FISHER ENGINEERING

ENVIRONMENTAL | GEOTECHNICAL | LABORATORIES

Soil, Groundwater and Methane Investigation
39 Pine Street North, Port Hope, Ontario

Prepared for use by:

2640573 Ontario Corp.

October 31, 2023

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1. INTRODUCTION

Fisher Engineering Limited (Fisher) was commissioned by Janus Xu of 2640573 Ontario Corp. (the Client) to carry out a Soil, Groundwater and Methane Investigation program at the property addressed 39 Pine Street North, Port Hope, Ontario, herein referred to as the Site. The purpose of the investigation was to satisfy requirements of the Municipality of Port Hope Planning Review Pre-Consultation letter, dated February 27, 2023. The field investigation was carried out between August 25 and September 22, 2023.

2. OBJECTIVES

The specific objectives of the work are to satisfy requirements of the Municipality of Port Hope Planning Review Pre-Consultation letter, dated February 27, 2023, which requires that the soil, groundwater and soil vapour be investigated for potential impacts associated with the Highland Landfill, located within 500 m of the Site, and located in a generally north direction. Methane is to be screened in relevant monitoring wells and in dedicated methane probes, and soil (specifically soil leachate) and groundwater are to be sampled and tested for relevant parameters.

3. PROPERTY DESCRIPTION

Location and Surrounding Area

The subject property is located on the east side of Pine Street North & south of North Street, south-east of the existing 2-storey brick school building in Port Hope, Ontario. St. John's Anglican Church building was observed west of the proposed building area. Port Hope United Church is located southeast of the subject area. Refer to Figure 1 in Appendix A.

Residential dwellings were observed east and southwest of the site investigated herein. It is Fisher's understanding that a five-storey dormitory building with basement along with paved driveway/parking is proposed in the area investigated. The Site has an area of 5,258 m^2.

According to the County of Northumberland, Highland Drive Landfill, located within 500 m of the Site, housed low-level radioactive wastes and municipal solid wastes, from late 1940s until 1991, when the landfill was closed. The landfill is located approximately 434 m from the Site, as shown in Figure 2 in Appendix A.

Physical Characteristics

Based on the grade elevation values obtained at positions approximately 200 m due north, east, south, and west, from the nearest Site boundaries, recorded at 103 m asl, 85 m asl, 101 m asl and 115 m asl, respectively, the regional topography was determined to generally slope in the east direction. Nearest

open water body is Ganaraska River, located approximately 200 m east of the Site. Groundwater flow direction was expected to flow eastward as well, based on regional topography and location of the nearest water body.

Regional surficial geology, based on the Ontario Geological Survey (OGS), was determined to be Till (5b) – stone poor, sandy silt to silty sand, on Paleozoic terrain. Refer to Figure 3 in Appendix A. Based on the Geotechnical Investigation (2023) completed by Fisher, the following stratigraphy was observed in the boreholes:

Fill

The fill consisted of dark brown to brown silty sand with some to trace of roots/topsoil/slag with occasional pieces of porcelain, and was observed with a thickness between 0.7 and 3.1 m.

Brown/Light Brown Sand/Silty Sand/Sandy Silt

Native soils of brown to light brown sand/silty sand to sandy silt were encountered below the fill. Relative density of these soils varied from compact to very dense and they extended to 4.88 m bgs in BH3 and termination depths of 3.51 m (BH1& BH2) and 9.60 m bgs (BH4).

Brown Silt

A dense layer of brown silt was encountered below the brown sand/silty sand of BH3 extending to termination depth of 6.55 m bgs.

Refer to Appendix B for soil stratigraphy encountered during drilling works.

Regional bedrock geology, based on OGS, was classified as 54a-Limestone, dolostone, shale, arkose, sandstone Ottawa Group; Simcoe Group; Shadow Lake Formation. Approximate depth of bedrock, based on MECP well records located with 1 km of the Site, was observed to 34 m bgs, at which point grey/black shale bedrock was encountered.

4. SCOPE OF WORK

The current investigation is conducted in general accordance with the CAN/CSA-Z769-00 standards, as published in March 2000 and reaffirmed in 2021, by the CSA Group.

With regards to Methane, as noted in the Ontario Ministry of the Environment “Guideline for Assessing Methane Hazards From Landfill Sites” (November 1987) publication, a mixture of 5% to 15% methane by volume in air will explode if ignited. A concentration of 5% methane by volume in air, called the Lower Explosion Limit (LEL), and concentrations equal to or greater than the LEL, are considered explosive.

The current Scope of Work is established to satisfy all requisite objectives. The scope of this work consisted of the following:

- **Drilling Program –** Install two (2) methane probes, and depths above groundwater static levels in nearby wells, for screening and, if required, sampling of methane (MP1

and MP2). Submit soil samples from relevant boreholes (BH1 and BH2), from within the aquifer zone, for TCLP analysis parameters.

- **Groundwater Sampling Program –** Conduct groundwater sampling at MW1 and MW2, where possible.

- **Methane Screening Program –** Utilizing a GEM-2000, screen MP1, MP2 and relevant monitoring wells for methane and other landfill gases. If elevated landfill gases encountered, conduct soil vapour sampling and analysis program at MP1 and MP2.

- **Laboratory Testing Program -** Recovery and analysis of soil TCLP samples and groundwater samples, for Metals, Hydride-Forming Metals, Mercury, Cyanide, Hexavalent Chromium, VOCs, PHCs, PAHs, PCBs, Chloride parameters.

- **Data Evaluation -** Comparison of results of chemical analyses with the applicable MECP SCS.

- **Reporting -** Provision of final report detailing findings of performed works, and any further recommendations.

5. FIELD PROGRAM

Soil and Groundwater

Fisher retains Terra Firma Environmental Services Ltd. (Terra Firma) as our drilling contractor. Terra Firma maintains licensure for drilling (Water Well Drillers, Environmental Protection Act, Well Contractor License No. 6946) as required by the MOE, and conducted drilling and soil sampling works in accordance with CSA Standard Z769-00 (reaffirmed in 2018) and the Ontario Ministry of Environment and Energy (MOEE, currently MECP) “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario”, December 1996, and in compliance with Occupational Health and Safety regulations.

The field investigation was carried out between August 25 and September 23, 2023. The intrusive subsurface investigation was conducted by means of solid stem auger boreholes advancement through the pavement and/or subsoil, and a 50 mm diameter spoon sampler driven 600 mm into subsoil by a 65 kg hammer, falling 760 mm, collecting soil samples at a maximum of 0.76 m interval and at stratigraphic boundaries.

Soil samples were collected and handled in accordance with generally accepted sampling and handling procedures used by the environmental consulting industry. For guidance, these practices rely on the 1996 MOEE publication “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites

in Ontario". To minimize the potential for cross contamination between soil samples, the split spoon sampler used to collect soil samples from the boreholes was brushed clean of soil and then washed in municipal water containing phosphate free detergent, rinsed in municipal water and then rinsed with distilled water. As well, new disposable nitrile gloves and stainless-steel spatula were used during each sampling event to remove the soil cores from the sampler and to transfer the samples into plastic bags and/or glass jars.

Through each soil sample, the lithology and esthetic evidence of impacts (debris, staining and odours) were recorded as part of field quality control (QC) procedures. Additionally, each sample was screened in the field for headspace vapour concentration (combustible soil vapour and total organic vapour) using the 10.6 eV lamp MiniRae 2000 PID calibrated to 100 ppm Isobutylene. The samples were kept out of direct sunlight during field storage and the headspace measurements were made after at least two hours had elapsed since the sample was bagged and the sample had reached a minimum temperature of 15ºC. The headspace monitoring was performed on the samples as a preliminary screening for analysis.

Selection of samples to be submitted for laboratory analysis are based on the headspace vapour concentration, physical evidence of odours/ staining, apparent water table and/or proximity to potential contaminant sources. If no odours/staining are noted in the soil samples, the samples with the highest field screening measurement (i.e., highest headspace vapour concentration) are selected for laboratory analysis. Soil samples from the boreholes selected for potential chemical analysis of organic parameters were placed directly into laboratory supplied glass jars at the time of sampling, labeled and packed with minimal headspace. Samples were kept in coolers provided with cold packs during field storage and transportation to Fisher Environmental Laboratories for analysis for testing of a toxicity characteristic leachate procedure (TCLP) leachate.

The groundwater investigation was carried out on 23 September, 2023. The field works were conducted by a senior field technician from Fisher, who conducted the groundwater level measurement and sampling operations, provisioned for adequate blanks and duplicates, and assured proper chain of custody procedures for the recovered groundwater samples.

One (1) monitoring well, MW2, was sampled, which included a duplicate sample. MW1 did not have groundwater at the time of sampling, and was not sampled. Groundwater samples were collected and handled in accordance with generally accepted sampling and handling procedures used by the environmental consulting industry. For guidance, these practices rely on the MOE publication "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario".

Groundwater sampling in the installed monitoring wells was conducted using dedicated Waterra D-25 footvalves, which are manually operated inertial pumps, and dedicated 5/8" by 1/2" LDPE tubing. Prior to sampling, three well volumes of groundwater were purged from each well to ensure the sampling of "fresh" formation water.

Pre-preserved sample containers were used to collect groundwater samples which were labeled, stored in coolers provided with ice/cold packs during field storage and transportation to Fisher Environmental

Laboratories for laboratory analysis. One (1) travel blank (prepared by the lab) and one (1) field duplicate groundwater sample (collected from MW2) have been submitted to the lab for analysis.

At the time of sampling, no dense or light non-aqueous phase liquids (DNAPLs or LNAPLs) were encountered in any monitoring well. No odours, suggestive of contaminants, were noted during sampling works.

