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# SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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PROJECT NO.: SM 188072-E

April 16, 2018

LOSANI HOMES  
430 MCNEILLY ROAD, SUITE 203  
STONEY CREEK, ONTARIO  
L8E 5E3

Attention: Fred Losani  
Chief Executive Office

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT  
FIFTH WHEEL TRUCK WASH PROPERTY  
GRIMSBY, ONTARIO

Dear Mr. Losani,

SOIL-MAT ENGINEERS & CONSULTANTS LTD. [SOIL-MAT ENGINEERS] were retained by LOSANI HOMES to undertake a Phase Two Environmental Site Assessment [ESA] on the above captioned property. Furthermore, it is our understanding that the Phase Two ESA is intended to support the filing of a Record of Site Condition [RSC]. In order to complete and file an RSC the subject property will either need to meet the applicable Ontario Regulation 153/04 [as amended] soil and groundwater standards or be subjected to some level of Risk Assessment activities.

Our fieldwork, laboratory testing and interpretation in connection with the assessment activities has been finalised and our comments and recommendations, based on our findings, are presented in the following paragraphs.

The subject property is herein referred to as the *Site*.

## 1.0 INTRODUCTION

### 1.1 SITE DESCRIPTION

The Site is comprised of an irregular shaped parcel of land on the east side of 398 North Service Road in the Town of Grimsby, Ontario.

At the time of this Report, the Site was developed as a commercial property occupied by a vacant one-storey building [former "Blue Beacon Truck Wash" business].

The remainder of the Site was comprised of a paved parking lot.

The Site was bounded to the north by Lake Ontario, to the south by North Service Road, to the east by a drainage channel, and vacant lands and to the west by the former Fifth Wheel gas station, motel and restaurant. Some remedial operations were noted to have been conducted on the adjacent lands to the east and west of the Site at the time of this Report.



The parcel of land described above comprises the Phase Two ESA property and is hereinafter referred to as the "Site".

The Site is located on the eastern portion of the 398 North Service Road property, Grimsby, Ontario. The property identification number [PIN] for the Site is '46007-0016'.

The legal description of PIN 46007-0016 is "Parcel 16-1, Sec Concession Broken Front Grimsby; Part Lot 16, Concession Broken Front North Grimsby; Part Lots 16 & 17, Concession 1 North Grimsby; Part RDAL Between Lot 16 Broken Front Concession & Lot 16 Concession 1 as Stopped up and Closed by By-Law 511 and Confirmed by By-Law 1199 All Registered as Instrument 3304; Part RDAL Between Lots 16 & 17, Concession Broken Front & 1 North Grimsby, Disposed by By-Law 236 Registered as Instrument RO330866 & Amended by By-Law 115 Registered as Instrument RO330868; Part RDAL Between Lot 17 Broken Front Concession & Lot 17 Concession 1, Stopped up and Closed by By-Law 87-14 Registered as Instrument 535096; All Being Parts 2, 3, 4, 5, 6 & 8, 30R7829 T/W Part Lot 16 Concession Broken Front NGMBY, Lot 16 Concession 1 North Grimsby & RDAL Between Lot 16 Concession Broken Front & Lot 16 Concession 1 North Grimsby Part 7 30R7829 as in NG2683, NG12341 & RO250560; S/T RO425996 Grimsby".

The geographic coordinates of the Site using a hand held global positioning unit are [NAD 83] 17T 614467E/ 4784800N.

Refer to Drawing No.: 1, Appendix 'A' for a general site location drawing.

## 1.2 PROPERTY OWNERSHIP

SOIL-MAT ENGINEERS were retained by LOSANI HOMES to undertake the Phase Two ESA activities on the Site in support of the redevelopment of the Site. The contact information for LOSANI HOMES is provided below:

LOSANI HOMES  
430 McNeilly Road, Suite 203  
Stoney Creek, Ontario  
L8E 5E3

Point of Contact: Mr. Fred Losani [fred@losanihomes.com]

The Site was owned by LOSANI HOMES (1998) LTD. at the time of this Report.

## 1.3 CURRENT AND PROPOSED FUTURE USES

The Site was most recently used for commercial purposes and the intended future use of the site is a residential development. The change in land use from a commercial use to a residential use will trigger a mandatory RSC filing under Ontario Regulation 153/04 [as amended].



## 1.4 APPLICABLE SITE CONDITION STANDARDS

The following criteria was utilised to determine the appropriate site classification and Ontario Regulation 153/04 [as amended] soil and groundwater standards.

- Current land use: Commercial;
- Intended land use: Residential;
- Drinking Water Supply: Non-potable Ground Water;
- On-site Soil Texture: Coarse Grained Soils;
- Depth to Bedrock: 6.1 metres;
- pH of soils on the Site: Within Standard range;
- Surface Water Body: A portion of the Site is within 30 metres of a surface water body.

Based on the above, all soil and groundwater laboratory analytical test results were compared to the Table 3 and Table 9 Soil and Ground Water Standards for a Residential/Parkland/Institutional Property Use [RPI] in a non-potable groundwater condition from the Ministry of the Environment document "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environment Protection Act, [2011], hereinafter referred to as the 'Table 3 RPI Standards' and 'Table 9 RPI Standards'.

For this report the area within 30 metres of the drainage course was compared to Table 9 RPI. For the submission of the Record of Site Condition this drainage course will be further assessed to determine if it falls under the category of a 'water body'.

## 2.0 BACKGROUND INFORMATION

### 2.1 PHYSICAL SETTING

At the time of this Report no construction activities were underway.

The Site was bounded to the north by Lake Ontario, to the east by a drainage course and vacant lands, south by North Service Road and to the west by the former gas station and motel.

The topography of the Site is relatively flat and even, with a slight overall fall to the north towards Lake Ontario.

### 2.2 PAST INVESTIGATIONS

Prior to the undertaking of SOIL-MAT ENGINEERS' Phase Two ESA activities, TankTek Environmental Services Ltd. was retained by the Fifth Wheel Corporation to complete a series of subsurface environmental investigations at the 398 and 362 North Service Road properties. The results were presented to Fifth Wheel Corporation under TankTek's Reference No. TT02856. 1-3 & TT03414. 1, dated May 28, 2015 and were released to Losani Homes Ltd. as part of a potential land transfer. The environmental investigations included the advancement of one borehole, borehole number "BH 3414K", on the Phase Two ESA Site just east of the Truck Wash. The soil was sampled at a depth of 1.5 to 3.0 metres and met the applicable Table 3 RPI and Table 9 RPI Standards for Petroleum Hydrocarbons [PHC], Benzene, Toluene, Ethylbenzene and Xylene [BTEX] and Volatile Organic Compounds [VOC].



A Phase One Environmental Site Assessment was previously prepared by SOIL-MAT ENGINEERS under our Project No.: SM 167155-E, dated April 7, 2017.

Upon completion of the Phase One ESA Report, two [2] potential contaminating activities [PCAs] were identified in connection with the Site. The PCAs are identified in the following table:

PCA Number	PCA Description
28	Gasoline and Associated Products Storage in Fixed Tanks
30	Importation of Fill Material of Unknown Quality

In addition background sampling and testing of the adjacent lands, and the north portion of the subject site were previously conducted by Soil-Mat Engineers during the course of soil remediation operations on the lands to the east and west. This sampling, notably test pit samples recovered in April 2017 from the north project of the former truck wash parcel, reported elevated levels of a number of metal parameters of fill materials present in the upper levels.

Based on the above, SOIL-MAT ENGINEERS was retained to undertake Phase Two ESA activities to assess the potential adverse exceedance(s) to the soil and groundwater medium as a result of the noted PCAs.

The primary area of potential environmental concern [APEC] associated with the PCAs was noted to be the west side of the Site in the vicinity of a former underground storage tank [UST] nest area and gas station was located off site as well as an oil-water interceptor on the east side of the truck wash. In addition, the majority of the Phase Two Property had documented exceedances of select metal parameters in the upper layers of the soil medium.

SOIL-MAT ENGINEERS' fieldwork included the advancement of eleven [11] sampled boreholes on the Site to depths ranging between 2.9 to 6.7 metres below ground surface.

### 3.0 SCOPE OF THE INVESTIGATION

#### 3.1 OVERVIEW OF SITE INVESTIGATION

The Phase Two ESA fieldwork programme was carried out on January 17 and 18 of 2018 and included the advancement of eleven [11] boreholes within the Site boundaries to assess potential adverse environmental impacts, if any, to the Site as a result of the above noted PCAs.

To achieve the above, twenty two [22] discrete soil samples and three [3] duplicate soil samples were selected from Borehole Nos. 1 through 11, inclusive, for submission to AGAT Laboratories Limited, [AGAT], [an accredited Canadian Environmental Laboratory] for analytical testing of the contaminants of potential concern [COPCs]. In this case, the COPCs were identified as metals, petroleum hydrocarbons [PHCs] and benzene, toluene, ethylbenzene and toluene [BTEX].



In addition to the above, groundwater monitoring wells were installed in Borehole Nos. 301, 303, 304, 306 and 307 and to allow for the collection of groundwater samples for laboratory analytical testing for the parameters listed above.

The laboratory analytical test results were interpreted from an environmental point-of-view and were compared to the applicable Ontario Regulation 153/04 [as amended] soil and groundwater standards for the Site.

### **3.2 MEDIA INVESTIGATED**

The Phase Two ESA investigated potential exceedances to the surface and subsurface soil and groundwater mediums. The COPC groupings were determined based on the previous site use. As previously noted, the COPC groupings were limited to PHCs, BTEX and Metals.

### **3.3 DEVIATIONS FROM SAMPLING AND ANALYSIS PLAN**

No deviations from the Phase Two ESA sampling plan were encountered.

### **3.4 IMPEDIMENTS**

SOIL-MAT ENGINEERS did not encounter any physical impediments on the Site and were not denied access to any parts of the Phase Two ESA property.

## **4.0 INVESTIGATION METHOD**

### **4.1 GENERAL**

The Phase Two ESA included securing both soil and groundwater samples.

Professional care was exercised during the retrieval of each sample, the placement of each sample in the appropriate sample jar, the labeling of the field samples and associated chain of custody and in the delivery of the samples to the testing laboratory.

As our standard operating procedures dictate unusual field observations, such as visual or olfactory evidence of a suspected impact, a deviation from SOIL-MAT ENGINEERS' field sampling and handling protocols or incident on the testing laboratories' side was documented either on our field borehole logs or in-house copy of the sample Certificate of Analysis.

### **4.2 DRILLING AND EXCAVATING**

Elite Drilling were retained by SOIL-MAT ENGINEERS for the physical advancement of the boreholes and installation of the groundwater monitoring wells. It is noted that Elite Drilling is a registered water well contractor for the installation and abandonment of groundwater monitoring wells under Ontario Regulation 903.

The boreholes were advanced using a track mounted drill rig under the direction of SOIL-MAT ENGINEERS. Soil samples were secured at roughly 0.61 metre intervals via split spoon samplers to the termination of each borehole. The split spoon samples were driven in general accordance with the Standard Penetration Test [SPT] method.

Each split-spoon sampler was thoroughly washed with non-phosphate detergent then rinsed with water before the collection of each subsequent sample to minimise the potential for cross-contamination between samples. The boreholes were advanced on the Site using solid stem augers.

A site plan drawing illustrating the borehole and groundwater monitoring well locations is included in Appendix 'A' for reference [refer to Drawing No.: 1].

#### 4.3 SOIL SAMPLING

The soil samples were examined in the field for visual and olfactory evidence of potential impacts such as unusual staining and/or odours, etc., and were split into two separate samples, including the following:

- One half of the sample was sealed in sampling jars for submission to AGAT for analytical testing, and;
- One half of the sample was sealed in a plastic sampling bag for further characterisation in SOIL-MAT ENGINEERS' in-house soils laboratory.

The soil samples that were delivered to AGAT were sealed in pre-cleaned sample jars, with preservatives were required, as provided by the laboratory.

The samples were delivered to AGAT's depot location in Stoney Creek, Ontario in coolers to maintain a temperature range between the applicable 0°C to 10°C [a recorded average temperature of 7.5°C].

A copy of SOIL-MAT ENGINEERS borehole logs is included in Appendix 'B' for reference.

#### 4.4 FIELD SCREENING MEASUREMENTS

All of the Phase Two ESA soil samples were examined in the field for visual and olfactory evidence of potential PHC impact(s), such as unusual staining and/or odours, etc.

No hand held field screening units were utilised during the collection of the confirmatory soil samples.

#### 4.5 GROUNDWATER MONITORING WELL INSTALLATION

Elite Drilling were retained by SOIL-MAT ENGINEERS for the physical drilling and construction of the groundwater monitoring wells.

The boreholes were advanced using a track mounted drill rig under the direction of SOIL-MAT ENGINEERS and were advanced using solid stem augers.

A 50-millimetre diameter groundwater monitoring well was installed at Borehole Nos. 301, 303, 304, 306 and 307 upon the completion of drilling activities. The groundwater monitoring wells were installed in accordance with *Regulation 903 [Wells]* under the Ontario Water Resources Act.



A water well record was submitted to the Ministry of the Environment upon completion of drilling activities. It is the responsibility of the Site owner to ensure the groundwater monitoring well is maintained in an appropriate, safe and secure condition as per the Regulation and to arrange for the monitoring well to be abandoned in accordance with the Regulation when it is no longer in use.

#### **4.6 GROUNDWATER FIELD MEASUREMENT OF WATER QUALITY PARAMETERS**

No hand held field screening units were utilised during the collection of the groundwater samples. The samples were delivered immediately to AGAT upon retrieval from the monitoring well and were subjected to AGAT's QA procedure which included a temperature reading upon their receipt.

In each case, the groundwater samples were delivered to AGAT's depot location in Stoney Creek, Ontario and maintained a temperature range between the applicable 0°C to 10°C [a recorded average temperature of 4.8 °C].

#### **4.7 GROUNDWATER SAMPLING**

Three [3] well volumes were purged from each groundwater monitoring well prior to the collection of the groundwater samples. The monitoring wells were then allowed to recharge back to recorded static groundwater levels prior to the physical sample collection.

The monitoring wells installed on the Site during this Phase Two ESA were equipped with dedicated sampling equipment, including a 25-millimetre diameter water bailer for sample collection for the PHC parameters and a high density 10-millimetre diameter tubing outfitted with a Waterra foot-valve pump.

Professional care was exercised during the retrieval of each sample, the placement of each sample in the appropriate sample jar, the labeling of the field samples and associated chain of custody and in the delivery of the samples to the testing laboratory.

