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HYDROGEOLOGICAL INVESTIGATION

900 LAKESHORE ROAD WEST,

MISSISSAUGA, ONTARIO, L5H 1H9

Prepared for:

1000570027 Ontario Inc.

Project No. FH24-14065_V3

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TABLE OF CONTENTS

1. INTRODUCTION

Fisher Engineering Limited was retained by 1000570027 Ontario Inc. to carry out a Hydrogeological Investigation for the proposed redevelopment at the property located at 900 Lakeshore Road West, Mississauga, Ontario, hereinafter referred to as the 'Site'.

The purpose of the Hydrogeological Investigation was to evaluate groundwater conditions with respect to the re-development of the site.

The Hydrogeological Review has been prepared in accordance with the Ontario Water Resources Act, Ontario Regulation 387/04 and Municipal/Regional Sewer discharge bylaws.

The report has been prepared specifically and solely for the proposed development regarding hydrogeological aspects for design and construction.

The report was revised to reflect changes to the site plan. Changes to the report with respect to previous versions are as follows:

1. Three underground levels are proposed instead of two.
2. Construction groundwater dewatering rate of 26.81 m^3/day instead of 19.52 m^3/day.
3. Permanent groundwater discharge rate of 21.17 m^3/day instead of 13.88 m^3/day.

2. SITE AND PROJECT DESCRIPTIONS

Site Settings

For the purpose of this report the Lakeshore Road West was assumed to run in an east to west direction. The site is located on the south side of Lakeshore Road West, approximately 1.75km west of the intersection with Mississauga Road in Mississauga and is bounded by Lakeshore Road West to the north, Richard's Memorial Park to the east, residential properties to the south, beyond which is Lake Ontario and Whittler Crescent to the west.

At the time of the investigation the subject property was occupied by a one & half-storey residence with detached garage and in-ground swimming pool. Several retaining walls/steps/stairs were observed connecting areas of higher elevations to the lower patio/inground pool areas.

Topography

Site grades drop significantly across the site changing from approximately 89.2m asl towards the front/middle to 79.4m near the southern apex. Elevations at borehole locations change from approximately 86.63m asl at BH1, located at the northeast corner to 82.55m asl at BH103 located at the eastern side of the site.

Proposed Development

It was understood that the development will consist of the construction of a 10-storey condominium building, with mechanical penthouse and three underground parking levels. Based on the draft site plans, prepared by KFA architects + planners inc., dated 09.01.2024, ground floor elevation will be 86.00m asl with the main P3 level at 77.20m asl. A lower P3 section extends 2.60m below the main P3 level or elevation of 74.60m asl.

3. SCOPE OF HYDROGEOLOGICAL INVESTIGATION

The Hydrogeological Investigation works were required to:

1) Establish groundwater conditions for the design of dewatering works, if required, prior to construction of the proposed building.
2) Determine the need for permanent drainage and
3) Conduct calculations/analyses of the groundwater quantity and quality to be used for the necessary application for permits prior to proceeding with construction dewatering and design of permanent drainage, if necessary.

The scope of this work generally consisted of the following:

- **Drilling/locating Monitoring Wells.** Drilling of monitoring wells and reviewing / compiling the borehole logs and onsite / laboratory testing.
- **Data Evaluation.** Evaluating the results of soil types, groundwater static levels, ground surface elevation, groundwater quality, flow direction and other available hydrogeological data for the Site and their potential impact on the proposed development.
- **Hydraulic Conductivity Tests.** Conduct single well response tests in six (6) monitoring wells and record groundwater level drawdown and recovery to model/calculate hydraulic conductivity.

- **Groundwater Quality Analysis.** Carry out laboratory analyses on soil and groundwater to determine compliance with the Ontario Reg. Mun of Peel Sanitary Bylaw #53-2010 and Peel Storm Sewer By-law #53-201 (Apr 2011).
- **Groundwater Level Monitoring.** Conduct long-term monitoring of the groundwater levels to determine seasonal highwater levels.
- **Hydrogeological Report.** Prepare and submit a report detailing the findings and recommendations of the Hydrogeological Investigation.