Groundwater static level measurement was conducted prior to sampling. The groundwater static level measurements, well depths, and groundwater elevations, based of surface elevation valued obtained from the Geotechnical Investigation (2023), are summarized below:

Table 1: Groundwater Static Level Measurements

Sampling Location	Surface Elevation (m asl)	Well Depth (m bgs)	Groundwater Static Level (m bgs) Measured September 22, 2023	Groundwater Elevation (m asl) Measured September 22, 2023
BH1(MW)	102.69	3.05	Dry	NA
BH2(MW)	102.97	4.59	3.93	94.45
BH3(MW)	102.80	4.76	3.73	94.31
BH4(MW)	102.67	6.21	3.64	92.82
BH5(MW)	102.70	4.55	3.48	94.67
BH6(MW)	102.48	4.76	3.82	93.90

Groundwater generally flows from areas of high hydraulic head towards areas of low hydraulic head. To assess the direction of groundwater movement, the hydraulic head is measured at each well location. This is accomplished by taking water level measurements and referencing them to a known benchmark to determine their elevation. Water level measurements having higher elevations suggest greater hydraulic head. Conversely, lower elevations of the water table are indicative of a lesser hydraulic head. Based on the groundwater elevations, the groundwater generally flowed east.

The localized shallow groundwater flow direction may be influenced by the presence of underground utilities, building foundation, variations in vertical and horizontal stratigraphy, depth of wells' screened intervals and/or well trauma.

Methane Screening Program

A Landtec GEM-2000 instrument, capable of detecting methane gas at concentrations of 0.5-100.0 % by volume in air, has been used to take direct reading concentrations of landfill gases in the two (2) installed methane probes. The Landtec GEM-2000 instrument was used to simultaneously measure concentrations of CH_4, H_2S, O_2, CO and CO_2 gases.

Maintenance and calibration documentation were provided for each instrument to satisfy quality assurance/quality control requirements. The following direct reading procedures were implemented:

- The two (2) methane probes were left opened to atmosphere for 24 hours before the soil gas readings were collected.
- A complete clean air purge was performed.
- Instrument pressure was allowed to stabilize.
- The clear hose provided was connected to the white port on the instrument and the other end to the methane monitor's teflon tubing.
- The pump was turned on and gas sample was drawn into the instrument for approximately 2 minutes, when the readings were recorded.

Findings of methane screening in MP1, MP2, MW1, MW2 and MW5, are described in Section 7.

6. SOIL AND GROUNDWATER LABORATORY PROGRAM

General

Recovered soil and groundwater samples were submitted to Fisher Environmental Laboratories for analysis. As CALA (Canadian Association for Laboratory Accreditation) registered analytical facility, QA/QC (Quality Assurance/Quality Control) procedures were maintained consistent with CALA requirements and standard laboratory practices. The laboratories ensured that analytical sub-samples were, by appearance, representative of the whole sample as collected in the field.

Data Evaluation

Soil and Groundwater Standards

The MECP presents Soil and Groundwater Standards, under the Publication "Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" March 9, 2004. These standards present soil and groundwater criteria which have been developed with regard to toxicological data. They are levels at and below which no environmental or safety concerns, or adverse conditions, are anticipated for environments or persons with average sensitivity.

The subject property has been used for institutional purposes, and it is our understanding that a residential building (dormitory) will be developed associated with the institutional use.

With regards to the potability status of the groundwater, it is understood that the surrounding area rely on municipal water as a source of drinking water, however water wells are present in the surrounding area, and therefore a potable groundwater use as been applied.

For the purpose of this Phase II ESA, the appropriate standards were identified as: Table 2 (Full Depth Generic Site Condition Standards in a Potable Groundwater Condition –All Types of Property Use for

groundwater samples, in coarse-textured soil) as contained in the MECP Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.

Regarding TCLP testing in soil samples, applicable guideline started was identified as Ontario Regulation 558/00 Leachate Quality Criteria (Toxicity Characteristic Leaching Procedure, amendment to Ontario Regulation 347- Waste Management) under the Ontario Environmental Protection Act, March 31, 2001.

Soil and Groundwater Quality

Two soil samples, from MW1 (3.05-3.20 m bgs) and MW2 (4.57-5.03 m bgs), were submitted to the laboratory for TCLP analysis, with soil results compared with the Leachate Quality Criteria. TCLP testing was carried out for parameters generally associated with landfill leachates in soil, including: Metals, Cyanide, Fluoride, Nitrate/Nitrite, VOCs, PAHs and PCBs.

No exceedances of applicable leachate criteria were found in soil samples.

Two (2) groundwater samples, including a field duplicate, were submitted to the laboratory for Metals, Mercury, Hexavalent Chromium, VOCs, PHCs, BTEX, PAHs, PCBs and Chloride analysis in groundwater. Additionally, a travel blank sample was also submitted for VOC analysis.

No exceedances of applicable Table 2 SCS were found in the groundwater samples.

Copies of the Laboratory Certificate of Analysis are provided in Appendix C.

Quality Assurance/Quality Control

A chain of custody form was filled out for all samples prior to submitting to the laboratory. The chain of custody documented movement from selection of the sample to receipt at the laboratory and provided sample identification, requested analysis, and condition of samples upon arrival at the laboratory.

The laboratory checks randomly selected samples for Quality Assurance. Generally, one sample for every twenty samples submitted is selected for Quality Assurance checks. For each parameter, there is an acceptable upper and lower limit for the measured concentration of the parameter. Measured concentrations of analyzed samples must fall within the upper and lower acceptable limits in order for the sample to be valid. If the result exceeds the upper or lower acceptable limits, the sample must be re-analyzed.

Based on Quality Assurance Reports provided by 'Fisher', measured concentrations in groundwater samples were within the acceptable limits for quality control. Copies of the QA/QC Reports for VOCs analysis in groundwater are included with the Certificates of Analysis in Appendix C.

7. METHANE SCREENING

Methane screening was performed on September 22, 2023. The recorded readings for methane are presented as follows:

Table 2: Current Exceedances in Groundwater

Location	CH_4	
	%Volume	%LEL
MP1	**0.0**	**0.0**
MP2	**0.0**	**0.0**
MW1	**0.0**	**0.0**
MW2	**0.0**	**0.0**
MW5	**0.0**	**0.0**

Notes:
LEL - Lower Explosive Limit.
ppm – parts per million.
5% Methane in Air = 100% LEL = 50,000 ppm.

No detectable methane readings were encountered were found in the screened methane probes and monitoring wells. Concentration of other landfill gases, CH_4, H_2S, O_2 and CO_2, did not exhibit concentration suggestive of soil vapour impacts.

8. CONCLUSION

Based on the methane field screening and soil and groundwater field investigation, no soil, groundwater or soil vapour impacts were noted. It is Fisher's opinion that the Highland Street Landfill has not impacted the on-site condition in regards to the scope of work undertaken. No further investigation is required at this time.

We trust that the information presented herein meets your current requirements. Should you have any questions or require additional information, please do not hesitate to contact us.

Respectfully submitted,

FISHER ENGINEERING LIMITED

David Fisher, P. Eng., C. Chem.
Principal

Arij Alam, MEnvSc, EP
Project Manager

9. APPENDICES

APPENDIX A – FIGURES

FISHER ENGINEERING

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755

NORTH

N

LEGEND

PROJECT NAME AND ADDRESS

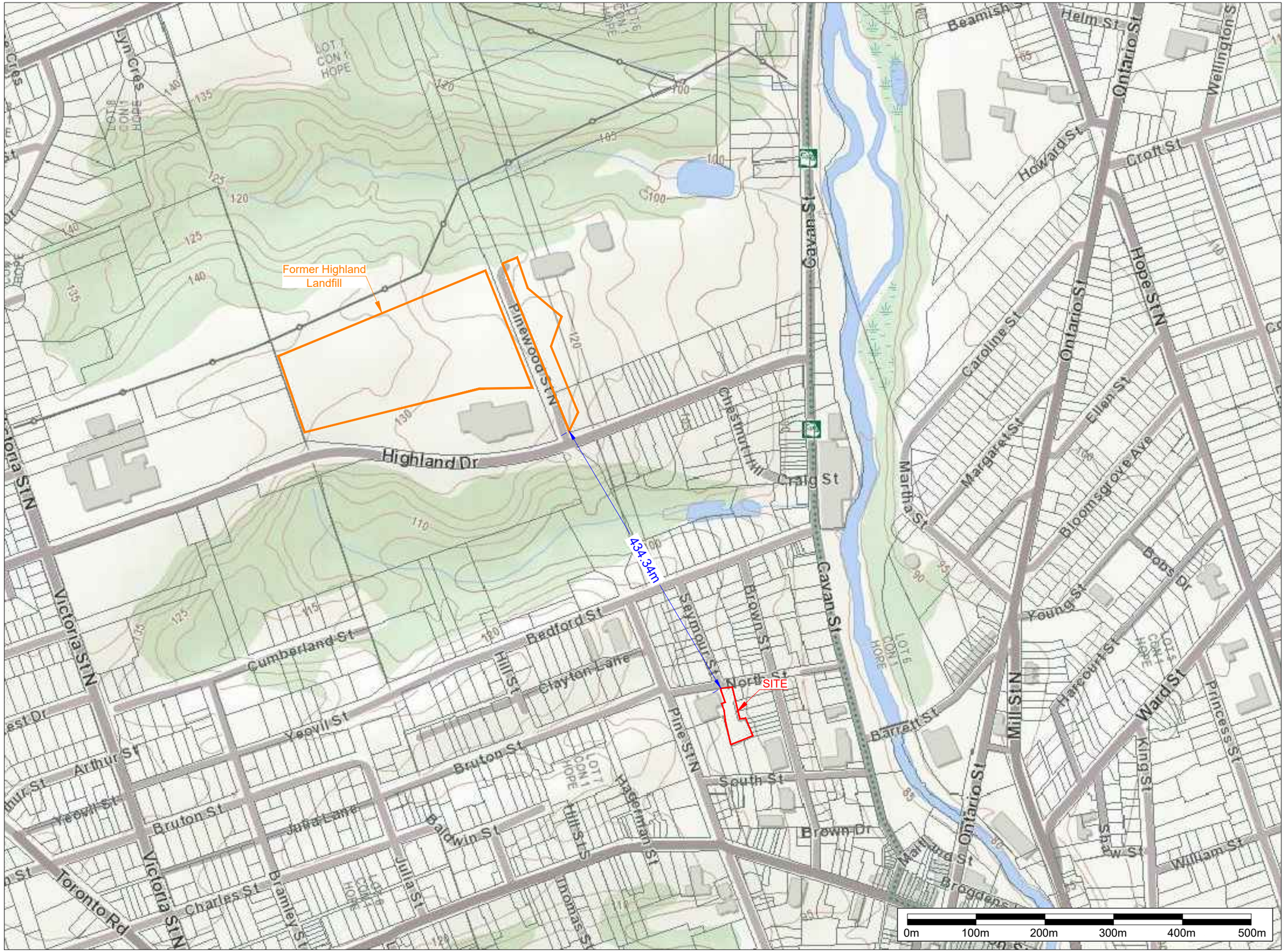
SOIL, GROUNDWATER & METHANE INVESTIGATION