As our standard operating procedures dictate unusual field observations, such as visual or olfactory evidence of a suspected impact, a deviation from SOIL-MAT ENGINEERS' field sampling and handling protocols or incident on the testing laboratories' side was documented either on our field borehole logs or in-house copy of the sample certificate of analysis.

There were no deviations recorded during the Phase Two ESAs.

#### **4.8 SEDIMENT SAMPLING**

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

#### **4.9 ANALYTICAL TESTING**

All laboratory analytical work was performed by AGAT Laboratories Limited [AGAT] in Mississauga, Ontario. AGAT is a member of the Canadian Association for Laboratory Accreditation [CALA] and meets the requirements of Section 47 of the RSC Regulation.



#### 4.10 RESIDUE MANAGEMENT PROCEDURES

The residue soil generated during advancement of the boreholes was stockpiled on Site.

Purged groundwater was stored on-site until the results of the laboratory analytical testing demonstrated that the groundwater met the applicable SCS at which time the groundwater was discarded across the surface soil in the vicinity of each groundwater sampling point.

#### 4.11 ELEVATION SURVEYING

All boreholes and groundwater monitoring wells were surveyed by a staff member of SOIL-MAT ENGINEERS to facilitate site relative survey information. The top of the catchbasin located on the southwest corner of Casablanca Road and North Service Road was used as a temporary benchmark. This benchmark has a geodetic elevation of 85.11 metres taken from a Site Plan for the nearby Aqua Zul development [Grading & Erosion Control Plan, Project No. 15103, Drawing No. C101, dated January 30, 2017, by S. Llewellyn & Associates Limited].

#### 4.12 QUALITY ASSURANCE AND QUALITY CONTROL MEASURES

A/QC was maintained during the field program through equipment decontamination and sampling procedures, as outlined in the "MOE Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario" (May, 1996).

Standard QA/QC protocols were followed for bottle preparation, sample collection and transportation, as outlined by MOE guidance documents, including the MOE's 2011 "Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act".

In addition to these field-based measures, extensive QA/QC procedures were carried out by the analytical laboratories, including:

- Lab blanks;
- Spikes;
- Matrix blanks; and
- Instrument blanks and assessments of instrument tuning and performance.

Based on the evaluation of the sampling and analytical procedures used, the following data quality statements can be made:

- The data are adequate for the RSC objectives and approach utilized; and,
- Soil and groundwater analytical data were of an acceptable quality for comparison to 2011 MOE SCS as defined by *O.Reg. 153/04, as amended*, for current investigations.

### 5.0 REVIEW AND EVALUATION

#### 5.1 GEOLOGY

A copy of SOIL-MAT ENGINEERS' borehole logs are presented in Appendix 'B' for reference.

In summary, the Phase Two ESA revealed the following Site stratigraphy:





## PAVEMENT STRUCTURE

All boreholes were advanced through the existing pavement structure. The pavement structure generally consisted of 25 to 200 millimetres of asphaltic concrete over 175 to 425 millimetres of compact granular base.

## SILTY CLAY/CLAYEY SILT

Native silty clay/clayey silt was encountered beneath the pavement structure in all borehole locations. The brown to grey cohesive soil contained trace gravel and sand, occasional shale fragments and was generally very stiff to hard in consistency. The silty clay/clayey silt was proven to termination in Borehole Nos. 302, 304, 305, 306, 307, 308, 309, 310 and 311.

## QUEENSTON SHALE BEDROCK

Queenston Shale Bedrock was encountered in Borehole Nos. 301 and 303, at depths of approximately 6.1 metres bgs. The shale was red, weathered in the upper layers becoming more sound with depth, and hard in terms of soil. The shale was proven to termination in each of the noted boreholes.

## 5.2 GROUNDWATER ELEVATIONS AND FLOW DIRECTIONS

All boreholes were recorded as 'dry' upon completion of drilling activities. It is noted that insufficient time would have passed for the static groundwater level to stabilize in the open boreholes. Groundwater monitoring wells were installed in Borehole Nos. 301, 303, 304, 306 and 307 for future monitoring of the static groundwater level and environmental sampling of the on-site groundwater. The results of these readings are outlined in the table below:

**TABLE A**  
**SUMMARY OF GROUNDWATER LEVELS**

Borehole No.	Surface Elevation (m)	February 5, 2018		February 15, 2018	
		Depth [m]	Elev. [m]	Depth [m]	Elev. [m]
BH-#301	82.8	3.68	79.12	3.35	79.45
BH-#303	82.82	1.26	81.56	1.5	81.32
BH-#304	82.8	5.65	77.15	5.4	77.4
BH-#306	82.73	4.19	78.54	4.7	78.03
BH-#307	82.61	6.00	76.61	5.6	77.01

Based on the groundwater readings the static groundwater level is estimated at a depth of approximately 1.0 to 5.0 metres below grade, although seasonal fluctuations must be expected.

Based on the groundwater contours extrapolated from the recorded static ground water levels on the Site the groundwater flow direction through the Site is to the north-northeast. The typical groundwater flow in the area is to the north towards the lake.

### 5.3 GROUNDWATER HYDRAULIC GRADIENTS

The horizontal hydraulic gradient was calculated based on the groundwater levels recorded during the Phase Two ESA. Based on these recordings, the distance between the monitoring wells and the depth of well installation the horizontal hydraulic gradient is estimated as 0.0281.

### 5.4 SOIL TEXTURE

SOIL-MAT ENGINEERS' borehole logs indicate that the surface and subsurface soil consists primarily of silty clay and clayey silt as the predominant soil type. These would be consistent with a fine-grained soil texture, however a grain size distribution profile was not performed by SOIL-MAT ENGINEERS and would need to be used to confirm the soil as a medium fine texture under the Regulation.

### 5.5 SOIL QUALITY –SOIL SAMPLING

In total, twenty two [22] soil samples and three [3] duplicates were secured from the Site to assess potential exceedances on the Site. The secured soil samples were submitted to AGAT for laboratory analytical testing as described in the summary tables below:

**TABLE B**  
**SUMMARY OF ANALYTICAL TESTING – SOIL [TABLE 3 RPI]**

Sample ID	Depth [m bgs]	Laboratory Analysis	Soil Description	Table 3 RPI Exceedances
BH301 SS5	3.0 – 3.6	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH301 SS6	3.8 – 4.4	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH301 SS7	4.6 – 5.2	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH304 SS1	0 – 0.6	Metals	Granular Material	Exceeds the Table 3 RPI SCSs in Metals as Boron (HWS) reported as 2.08ppm vs the Standard of 1.5ppm, Cadmium reported as 1.3ppm vs the Standard of 1.2ppm, EC reported as 1.18ppm vs the Standard of 0.7ppm and Zinc reported as 400ppm vs the Standard of 340ppm.
BH304 SS2	0.8 – 1.4	Metals	Silty Clay/Clayey Silt	Exceeds the Table 3 RPI SCSs in Metals as EC reported as 1.45ppm vs the Standard of



				0.7ppm and SAR reported as 8.75ppm vs the Standard of 5ppm.
BH304 SS3	1.5 – 2.1	Metals	Silty Clay/Clayey Silt	Exceeds the Table 3 RPI SCSs in Metals as EC reported as 1.44ppm vs the Standard of 0.7ppm and SAR reported as 11.8ppm vs the Standard of 5ppm.
BH304 SS4	2.3 – 2.9	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH304 SS5	3.0 – 3.6	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH304 SS6	3.8 – 4.4	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH307 SS4	2.3 – 2.9	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH307 SS5	3.0 – 3.6	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH307 SS6	3.8 – 4.4	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
Dupe 1 (BH301 SS6)	3.8 – 4.4	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
Dupe 2 (BH304 SS5)	3.0 – 3.6	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported

**TABLE C**  
**SUMMARY OF ANALYTICAL TESTING – SOIL [TABLE 9 RPI]**

Sample ID	Depth [m bgs]	Laboratory Analysis	Soil Description	Table 9 RPI Exceedances
BH303 SS1	0 – 0.6	Metals	Granular Material	Exceeds the Table 9 RPI SCSs in Metals as Cadmium reported as 1.8ppm vs the Standard of 1.2ppm and Zinc reported as 531ppm vs the Standard of 290ppm.
BH303 SS2	0.8 – 1.4	Metals	Silty Clay/Clayey Silt	Exceeds the Table 9 RPI SCSs in Metals as EC reported as 0.941ppm vs the Standard of 0.7ppm.



BH303 SS3	1.5 – 2.1	Metals	Silty Clay/Clayey Silt	Exceeds the Table 9 RPI SCSs in Metals as Boron (HWS) reported as 1.51ppm vs the Standard of 1.5ppm and EC reported as 1.11ppm vs the Standard of 0.7ppm.
BH306 SS4	2.3 – 2.9	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH306 SS5	3.0 – 3.6	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH306 SS6	3.8 – 4.4	PHCs and BTEX	Silty Clay/Clayey Silt	No exceedances reported
BH308 SS1	0 – 0.6	Metals	Granular Material	Exceeds the Table 9 RPI SCSs in Metals as Cadmium reported as 1.6ppm vs the Standard of 1.2ppm, Zinc reported as 457ppm vs the Standard of 290ppm and EC reported as 1.64ppm vs the Standard of 0.7ppm.
BH308 SS2	0.8 – 1.4	Metals	Silty Clay/Clayey Silt	No exceedances reported
BH310 SS1	0 – 0.6	Metals	Granular Material	Exceeds the Table 9 RPI SCSs in Metals as Cadmium reported as 2.2ppm vs the Standard of 1.2ppm and Zinc reported as 744ppm vs the Standard of 290ppm.
BH310 SS2	0.8 – 1.4	Metals	Silty Clay/Clayey Silt	No exceedances reported
BH311 SS1	0 – 0.6	Metals	Granular Material	Exceeds the Table 9 RPI SCSs in Metals as Cadmium reported as 2.8ppm vs the Standard of 1.2ppm, Zinc reported as 765ppm vs the Standard of 290ppm, Lead reported as 134ppm vs the Standard of 120ppm and EC reported as 0.786ppm vs the Standard of 0.7ppm.
BH311 SS2	0.8 – 1.4	Metals	Silty Clay/Clayey Silt	Exceeds the Table 9 RPI SCSs in Metals as Barium reported as 278ppm vs the Standard of 220ppm.
BH311 SS3	1.2 – 2.1	Metals	Silty Clay/Clayey Silt	No exceedances reported



Dupe 3 (BH308 SS1)	0 – 0.6	Metals	Silty Clay/Clayey Silt	Exceeds the Table 9 RPI SCSs in Metals as Cadmium reported as 1.5ppm vs the Standard of 1.2ppm, Zinc reported as 417ppm vs the Standard of 290ppm and EC reported as 1.62ppm vs the Standard of 0.7ppm.
Notes: PHCs = Petroleum Hydrocarbons, BTEX = Benzene, Toluene, Ethylbenzene and Xylene				

In most cases, the laboratory analytical test results for the submitted soil samples are within the applicable Table 3 and 9 [RPI] Standards for the select tested parameters. The boreholes with submitted samples for Metals all had exceedances for certain metal parameters in the upper 0.6 to 2.1 metres. The analytical results for metal parameters in soil are illustrated on Drawing.: 2, Appendix A.

The analytical results for PHC parameters in soil are illustrated on Drawing No.: 3, Appendix A.

The AGAT Certificate of Analysis for the soil analytical data is contained in Appendix 'C' for reference.

## 5.6 SOIL QUALITY – IMPORTED FILL MATERIAL

Fill material was not encountered on the Site.

## 5.7 GROUNDWATER QUALITY

A groundwater sample was secured on February 15, 2018 from the five [5] existing monitoring wells installed on the Site.

A summary of the field samples and laboratory analytical test results is presented in the tables below:

**TABLE D**  
**SUMMARY OF ANALYTICAL TESTING – WATER [TABLE 3 NPGW]**

Sample ID	Laboratory Analysis	Table 3 NPGW Exceedances
BH301 S1	Metals & PHCs & BTEX	No exceedances reported
BH304 S1	Metals & PHCs & BTEX	No exceedances reported
BH307 S1	Metals & PHCs & BTEX	Exceeds the Table 3 NPGW in Metals as Chloride reported as 2930000ppm vs the Standard of 2300000ppm
Dup 2 (BH301 S1)	PHCs & BTEX	No exceedances reported
Notes: PHCs = Petroleum Hydrocarbons, BTEX = Benzene, Toluene, Ethylbenzene, Xylene		



**TABLE E**  
**SUMMARY OF ANALYTICAL TESTING – WATER [TABLE 9 GW]**

Sample ID	Laboratory Analysis	Table 3 NPGW Exceedances
BH303 S1	Metals	No exceedances reported
BH306 S1	Metals & PHCs & BTEX	Exceeds the Table 9 GW in Metals as Chloride reported as 2900000ppm vs the Standard of 1800000ppm
Dup 1 (BH303 S1)	Metals	No exceedances reported
Notes: PHCs = Petroleum Hydrocarbons, BTEX = Benzene, Toluene, Ethylbenzene, Xylene		

The laboratory analytical test results for the submitted ground water samples are all below the applicable Table 3 NPGW and Table 9 GW Standards for the select test parameters, with the exception of the groundwater samples secured from the monitoring wells installed at Borehole Nos. 306 and 307. Borehole Nos. 306 and 307 exceed the applicable Standards for Metals as Chloride. The analytical results for metal parameters in groundwater are illustrated on Drawing.: 4, Appendix A.

The analytical results for PHC parameters in groundwater are illustrated on Drawing.: 5, Appendix A.

The AGAT certificate of analysis for the groundwater analytical data is contained in Appendix 'D' for reference.

## 5.8 SEDIMENT QUALITY

Sediment sampling was not conducted as part of this Phase Two ESA. The APEC and COC groupings were limited to the soil and groundwater mediums.

## 5.9 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

QA/QC was maintained during the field program through equipment decontamination and sampling procedures, as outlined in the "MOE Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario" (May, 1996). Each groundwater monitoring well was equipped with dedicated sampling equipment, including a 25 millimetre water bailer for sample collection. Standard QA/QC protocols were followed for bottle preparation, sample collection and transportation, as outlined by MOE guidance documents, including the MOE's 2011 "Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act".

In addition to these field-based measures, extensive QA/QC procedures were carried out by the analytical laboratories, including:

- Lab blanks;
- Spikes;
- Matrix blanks; and
- Instrument blanks and assessments of instrument tuning and performance.