4. FIELD AND LABORATORY INVESTIGATION

Public and private utilities clearances were carried out by Ontario One-Call and Utility Marx, on behalf of Fisher, prior to drilling.

Subsurface Investigation

Subsurface exploration for the initial Hydrogeological Investigation was carried out concurrent with drilling for the Geotechnical Investigation and a Phase Two ESA on November 6, 7 and 8, 2023, during which five (5) boreholes (BH1 – BH5) were advanced to approximate depths varying from 10.74m to 17.53m below prevailing grades. Monitoring wells were installed in the five boreholes (MW1 to MW5) and used for groundwater level monitoring and sampling. The monitoring wells were constructed using 50mm diameter PVC pipes with 3.05m (10') long screens.

Drilling for the current hydrogeological and geotechnical investigations was conducted on September 3, 2024 during which three (3) boreholes were advanced to depths of 12.19m to 17.45m below prevailing grade. The three boreholes were instrumented as monitoring wells.

A track mounted drill rig equipped with solid stem augers, supplied by Terra Firma Services, was used for drilling under direct supervision of Fisher Engineering personnel. Soil samples were taken at regular intervals using a split–spoon sampler advanced by means of the Standard Penetration Test (SPT) which was conducted in general accordance with ASTM Specification D1586. Rock coring was carried out in BH1 and BH103. All recovered soil samples were placed in clear, sealable plastic bags in the field and transported to Fisher Engineering laboratory for further examination, characterization and laboratory analyses.

A description of the subsurface conditions encountered at each borehole location is presented in Appendix B - Log of Boreholes.

Laboratory Analyses

The soil samples were taken to the Fisher Engineering laboratory for final visual assessment and classification. The samples were tested and classified in general accordance with the Unified Soil Classification System, ASTM D 2487 and Standard Practice for Classification of Soil for Engineering Purposes.

Representative soil samples were submitted to the laboratory for analyses as follows:

- Forty (40) soil samples from BH1, BH2, BH3 & BH5 and twenty (20) from BH102 & BH103 were selected and submitted to the laboratory for moisture content analyses.
- Seven (7) samples from BH1, BH2 & BH5.
- Seven (7) samples from BH1, BH2, BH5, TH1 & TH2 and ten (10) from BH101 & BH103 were submitted for hydrometer tests.

The laboratory results, which are presented in Appendix C, are consistent with the field description for subsurface soils discussed in Section 5.0.

The soil samples recovered during the current investigation will be stored in the Fisher Engineering laboratory for a period of 30 days after submitting this report and will be discarded thereafter unless instructed otherwise by the client

Site Survey

Elevations at borehole/monitoring well locations were interpolated from a topography/survey plan, prepared by Tarasick McMillan Kubicki Limited, dated November 08, 2023, which was provided to Fisher during the investigation.

5. SUBSOIL CONDITIONS

Surface and subsurface conditions encountered at borehole locations are shown in Appendix B - Log of Boreholes, and are summarized in the following sections. The records include stratification at borehole locations along with detailed soil descriptions. Variations in soil stratification may occur and should be expected between borehole locations and elsewhere on the site.

Fill/Asphalt/Granular Material/Topsoil – Layers of asphalt/granular materials were found at the surface of BH1 while topsoil was encountered at the surface of BH2 to BH5 and BH101 to BH103. Fill soils were encountered below the surficial layers. Fill composition varied from dark brown to brown sand/silty sand

with trace of roots/topsoil. Fill extended to approximate depths below prevailing grades/elevations as shown in Table 1.