39 Pine Street North,
Port Hope, ON

FIGURE 1:

SITE LOCATION PLAN

PROJECT NO.	SHEET NO.
FE- 23-13248	1
DATE: 10 October 2023	
SCALE: AS SHOWN	



FISHER ENGINEERING

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755

NORTH

N

LEGEND

- SITE BOUNDARY
- FORMER HIGHLAND LANDFILL

PROJECT NAME AND ADDRESS

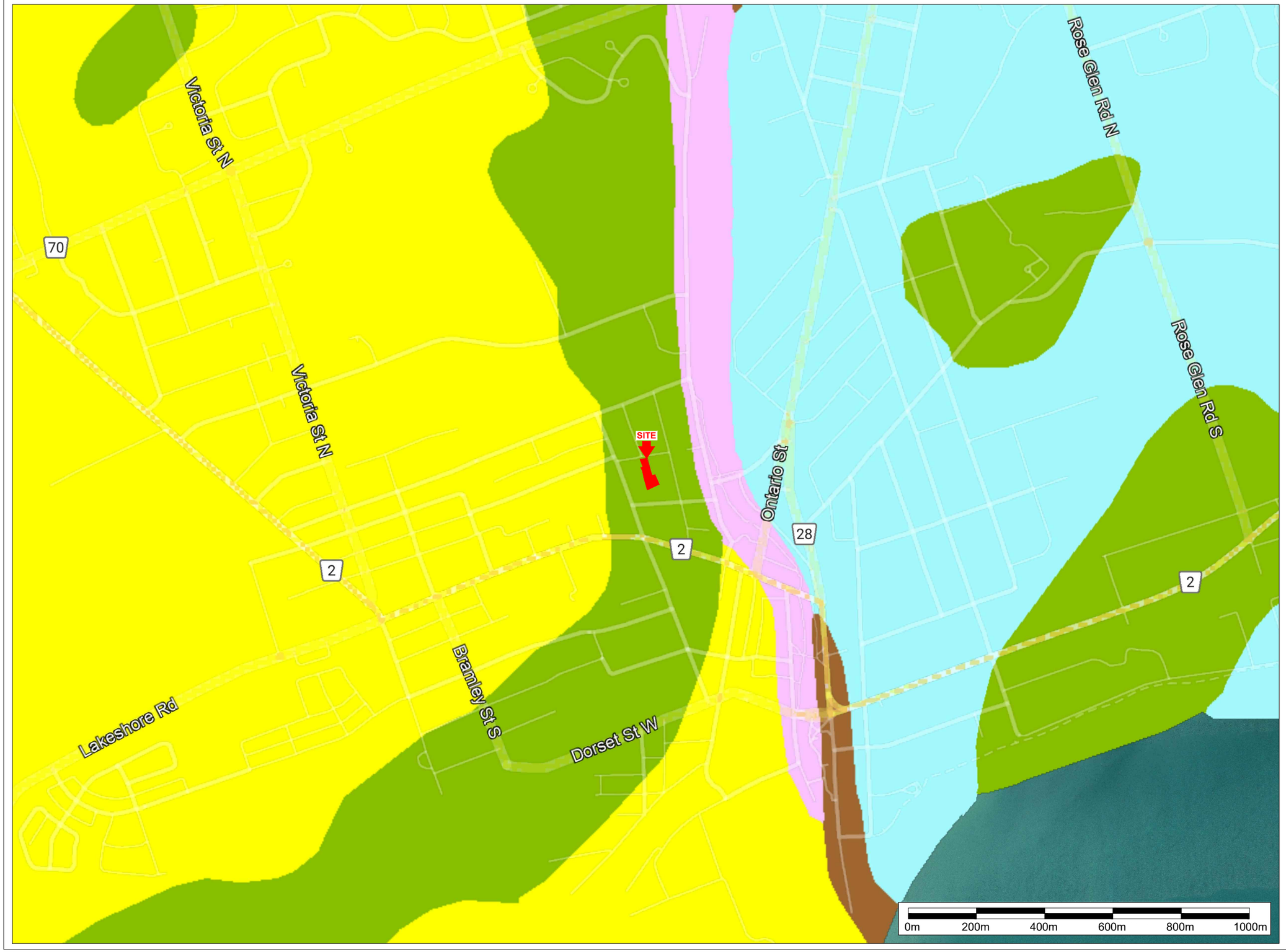
SOIL, GROUNDWATER & METHANE INVESTIGATION

39 Pine Street North,
Port Hope, ON

FIGURE 2:

SITE TOPOGRAPHY AND DISTANCE TO FORMER LANDFILL

PROJECT NO.	SHEET NO.
FE- 23-13248	2
DATE: 10 October 2023	
SCALE: AS SHOWN	



FISHER ENGINEERING

400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2

Tel: 905 475-7755

NORTH

N

LEGEND

3 PALEOZOIC BEDROCK

5B TILL
Stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain

8A FINE-TEXTURED GLACIOLACUSTRINE DEPOSITS
silt and clay, minor sand and gravel
Massive to well laminated

9C COARSE-TEXTURED GLACIOLACUSTRINE DEPOSITS
sand, gravel, minor silt and clay Foreshore and basinal deposits

14B COARSE-TEXTURED LACUSTRINE DEPOSITS
sand, gravel, minor silt and clay
Littoral deposits

19 MODERN ALLUVIAL DEPOSITS
clay, silt, sand, gravel, may contain organic remains

PROJECT NAME AND ADDRESS

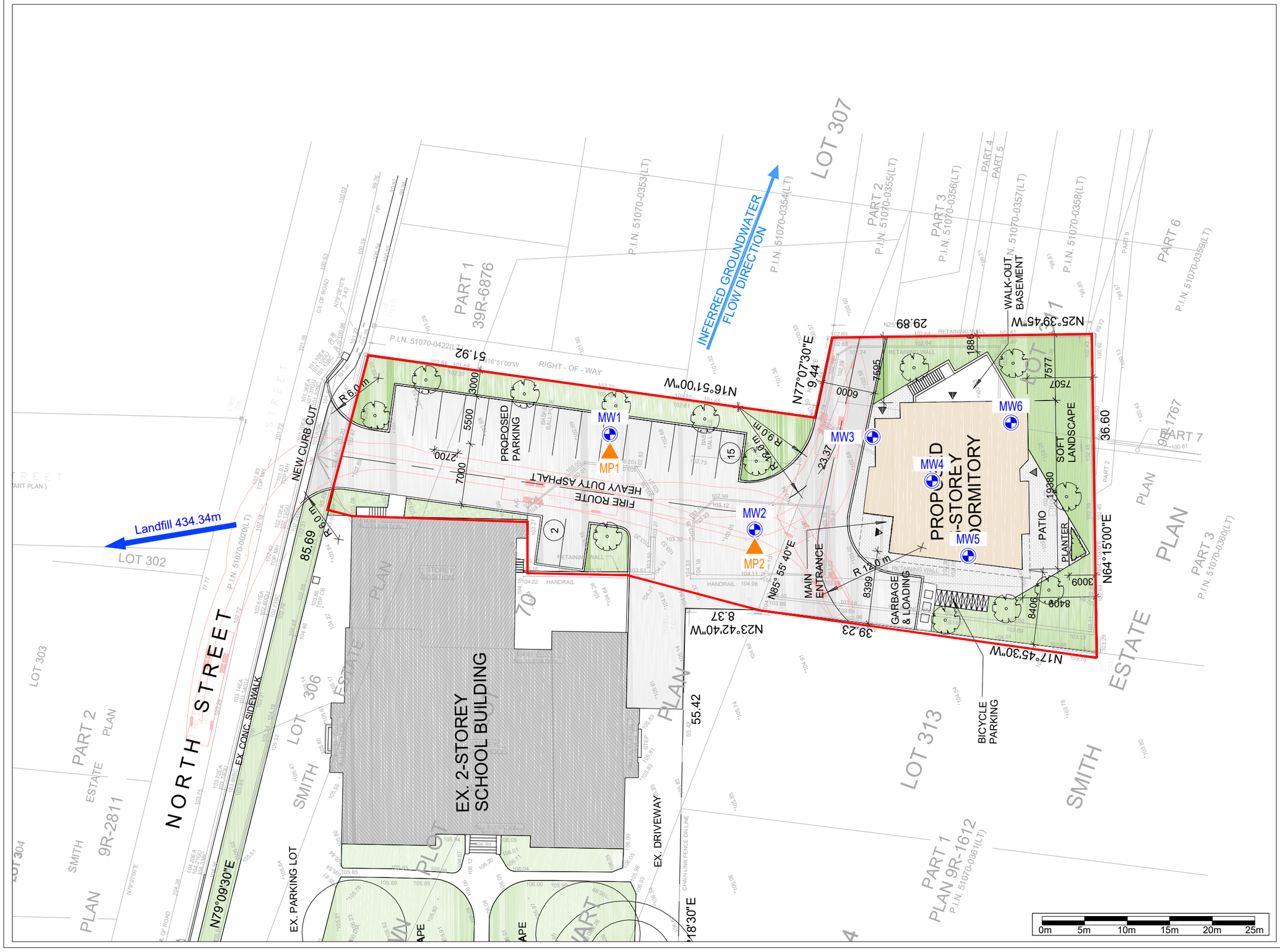
SOIL, GROUNDWATER & METHANE INVESTIGATION

