (#30)	34.7	<3.5	3.5 to 5.0	>5.0	33.0	16-45
300 μm (#50)	20.3				19.1	7-26
150 μm (#100)	7.5				7.1	3-10
75 μm (#200)	4.3	<2.0	2.0 to 3.0	>3.0	3.4	0-5
Asphalt Content, %	5.0	<0.30	0.30 to 0.50	>0.50	5.1	5.0 (min)
% VMA	15.5				15.6	15.5 (min)
Bulk Relative Density	2.3800				2.3831	
Maximum Relative Density	2.4920				2.5018	
% Air Voids	4.5	3 - 5			4.7	3.5-4.5
Marshall Stability (N)	11008				11491	8900 (min)
Flow Index	9.5	8 - 14			8.3	8 (min)

* Ontario Provincial Standard Specification 1150 (Nov. 2010)



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CAMP 001131/2

CHAIN OF CUSTODY RECORD 81107

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Invoice Information		Report Information (if different from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name	Company Name	Company Name	Company Name	Project #	Project #	Regular TAT (5-7 days) / Cold Analysis	Regular TAT (5-7 days) / Cold Analysis
Maxxam	Maxxam	Maxxam	Maxxam	7706-ED80	7706-ED80	☒ Regular TAT (5-7 days) / Cold Analysis	☐ Rush TAT (Surcharge will be applied)
Contact Name	Contact Name	Contact Name	Contact Name	Site Location	Site Location	☐ 1 Day	☐ 2 Days
Address	Address	Address	Address	Site Location	Site Location	☐ 3-4 Days	☐ 5-7 Days
Phone	Phone	Phone	Phone	Site Location	Site Location	Date Required: August 8/17	
Fax	Fax	Fax	Fax	Site Location	Site Location	Rush Confirmation #:	
Other Regulations				LABORATORY USE ONLY			
Regulation 111				CUSTODY SEAL			
Regulation 111				COOLER TEMPERATURES			
Regulation 111				Present			
Regulation 111				Impact			
Regulation 111				7819			
Regulation 111				# 400455			
Regulation 111				ECCODING MEDIA PRESENT: ☒ N			
Regulation 111				COMMENTS			
Regulation 111				HOLD - DO NOT ANALYZE			
Regulation 111				01-Aug-17 14:20			
Regulation 111				Antonella Brasil			
Regulation 111				B7G4018			
Regulation 111				GK1 env-1302			
Regulation 111				MAXXAM JOB #			
Regulation 111				DATE/TIME/ANALYST			
Regulation 111				TIME (HH:MM)			
Regulation 111				8:08:10Z			
Regulation 111				8:08:10Z			
Regulation 111				14:20			