Table 1: Fill Depths and Elevations

Borehole No.	BH1	BH2	BH3	BH4	BH5	TH1	TH2	BH101	BH102	BH103
Surface Elevation (m asl)	86.63	85.68	86.60	83.20	82.63	85.98	86.81	89.10	85.39	82.55
Depth of Borehole (m)	17.53	12.29	13.72	10.97	10.74	1.98	1.98	13.82	12.19	17.45
Elevation at Bottom of Borehole (m asl)	69.10	73.39	72.88	72.23	71.89	84.00	84.83	75.28	73.20	65.10
Depth of Fill (m)	1.37	1.37	1.37	1.52	1.17	1.52	1.52	1.91	3.66	1.67
Elevation at Bottom of Fill (m asl)	85.26	84.31	85.23	81.68	81.46	84.46	85.29	87.19	81.73	80.88
Depth to bedrock surface(m)	12.19	12.19	13.72	9.30	10.67	n/a	n/a	12.04	10.36	10.52
Elevation at surface of Bedrock (m asl)	74.44	73.49	72.88	73.90	71.96			77.06	75.03	72.03

Brown Sand/ Silty Sand – Layers of native, brown to grey, moist, compact to very dense sand/silty sand were found underlying the fill soils of BH1 to BH5 and BH101 extending to approximate depths of 2.59m (BH5) to 5.18m (BH101).

Grey Silt/Sandy Silt – The brown to grey silty sand layers were underlain by grey, moist, dense to very dense silt to sandy silt extending to depths of 5.18m in BH101 to 9.76m in BH3.

Grey Clayey Silt/Clayey Silt Till – Layers of grey clayey silt to clayey silt till, of variable thickness/depth (less than 1.12m thick in BH103 to 2.6m thick in BH4), and consistency (firm to very stiff), were encountered below the grey to brown silt to sandy silt. Moisture content of the clayey silt varied from 11.5% to 23.1% in the samples tested.

Grey Sandy Silt Till – Deposits of grey, moist, dense to very dense sandy silt till were encountered beneath the grey clayey silt of BH2, BH3, BH5, BH102 and BH103 extending to approximate depths of 8.84m (BH103) to 13.72m (BH3).

Grey Shale/Weathered Shale – Weathered shale bedrock was found underlying the grey clayey silt/clayey silt till of BH1, BH4 & BH101 and grey sandy silt till/silty sand of BH2, BH5, BH102 & BH103. Shale was found to be hard in consistency and dry within the depths explored. Rock coring carried out in BH1 and BH103 indicated that the upper 1.3m of shale is severely weathered.

RQD values of 85% to 100% below depth of 14.48m in BH1 and 12.79m in BH103 indicate very good to excellent quality of bedrock. Core samples retrieved from BH1 yielded compressive strength of 13 MPa & 21.2MPa at depths of 14m and 16.5m. One core sample from BH103 yielded compressive strength of 24.8MPa at depths of 15.85m below prevailing grade. Inferred bedrock surface elevation are shown in Table 1.

6. HYDROGEOLOGICAL STUDY

A hydrogeological study for the subject site was conducted based on the boreholes/wells' exploration, observation and site/laboratory tests. Groundwater details from the five (5) monitoring wells were used in the Hydrogeological Study. The monitoring wells were constructed with 3.05m (10') long, 51mm diameter PVC slotted screen pipes, with the bases at approximate depths below existing grade as shown in Appendix B. Clean silica sand packs were placed around each well screen which was isolated with bentonite extending to slightly below existing grade.

Standing water was observed in the open boreholes BH1, BH3 and BH5 at depths of 9.14m to 10.67m below prevailing grades (elevations of 72.12m to 77.49m asl) on completion of drilling while the other boreholes were observed to be dry. No caving in of soils was observed during drilling.

6.1 Hydrogeological Conditions

Review of the available surficial geological and hydrogeological information for the area shows that the site is underlain generally with Glacial Lake Deposits consisting predominantly of Lake Iroquois, shallow water deposits of sand and silty sand (Quaternary Geology, Toronto and Surrounding Area, Ontario Geological Survey Map 2204, 1998). Underlying bedrock is represented by shale interbedded siltstone, and minor limestone of the Georgian Bay Formation. Depth to bedrock in the area is generally less than 5m.