39 Pine Street North,
Port Hope, ON

FIGURE 3:

SURFICIAL GEOLOGY

PROJECT NO.	SHEET NO.
FE- 23-13248	3
DATE: 10 October 2023	
SCALE: AS SHOWN	



FISHER ENGINEERING
400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2
Tel: 905 475-7755

NORTH

LEGEND

- SITE BOUNDARY
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION
- METHANE PROBE LOCATION
- INFERRED GROUNDWATER FLOW DIRECTION

PROJECT NAME AND ADDRESS

SOIL, GROUNDWATER & METHANE INVESTIGATION

39 Pine Street North,
Port Hope, ON

FIGURE 4:

SITE PLAN WITH MONITORING WELL AND METHANE PROBE LOCATIONS

PROJECT NO. FE- 23-13248	SHEET NO. 4
DATE 10 October 2023	
SCALE AS SHOWN	

APPENDIX B – BOREHOLE/METHANE PROBE LOGS

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW1 SHEET. 1 of 1

PROJECT NO.: FE-P# 23-13246/47

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 39 Pine Street North., Port Hope, ON

DRILLING METHOD: CME-75 Solid Stem

DRILLING DATE: 25 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				98.77			
0	0	ASPHALT ~76mm		0.20 / 98.57		SS-1	16
2		FILL: Black foundry slag, occ. pieces of porcelain, moist					
4	1	FILL: Dark brown to brown, trace to some slag, pockets of sandy silt, trace roots/ topsoil, moist				SS-2	2
6	2					SS-3	5
8						SS-4	17
10	3	SAND/SILTY SAND: Brown, occ. trace of gravel, moist, compact		3.10 / 95.67		SS-5	25
12	4	End of borehole at 3.51m		3.51 / 95.26			
14							
16	5						
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32							
34	10						

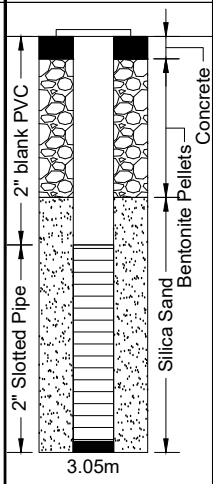
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry/ On September 6, 2023: Dry

DRAWN: A.M | LOGGED: D.G. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW2 SHEET. 1 of 1

PROJECT NO.: FE-P# 23-13246/47

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 39 Pine Street North., Port Hope, ON

DRILLING METHOD: CME-75 Solid Stem

DRILLING DATE: 25 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				99.22			
0	0	TOPSOIL ~150mm		0.15 / 99.07		SS-1	5
2		FILL: Dark brown to brown silty sand, trace to some topsoil/roots, moist		0.76 / 98.46			
4	1	SILTY SAND/SANDY SILT: Brown, moist to very moist, compact to very dense				SS-2	19
6	2					SS-3	26
8						SS-4	40
10	3			3.51 / 95.71		SS-5	100+
12		SAND: Brown, some silt, seam of silt/silty sand, occ. trace of gravel, wet, dense					
14	4						
16	5			5.03 / 94.19		SS-6	38
		End of borehole at 5.03m					
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32	10						
34							

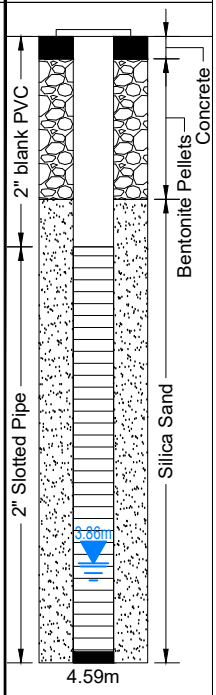
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry/ On September 6, 2023: 3.86m

DRAWN: A.M | LOGGED: D.G. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW3 SHEET. 1 of 1

PROJECT NO.: FE-P# 23-13246/47

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 39 Pine Street North., Port Hope, ON

DRILLING METHOD: CME-75 Solid Stem

DRILLING DATE: 25 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				98.87			
0	0	FILL: Brown to greyish brown silty sand, some slag/pieces of porcelain, moist				SS-1	8
2				0.76 / 98.11			
4	1	FILL: Dark brown to grey sandy to clayey silt, pockets of topsoil/topsoil mixed soil, trace to some roots, trace of gravel, moist				SS-2	6
6	2					SS-3	9
8				2.28 / 96.59			
		SAND/SILTY SAND: Brown, seam/pockets of silt, very moist to wet, compact to very dense				SS-4	21
10	3					SS-5	58
12							
14	4						
16	5			4.88 / 93.99		SS-6	48
		SILT: Brown, seams/layers of sand/silty sand, wet, dense					
18							
20	6					SS-7	30
				6.55 / 92.32			
22	7	End of borehole at 6.55m					
24							
26	8						
28							
30	9						
32							
	10						
34							

PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

19.9%

16.3%

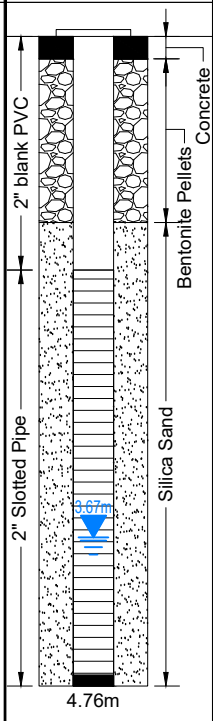
18.6%

18.4%

18.4%

17.1%

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry/ On September 6, 2023: 3.67

DRAWN: A.M | LOGGED: D.G. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW4 SHEET. 1 of 1

PROJECT NO.: FE-P# 23-13246/47

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 39 Pine Street North., Port Hope, ON

DRILLING METHOD: CME-75 Solid Stem

DRILLING DATE: 25 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
			98.65			
0	0	TOPSOIL ~102mm			SS-1	5
2		FILL: Dark brown to brown silty sand, trace of topsoil/roots/slag/gravel, moist				
4	1				SS-2	5
			1.68 / 96.97			
6	2	SAND/SILTY SAND: Brown to light brown, trace of gravel, moist, compact			SS-3	24
8					SS-4	27
10	3		3.05 / 95.60			
		SANDY SILT: Light brown, trace of clay/gravel, moist, very dense			SS-5	100+
12			3.96 / 94.69			
14	4	SAND/SILTY SAND: Brown, very moist to wet, very dense to dense				
16	5				SS-6	100+
18						
20	6				SS-7	37
22	7					
24						
26	8				SS-8	42
28			8.53 / 90.12			
		SAND: Grey, some silt, wet, dense				
30	9				SS-9	34
			9.60 / 89.05			
32	10	End of borehole at 9.60m				
34						

PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

14.0%

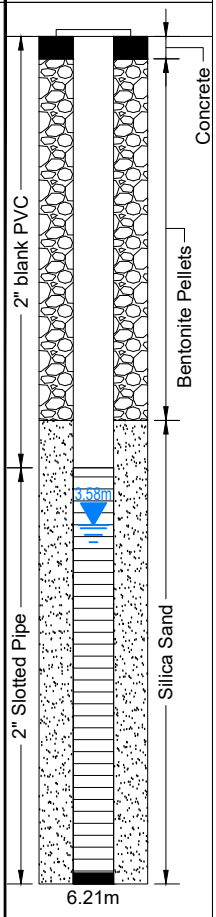
4.3%

5.1%

12.6%

17.4%

19.3%



Groundwater Depth (m): on completion: Dry/ On September 6, 2023: 3.58m

DRAWN: A.M LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW5 SHEET. 1 of 1

PROJECT NO.: FE-P# 23-13246/47

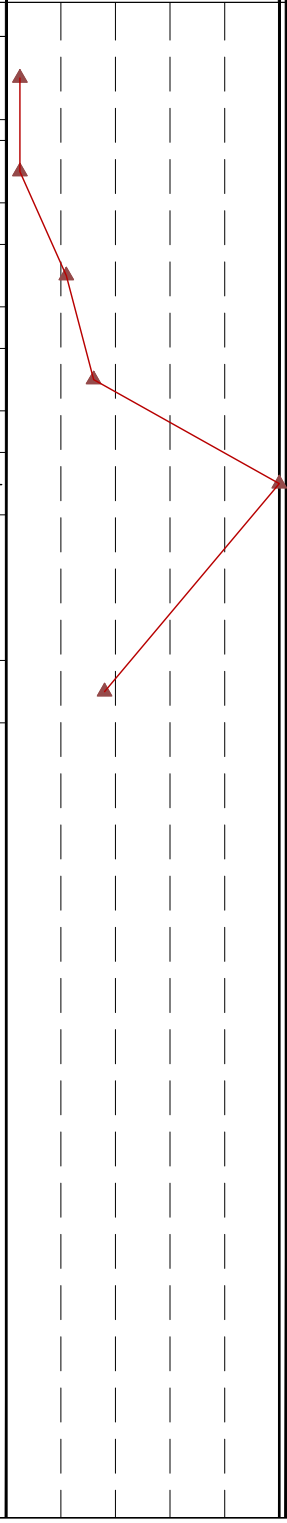
PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