Based on the evaluation of the sampling and analytical procedures used, the following data quality statements can be made:

- The data are adequate for the RSC objectives and approach utilized; and,
- Soil and groundwater analytical data were of an acceptable quality for comparison to 2011 MOE Standards as defined by *O.Reg. 153/04* for current investigations.

### 5.10 PHASE TWO CONCEPTUAL SITE MODEL [CSM]

SOIL-MAT ENGINEERS' has not prepared a Phase Two CSM as part of this Phase Two ESA as additional assessment and/or remedial work is required. A final Phase Two CSM will be prepared to support the filing of an RSC once the Site has been subjected to a remedial operation or site specific risk assessment activities, or a combination of the two.

### 6.0 CONCLUSIONS

SOIL-MAT ENGINEERS were retained by LOSANI HOMES to undertake a Phase Two ESA programme on the Site to assess potential adverse environmental exceedance(s) to the soil and groundwater mediums as a result of two [2] PCAs associated with the Site and neighbouring lands.

The results of our Phase Two ESA findings are summarized below:

#### METAL SOIL EXCEEDANCE AREA

The Phase Two ESA activities carried out by SOIL-MAT ENGINEERS revealed Metal exceedances on the property. The metal exceedances [to date] are identified in the upper 0.6 to 1.4 metres as consisting of Cadmium, Zinc and Lead, as well as EC, SAR and Hot Water Soluble Boron (HWSB) which were also found to have elevated levels in the subsurface soil. The elevated levels of EC, SAR and Hot Water Soluble Boron were found to depths of 2.1 metres with no vertical extent established.

It is noted that additional intrusive soil sampling is required to assess the lateral and vertical extent of the Metal exceedances in the soil medium on the Site.

The metals exceedances are illustrated on Drawing.: 2, Appendix A.

#### PHC & BTEX SOIL EXCEEDANCE AREA

The Phase Two ESA activities carried out by SOIL-MAT ENGINEERS did not reveal any PHC exceedances on the property.

The PHC exceedances are illustrated on Drawing No.: 3, Appendix A.

#### GROUNDWATER ANALYTICAL DATA

SOIL-MAT ENGINEERS' Phase Two ESA activities undertaken on the Site [to date] did not reveal any exceedances of the applicable Table 3 and Table 9 SCSs with the exception of Borehole Nos. 306 and 307, which had a reported Table 3 and Table 9 Metal exceedance for 'Chloride' parameter.





## PROPOSED FUTURE RESIDENTIAL REDEVELOPMENT

Given the proposed future use of the Site [residential], the Site would be subject to a mandatory Record of Site Condition [RSC] filing. In order to complete and file an RSC the properties will either need to meet the applicable Ontario Regulation 153/04 [as amended] soil and groundwater standards or be subjected to some level of risk assessment activities. In either scenario, additional intrusive sampling is recommended to complete the following:

- The on-Site materials with Metal exceedances [excluding EC, SAR and HWS Boron] may be remediated employing a traditional “dig and dump” operation. In this scenario, confirmatory soil sampling would be undertaken on the sidewalls and floor [base] of the remedial excavation. The number of samples would be determined based on the final dimensions of the remedial excavation. Assuming a typical ‘dig and dump’ remediation, the total volume of impacted soil for removal is estimated at approximately 5300m<sup>3</sup> to 7800m<sup>3</sup>. This applies an average zone of impact of 0.6 to 0.9 metres in thickness across the property, with the affected soils consisting primarily of the aggregate within the existing pavement structure as well as a portion of the underlying native silty clay/clayey silt soils. Applying a conservative approximate density of 2.2 tonnes/m<sup>3</sup>, the total mass of excavated soil is estimated at approximately 11660 to 17160 tonnes. We note that the above estimate is based on our present interpretation of the current information, and the full extent of the impact cannot be known until the remediation work is undertaken.
- The remainder of the site will be subject to some level of Risk Assessment to assess the EC, SAR and Boron (HWS) parameters in soil, as well as the Chloride parameter in the groundwater. Additional intrusive sampling may be required to establish the lateral and vertical extent of the exceedance(s) to both the soil and groundwater mediums.

**7.0 CLOSURE**

SOIL-MAT ENGINEERS & CONSULTANTS LTD. prepared this Report for the account of LOSANI HOMES. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any suffered by any third party as a result of decisions made or actions based on this report.

We trust this Report is satisfactory for your purposes. Please feel free to contact our Office if you have any questions, or we may be of further service to you.


Yours very truly,  
SOIL-MAT ENGINEERS & CONSULTANTS LTD.



Jeremy Yang, M.Sc. Eng., EIT  
Environmental Scientist



Keith Gleadall, B.A., EA Dipl.  
Environmental Manager



Ian Shaw, P. Eng., QP<sub>ESA</sub>  
Review Engineer

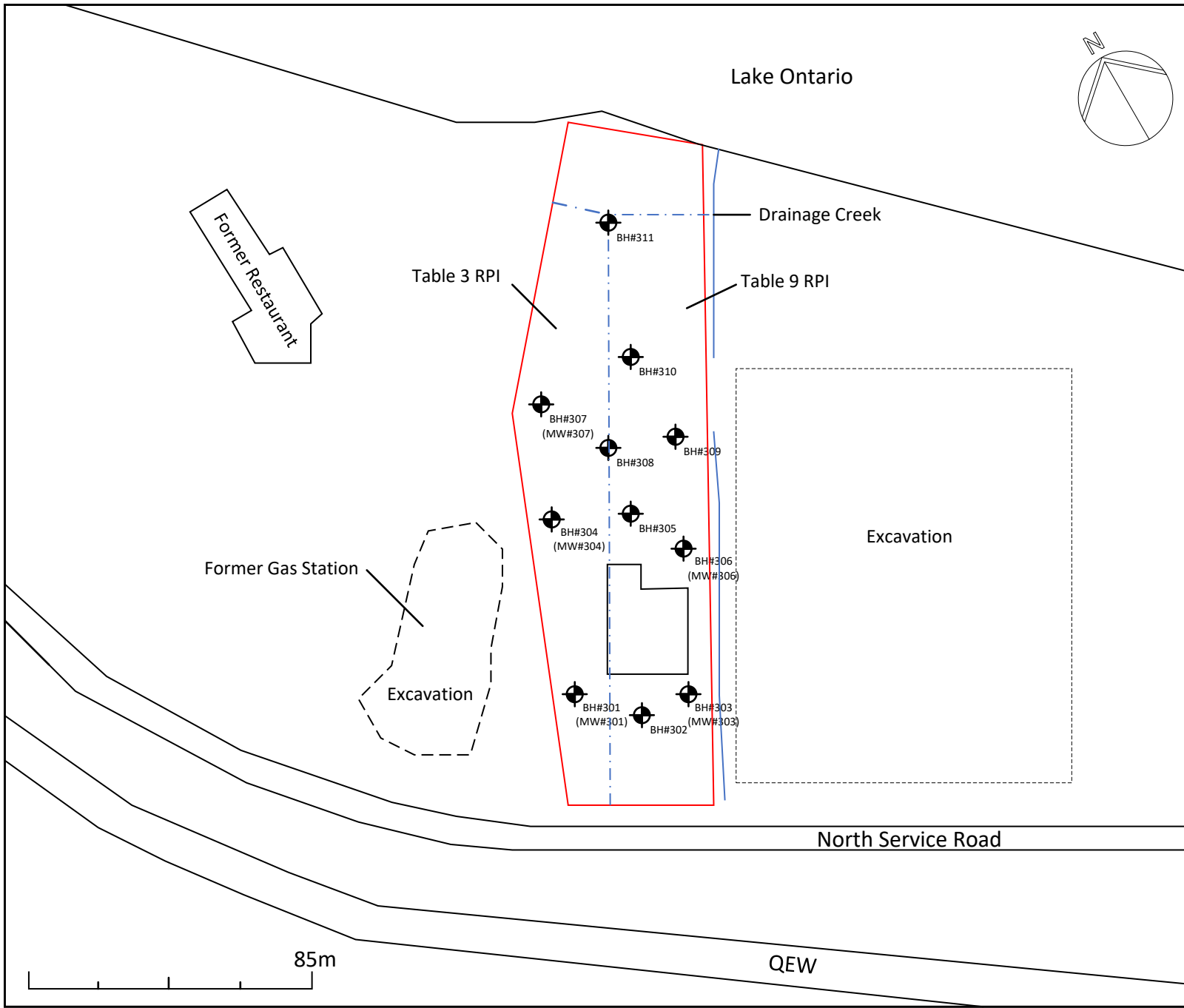


Distribution: LOSANI HOMES [2]

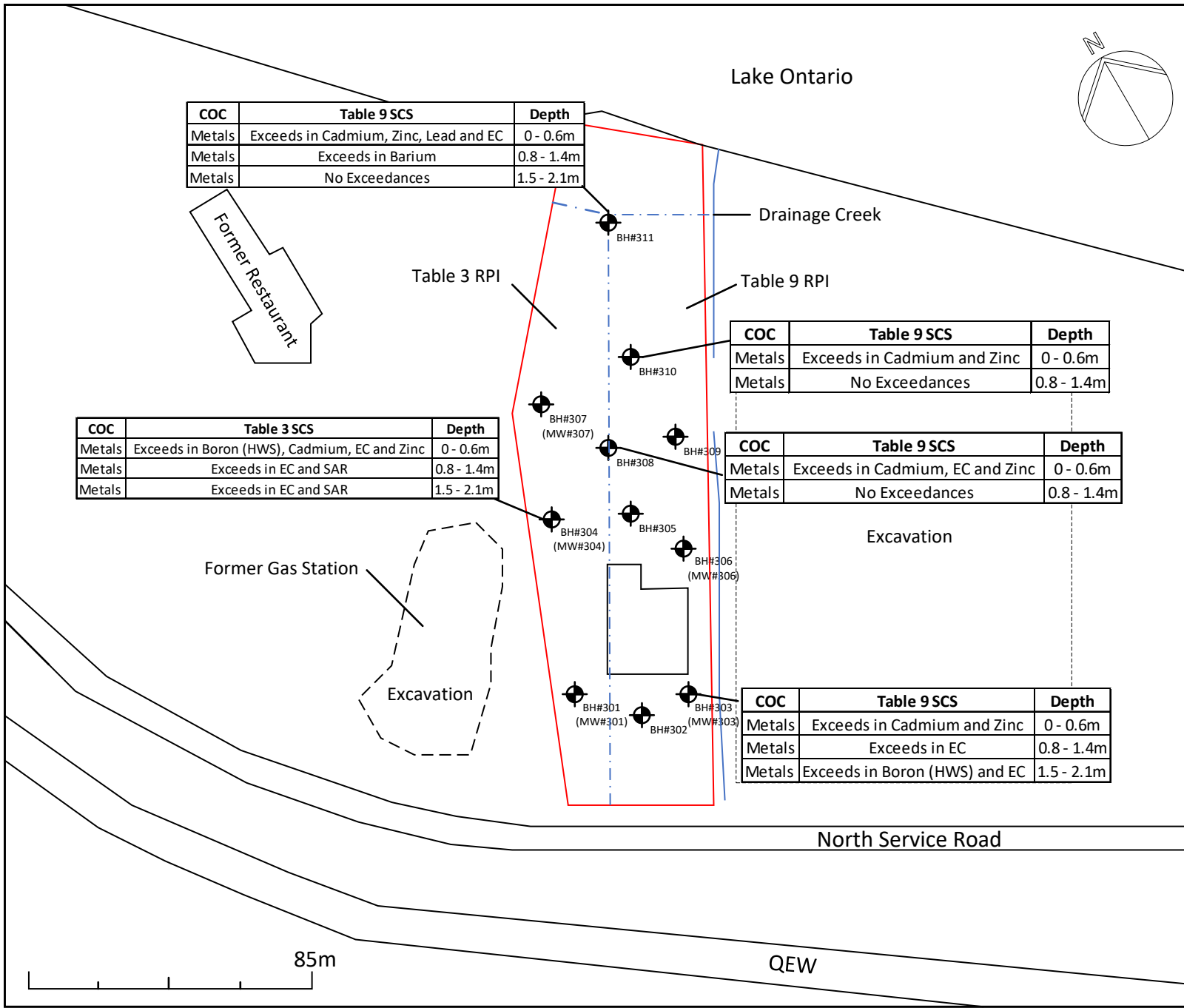
Enclosures: Appendix 'A': Drawing Nos. 1 to 5 – Borehole Location & Analytical Data Summary;  
Appendix 'B': Borehole Logs;  
Appendix 'C': AGAT Soil Analytical Data;  
Appendix 'D': AGAT Ground Water Analytical Data;  
Appendix 'E': Qualifications of Assessors;  
Appendix 'F': Statement of Limitations.

### **Appendix 'A'**

1. Drawing No.: 1: Borehole Location Plan;
2. Drawing No.: 2: Analytical Data Summary [Soil] Metals;
3. Drawing No.: 3: Analytical Data Summary [Soil] PHCs;
4. Drawing No.: 4: Analytical Data Summary [Water] Metals;
5. Drawing No.: 5: Analytical Data Summary [Water] PHCs.



<b>LEGEND</b>	
	Borehole Location BH#
	Phase Two ESA Property
	Boundary 30 metres from water
<b>NOTES</b>	
1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 188072-E.	
2. Sample locations are approximate.	
<b>SOIL-MAT</b>	
ENGINEERS & CONSULTANTS LTD.	
<b>CLIENT</b>	
Losani Homes	
Phase Two Environmental Site Assessment Fifth Wheel Truck Wash Property Grimsby, Ontario	
<b>Borehole Location Plan</b>	
Project No. SM 188072-E	
Date: January 2018	
Drawn: JY	Checked: KG
SM 188072-E Borehole Location Plan	
Drawing No. 1	



**LEGEND**

- Borehole Location
- Phase Two ESA Property
- Boundary 30 metres from water

**NOTES**

- This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 188072-E.
- Sample locations are approximate.

# SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

**CLIENT**

Losani Homes

Phase Two Environmental Site Assessment  
Fifth Wheel Truck Wash Property  
Grimsby, Ontario

Analytical Data Summary  
[Soil] - Metals

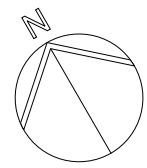
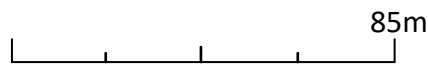
Project No. SM 188072-E

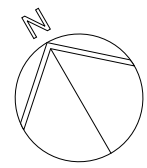
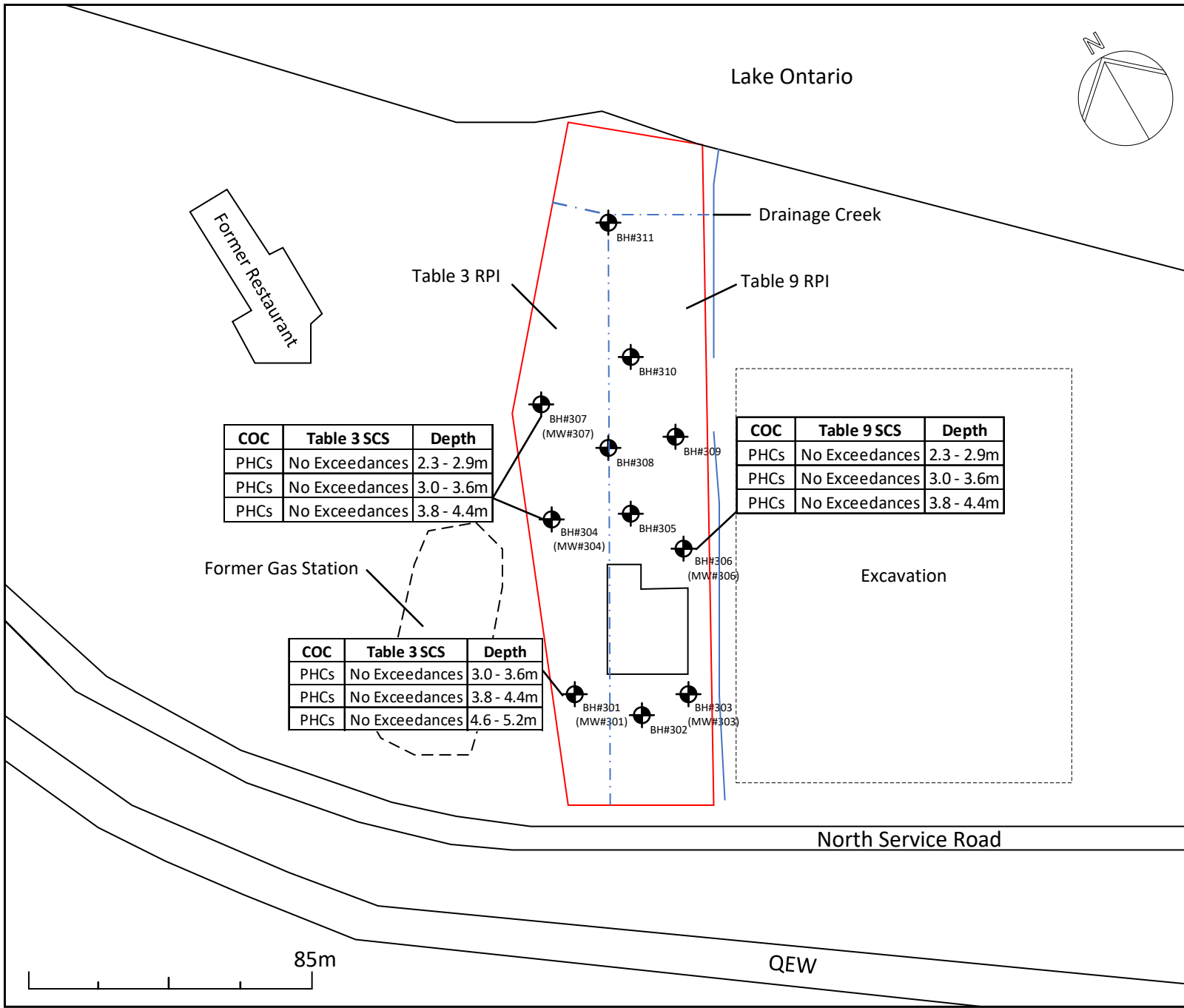
Date: January 2018

Drawn: JY      Checked: KG

Drawing 2 – Soil Metals

Drawing No. 2





Lake Ontario

Drainage Creek

North Service Road

QEW

Former Restaurant

Former Gas Station

Excavation

Table 3 RPI

Table 9 RPI

COC	Table 3 SCS	Depth
PHCs	No Exceedances	2.3 - 2.9m
PHCs	No Exceedances	3.0 - 3.6m
PHCs	No Exceedances	3.8 - 4.4m

COC	Table 9 SCS	Depth
PHCs	No Exceedances	2.3 - 2.9m
PHCs	No Exceedances	3.0 - 3.6m
PHCs	No Exceedances	3.8 - 4.4m

COC	Table 3 SCS	Depth
PHCs	No Exceedances	3.0 - 3.6m
PHCs	No Exceedances	3.8 - 4.4m
PHCs	No Exceedances	4.6 - 5.2m

**LEGEND**

- Borehole Location
- Phase Two ESA Property
- Boundary 30 metres from water

**NOTES**

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 188072-E.
2. Sample locations are approximate.

**SOIL-MAT**

ENGINEERS & CONSULTANTS LTD.

**CLIENT**

Losani Homes

Phase Two Environmental Site Assessment  
Fifth Wheel Truck Wash Property  
Grimsby, Ontario

Analytical Data Summary  
[Soil] - PHCs

Project No. SM 188072-E

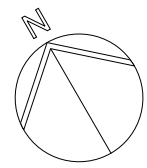
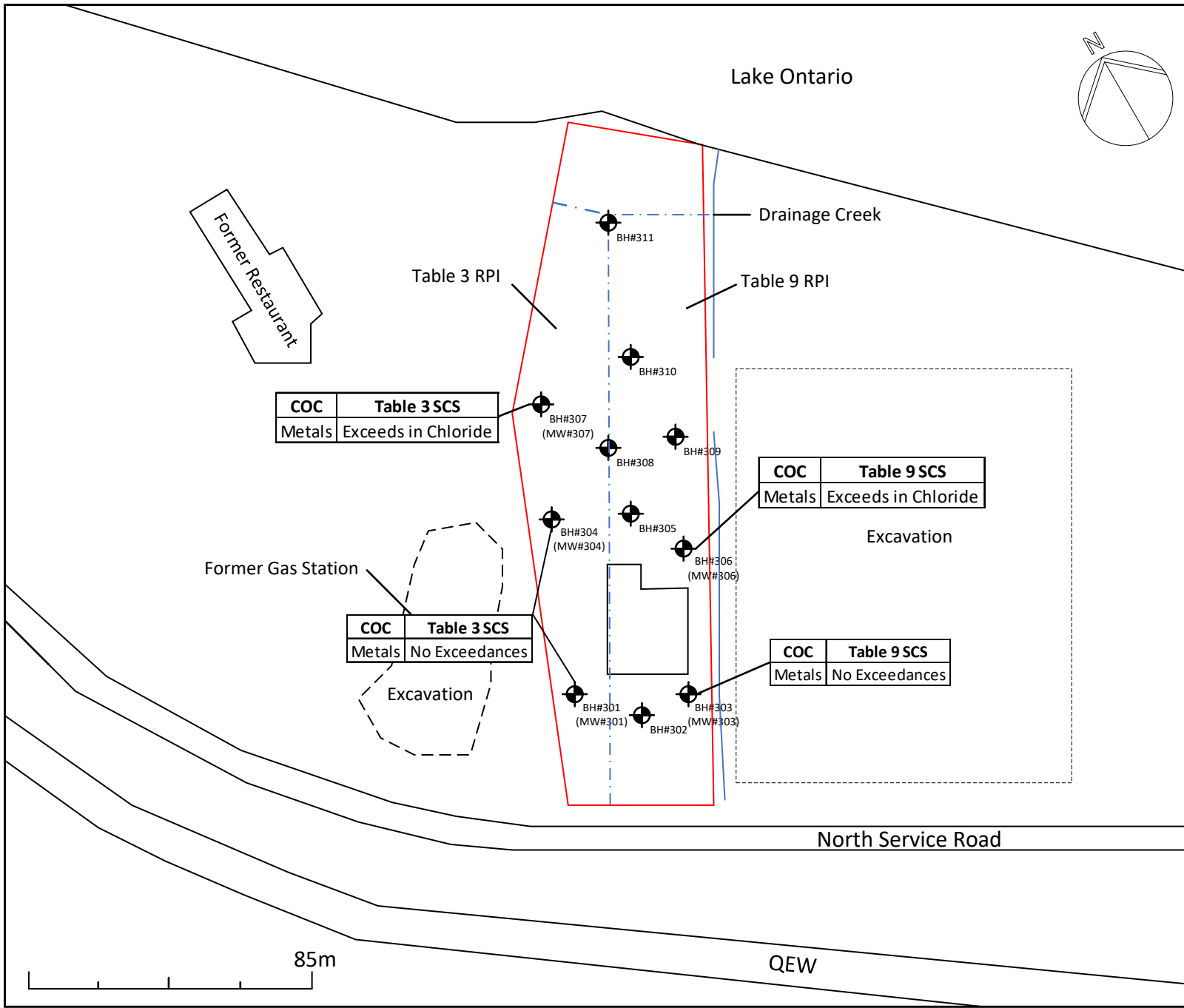
Date: January 2018

Drawn: JY      Checked: KG




Drawing 3 – Soil PHCs

Drawing No. 3

85m



**LEGEND**

-  Borehole Location
-  Phase Two ESA Property
-  Boundary 30 metres from water

**NOTES**

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 188072-E.
2. Sample locations are approximate.

# SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

**CLIENT**

Losani Homes

Phase Two Environmental Site Assessment  
Fifth Wheel Truck Wash Property  
Grimbsby, Ontario

Analytical Data Summary  
[Groundwater] - Metals

Project No. SM 188072-E

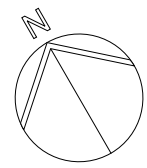
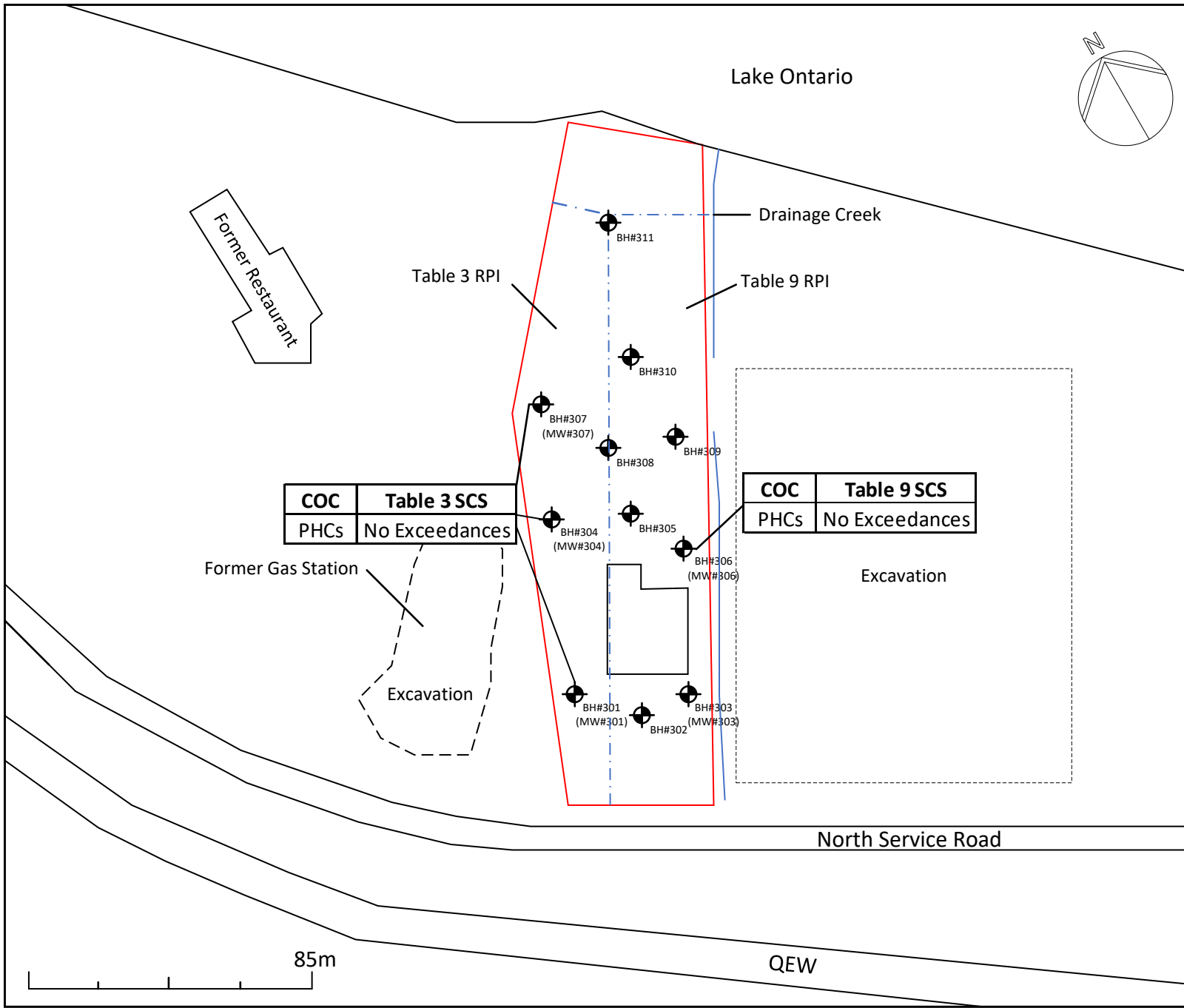
Date: January 2018

Drawn: JY      Checked: KG

Drawing 4 – Water Metals

Drawing No. 4





**LEGEND**

- BH# Borehole Location
- Phase Two ESA Property
- Boundary 30 metres from water

**NOTES**

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 188072-E.
2. Sample locations are approximate.

# SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

**CLIENT**

Losani Homes

Phase Two Environmental Site Assessment  
Fifth Wheel Truck Wash Property  
Grimsby, Ontario

Analytical Data Summary  
[Groundwater] - PHCs

Project No. SM 188072-E

Date: January 2018

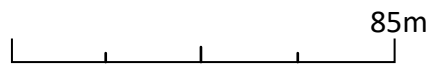
Drawn: JY      Checked: KG

Drawing 5 – Water PHCs

Drawing No. 5

<b>COC</b>	<b>Table 3 SCS</b>
<b>PHCs</b>	<b>No Exceedances</b>

<b>COC</b>	<b>Table 9 SCS</b>
<b>PHCs</b>	<b>No Exceedances</b>



## **Appendix 'B'**

### 1. Borehole Logs

# Log of Borehole No. 301

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784756

**E:** 614444



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE					Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10 20 30 40 ▲
0	82.80		Ground Surface									
0	82.50		<b>Pavement Structure</b> Approximately 100 millimetres of asphaltic concrete over 200 millimetres of compact granular base.	SS	1	50/3"	100					
1			<b>Silty Clay/Clayey Silt</b> Brown, trace gravel and sand, occasional shale fragments, very stiff to hard.	SS	2	5,9,11,12	20		>4.5			
2				SS	3	7,11,12,12	23		>4.5			
3				SS	4	4,8,10,14	18		>4.5			
4	79.50		Transition to grey in colour.	SS	5	4,8,16,18	24		>4.5			
5				SS	6	10,15,15,25	30		>4.5			
6				SS	7	6,12,16,24	28		>4.5			
6	76.70		<b>Queenston Shale</b> Red, highly weathered in upper levels, becoming more sound with depth, hard.	SS	8	50/5"	100					
<p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>Borehole was advanced using solid stem auger equipment on January 17, 2018 to termination at a depth of 6.2 metres.</li> <li>Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.</li> <li>Soil samples will be discarded after 3 months unless otherwise directed by our client.</li> <li>A monitoring well was installed. The following free groundwater level readings have been measured: February 5, 2018 - 3.68 metres February 15, 2018 - 3.35 metres</li> </ol>												

**Drill Method:** Solid Stem Augers

**Drill Date:** January 17, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

# Log of Borehole No. 302

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784756

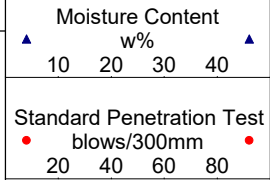
**E:** 614456



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10 20 30 40 ▲	
0	82.78		Ground Surface										
0	82.48		<b>Pavement Structure</b> Approximately 175 millimetres of asphaltic concrete over 175 millimetres of compact granular base.		SS	1	50/5"	100					
1			<b>Silty Clay/Clayey Silt</b> Brown, trace to some gravel and sand, occasional shale fragments, very stiff.		SS	2	5,9,12,15	20		>4.5			
2					SS	3	5,8,10,12	23		>4.5			
3	79.88		End of Borehole		SS	4	4,7,10,14	18		>4.5			
4													
5													
6													
7													
8													
9													
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30													
31													
32													
33													

**NOTES:**

- Borehole was advanced using solid stem auger equipment on January 17, 2018 to termination at a depth of 2.9 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.



**Drill Method:** Solid Stem Augers

**Drill Date:** January 17, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

# Log of Borehole No. 303

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784758

**E:** 614468



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE					Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10 20 30 40 ▲
0	82.82		Ground Surface									
0	82.44		<b>Pavement Structure</b> Approximately 75 millimetres of asphaltic concrete over 300 millimetres of compact granular base.	SS/AS	1	50/0"	100					
1			<b>Silty Clay/Clayey Silt</b> Brown, trace gravel and sand, some mottling in the upper layers, occasional shale fragments and cobbles, very stiff to hard.	SS	2	5,8,12,15	20		>4.5			
2				SS	3	5,10,11,11	21		>4.5			
3				SS	4	5,7,10,12	17		>4.5			
4				SS	5	5,12,50/5"	100		>4.5			
5	79.90		Transition to grey in colour.									
6			<b>Queenston Shale</b> Red, highly weathered in upper levels, becoming more sound with depth, hard.	SS	6	13,18,23,28	41		>4.5			
7				SS	7	50/5"	100					
6.2	76.72											
<p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>Borehole was advanced using solid stem auger equipment on January 17, 2018 to termination at a depth of 6.2 metres.</li> <li>Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.</li> <li>Soil samples will be discarded after 3 months unless otherwise directed by our client.</li> <li>A monitoring well was installed. The following free groundwater level readings have been measured: February 5, 2018 - 1.26 metres February 15, 2018 - 1.5 metres</li> </ol>												

**Drill Method:** Solid Stem Augers

**Drill Date:** January 17, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

# Log of Borehole No. 304

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784819

**E:** 614459



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE					Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10 20 30 40 ▲
0	82.80		Ground Surface									
1	82.27		<b>Pavement Structure</b> Approximately 100 millimetres of asphaltic concrete over 425 millimetres of compact granular base.	SS	1	50/2"	100					
2			<b>Silty Clay/Clayey Silt</b> Brown, trace gravel, some mottling of the upper layers, occasional cobbles, very stiff to hard.	SS	2	6,10,12,14	22		>4.5			
3				SS	3	6,12,16,17	28		>4.5			
4				SS	4	5,8,11,13	19		>4.5			
5	79.90			SS	5	5,10,10,12	20		>4.5			
6			Transition to grey in colour.	SS	6	5,9,14,19	23		>4.5			
7				SS	7	20,40,31,20	71		>4.5			
8				SS	8	5,19,23,50/4"	42		>4.5			
9	76.10		End of Borehole									
<p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>Borehole was advanced using solid stem auger equipment on January 17, 2018 to termination at a depth of 6.7 metres.</li> <li>Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.</li> <li>Soil samples will be discarded after 3 months unless otherwise directed by our client.</li> <li>A monitoring well was installed. The following free groundwater level readings have been measured: February 5, 2018 - 5.65 metres February 15, 2018 - 5.40 metres</li> </ol>												

**Drill Method:** Solid Stem Augers

**Drill Date:** January 17, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

# Log of Borehole No. 305

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784806

**E:** 614472



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10	▲ 40
0	82.83		Ground Surface										
0	82.40		<b>Pavement Structure</b> Approximately 100 millimetres of asphaltic concrete over 325 millimetres of compact granular base.		SS	1	50/5"	100					
1			<b>Silty Clay/Clayey Silt</b> Brown, trace to some gravel and sand, occasional shale fragments, very stiff.		SS	2	5,8,10,13	18		>4.5			
2					SS	3	6,8,11,12	19		>4.5			
3	79.93		End of Borehole		SS	4	5,9,11,15	20		>4.5			
4													
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33													

**NOTES:**

- Borehole was advanced using solid stem auger equipment on January 17, 2018 to termination at a depth of 2.9 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

**Drill Method:** Solid Stem Augers

**Drill Date:** January 17, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1



# Log of Borehole No. 306

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784803

**E:** 614484



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE					Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10 20 30 40 ▲
0	82.73		Ground Surface									
0	82.48		<b>Pavement Structure</b> Approximately 25 millimetres of asphaltic concrete over 225 millimetres of compact granular base.	AS	1							
1			<b>Silty Clay/Clayey Silt</b> Brown, trace gravel, occasional shale fragments, very stiff to hard.	SS	2	3,5,10,12	15		>4.5			
2				SS	3	6,9,10,12	19		>4.5			
3				SS	4	5,9,11,13	20		>4.5			
4				SS	5	4,7,9,12	16		>4.5			
5				SS	6	4,5,9,11	14		2.0			
6				SS	7	6,9,10,12	19		>4.5			
7				SS	8	7,13,17,24	30		>4.5			
8												
9	79.83		Transition to grey in colour.									
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21												
22	76.03		End of Borehole									
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33												

**NOTES:**

- Borehole was advanced using solid stem auger equipment on January 18, 2018 to termination at a depth of 6.7 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.
- A monitoring well was installed. The following free groundwater level readings have been measured:  
February 5, 2018 - 4.19 metres  
February 15, 2018 - 4.70 metres

**Drill Method:** Solid Stem Augers

**Drill Date:** January 18, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

# Log of Borehole No. 307

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784853

**E:** 614464



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE					Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10 20 30 40 ▲
0	82.61		Ground Surface									
1	82.14		<b>Pavement Structure</b> Approximately 200 millimetres of asphaltic concrete over 275 millimetres of compact granular base.	AS	1							
2			<b>Silty Clay/Clayey Silt</b> Brown, trace gravel, occasional shale fragments, stiff to very stiff.	SS	2	6,9,12,16	21		>4.5			
3				SS	3	6,8,12,15	20		>4.5			
4				SS	4	4,5,7,10	12		>4.5			
5				SS	5	4,10,13,13	23		>4.5			
6				SS	6	4,5,8,9	13		>4.5			
7				SS	7	9,11,13,13	24		>4.5			
8				SS	8	9,11,17,18	28		>4.5			
9	79.30			Transition to grey in colour.								
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33												
			End of Borehole									
			NOTES:									
			1. Borehole was advanced using solid stem auger equipment on January 18, 2018 to termination at a depth of 6.7 metres.									
			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.									
			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.									
			4. A monitoring well was installed. The following free groundwater level readings have been measured: February 5, 2018 - 6.00 metres February 15, 2018 - 5.60 metres									

**Drill Method:** Solid Stem Augers

**Drill Date:** January 18, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

# Log of Borehole No. 308

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784726

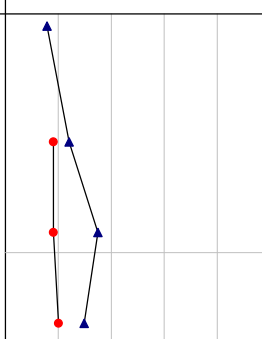
**E:** 614481



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10 20 30 40 ▲	
0	82.76		Ground Surface										
1	82.31		<b>Pavement Structure</b> Approximately 100 millimetres of asphaltic concrete over 350 millimetres of compact granular base.	AS	1								
2			<b>Silty Clay/Clayey Silt</b> Brown, trace gravel, very stiff.	SS	2	4,7,11,13	18		>4.5				
3				SS	3	6,9,9,11	18		>4.5				
4				SS	4	4,8,12,15	20		>4.5				
5	79.86		End of Borehole										
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**NOTES:**

- Borehole was advanced using solid stem auger equipment on January 17, 2018 to termination at a depth of 2.9 metres.
- Borehole was recorded as open and wet at a depth of 2 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.



**Drill Method:** Solid Stem Augers

**Drill Date:** January 17, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

# Log of Borehole No. 309

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784833

**E:** 614496



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE					Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10 20 30 40 ▲
0	82.61		Ground Surface									
1	82.16		<b>Pavement Structure</b> Approximately 100 millimetres of asphaltic concrete over 350 millimetres of compact granular base.	AS	1							
2			<b>Silty Clay/Clayey Silt</b> Brown, trace gravel, stiff to very stiff.	SS	2	4,8,10,12	18		>4.5			
3				SS	3	6,10,12,15	22		>4.5			
4				SS	4	4,4,6,8	10		>4.5			
5	79.70		Transition to grey in colour.									
6	79.00			SS	5	4,9,13,15	22		>4.5			
7			End of Borehole									
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**NOTES:**

- Borehole was advanced using solid stem auger equipment on January 18, 2018 to termination at a depth of 3.6 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

**Drill Method:** Solid Stem Augers

**Drill Date:** January 18, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

# Log of Borehole No. 310

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784858

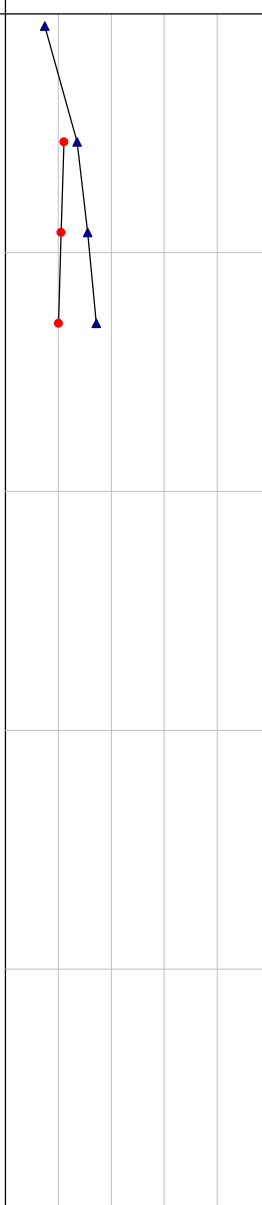
**E:** 614489



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲ 10 20 30 40 ▲	
0	82.83		Ground Surface										
1	82.43		<b>Pavement Structure</b> Approximately 100 millimetres of asphaltic concrete over 300 millimetres of compact granular base.	AS	1								
2			<b>Silty Clay/Clayey Silt</b> Brown, very stiff.	SS	2	5,11,14	22		>4.5				
3				SS	3	9,10,11,11	21		>4.5				
4				SS	4	6,8,12,14	20		>4.5				
5	79.93		End of Borehole										
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**NOTES:**

- Borehole was advanced using solid stem auger equipment on January 17, 2018 to termination at a depth of 2.9 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.