The subsoils and hydrogeological conditions were observed and recorded during both the Geotechnical and Hydrogeological Investigations. Based on the boreholes/wells' exploration, the saturated soil layers

on the site, below the fill material, are dominated by grey, sandy silt to clayey silt, with occasional layers of sand in some areas, underlain by shale at further depths.

All monitoring wells were purged/developed and allowed to fully recover prior to carrying out groundwater level measurements and sampling. Groundwater levels were monitored bi-weekly for three months to determine seasonal highwater levels. Measured groundwater depths and elevations are summarized in Table 2.

Table 2: Groundwater Depths and Elevations

Monitoring Wells		MW1	MW2	MW3	MW4	MW5	MW101	MW102	MW103
Surface Elevation, m asl		86.63	85.68	86.60	83.20	82.63	89.10	85.39	82.55
Depth of Well, m bgs		7.62	7.62	7.62	6.10	4.57	10.18	10.49	14.41
Elevation at well base, m asl		79.01	78.06	78.98	77.10	78.06	78.92	74.90	68.14
In open BH on completion	GW level, m bgs	9.14	dry	10.67	dry	10.51	dry	dry	dry
	GW Ele, m asl	77.49		75.93		72.12			
28-Nov-23	GW level, m bgs	3.17	3.96	4.41	2.42	3.21	n/a		
	GW Ele, m asl	83.46	81.72	82.19	80.78	79.42			
6-Dec-23	GW level, m bgs	2.96	3.89	4.18	2.16	3.11			
	GW Ele, m asl	83.67	81.79	82.42	81.04	79.52			
10-Dec-23	GW level, m bgs	3.36	4.53	4.70	2.66	3.79			
	GW Ele, m asl	83.27	81.15	81.90	80.54	78.84			
15-Jan-24	GW level, m bgs	3.39	4.58	4.79	2.61	3.84			
	GW Ele, m asl	83.24	81.10	81.81	80.59	78.79			
3-Apr-24	GW level, m bgs	3.37	4.05	4.10	2.35	3.65			
	GW Ele, m asl	83.26	81.63	82.50	80.85	78.98			
17-Apr-24	GW level, m bgs	3.35	3.86	3.91	2.31	3.54			
	GW Ele, m asl	83.28	81.82	82.69	80.89	79.09			

Monitoring Wells		MW1	MW2	MW3	MW4	MW5	MW101	MW102	MW103
Surface Elevation, m asl		86.63	85.68	86.60	83.20	82.63	89.10	85.39	82.55
Depth of Well, m bgs		7.62	7.62	7.62	6.10	4.57	10.18	10.49	14.41
8-May-24	GW level, m bgs	3.32	3.74	3.77	2.26	3.01			
	GW Ele, m asl	83.31	81.94	82.83	80.94	79.62			
22-May-24	GW level, m bgs	3.30	3.52	3.56	2.11	2.65			
	GW Ele, m asl	83.33	82.16	83.04	81.09	79.98			
5-Jun-24	GW level, m bgs	3.31	3.51	3.53	2.07	2.31			
	GW Ele, m asl	83.32	82.17	83.07	81.13	80.32			
19-Jun-24	GW level, m bgs	3.30	3.50	3.51	2.10	2.30			
	GW Ele, m asl	83.33	82.18	83.09	81.10	80.33			
29-Aug-24	GW level, m bgs	3.37	3.54	3.90	2.09	2.39			
	GW Ele, m asl	83.26	82.14	82.70	81.11	80.24			
9-Sep-24	GW level, m bgs	3.31	4.85	5.11	3.86	3.67	4.11	2.86	2.43
	GW Ele, m asl	83.32	80.83	81.49	79.34	78.96	84.99	82.53	80.12