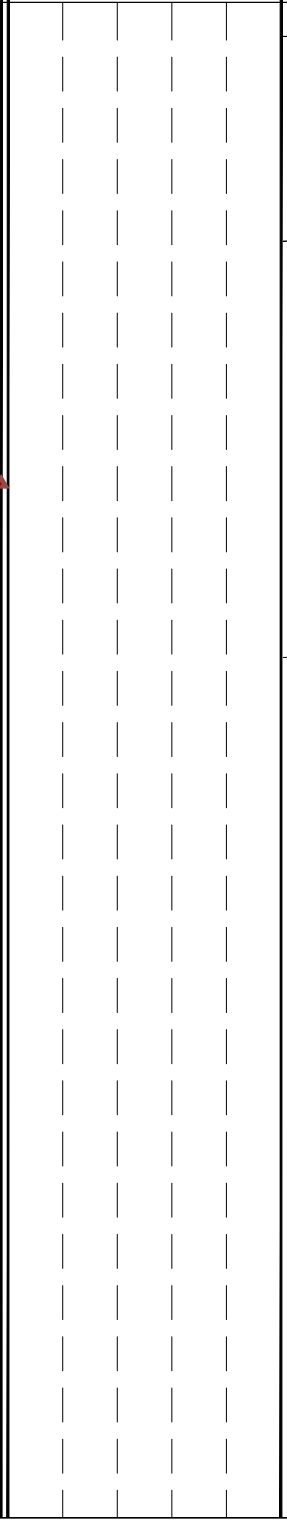
LOCATION: 39 Pine Street North., Port Hope, ON

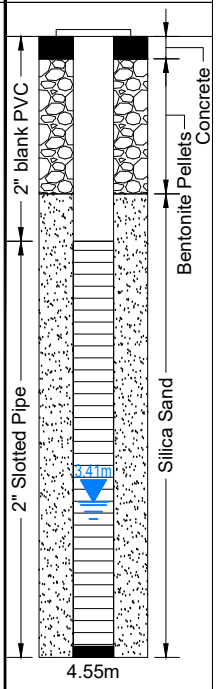
DRILLING METHOD: CME-75 Solid Stem

DRILLING DATE: 25 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				98.59			
0	0	TOPSOIL ~102mm				SS-1	5
2	1	FILL: Dark brown to brown silty sand, trace of roots/topsoil/slag, moist				SS-2	5
4				1.52 / 97.07			
6	2	SANDY SILT: Light brown, trace of clay/gravel, moist, compact to dense				SS-3	22
8						SS-4	32
10	3	SAND/SILTY SAND: Brown, seam/pockets of silt/sandy silt, moist to very moist, very dense to dense		2.79 / 95.80		SS-5	100+
12	4						
14							
16	5	End of borehole at 5.03m		5.03 / 93.56		SS-6	36
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32	10						
34							







Groundwater Depth (m): on completion: Dry/ On September 6, 2023: 3.41m

DRAWN: A.M | LOGGED: D.G. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW6 SHEET. 1 of 1

PROJECT NO.: FE-P# 23-13246/47

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 39 Pine Street North., Port Hope, ON

DRILLING METHOD: CME-75 Solid Stem

DRILLING DATE: 25 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				98.58			
0	0	TOPSOIL ~102mm				SS-1	7
2		FILL: Dark brown to brown silty sand, trace to some topsoil/slag, occ. pieces of porcelain, trace of gravel, moist					
4	1					SS-2	9
6	2					SS-3	7
8				2.28 / 96.30			
		SAND/SILTY SAND: Brown, seam/pockets of silt/sandy silt, moist, dense to very dense				SS-4	32
10	3					SS-5	100+
12							
	4	Wet below 4m					
14							
16	5					SS-6	61
18							
20	6					SS-7	60
				6.55 / 92.03			
22	7	End of borehole at 6.55m					
24							
26	8						
28							
30	9						
32	10						
34							

PENETRATION TESTING (SPT) ▲ 20 40 60 80

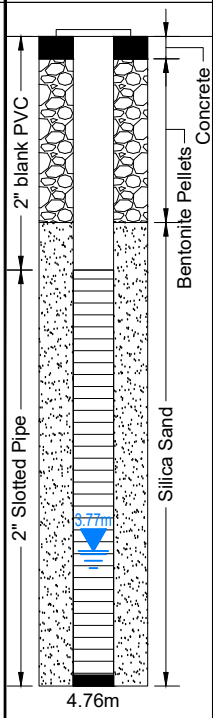
SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

SS-2	7.0%
SS-3	7.2%
SS-4	17.6%
SS-5	17.1%
SS-6	18.1%
SS-7	18.7%

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry/ On September 6, 2023: 3.77m

DRAWN: A.M LOGGED: D.G. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MP1 SHEET. 1 of 1

PROJECT NO.: FE-23-13248

PROJECT NAME: SOIL, GROUNDWATER & METHANE INVESTIGATION

LOCATION: 39 Pine Street North, Port Hope, ON

DRILLING METHOD: CME-75 Solid Stem

DRILLING DATE: 25 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				102.69			
0	0	ASPHALT ~76mm					
		FILL: Black foundry slag, occ. pieces of porcelain, moist		0.14 / 102.55			
		FILL: Dark brown to brown silty sand, trace to some slag, pockets of sandy silt, trace roots/topsoil, moist					
2	1						
4							
6	2						
8							
10	3			3.10 / 99.59			
		SANDY SILT: Brown, some clay, trace gravel, very moist to wet, stiff					
		End of borehole at 3.51m		3.51 / 99.18			
12	4						
14							
16	5						
18							

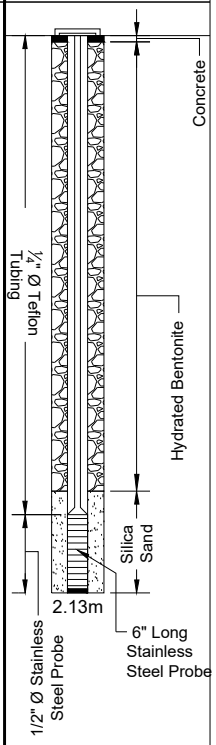
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry

DRAWN: A.M. LOGGED: R.R. CHECKED: A.A.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MP2 SHEET. 1 of 1

PROJECT NO.: FE-23-13248

PROJECT NAME: SOIL, GROUNDWATER & METHANE INVESTIGATION

LOCATION: 39 Pine Street North, Port Hope, ON

DRILLING METHOD: CME-75 Solid Stem

DRILLING DATE: 25 August, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				102.97			
0	0	TOPSOIL ~150mm					
		FILL: Dark brown to brown silty sand, trace to some topsoil/roots, moist		0.76 / 102.21			
2		SILTY SAND/SANDY SILT: Brown, moist to very moist, compact to very dense					
4	1						
6	2						
8							
10	3						
12		SAND: Brown, some silt, seam of silt/silty sand, occ. trace of gravel, wet, dense		3.50 / 99.47			
14	4						
16							
18	5	End of borehole at 5.03m		5.03 / 97.94			

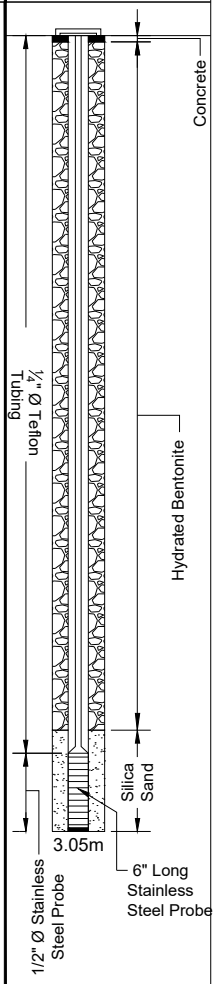
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry

DRAWN: A.M. LOGGED: R.R. CHECKED: A.A.

APPENDIX C – CERTIFICATES OF ANALYSIS

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Tel:
Email:
Attn.:

F.E. Job #: 23-1761
Project Name: Landfill Investigation
Project ID: FE-P 23-13248
Date Sampled: 25-Aug-2023
Date Received: 28-Aug-2023
Date Reported: 5-Sep-2023
Location: 39 Pine Street North
Port Hope, ON

Certificate of Analysis

Analyses	Matrix	Quantity	Date Extracted	Date Analyzed	Lab SOP	Method Reference
Metals	Leachate	2	5-Sep-23	5-Sep-23	Metals F-18	EPA 200.2/200.8
Cyanide	Leachate	2	5-Sep-23	5-Sep-23	Cyanide F-24	SM 4500-CN-I
Fluoride	Leachate	2	28-Aug-23	5-Sep-23	Fluoride F-11	SM 4500-F-D
Nitrate/Nitrite	Leachate	2	28-Aug-23	5-Sep-23	Nitrate F-13	SM 4500-NO3-E
VOCs	Leachate	2	28-Aug-23	31-Aug-23	VOCs F-6	SM 6200B
PAHs	Leachate	2	1-Sep-23	1-Sep-23	PAHs F-4	SM 6410B
PCBs	Leachate	2	28-Aug-23	28-Aug-23	PCBs F-5	SM 6630B

Fisher Environmental Laboratories is accredited by CALA (the Canadian Association for Laboratory Accreditation Inc.) for specific parameters as required by Ontario Regulation 153/04. All analytical testing has been performed in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act published by Ontario Ministry of the Environment.

Authorized by:

Roger Lin, Ph. D., C. Chem.
Laboratory Manager

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Ronggen (Roger) Lin
CHEMIST

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	TCLP
Sample Description:	2 Soil Sample(s)

Parameter	***23-1761-1*** MW1 3.05-3.20m	***23-1761-2*** MW2 4.57-5.03m				**Leachate Quality Criteria** [1]
	Concentration (mg/L)					
Metals in Leachate						
Arsenic	<0.1	<0.1				2.5
Barium	0.18	0.30				100.0
Boron	<0.1	<0.1				500.0
Cadmium	<0.1	<0.1				0.5
Chromium	<0.1	<0.1				5.0
Lead	<0.1	<0.1				5.0
Mercury	<0.01	<0.01				0.1
Selenium	<0.1	<0.1				1.0
Silver	<0.1	<0.1				5
Uranium	<0.1	<0.1				10.0
Anions in Leachate						
Cyanide	<0.1	<0.1				20.0
Fluoride	0.2	0.2				150.0
Nitrate & Nitrite	<0.03	<0.03				1000.0

< result obtained was below RL (Reporting Limit).