**Drill Method:** Solid Stem Augers

**Drill Date:** January 17, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

# Log of Borehole No. 311

**Project No:** SM 188072-E

**Project:** Fifth Wheel Truck Wash

**Location:** 398 North Sevice Road, Grimsby

**Client:** Losani Homes

**Project Manager:** Jeremy Yang

**Borehole Location:** See Drawing No. 1

**UTM Coordinates - N:** 4784891

**E:** 614496



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w%		
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm <sup>2</sup> )	U.Wt. (kN/m <sup>3</sup> )	▲	▲
0	82.37		Ground Surface										
0	82.15		<b>Pavement Structure</b> Approximately 50 millimetres of asphaltic concrete over 175 millimetres of compact granular base.	AS	1								
1			<b>Silty Clay/Clayey Silt</b> Brown, trace gravel and sand, occasional cobbles, stiff to very stiff.	SS	2	4,6,10,13	16		>4.5				
2				SS	3	6,9,13,16	22		>4.5				
3	79.47		End of Borehole	SS	4	8,10,15,16	25		>4.5				
4													
5													
6													
7			NOTES: 1. Borehole was advanced using solid stem auger equipment on January 18, 2018 to termination at a depth of 2.9 metres. 2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.										
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33													

**Drill Method:** Solid Stem Augers

**Drill Date:** January 18, 2018

**Hole Size:** 150 millimetres

**Drilling Contractor:** Elite Drilling

**Soil-Mat Engineers & Consultants Ltd.**

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: [info@soil-mat.ca](mailto:info@soil-mat.ca)

**Datum:** Geodetic

**Field Logged by:** A.R.

**Checked by:** J.Y.

**Sheet:** 1 of 1

## **Appendix 'C'**

1. AGAT Certificate of Analysis - Soil



**CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
130 LANCING DRIVE  
HAMILTON, ON L8W3A1  
(905) 318-7440**

**ATTENTION TO: Jeremy Yang**

**PROJECT: SM 188072-E**

**AGAT WORK ORDER: 18H303547**

**SOIL ANALYSIS REVIEWED BY: Parvathi Malemath, Data Reviewer**

**TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist**

**DATE REPORTED: Jan 26, 2018**

**PAGES (INCLUDING COVER): 12**

**VERSION\*: 1**

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

\*NOTES

**All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.**





## Certificate of Analysis

AGAT WORK ORDER: 18H303547

PROJECT: SM 188072-E

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
SAMPLING SITE: 398 North Service Road, Grimsby, ON

ATTENTION TO: Jeremy Yang  
SAMPLED BY: AR

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

DATE RECEIVED: 2018-01-19

DATE REPORTED: 2018-01-26

Parameter	Unit	SAMPLE DESCRIPTION:		BH 303 SS1	BH 303 SS2	BH 304 SS1	BH 304 SS2	BH 308 SS1	BH 308 SS2	BH 310 SS1	BH 310 SS2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-01-17	2018-01-17	2018-01-17	2018-01-17	2018-01-17	2018-01-17	2018-01-17	2018-01-17
		G / S	RDL	9019543	9019545	9019546	9019547	9019548	9019549	9019550	9019551
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	2	5	2	7	2	6	3	6
Barium	µg/g	220	2	154	116	219	<b>222</b>	63	128	128	85
Beryllium	µg/g	2.5	0.5	1.9	0.8	2.1	0.8	<0.5	0.8	0.6	0.8
Boron	µg/g	36	5	12	14	<b>40</b>	11	8	13	13	12
Boron (Hot Water Soluble)	µg/g	NA	0.10	<0.10	1.31	2.08	0.40	0.23	0.63	0.21	0.49
Cadmium	µg/g	1.2	0.5	<b>1.8</b>	<0.5	<b>1.3</b>	<0.5	<b>1.6</b>	<0.5	<b>2.2</b>	<0.5
Chromium	µg/g	70	2	22	29	63	26	8	28	16	28
Cobalt	µg/g	21	0.5	2.1	16.7	2.1	13.7	2.8	15.2	3.8	15.7
Copper	µg/g	92	1	5	30	6	29	8	33	9	34
Lead	µg/g	120	1	74	14	57	14	57	16	112	14
Molybdenum	µg/g	2	0.5	1.2	0.5	1.5	0.8	1.1	0.6	1.2	0.6
Nickel	µg/g	82	1	3	30	2	25	4	29	8	30
Selenium	µg/g	1.5	0.4	1.0	<0.4	1.4	<0.4	<0.4	0.5	0.6	<0.4
Silver	µg/g	0.5	0.2	0.3	<0.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	2.5	0.5	1.8	1.1	1.8	1.0	0.9	0.9	1.2	0.9
Vanadium	µg/g	86	1	21	37	47	35	11	38	18	37
Zinc	µg/g	290	5	<b>531</b>	74	<b>400</b>	74	<b>457</b>	89	<b>744</b>	77
Chromium VI	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm	0.57	0.005	0.295	<b>0.941</b>	<b>1.18</b>	<b>1.45</b>	<b>1.64</b>	0.438	0.231	0.548
Sodium Adsorption Ratio	NA	2.4	NA	0.760	<b>3.20</b>	0.517	<b>8.75</b>	0.484	<b>3.29</b>	0.777	2.33
pH, 2:1 CaCl2 Extraction	pH Units		NA	11.1	7.78	11.9	7.91	12.2	7.90	10.2	7.73

Certified By:





## Certificate of Analysis

AGAT WORK ORDER: 18H303547

PROJECT: SM 188072-E

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
SAMPLING SITE: 398 North Service Road, Grimsby, ON

ATTENTION TO: Jeremy Yang  
SAMPLED BY: AR

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

DATE RECEIVED: 2018-01-19

DATE REPORTED: 2018-01-26

Parameter	Unit	SAMPLE DESCRIPTION:		BH 311 SS1	BH 311 SS2	Dupe 3
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2018-01-18	2018-01-18	2018-01-18
		G / S	RDL	9019552	9019553	9019554
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	5	8	2
Barium	µg/g	220	2	190	<b>278</b>	69
Beryllium	µg/g	2.5	0.5	2.1	0.9	<0.5
Boron	µg/g	36	5	28	8	8
Boron (Hot Water Soluble)	µg/g	NA	0.10	1.10	0.47	0.24
Cadmium	µg/g	1.2	0.5	<b>2.8</b>	<0.5	<b>1.5</b>
Chromium	µg/g	70	2	27	25	8
Cobalt	µg/g	21	0.5	4.9	12.5	2.9
Copper	µg/g	92	1	14	64	9
Lead	µg/g	120	1	<b>134</b>	17	49
Molybdenum	µg/g	2	0.5	1.2	1.2	1.2
Nickel	µg/g	82	1	9	35	4
Selenium	µg/g	1.5	0.4	1.1	0.8	<0.4
Silver	µg/g	0.5	0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4
Uranium	µg/g	2.5	0.5	1.5	0.9	1.0
Vanadium	µg/g	86	1	25	36	11
Zinc	µg/g	290	5	<b>765</b>	100	<b>417</b>
Chromium VI	µg/g	0.66	0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm	0.57	0.005	<b>0.786</b>	0.322	<b>1.62</b>
Sodium Adsorption Ratio	NA	2.4	NA	1.57	1.51	0.509
pH, 2:1 CaCl2 Extraction	pH Units		NA	8.40	7.11	12.2

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

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

**9019543-9019554** EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Certified By:





## Certificate of Analysis

AGAT WORK ORDER: 18H303547

PROJECT: SM 188072-E

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
SAMPLING SITE: 398 North Service Road, Grimsby, ON

ATTENTION TO: Jeremy Yang  
SAMPLED BY: AR

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

DATE RECEIVED: 2018-01-19

DATE REPORTED: 2018-01-26

Parameter	Unit	SAMPLE DESCRIPTION:		BH 301 SS5	BH 301 SS6	BH 301 SS7	BH 304 SS4	BH 304 SS5	BH 304 SS6	Dupe 1	Dupe 2	
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-01-17	2018-01-17	2018-01-17	2018-01-17	2018-01-17	2018-01-17	2018-01-17	2018-01-17	2018-01-17
		G / S	RDL	9019524	9019529	9019530	9019531	9019532	9019533	9019534	9019535	
Benzene	µg/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Toluene	µg/g	0.2	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
Ethylbenzene	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Xylene Mixture	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
F1 (C6 to C10)	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5	
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5	
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10	
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50	
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50	<50	
Gravimetric Heavy Hydrocarbons	µg/g	120	50	NA	NA	NA	NA	NA	NA	NA	NA	
Moisture Content	%		0.1	16.6	9.7	13.4	15.8	15.1	8.8	9.7	14.8	
<b>Surrogate</b>	<b>Unit</b>	<b>Acceptable Limits</b>										
Terphenyl	%	60-140		98	90	91	101	88	83	90	80	

Certified By:





## Certificate of Analysis

AGAT WORK ORDER: 18H303547

PROJECT: SM 188072-E

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CANADA L4Z 1Y2  
TEL (905)712-5100  
FAX (905)712-5122  
<http://www.agatlabs.com>

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
SAMPLING SITE: 398 North Service Road, Grimsby, ON

ATTENTION TO: Jeremy Yang  
SAMPLED BY: AR

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

DATE RECEIVED: 2018-01-19

DATE REPORTED: 2018-01-26

Parameter	Unit	SAMPLE DESCRIPTION:		BH307 SS4	BH307 SS5	BH307 SS6	BH 306 SS4	BH 306 SS5	BH 306 SS6
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-01-18	2018-01-18	2018-01-18	2018-01-18	2018-01-18	2018-01-18
		G / S	RDL	9019536	9019537	9019538	9019539	9019540	9019541
Benzene	µg/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	0.2	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g	25	5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	120	50	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	18.3	15.2	12.4	16.8	17.0	15.0
<b>Surrogate</b>	<b>Unit</b>	<b>Acceptable Limits</b>							
Terphenyl	%	60-140		86	77	84	91	83	84

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use  
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

**9019524-9019541** Results are based on sample dry weight.  
The C6-C10 fraction is calculated using Toluene response factor.  
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.  
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.  
The chromatogram has returned to baseline by the retention time of nC50.  
Total C6 - C50 results are corrected for BTEX contributions.  
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.  
nC6 and nC10 response factors are within 30% of Toluene response factor.  
nC10, nC16 and nC34 response factors are within 10% of their average.  
C50 response factor is within 70% of nC10 + nC16 + nC34 average.  
Linearity is within 15%.  
Extraction and holding times were met for this sample.  
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.  
Quality Control Data is available upon request.

Certified By:



## Guideline Violation

AGAT WORK ORDER: 18H303547

PROJECT: SM 188072-E

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<http://www.agatlabs.com>

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Jeremy Yang

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
9019543	BH 303 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Cadmium	µg/g	1.2	1.8
9019543	BH 303 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	531
9019545	BH 303 SS2	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.57	0.941
9019545	BH 303 SS2	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	NA	2.4	3.20
9019546	BH 304 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Boron	µg/g	36	40
9019546	BH 304 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Cadmium	µg/g	1.2	1.3
9019546	BH 304 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.57	1.18
9019546	BH 304 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	400
9019547	BH 304 SS2	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Barium	µg/g	220	222
9019547	BH 304 SS2	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.57	1.45
9019547	BH 304 SS2	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	NA	2.4	8.75
9019548	BH 308 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Cadmium	µg/g	1.2	1.6
9019548	BH 308 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.57	1.64
9019548	BH 308 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	457
9019549	BH 308 SS2	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	NA	2.4	3.29
9019550	BH 310 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Cadmium	µg/g	1.2	2.2
9019550	BH 310 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	744
9019552	BH 311 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Cadmium	µg/g	1.2	2.8
9019552	BH 311 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.57	0.786
9019552	BH 311 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Lead	µg/g	120	134
9019552	BH 311 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	765
9019553	BH 311 SS2	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Barium	µg/g	220	278
9019554	Dupe 3	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Cadmium	µg/g	1.2	1.5
9019554	Dupe 3	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.57	1.62
9019554	Dupe 3	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	417

## Quality Assurance

**CLIENT NAME:** SOIL MAT ENGINEERS & CONSULTANTS LT  
**PROJECT:** SM 188072-E  
**SAMPLING SITE:** 398 North Service Road, Grimsby, ON

**AGAT WORK ORDER:** 18H303547  
**ATTENTION TO:** Jeremy Yang  
**SAMPLED BY:** AR

Soil Analysis															
RPT Date: Jan 26, 2018			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

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

Antimony	9019543	9019543	<0.8	<0.8	NA	< 0.8	108%	70%	130%	109%	80%	120%	75%	70%	130%
Arsenic	9019543	9019543	2	2	NA	< 1	107%	70%	130%	97%	80%	120%	100%	70%	130%
Barium	9019543	9019543	154	145	6.0%	< 2	100%	70%	130%	102%	80%	120%	93%	70%	130%
Beryllium	9019543	9019543	1.9	1.9	NA	< 0.5	85%	70%	130%	96%	80%	120%	90%	70%	130%
Boron	9019543	9019543	12	12	NA	< 5	73%	70%	130%	100%	80%	120%	91%	70%	130%
Boron (Hot Water Soluble)	9019543	9019543	<0.10	<0.10	NA	< 0.10	101%	60%	140%	94%	70%	130%	103%	60%	140%
Cadmium	9019543	9019543	1.8	1.7	NA	< 0.5	99%	70%	130%	108%	80%	120%	104%	70%	130%
Chromium	9019543	9019543	22	22	0.0%	< 2	98%	70%	130%	105%	80%	120%	109%	70%	130%
Cobalt	9019543	9019543	2.1	2.1	NA	< 0.5	100%	70%	130%	101%	80%	120%	106%	70%	130%
Copper	9019543	9019543	5	5	0.0%	< 1	89%	70%	130%	104%	80%	120%	92%	70%	130%
Lead	9019543	9019543	74	71	4.1%	< 1	106%	70%	130%	104%	80%	120%	104%	70%	130%
Molybdenum	9019543	9019543	1.2	1.2	NA	< 0.5	111%	70%	130%	106%	80%	120%	119%	70%	130%
Nickel	9019543	9019543	3	3	NA	< 1	97%	70%	130%	100%	80%	120%	93%	70%	130%
Selenium	9019543	9019543	1.0	0.8	NA	< 0.4	115%	70%	130%	97%	80%	120%	94%	70%	130%
Silver	9019543	9019543	0.3	0.3	NA	< 0.2	94%	70%	130%	110%	80%	120%	96%	70%	130%
Thallium	9019543	9019543	<0.4	<0.4	NA	< 0.4	98%	70%	130%	98%	80%	120%	96%	70%	130%
Uranium	9019543	9019543	1.8	1.9	NA	< 0.5	108%	70%	130%	98%	80%	120%	104%	70%	130%
Vanadium	9019543	9019543	21	20	4.9%	< 1	100%	70%	130%	100%	80%	120%	105%	70%	130%
Zinc	9019543	9019543	531	482	9.7%	< 5	99%	70%	130%	100%	80%	120%	113%	70%	130%
Chromium VI	9019552	9019552	<0.2	<0.2	NA	< 0.2	71%	70%	130%	93%	80%	120%	98%	70%	130%
Cyanide	9012391		<0.040	<0.040	NA	< 0.040	99%	70%	130%	92%	80%	120%	102%	70%	130%
Mercury	9019543	9019543	<0.10	<0.10	NA	< 0.10	99%	70%	130%	93%	80%	120%	101%	70%	130%
Electrical Conductivity	9019543	9019543	0.295	0.279	5.6%	< 0.005	99%	90%	110%						
Sodium Adsorption Ratio	9019543	9019543	0.760	0.760	0.0%	NA	NA								
pH, 2:1 CaCl2 Extraction	9020200		7.55	7.61	0.8%	NA	100%	80%	120%						

Comments: NA signifies Not Applicable.