[1] **TCLP Ontario Regulation 558/00** (Toxicity Characteristic Leaching Procedure, amendment to Ontario Regulation 347- Waste Management) under the Ontario Environmental Protection Act, March 31,2001.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(mg/L)		Recovery (%)		Recovery (%)	
Metals in Leachate						
Arsenic	<0.1	0.1	116	80-120	92	70-130
Barium	<0.1	0.1	100	80-120	90	70-130
Boron	<0.1	0.1	111	80-120	124	70-130
Cadmium	<0.1	0.1	101	80-120	98	70-130
Chromium	<0.1	0.1	119	80-120	73	70-130
Lead	<0.1	0.1	97	80-120	92	70-130
Mercury	<0.01	0.01	105	80-120	89	70-130
Selenium	<0.1	0.1	102	80-120	84	70-130
Silver	<0.1	0.1	101	80-120	98	70-130
Uranium	<0.1	0.1	101	80-120	97	70-130
Anions in Leachate						
Cyanide	<0.1	0.1	104	80-120	103	70-130
Fluoride	<0.1	0.1	91	80-120	78	70-130
Nitrate & Nitrite	<0.03	0.03	96	80-120	97	70-130

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
Metals in Leachate						
Arsenic	21.2	0-30				
Barium	2.6	0-30				
Boron	18.9	0-30				
Cadmium	0.0	0-30				
Chromium	3.2	0-30				
Lead	5	0-30				
Mercury	0.0	0-30				
Selenium	0	0-30				
Silver	0.0	0-30				
Uranium	2.2	0-30				
Anions in Leachate						
Cyanide	0.0	0-30				
Fluoride	1.7	0-30				
Nitrate & Nitrite	4.4	0-30				

LEGEND:
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	TCLP
Sample Description:	2 Soil Sample(s)

Parameter	***23-1761-1*** MW1 3.05-3.20m	***23-1761-2*** MW2 4.57-5.03m				**Leachate Quality Criteria** [1]
	Concentration (mg/L)					
VOCs in Leachate						
1.1 Dichloroethylene	<0.05	<0.05				1.4
1.2 Dichlorobenzene	<0.05	<0.05				20.0
1.2 Dichloroethane	<0.05	<0.05				0.5
1.4 Dichlorobenzene	<0.05	<0.05				0.5
Benzene	<0.05	<0.05				0.5
Carbon Tetrachloride	<0.05	<0.05				0.5
Chlorobenzene	<0.05	<0.05				8.0
Chloroform	<0.05	<0.05				10.0
Dichloromethane	<0.05	<0.05				5.0
MEK	<0.5	<0.5				200.0
Tetrachloroethylene	<0.05	<0.05				3.0
Trichloroethylene	<0.05	<0.05				5.0
Vinyl Chloride	<0.1	<0.1				0.2
PAHs in Leachate						
Benzo(a)pyrene	<0.001	<0.001				0.001
PCBs in Leachate						
PCBs	<0.02	<0.02				0.3

< result obtained was below RL (Reporting Limit).

[1] **TCLP Ontario Regulation 558/00** (Toxicity Characteristic Leaching Procedure, amendment to Ontario Regulation 347- Waste Management) under the Ontario Environmental Protection Act, March 31,2001.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(mg/L)		Recovery (%)		Recovery (%)	
VOCs in Leachate						
1.1 Dichloroethylene	<0.05	0.05	98	70-130	109	70-130
1.2 Dichlorobenzene	<0.05	0.05	81	70-130	95	70-130
1.2 Dichloroethane	<0.05	0.05	112	70-130	112	70-130
1.4 Dichlorobenzene	<0.05	0.05	83	70-130	95	70-130
Benzene	<0.05	0.05	109	70-130	107	70-130
Carbon Tetrachloride	<0.05	0.05	118	70-130	91	70-130
Chlorobenzene	<0.05	0.05	98	70-130	99	70-130
Chloroform	<0.05	0.05	111	70-130	112	70-130
Dichloromethane	<0.05	0.05	77	70-130	88	70-130
MEK	<0.5	0.5	82	70-130	115	70-130
Tetrachloroethylene	<0.05	0.05	87	70-130	104	70-130
Trichloroethylene	<0.05	0.05	99	70-130	104	70-130
Vinyl Chloride	<0.1	0.1	77	70-130	110	70-130
PAHs in Leachate						
Benzo(a)pyrene	<0.001	0.001	94	50-140	99	50-140
PCBs in Leachate						
PCBs	<0.02	<0.02	121	60-140	112	60-140

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
VOCs in Leachate						
1.1 Dichloroethylene	0.0	0-30				
1.2 Dichlorobenzene	0.0	0-30				
1.2 Dichloroethane	0.0	0-30				
1.4 Dichlorobenzene	0.0	0-30				
Benzene	0.0	0-30				
Carbon Tetrachloride	0.0	0-30				
Chlorobenzene	0.0	0-30				
Chloroform	0.0	0-30				
Dichloromethane	0.0	0-30				
MEK	0.0	0-30				
Tetrachloroethylene	0.0	0-30				
Trichloroethylene	0.0	0-30				
Vinyl Chloride	0.0	0-30				
PAHs in Leachate						
Benzo(a)pyrene	0.0	0-30				
PCBs in Leachate						
PCBs	0.0	0-30				

LEGEND:
AR - Acceptable Range obtained from historical data.
RPD - Relative Percent Difference.

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F.E. Job #: 23-1898
Project Name: Landfill Investigation
Project ID: FE-P 23-13248
Date Sampled: 23-Sep-2023
Date Received: 29-Sep-2023
Date Reported: 6-Oct-2023
Location: 39 Pine Street North
Port Hope, ON

Certificate of Analysis

Analyses	Matrix	Quantity	Date Extracted	Date Analyzed	Lab SOP	Method Reference
Metals	Water	2	N/A	29-Sep-23	Metals F-18	EPA 200.2/200.8
Mercury	Water	2	29-Sep-23	29-Sep-23	Metals F-18	EPA 200.2/200.8
Chromium (VI)	Water	2	N/A	4-Oct-23	Chromium VI F-9	SM 3500-Cr
VOCs	Water	3	N/A	29-Sep-23	VOCs F-6	SM 6200-B
PHCs (F1 & BTEX)	Water	2	N/A	29-Sep-23	PHCs F-7	CCME CWS
PHCs (F2 - F4)	Water	2	3-Oct-23	3-Oct-23	PHCs F-7	CCME CWS
PAHs	Water	2	4-Oct-23	6-Oct-23	PAHs F-4	SM 6410B
PCBs	Water	2	3-Oct-23	3-Oct-23	PCBs F-5	SM 6630C
Chloride	Water	2	N/A	4-Oct-23	Chloride F-20	SM 4500-Cl-E

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Authorized by:

Roger Lin, Ph. D., C. Chem.
Laboratory Manager

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Ronggen (Roger) Lin
CHEMIST

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Metals, Mercury, Chromium VI, VOCs, PHCs, PAHs, PCBs, Chloride
Sample Description:	3 Water Sample(s)

Parameter	***23-1898-1*** MW2	***23-1898-2*** MW2 Field Duplicate				**Ground Water Standards** [1]
	Concentration (µ g/L)					
Metals in Water						
Antimony	<0.5	<0.5				6
Arsenic	<1	<1				25
Barium	274	275				1,000
Beryllium	<0.5	<0.5				4
Boron	26	26				5,000
Cadmium	<0.5	<0.5				2.7
Chromium	<10	<10				50
Cobalt	<1	<1				3.8
Copper	<5	<5				87
Lead	<1	<1				10
Molybdenum	<0.5	<0.5				70
Nickel	17	17				100
Selenium	5.4	<5				10
Silver	<0.3	<0.3				1.5
Thallium	<0.5	<0.5				2
Uranium	3.3	3.4				20
Vanadium	0.98	<0.5				6.2
Zinc	7.3	7.2				1,100

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition.
All Types of Property Use.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(µg/L)		Recovery (%)		Recovery (%)	
Metals in Water						
Antimony	<0.5	0.5	99	80-120	96	70-130
Arsenic	<1	1	101	80-120	92	70-130
Barium	<2	2	100	80-120	91	70-130
Beryllium	<0.5	0.5	103	80-120	92	70-130
Boron	<10	10	100	80-120	107	70-130
Cadmium	<0.5	0.5	100	80-120	92	70-130
Chromium	<10	10	100	80-120	82	70-130
Cobalt	<1	1	98	80-120	80	70-130
Copper	<5	5	103	80-120	77	70-130
Lead	<1	1	96	80-120	96	70-130
Molybdenum	<0.5	0.5	100	80-120	97	70-130
Nickel	<1	1	99	80-120	76	70-130
Selenium	<5	5	104	80-120	95	70-130
Silver	<0.3	0.3	104	80-120	74	70-130
Thallium	<0.5	0.5	100	80-120	100	70-130
Uranium	<2	2	100	80-120	109	70-130
Vanadium	<0.5	0.5	100	80-120	94	70-130
Zinc	<5	5	102	80-120	84	70-130

LEGEND:

RL - Reporting Limit

LCS - Laboratory Control Sample

MS - Matrix Spike (in case the original sample contains >100ppb, the matrix spike is no longer reliable, the data of reagent spike are entered instead)

AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
Metals in Water						
Antimony	13.3	0-20				
Arsenic	0.0	0-20				
Barium	0.4	0-20				
Beryllium	0.0	0-20				
Boron	8.9	0-20				
Cadmium	0.0	0-20				
Chromium	0.0	0-20				
Cobalt	0.6	0-20				
Copper	2.3	0-20				
Lead	7.0	0-20				
Molybdenum	1.5	0-20				
Nickel	1.8	0-20				
Selenium	12.6	0-20				
Silver	0.0	0-20				
Thallium	0.0	0-20				
Uranium	0.0	0-20				
Vanadium	0.0	0-20				
Zinc	0.4	0-20				

LEGEND:
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, Mercury, Chromium VI, VOCs, PHCs, PAHs, PCBs, Chloride
Sample Description:	3 Water Sample(s)

Parameter	***23-1898-1*** MW2	***23-1898-2*** MW2 Field Duplicate				**Ground Water Standards [1]**
	Concentration (µg/g)					
Mercury in Water	<0.1	<0.1				(1) 0.29

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition.
All Types of Property Use.