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

Certified By: \_\_\_\_\_



## Quality Assurance

**CLIENT NAME:** SOIL MAT ENGINEERS & CONSULTANTS LT  
**PROJECT:** SM 188072-E  
**SAMPLING SITE:** 398 North Service Road, Grimsby, ON

**AGAT WORK ORDER:** 18H303547  
**ATTENTION TO:** Jeremy Yang  
**SAMPLED BY:** AR

### Trace Organics Analysis

RPT Date: Jan 26, 2018			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
<b>O. Reg. 153(511) - PHCs F1 - F4 (Soil)</b>																
Benzene	9019541	9019541	< 0.02	< 0.02	NA	< 0.02	76%	60%	130%	73%	60%	130%	71%	60%	130%	
Toluene	9019541	9019541	< 0.08	< 0.08	NA	< 0.08	76%	60%	130%	74%	60%	130%	75%	60%	130%	
Ethylbenzene	9019541	9019541	< 0.05	< 0.05	NA	< 0.05	77%	60%	130%	76%	60%	130%	77%	60%	130%	
Xylene Mixture	9019541	9019541	< 0.05	< 0.05	NA	< 0.05	71%	60%	130%	77%	60%	130%	81%	60%	130%	
F1 (C6 to C10)	9019541	9019541	< 5	< 5	NA	< 5	82%	60%	130%	85%	85%	115%	73%	70%	130%	
F2 (C10 to C16)	9019539	9019539	< 10	< 10	NA	< 10	98%	60%	130%	99%	80%	120%	80%	70%	130%	
F3 (C16 to C34)	9019539	9019539	< 50	< 50	NA	< 50	101%	60%	130%	106%	80%	120%	90%	70%	130%	
F4 (C34 to C50)	9019539	9019539	< 50	< 50	NA	< 50	90%	60%	130%	101%	80%	120%	80%	70%	130%	

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

Certified By: \_\_\_\_\_





## Method Summary

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 18H303547

PROJECT: SM 188072-E

ATTENTION TO: Jeremy Yang

SAMPLING SITE: 398 North Service Road, Grimsby, ON

SAMPLED BY: AR

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
<b>Soil Analysis</b>			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A; SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010B	ICP/OES
pH, 2:1 CaCl <sub>2</sub> Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER
<b>Trace Organics Analysis</b>			
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID









CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
130 LANCING DRIVE  
HAMILTON, ON L8W3A1  
(905) 318-7440

ATTENTION TO: Ian Shaw

PROJECT: 188072

AGAT WORK ORDER: 18H307924

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Feb 08, 2018

PAGES (INCLUDING COVER): 7

VERSION\*: 1

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

\*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



## Certificate of Analysis

AGAT WORK ORDER: 18H307924

PROJECT: 188072

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<http://www.agatlabs.com>

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-02-02

DATE REPORTED: 2018-02-08

Parameter	Unit	SAMPLE DESCRIPTION:		BH 303 SS3	BH 304 SS3	BH 311 SS3
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2018-01-17	2018-01-17	2018-01-17
		G / S	RDL	9042400	9042403	9042404
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	6	5	5
Barium	µg/g	220	2	120	118	76
Beryllium	µg/g	2.5	0.5	0.8	0.7	0.7
Boron	µg/g	36	5	14	11	9
Boron (Hot Water Soluble)	µg/g	NA	0.10	1.51	0.47	0.33
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	2	31	27	27
Cobalt	µg/g	21	0.5	17.3	17.2	14.3
Copper	µg/g	92	1	29	32	30
Lead	µg/g	120	1	13	12	11
Molybdenum	µg/g	2	0.5	0.6	0.6	0.5
Nickel	µg/g	82	1	36	31	28
Selenium	µg/g	1.5	0.4	<0.4	<0.4	<0.4
Silver	µg/g	0.5	0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4
Uranium	µg/g	2.5	0.5	1.0	0.9	0.8
Vanadium	µg/g	86	1	39	34	35
Zinc	µg/g	290	5	68	66	62
Chromium VI	µg/g	0.66	0.2	<0.2	<0.2	0.4
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm	0.57	0.005	1.11	1.44	0.264
Sodium Adsorption Ratio	NA	2.4	NA	3.97	11.8	1.26
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.64	7.49	7.58

Certified By:

*Amanjot Bhela*





**AGAT** Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 18H307924

PROJECT: 188072

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-02-02

DATE REPORTED: 2018-02-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

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

9042400-9042404 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Samples were received and analyzed beyond recommended hold times for Cyanide analysis.

Certified By:

*Amanjot Bhela*



# Guideline Violation

AGAT WORK ORDER: 18H307924

PROJECT: 188072

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
9042400	BH 303 SS3	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.57	1.11
9042400	BH 303 SS3	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	NA	2.4	3.97
9042403	BH 304 SS3	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.57	1.44
9042403	BH 304 SS3	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	NA	2.4	11.8

## Quality Assurance

 CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
 PROJECT: 188072  
 SAMPLING SITE:

 AGAT WORK ORDER: 18H307924  
 ATTENTION TO: Ian Shaw  
 SAMPLED BY:

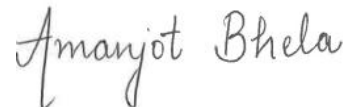
Soil Analysis															
RPT Date: Feb 08, 2018			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	9042400	9042400	<0.8	<0.8	NA	< 0.8	100%	70%	130%	105%	80%	120%	75%	70%	130%
Arsenic	9042400	9042400	6	6	0.0%	< 1	106%	70%	130%	95%	80%	120%	99%	70%	130%
Barium	9042400	9042400	120	120	0.0%	< 2	95%	70%	130%	96%	80%	120%	91%	70%	130%
Beryllium	9042400	9042400	0.8	0.8	NA	< 0.5	86%	70%	130%	95%	80%	120%	94%	70%	130%
Boron	9042400	9042400	14	14	NA	< 5	77%	70%	130%	96%	80%	120%	89%	70%	130%
Boron (Hot Water Soluble)	9042400	9042400	1.51	1.48	2.0%	< 0.10	107%	60%	140%	91%	70%	130%	91%	60%	140%
Cadmium	9042400	9042400	<0.5	<0.5	NA	< 0.5	99%	70%	130%	104%	80%	120%	109%	70%	130%
Chromium	9042400	9042400	31	31	0.0%	< 2	99%	70%	130%	108%	80%	120%	108%	70%	130%
Cobalt	9042400	9042400	17.3	18.2	5.1%	< 0.5	107%	70%	130%	101%	80%	120%	104%	70%	130%
Copper	9042400	9042400	29	30	3.4%	< 1	90%	70%	130%	97%	80%	120%	90%	70%	130%
Lead	9042400	9042400	13	14	7.4%	< 1	102%	70%	130%	100%	80%	120%	104%	70%	130%
Molybdenum	9042400	9042400	0.6	0.7	NA	< 0.5	108%	70%	130%	107%	80%	120%	111%	70%	130%
Nickel	9042400	9042400	36	38	5.4%	< 1	101%	70%	130%	98%	80%	120%	99%	70%	130%
Selenium	9042400	9042400	<0.4	<0.4	NA	< 0.4	123%	70%	130%	97%	80%	120%	84%	70%	130%
Silver	9042400	9042400	<0.2	<0.2	NA	< 0.2	99%	70%	130%	100%	80%	120%	99%	70%	130%
Thallium	9042400	9042400	<0.4	<0.4	NA	< 0.4	94%	70%	130%	98%	80%	120%	97%	70%	130%
Uranium	9042400	9042400	1.0	1.0	NA	< 0.5	104%	70%	130%	100%	80%	120%	104%	70%	130%
Vanadium	9042400	9042400	39	38	2.6%	< 1	100%	70%	130%	99%	80%	120%	104%	70%	130%
Zinc	9042400	9042400	68	69	1.5%	< 5	99%	70%	130%	100%	80%	120%	105%	70%	130%
Chromium VI	9043334		<0.2	<0.2	NA	< 0.2	77%	70%	130%	89%	80%	120%	96%	70%	130%
Cyanide	9039143		<0.040	<0.040	NA	< 0.040	97%	70%	130%	99%	80%	120%	101%	70%	130%
Mercury	9042400	9042400	<0.10	<0.10	NA	< 0.10	99%	70%	130%	99%	80%	120%	100%	70%	130%
Electrical Conductivity	9042400	9042400	1.11	1.15	3.5%	< 0.005	99%	90%	110%	NA			NA		
Sodium Adsorption Ratio	9042400	9042400	3.97	4.18	5.2%	NA	NA			NA			NA		
pH, 2:1 CaCl2 Extraction	9042472		7.28	7.32	0.5%	NA	101%	80%	120%	NA			NA		

Comments: NA signifies Not Applicable.

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

Certified By:







## Method Summary

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 18H307924

PROJECT: 188072

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A; SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010B	ICP/OES
pH, 2:1 CaCl <sub>2</sub> Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER



## **Appendix 'D'**

1. AGAT Certificate of Analysis - Water



CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
130 LANCING DRIVE  
HAMILTON, ON L8W3A1  
(905) 318-7440

ATTENTION TO: Jeremy Yang

PROJECT: 188072

AGAT WORK ORDER: 18H312110

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Feb 23, 2018

PAGES (INCLUDING COVER): 9

VERSION\*: 1

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

\*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



## Certificate of Analysis

AGAT WORK ORDER: 18H312110  
PROJECT: 188072

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
SAMPLING SITE:

ATTENTION TO: Jeremy Yang  
SAMPLED BY:

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

DATE RECEIVED: 2018-02-16

DATE REPORTED: 2018-02-23

Parameter	Unit	SAMPLE DESCRIPTION:		MW 301 S1	MW 304 S1	MW 306 S1	MW 307 S1	Dup 2
		G / S	RDL	9071236	9071240	9071241	9071242	9071244
Benzene	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	0.8	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Xylene Mixture	µg/L	72	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
F1 (C6 to C10)	µg/L	420	25	<25	<25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	420	25	<25	<25	<25	<25	<25
F2 (C10 to C16)	µg/L	150	100	<100	<100	<100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	<100	<100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	500	NA	NA	NA	NA	NA
Surrogate	Unit	Acceptable Limits						
Terphenyl	%	60-140		93	87	90	92	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses  
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9071236-9071244 The C6-C10 fraction is calculated using Toluene response factor.  
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.  
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.  
The chromatogram has returned to baseline by the retention time of nC50.  
Total C6-C50 results are corrected for BTEX contributions.  
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.  
nC6 and nC10 response factors are within 30% of Toluene response factor.  
nC10, nC16 and nC34 response factors are within 10% of their average.  
C50 response factor is within 70% of nC10 + nC16 nC34 average.  
Linearity is within 15%.  
Extraction and holding times were met for this sample.  
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.  
NA = Not Applicable

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 18H312110

PROJECT: 188072

5835 COOPERS AVENUE  
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TEL (905)712-5100  
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<http://www.agatlabs.com>

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Jeremy Yang

SAMPLING SITE:

SAMPLED BY:

### O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2018-02-16

DATE REPORTED: 2018-02-23

Parameter	Unit	SAMPLE DESCRIPTION:		MW 301 S1	MW 303 S1	MW 304 S1	RDL	MW 306 S1	RDL	MW 307 S1
		SAMPLE TYPE:		Water	Water	Water		Water		Water
		DATE SAMPLED:		2018-02-15	2018-02-15	2018-02-15		2018-02-15		2018-02-15
		G / S	RDL	9071236	9071237	9071240		9071241		9071242
Antimony	µg/L	1.5	1.0	<1.0	<1.0	<1.0	1.0	<1.0	1.0	1.3
Arsenic	µg/L	13	1.0	8.9	5.5	6.9	1.0	8.6	1.0	9.4
Barium	µg/L	610	2.0	35.9	35.3	33.5	2.0	39.5	2.0	45.5
Beryllium	µg/L	0.5	0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5
Boron	µg/L	1700	10.0	5790	2520	1990	10.0	1740	10.0	2340
Cadmium	µg/L	0.5	0.2	<0.2	<0.2	<0.2	0.2	<0.2	0.2	<0.2
Chromium	µg/L	11	2.0	2.6	5.5	2.7	2.0	7.3	2.0	4.9
Cobalt	µg/L	3.8	0.5	1.8	4.5	3.4	0.5	9.3	0.5	6.8
Copper	µg/L	5	1.0	4.2	8.5	8.1	1.0	13.4	1.0	13.3
Lead	µg/L	1.9	0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5
Molybdenum	µg/L	23	0.5	94.0	6.7	36.5	0.5	11.4	0.5	17.6
Nickel	µg/L	14	1.0	1.6	4.3	2.8	1.0	14.1	1.0	8.6
Selenium	µg/L	5	1.0	9.5	8.3	15.8	1.0	14.8	1.0	17.5
Silver	µg/L	0.3	0.2	<0.2	<0.2	<0.2	0.2	<0.2	0.2	<0.2
Thallium	µg/L	0.5	0.3	<0.3	<0.3	<0.3	0.3	<0.3	0.3	<0.3
Uranium	µg/L	8.9	0.5	21.9	19.5	16.3	0.5	28.4	0.5	25.7
Vanadium	µg/L	3.9	0.4	2.7	2.3	0.8	0.4	2.6	0.4	3.0
Zinc	µg/L	160	5.0	<5.0	<5.0	12.6	5.0	16.6	5.0	18.7
Mercury	µg/L	0.1	0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02
Chromium VI	µg/L	25	5	<5	<5	<5	5	<5	5	<5
Cyanide	µg/L	5	2	<2	<2	<2	2	<2	2	<2
Sodium	µg/L	490000	5000	1370000	1290000	1300000	10000	1730000	5000	1510000
Chloride	µg/L	790000	5000	2250000	1750000	2290000	10000	2900000	10000	2930000
Electrical Conductivity	uS/cm		2	7660	7960	8050	2	10400	2	9810
pH	pH Units		NA	7.51	7.84	7.60	NA	7.83	NA	7.66

Certified By:

*Amanjot Bhela*





## Certificate of Analysis

AGAT WORK ORDER: 18H312110

PROJECT: 188072

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Jeremy Yang

SAMPLING SITE:

SAMPLED BY:

### O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2018-02-16

DATE REPORTED: 2018-02-23

Parameter	Unit	SAMPLE DESCRIPTION: Dup 1		
		G / S	RDL	9071243
Antimony	µg/L	1.5	1.0	<1.0
Arsenic	µg/L	13	1.0	5.5
Barium	µg/L	610	2.0	35.1
Beryllium	µg/L	0.5	0.5	<0.5
Boron	µg/L	1700	10.0	2200
Cadmium	µg/L	0.5	0.2	<0.2
Chromium	µg/L	11	2.0	5.8
Cobalt	µg/L	3.8	0.5	4.4
Copper	µg/L	5	1.0	8.3
Lead	µg/L	1.9	0.5	<0.5
Molybdenum	µg/L	23	0.5	6.4
Nickel	µg/L	14	1.0	4.6
Selenium	µg/L	5	1.0	8.2
Silver	µg/L	0.3	0.2	<0.2
Thallium	µg/L	0.5	0.3	<0.3
Uranium	µg/L	8.9	0.5	18.3
Vanadium	µg/L	3.9	0.4	2.5
Zinc	µg/L	160	5.0	<5.0
Mercury	µg/L	0.1	0.02	<0.02
Chromium VI	µg/L	25	5	<5
Cyanide	µg/L	5	2	<2
Sodium	µg/L	490000	5000	1310000
Chloride	µg/L	790000	5000	1690000
Electrical Conductivity	uS/cm		2	7950
pH	pH Units		NA	7.88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses  
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.  
9071236-9071243 Elevated RDLs indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and to avoid contaminating the instrument.