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**MS**	**AR**
	(µg/g)		**Recovery (%)**		**Recovery (%)**	
Mercury in Water	<0.1	0.1	100	80-120	85	70-130

Parameter	**Duplicate**	**AR**				
	RPD (%)					
Mercury in Water	19.2	0-30				

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike (in case the original sample contains >100ppb, the matrix spike is no longer reliable, the data of reagent spike are entered instead)
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, Mercury, Chromium VI, VOCs, PHCs, PAHs, PCBs, Chloride
Sample Description:	3 Water Sample(s)

Parameter	***23-1898-1*** MW2	***23-1898-2*** MW2 Field Duplicate				**Ground Water Standards [1]**
	Concentration (µ g/L)					
Chromium VI in Water	<10	<10				25

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition.
All Types of Property Use.

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**MS**	**AR**
	(µg/L)		**Recovery (%)**		**Recovery (%)**	
Chromium VI in Water	<10	10	92	80-120	93	70-130

Parameter	**Duplicate**	**AR**				
	RPD (%)					
Chromium VI in Water	0.0	0-20				

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike (in case the original sample contains >100ppb, the matrix spike is no longer reliable, the data of reagent spike are entered instead)
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, Mercury, Chromium VI, VOCs, PHCs, PAHs, PCBs, Chloride
Sample Description:	3 Water Sample(s)

Parameter	***23-1898-1*** MW2	***23-1898-2*** MW2 Field Duplicate	***23-1898-3*** Travel Blank			**Ground Water Standards [1]**
	Concentration (µ g/L)					
VOCs in Water						
Acetone	<30	<30	<30			2700
Benzene	<0.5	<0.5	<0.5			5
Bromodichloromethane	<2	<2	<2			16
Bromoform	<5	<5	<5			25
Bromomethane	<0.5	<0.5	<0.5			0.89
Carbon Tetrachloride	<0.2	<0.2	<0.2			(5) 0.79
Chlorobenzene	<0.5	<0.5	<0.5			30
Chloroform	<1	<1	<1			(22) 2.4
Dibromochloromethane	<2	<2	<2			25
1,2-Dichlorobenzene	<0.5	<0.5	<0.5			3
1,3-Dichlorobenzene	<0.5	<0.5	<0.5			59
1,4-Dichlorobenzene	<0.5	<0.5	<0.5			1
Dichlorodifluoromethane	<2	<2	<2			590
1,1-Dichloroethane	<0.5	<0.5	<0.5			5
1,2-Dichloroethane	<0.5	<0.5	<0.5			(5) 1.6
1,1-Dichloroethylene	<0.5	<0.5	<0.5			(14) 1.6
c-1,2-Dichloroethylene	<0.5	<0.5	<0.5			(17) 1.6
t-1,2-Dichloroethylene	<0.5	<0.5	<0.5			(17) 1.6
1,2-Dichloropropane	<0.5	<0.5	<0.5			5
1,3-Dichloropropene (cis-+trans-)	<0.5	<0.5	<0.5			0.5
Ethylbenzene	<0.5	<0.5	<0.5			2.4
Ethylene Dibromide	<0.2	<0.2	<0.2			0.2
Hexane (n)	<5	<5	<5			(520) 51
Methyl Ethyl Ketone	<20	<20	<20			1800
Methyl Isobutyl Ketone	<20	<20	<20			640
Methyl tert-butyl Ether	<2	<2	<2			15
Methylene Chloride	<5	<5	<5			50
Styrene	<0.5	<0.5	<0.5			5.4
1,1,1,2-Tetrachloroethane	<0.5	<0.5	<0.5			1.1
1,1,2,2-Tetrachloroethane	<0.5	<0.5	<0.5			1
Tetrachloroethylene	<0.5	<0.5	<0.5			(17) 1.6
Toluene	<0.5	<0.5	<0.5			24
1,1,1-Trichloroethane	<0.5	<0.5	<0.5			200
1,1,2-Trichloroethane	<0.5	<0.5	<0.5			(5) 4.7
Trichloroethylene	<0.5	<0.5	<0.5			(5) 1.6
Trichlorofluoromethane	<5	<5	<5			150
Vinyl Chloride	<0.5	<0.5	<0.5			(1.7) 0.5
Xylenes	<0.5	<0.5	<0.5			300
Surrogate Recovery (%)						
Dibromofluoromethane	82	79	83			50-140
Toluene-d8	93	85	101			50-140
4-Bromofluorobenzene	73	81	60			50-140

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.

Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition.

All Types of Property Use. ( ) Standard value in brackets applies to medium and fine textured soils.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(ug/L)		Recovery (%)		Recovery (%)	
VOCs in Water						
Acetone	<30	30	121	50-140	116	50-140
Benzene	<0.5	0.5	81	60-130	77	50-140
Bromodichloromethane	<2	2	85	50-140	94	50-140
Bromoform	<5	5	97	60-130	106	50-140
Bromomethane	<0.5	0.5	80	50-140	73	50-140
Carbon Tetrachloride	<0.2	0.2	77	60-130	102	50-140
Chlorobenzene	<0.5	0.5	89	60-130	68	50-140
Chloroform	<1	1	113	60-130	90	50-140
Dibromochloromethane	<2	2	98	60-130	93	50-140
1,2-Dichlorobenzene	<0.5	0.5	125	60-130	85	50-140
1,3-Dichlorobenzene	<0.5	0.5	112	60-130	83	50-140
1,4-Dichlorobenzene	<0.5	0.5	121	60-130	87	50-140
Dichlorodifluoromethane	<2	2	113	50-140	74	50-140
1,1-Dichloroethane	<0.5	0.5	88	60-130	84	50-140
1,2-Dichloroethane	<0.5	0.5	92	60-130	97	50-140
1,1-Dichloroethylene	<0.5	0.5	92	60-130	70	50-140
c-1,2-Dichloroethylene	<0.5	0.5	98	60-130	71	50-140
t-1,2-Dichloroethylene	<0.5	0.5	81	60-130	76	50-140
1,2-Dichloropropane	<0.5	0.5	82	60-130	77	50-140
1,3-Dichloropropene (cis-+trans-)	<0.5	0.5	85	60-130	78	50-140
Ethylbenzene	<0.5	0.5	83	60-130	84	50-140
Ethylene Dibromide	<0.2	0.2	89	60-130	98	50-140
Hexane (n)	<5	5	71	60-130	73	50-140
Methyl Ethyl Ketone	<20	20	127	50-140	107	50-140
Methyl Isobutyl Ketone	<20	20	115	50-140	86	50-140
Methyl tert-butyl Ether	<2	2	125	60-130	80	50-140
Methylene Chloride	<5	5	105	60-130	78	50-140
Styrene	<0.5	0.5	95	60-130	70	50-140
1,1,1,2-Tetrachloroethane	<0.5	0.5	98	60-130	94	50-140
1,1,2,2-Tetrachloroethane	<0.5	0.5	112	60-130	116	50-140
Tetrachloroethylene	<0.5	0.5	92	60-130	76	50-140
Toluene	<0.5	0.5	73	60-130	80	50-140
1,1,1-Trichloroethane	<0.5	0.5	108	60-130	99	50-140
1,1,2-Trichloroethane	<0.5	0.5	71	60-130	99	50-140
Trichloroethylene	<0.5	0.5	102	60-130	81	50-140
Trichlorofluoromethane	<5	5	121	50-140	98	50-140
Vinyl Chloride	<0.5	0.5	105	50-140	72	50-140
Xylenes	<0.5	0.5	93	60-130	76	50-140
Surrogates						
Parameter	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**
Dibromofluoromethane	83	60-140	91	60-140	91	60-140
Toluene-d8	88	60-140	84	60-140	93	60-140
4-Bromofluorobenzene	138	60-140	86	60-140	109	60-140

LEGEND:

RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
VOCs in Water						
Acetone	0.0	0-30				
Benzene	8.7	0-30				
Bromodichloromethane	0.0	0-30				
Bromoform	0.0	0-30				
Bromomethane	0.0	0-30				
Carbon Tetrachloride	0.0	0-30				
Chlorobenzene	0.0	0-30				
Chloroform	0.0	0-30				
Dibromochloromethane	0.0	0-30				
1,2-Dichlorobenzene	0.0	0-30				
1,3-Dichlorobenzene	0.0	0-30				
1,4-Dichlorobenzene	0.0	0-30				
Dichlorodifluoromethane	0.0	0-30				
1,1-Dichloroethane	0.0	0-30				
1,2-Dichloroethane	0.0	0-30				
1,1-Dichloroethylene	0.0	0-30				
c-1,2-Dichloroethylene	0.0	0-30				
t-1,2-Dichloroethylene	0.0	0-30				
1,2-Dichloropropane	0.0	0-30				
1,3-Dichloropropene (cis-+trans-)	0.0	0-30				
Ethylbenzene	0.0	0-30				
Ethylene Dibromide	0.0	0-30				
Hexane (n)	0.0	0-30				
Methyl Ethyl Ketone	0.0	0-30				
Methyl Isobutyl Ketone	0.0	0-30				
Methyl tert-butyl Ether	0.0	0-30				
Methylene Chloride	0.0	0-30				
Styrene	0.0	0-30				
1,1,1,2-Tetrachloroethane	0.0	0-30				
1,1,2,2-Tetrachloroethane	0.0	0-30				
Tetrachloroethylene	0.0	0-30				
Toluene	14	0-30				
1,1,1-Trichloroethane	0.0	0-30				
1,1,2-Trichloroethane	0.0	0-30				
Trichloroethylene	0.0	0-30				
Trichlorofluoromethane	0.0	0-30				
Vinyl Chloride	0.0	0-30				
Xylenes	7.8	0-30				
Surrogates						
Parameter	**Recovery (%)**	**AR**				
Dibromofluoromethane	78	60-140				
Toluene-d8	76	60-140				
4-Bromofluorobenzene	66	60-140				