Certified By:

*Amanjot Bhela*



## Guideline Violation

AGAT WORK ORDER: 18H312110

PROJECT: 188072

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Jeremy Yang

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
9071236	MW 301 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Boron	µg/L	1700	5790
9071236	MW 301 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Chloride	µg/L	790000	2250000
9071236	MW 301 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Molybdenum	µg/L	23	94.0
9071236	MW 301 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Selenium	µg/L	5	9.5
9071236	MW 301 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Sodium	µg/L	490000	1370000
9071236	MW 301 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Uranium	µg/L	8.9	21.9
9071237	MW 303 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Boron	µg/L	1700	2520
9071237	MW 303 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Chloride	µg/L	790000	1750000
9071237	MW 303 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Cobalt	µg/L	3.8	4.5
9071237	MW 303 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Copper	µg/L	5	8.5
9071237	MW 303 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Selenium	µg/L	5	8.3
9071237	MW 303 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Sodium	µg/L	490000	1290000
9071237	MW 303 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Uranium	µg/L	8.9	19.5
9071240	MW 304 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Boron	µg/L	1700	1990
9071240	MW 304 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Chloride	µg/L	790000	2290000
9071240	MW 304 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Copper	µg/L	5	8.1
9071240	MW 304 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Molybdenum	µg/L	23	36.5
9071240	MW 304 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Selenium	µg/L	5	15.8
9071240	MW 304 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Sodium	µg/L	490000	1300000
9071240	MW 304 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Uranium	µg/L	8.9	16.3
9071241	MW 306 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Boron	µg/L	1700	1740
9071241	MW 306 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Chloride	µg/L	790000	2900000
9071241	MW 306 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Cobalt	µg/L	3.8	9.3
9071241	MW 306 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Copper	µg/L	5	13.4
9071241	MW 306 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Nickel	µg/L	14	14.1
9071241	MW 306 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Selenium	µg/L	5	14.8
9071241	MW 306 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Sodium	µg/L	490000	1730000
9071241	MW 306 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Uranium	µg/L	8.9	28.4
9071242	MW 307 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Boron	µg/L	1700	2340
9071242	MW 307 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Chloride	µg/L	790000	2930000
9071242	MW 307 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Cobalt	µg/L	3.8	6.8
9071242	MW 307 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Copper	µg/L	5	13.3
9071242	MW 307 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Selenium	µg/L	5	17.5
9071242	MW 307 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Sodium	µg/L	490000	1510000
9071242	MW 307 S1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Uranium	µg/L	8.9	25.7
9071243	Dup 1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Boron	µg/L	1700	2200
9071243	Dup 1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Chloride	µg/L	790000	1690000
9071243	Dup 1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Cobalt	µg/L	3.8	4.4
9071243	Dup 1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Copper	µg/L	5	8.3
9071243	Dup 1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Selenium	µg/L	5	8.2
9071243	Dup 1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Sodium	µg/L	490000	1310000
9071243	Dup 1	ON T1 GW	O. Reg. 153(511) - Metals & Inorganics (Water)	Uranium	µg/L	8.9	18.3



## Quality Assurance

 CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
 PROJECT: 188072  
 SAMPLING SITE:

 AGAT WORK ORDER: 18H312110  
 ATTENTION TO: Jeremy Yang  
 SAMPLED BY:

### Trace Organics Analysis

RPT Date: Feb 23, 2018			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (Water)															
Benzene	9068096		< 0.20	< 0.20	NA	< 0.20	83%	50%	140%	99%	60%	130%	69%	50%	140%
Toluene	9068096		< 0.20	< 0.20	NA	< 0.20	78%	50%	140%	99%	60%	130%	67%	50%	140%
Ethylbenzene	9068096		< 0.10	< 0.10	NA	< 0.10	74%	50%	140%	97%	60%	130%	65%	50%	140%
Xylene Mixture	9068096		< 0.20	< 0.20	NA	< 0.20	68%	50%	140%	101%	60%	130%	79%	50%	140%
F1 (C6 to C10)	9068096		< 25	< 25	NA	< 25	93%	60%	140%	100%	60%	140%	95%	60%	140%
F2 (C10 to C16)		TW	< 100	< 100	NA	< 100	92%	60%	140%	60%	60%	140%	63%	60%	140%
F3 (C16 to C34)		TW	< 100	< 100	NA	< 100	98%	60%	140%	78%	60%	140%	82%	60%	140%
F4 (C34 to C50)		TW	< 100	< 100	NA	< 100	89%	60%	140%	83%	60%	140%	91%	60%	140%

Comments: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume. When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:



## Quality Assurance

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
 PROJECT: 188072  
 SAMPLING SITE:

AGAT WORK ORDER: 18H312110  
 ATTENTION TO: Jeremy Yang  
 SAMPLED BY:

Water Analysis															
RPT Date: Feb 23, 2018			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

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

Antimony	9070682		<1.0	<1.0	NA	< 1.0	104%	70%	130%	102%	80%	120%	97%	70%	130%
Arsenic	9070682		<1.0	1.2	NA	< 1.0	103%	70%	130%	104%	80%	120%	109%	70%	130%
Barium	9070682		171	200	15.6%	< 2.0	104%	70%	130%	102%	80%	120%	93%	70%	130%
Beryllium	9070682		<0.5	<0.5	NA	< 0.5	102%	70%	130%	104%	80%	120%	110%	70%	130%
Boron	9070682		181	214	16.7%	< 10.0	104%	70%	130%	100%	80%	120%	102%	70%	130%
Cadmium	9070682		<0.2	<0.2	NA	< 0.2	103%	70%	130%	110%	80%	120%	103%	70%	130%
Chromium	9070682		5.0	7.1	NA	< 2.0	101%	70%	130%	105%	80%	120%	98%	70%	130%
Cobalt	9070682		<0.5	<0.5	NA	< 0.5	103%	70%	130%	109%	80%	120%	100%	70%	130%
Copper	9070682		2.4	2.7	NA	< 1.0	107%	70%	130%	109%	80%	120%	98%	70%	130%
Lead	9070682		<0.5	<0.5	NA	< 0.5	106%	70%	130%	106%	80%	120%	99%	70%	130%
Molybdenum	9070682		1.7	1.9	NA	< 0.5	106%	70%	130%	106%	80%	120%	103%	70%	130%
Nickel	9070682		<1.0	<1.0	NA	< 1.0	105%	70%	130%	106%	80%	120%	97%	70%	130%
Selenium	9070682		2.4	3.5	NA	< 1.0	101%	70%	130%	104%	80%	120%	126%	70%	130%
Silver	9070682		<0.2	<0.2	NA	< 0.2	103%	70%	130%	110%	80%	120%	100%	70%	130%
Thallium	9070682		<0.3	<0.3	NA	< 0.3	104%	70%	130%	103%	80%	120%	97%	70%	130%
Uranium	9070682		1.1	1.3	NA	< 0.5	106%	70%	130%	106%	80%	120%	106%	70%	130%
Vanadium	9070682		1.2	1.8	NA	< 0.4	101%	70%	130%	107%	80%	120%	101%	70%	130%
Zinc	9070682		22.9	26.8	NA	< 5.0	103%	70%	130%	107%	80%	120%	103%	70%	130%
Mercury	9071236	9071236	<0.02	<0.02	NA	< 0.02	101%	70%	130%	102%	80%	120%	105%	70%	130%
Chromium VI	9071843		<5	<5	NA	< 5	101%	70%	130%	101%	80%	120%	100%	70%	130%
Cyanide	9071236	9071236	<2	<2	NA	< 2	107%	70%	130%	103%	80%	120%	97%	70%	130%
Sodium	9068695		122000	121000	0.8%	< 500	NA	70%	130%	99%	80%	120%	96%	70%	130%
Chloride	9068695		120000	117000	2.5%	< 100	91%	70%	130%	95%	70%	130%	93%	70%	130%
Electrical Conductivity	9071161		495	493	0.4%	< 2	95%	90%	110%	NA			NA		
pH	9071161		8.15	8.28	1.6%	NA	100%	90%	110%	NA			NA		

Comments: NA signifies Not Applicable.

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

Certified By: \_\_\_\_\_

*Amanjot Bhela*



## Method Summary

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT  
 PROJECT: 188072  
 SAMPLING SITE:

AGAT WORK ORDER: 18H312110  
 ATTENTION TO: Jeremy Yang  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
<b>Trace Organics Analysis</b>			
Benzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Toluene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Ethylbenzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Xylene Mixture	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F1 (C6 to C10)	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	MOE PHC-E3421	GC/FID
F3 (C16 to C34)	VOL-91-5010	MOE PHC-E3421	GC/FID
F4 (C34 to C50)	VOL-91-5010	MOE PHC-E3421	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC-E3421	BALANCE
Terphenyl	VOL-91-5010		GC/FID
<b>Water Analysis</b>			
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW-846 7470 & 245.1	CVAAS
Chromium VI	INOR-93-6034	SM 3500-Cr B	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE METHOD CN- 3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE



## **Appendix 'E'**

### **1. Qualification of Assessors**





## **COMPANY BACKGROUND**

SOIL-MAT ENGINEERS & CONSULTANTS LTD. [SOIL-MAT ENGINEERS] is a Canadian Consulting Engineering firm owned by its senior staff. Over the past thirty years the principals of SOIL-MAT ENGINEERS have undertaken geotechnical investigations in all areas of Hamilton and surrounding area and are familiar with the distinct geology of the area and therefore well-versed with the various soil, bedrock and groundwater conditions. SOIL-MAT ENGINEERS has a staff of over twenty-five engineers and technical staff who specialize in geotechnical assignments, environmental assessments, hydrogeological investigations and construction quality control/assurance projects. The company commenced operation on June 15, 1992 and has undertaken over 5,000 projects since its inception. The firm and all professional staff are in good standing with Professional Engineers Ontario. The company has maintained a current Certificate of Authorisation since it was granted on April 28, 1992. The firm's office and laboratory facilities are located at 130 Lancing Drive in Hamilton, Ontario.

## **REPORT AUTHORS**

**Jeremy Yang, M.Sc. Eng., EIT.**  
Project Manager

Mr. Yang has over three years of experience in conducting Phase I ESA research and Phase II ESA fieldwork, including soil and groundwater sampling. Mr. Yang also has experience in Phase III Environmental Site Assessments including remediation of underground storage tanks and various ex-situ 'dig and dump' remediation programmes.

**Ian Shaw, P. Eng.**  
[Director/ Senior Professional]

Mr. Shaw has over seventeen years of experience in the geotechnical and geo-environmental fields. Mr. Shaw has supervised the geotechnical investigations for the replacement/rehabilitation of bridge/culvert structures located within the Haldimand County, numerous residential and industrial subdivision projects, slope stability assignments associated with Hamilton Conservation Authority and Conservation Halton requirements, and several high rise developments in Hamilton, Burlington, Oakville, Brantford, St. Catharines, and Niagara Falls. Mr. Shaw has also been involved in numerous hydrogeological investigations, primarily within the City of Hamilton, associated with the development of residential and commercial subdivision projects. Some of Mr. Shaw's projects have included the decommissioning of underground and above ground fuel oil storage tanks, the implementation of in-situ and ex-situ remediation programmes and numerous 'dig and dump' remediation projects.



**Keith Gleadall, B.A., EA Dipl.**

Vice-President [Senior Professional]

Mr. Gleadall has over seventeen years of experience in conducting Phase I, II and III Environmental Site Assessments and has successfully completed the requirements of the Associated Environmental Site Assessors of Canada and a Post Graduate Diploma in Environmental Site Assessment from Niagara College. Mr. Gleadall is responsible for undertaking numerous hydrogeological investigations, primarily within the City of Hamilton, associated with the development of residential and commercial subdivision projects, together with Phase I, II and III Environmental Site Assessments. Projects have included the decommissioning of underground and above ground fuel oil storage tanks, the implementation of in-situ and ex-situ remediation programmes, the decommissioning of a former dry-cleaning facility and numerous 'dig and dump' remediation projects.



## **Appendix 'F'**

### **1. Statement of Limitations**

## REPORT LIMITATIONS

Achieving the objectives that are stated in this report has required SOIL-MAT ENGINEERS to derive conclusions based upon the best and most recent information currently available to SOIL-MAT ENGINEERS. No investigative method can completely eliminate the possibility of obtaining partially imprecise information. SOIL-MAT ENGINEERS has expressed professional judgement in gathering and analysing the information obtained and in the formulation of its conclusions.

Information in this report was obtained from sources deemed to be reliable, however, no representation or warranty is made as to the accuracy of this information. To the best of SOIL-MAT ENGINEERS' knowledge, the information gathered from outside sources contained in this report on which SOIL-MAT ENGINEERS has formulated its opinions and conclusions, are both true and correct. SOIL-MAT ENGINEERS assumes no responsibility for any misrepresentation of facts gathered from outside sources.

This report was prepared to assess and document evidence of potential environmental contamination, and not to judge the acceptability of the risks associated with such environmental contamination. Much of the information gathered for this report is only accurate at the time of collection and a change in the Site conditions may alter the interpretation of SOIL-MAT ENGINEERS' findings. Furthermore, the reader should note that the Site reconnaissance described in this report was an environmental assessment of the Site, not a regulatory compliance or an environmental audit of the Site.

SOIL-MAT ENGINEERS & CONSULTANTS LTD. prepared this Report for the account of LOSANI HOMES. The material in it reflects SOIL-MAT ENGINEERS best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any suffered by any third party as a result of decisions made or actions based on this report.