LEGEND:
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, Mercury, Chromium VI, VOCs, PHCs, PAHs, PCBs, Chloride
Sample Description:	3 Water Sample(s)

Parameter	***23-1898-1*** MW2	***23-1898-2*** MW2 Field Duplicate				**Ground Water Standards [1]**
	Concentration (µ g/L)					
BTEX in Water						
Benzene	<0.5	<0.5				5
Toluene	<0.5	<0.5				24
Ethylbenzene	<0.5	<0.5				2.4
Xylenes	<0.5	<0.5				300
PHCs (F1-F4) in Water						
$F1_{-BTEX}$ (C_6 - C_{10})	<25	<25				750
F2 (C_{10} - C_{16})	<100	<100				150
F3 (C_{16} - C_{34})	<100	<100				500
F4 (>C_{34})	<100	<100				500
Chromatogram descends to baseline by nC50 ? (Yes/No)	Yes	Yes				
Surrogate Recovery (%)						
Dibromofluoromethane	82	79				60-140
Toluene-d8	93	85				60-140
4-Bromofluorobenzene	73	81				60-140

F_{4G} (gravimetric heavy hydrocarbons) cannot be added to the C_6 to C_{50} hydrocarbons.

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.

Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition.

All Types of Property Use.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(ug/L)		Recovery (%)		Recovery (%)	
BTEX in Water						
Benzene	<0.5	0.5	81	60-130	77	50-140
Toluene	<0.5	0.5	73	60-130	80	50-140
Ethylbenzene	<0.5	0.5	83	60-130	84	50-140
Xylenes	<0.5	0.5	93	60-130	76	50-140
PHC (F1-F4) in Water						
$F1_{-BTEX}$ (C_6 - C_{10})	<25	25	85	60-140	114	60-140
F2 (C_{10} - C_{16})	<100	100	101	60-140	90	60-140
F3 (C_{16} - C_{34})	<100	100	100	60-140	93	60-140
F4 (>C_{34})	<100	100	100	60-140	87	60-140
Surrogates						
Parameter	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**
Dibromofluoromethane	83	60-140	91	60-140	91	60-140
Toluene-d8	88	60-140	84	60-140	93	60-140
4-Bromofluorobenzene	138	60-140	86	60-140	109	60-140

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
BTEX in Water						
Benzene	8.7	0-30				
Toluene	14	0-30				
Ethylbenzene	0.0	0-30				
Xylenes	7.8	0-30				
PHC (F1-F4) in Water						
$F1_{-BTEX}$ (C_6 - C_{10})	3.3	0-30				
F2 (C_{10} - C_{16})	0.0	0-30				
F3 (C_{16} - C_{34})	0.0	0-30				
F4 (>C_{34})	0.0	0-30				
Surrogates						
Parameter	**Recovery (%)**	**AR**				
Dibromofluoromethane	78	60-140				
Toluene-d8	76	60-140				
4-Bromofluorobenzene	66	60-140				

LEGEND:
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, Mercury, Chromium VI, VOCs, PHCs, PAHs, PCBs, Chloride
Sample Description:	3 Water Sample(s)

Parameter	***23-1898-1*** MW2	***23-1898-2*** MW2 Field Duplicate				**Ground Water Standards [1]**
	Concentration (µ g/L)					
PAHs in Water						
Naphthalene	<2	<2				11
2-Methylnaphthalene	<1	<1				3.2
1-Methylnaphthalene	<1	<1				
Acenaphthylene	<1	<1				1
Acenaphthene	<1	<1				4.1
Fluorene	<0.5	<0.5				120
Phenanthrene	<0.1	<0.1				1
Anthracene	<0.1	<0.1				2.4
Fluoranthene	<0.4	<0.4				0.41
Pyrene	<0.2	<0.2				4.1
Benz [a] anthracene	<0.2	<0.2				1
Chrysene	<0.1	<0.1				0.1
Benzo [b] fluoranthene	<0.1	<0.1				0.1
Benzo [k] fluoranthene	<0.1	<0.1				0.1
Benzo [a] pyrene	<0.01	<0.01				0.01
Indeno [1,2,3-cd] pyrene	<0.2	<0.2				0.2
Dibenz [a,h] anthracene	<0.2	<0.2				0.2
Benzo [g,h,i] perylene	<0.2	<0.2				0.2
Surrogate Recovery (%)						
Naphthalene-d8	100	97				50-140
Phenanthrene-d10	103	109				50-140
Chrysene-d12	104	94				50-140

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition.
All Types of Property Use.

QA/QC Report

Parameter	Blank	RL	LCS	AR	MS	AR
	(µg/L)		Recovery (%)		Recovery (%)	
PAHs in Water						
Naphthalene	<2	2	103	50-140	106	50-140
2-Methylnaphthalene	<1	1	105	50-140	108	50-140
1-Methylnaphthalene	<1	1	106	50-140	109	50-140
Acenaphthylene	<1	1	87	50-140	87	50-140
Acenaphthene	<1	1	107	50-140	108	50-140
Fluorene	<0.5	0.5	105	50-140	103	50-140
Phenanthrene	<0.1	0.1	96	50-140	98	50-140
Anthracene	<0.1	0.1	87	50-140	88	50-140
Fluoranthene	<0.4	0.4	94	50-140	94	50-140
Pyrene	<0.2	0.2	96	50-140	96	50-140
Benz [a] anthracene	<0.2	0.2	79	50-140	76	50-140
Chrysene	<0.1	0.1	87	50-140	90	50-140
Benzo [b] fluoranthene	<0.1	0.1	93	50-140	95	50-140
Benzo [k] fluoranthene	<0.1	0.1	93	50-140	98	50-140
Benzo [a] pyrene	<0.01	0.01	80	50-140	81	50-140
Indeno [1,2,3-cd] pyrene	<0.2	0.2	87	50-140	92	50-140
Dibenz [a,h] anthracene	<0.2	0.2	53	50-140	55	50-140
Benzo [g,h,i] perylene	<0.2	0.2	84	50-140	87	50-140
Surrogates						
Parameter	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**
Naphthalene-d8	108	50-140	98	50-140	110	50-140
Phenanthrene-d10	78	50-140	88	50-140	93	50-140
Chrysene-d12	82	50-140	102	50-140	108	50-140

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range

QA/QC Report

Parameter	Duplicate	AR				
	RPD (%)					
PAHs in Water						
Naphthalene	0.0	0-30				
2-Methylnaphthalene	0.0	0-30				
1-Methylnaphthalene	0.0	0-30				
Acenaphthylene	0.0	0-30				
Acenaphthene	0.0	0-30				
Fluorene	0.0	0-30				
Phenanthrene	0.0	0-30				
Anthracene	0.0	0-30				
Fluoranthene	0.0	0-30				
Pyrene	0.0	0-30				
Benz [a] anthracene	0.0	0-30				
Chrysene	0.0	0-30				
Benzo [b] fluoranthene	0.0	0-30				
Benzo [k] fluoranthene	0.0	0-30				
Benzo [a] pyrene	0.0	0-30				
Indeno [1,2,3-cd] pyrene	0.0	0-30				
Dibenz [a,h] anthracene	0.0	0-30				
Benzo [g,h,i] perylene	0.0	0-30				
Surrogates						
Parameter	**Recovery (%)**	**AR**				
Naphthalene-d8	97	50-140				
Phenanthrene-d10	109	50-140				
Chrysene-d12	94	50-140				

LEGEND:
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, Mercury, Chromium VI, VOCs, PHCs, PAHs, PCBs, Chloride
Sample Description:	3 Water Sample(s)

Parameter	***23-1898-1*** MW2	***23-1898-2*** MW2 Field Duplicate				**Ground Water Standards [1]**
	Concentration (µg/L)					
PCBs in Water	<1.0	<1.0				3
Surrogate Recovery (%)						
Decachlorobiphenyl	90	89				60-140

< result obtained was below RL (Reporting Limit).

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition.
All Types of Property Use.

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**MS**	**AR**
	(µg/L)		**Recovery (%)**		**Recovery (%)**	
PCBs in Water	<1.0	1.0	107	60-140	119	60-140
Surrogates						
Parameter	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**	**Recovery (%)**	**AR**
Decachlorobiphenyl	95	60-140	109	60-140	118	60-140

Parameter	**Duplicate**	**AR**				
	RPD (%)					
PCBs in Water	0.0	0-40				
Surrogates						
Parameter	**Recovery (%)**	**AR**				
Decachlorobiphenyl	84	60-140				

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Metals, Mercury, Chromium VI, VOCs, PHCs, PAHs, PCBs, Chloride
Sample Description:	3 Water Sample(s)

Parameter	***23-1898-1*** MW2	***23-1898-2*** MW2 Field Duplicate				**Ground Water Standards [1]**
	Concentration (µg/L)					
Chloride in Water	**1,128,000**	**1,193,000**				790,000

< result obtained was below RL (Reporting Limit).

Bold: Result exceeds limit noted in Ground Water Standard.

[1] MOE - Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition.
All Types of Property Use.

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**MS**	**AR**
	(µg/L)		**Recovery (%)**		**Recovery (%)**	
Chloride in Water	<100	100	103	80-120	100	70-130

Parameter	**Duplicate**	**AR**				
	RPD (%)					
Chloride in Water	2.6	0-20				

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range
RPD - Relative Percent Difference