Comments on Table 2:

The following general comments regarding groundwater conditions at the site are based on the groundwater level data and the Geotechnical Investigation:

- Static groundwater levels were measured at depths of 2.07m to 5.11m bgs (elevations vary from 78.79m to 84.99m asl).
- Groundwater flow is towards southeast with a gradient of approximately 4.5%.
- The nearest body of surface water is Lake Ontario located approximately 300m southeast of the site.
- The site is located in a developed residential/commercial neighbourhood, with water supply via municipal water system, and with no active domestic water wells in the area.
- Groundwater levels on the site are being monitored biweekly to determine seasonal highwater levels.

6.2 Hydraulic Conductivity K Modeling Results

Single Well Response Tests

Single well response tests (SWRT) were conducted in MW1, MW3 and MW4 on November 28, 2023 and in MW101, MW102 and MW103 on September 5, 2024. The upper water bearing soils consist mainly of layers of grey silt/sandy silt in some areas and were assumed to be unconfined, homogenous, isotropic and of uniform thickness. Monitoring well MW103 was screened in the upper region of shale. It was also assumed that the wells fully penetrated the water bearing layers. Data from the single well response tests were used to calculate the hydraulic conductivity values using Luthin's method.

Details of the hydraulic conductivity analyses are presented in Appendix C and summarized in Table 3.

Table 3: Summary of Single Well Response Tests and Hydraulic Conductivity Results

Test Wells	Well Surface Elevation (m asl)	Groundwater Depth (m)	Screen Elevation (m asl)	Variance of water head created (m)	30 Minutes/	Hydraulic Conductivity, K (Luthin's Method)	
					Recovery Percentage	m/s	m/day
MW1	86.63	3.17	79.01 – 82.10	3.16	31 mins / 42%	1.06E-06	0.092
MW3	86.60	5.31	78.98 – 86.60	2.51	31 mins / 10%	6.05E-07	0.052
MW4	83.20	3.20	77.10 – 80.15	3.27	31 mins / 15%	3.03E-07	0.026
MW101	89.10	4.09	78.92 – 81.97	5.96	31 mins / 3%	9.08E-08	0.008
MW102	85.39	2.85	74.90 – 77.95	7.545	31 mins / 6%	6.05E-08	0.005
MW103	82.55	2.40	68.14 – 71.19	14.155	31 mins / 92%	1.36E-07	0.012

6.3 Grain Size Analysis for Hydraulic Conductivity K

Representative samples from BH1, BH11, BH13, BH101 and BH103 were selected from depths associated with the footing/slab on grade locations for the underground levels or change in soil stratigraphy and submitted to Fisher Engineering laboratory for grain size distribution and hydrometer analyses. The results for the grain size distribution and hydrometer analyses are presented in Appendix C.

The effective D_{10} sizes obtained from the Grain Size Distribution Graph were used to estimate the hydraulic conductivity (K) of the overburden soils using Hazen's expression, Equation 1:

$$K=10^{-2} D^2_{10} (m/s) \qquad \text{Equation 1}$$

The hydraulic conductivity values at various depths, based on grain size, are summarized in Table 4. The estimated k values are consistent with those obtained during the single well response tests.

Table 4: Hydraulic Conductivity Estimated from Grain Size Analyses

Location	Depth of soil sample (m)	Soil Classification	Estimated Hydraulic Conductivity (Hazen Number)	
			m/s	m/day
BH1	9.15 – 9.61	Silt, trace Clay, trace Sand	6.25×10^{-8}	0.0054
	10.68 – 11.13	Sandy Silt, some Clay, some Gravel	4.76×10^{-9}	0.00041
BH2	10.68 – 10.82	Clayey Silt and Sand, trace Gravel	4.23×10^{-9}	0.000365
BH3	10.68 – 11.13	Clayey Silt, trace Sand, trace Gravel	2.03×10^{-9}	0.000175
BH5	4.58 – 5.03	Silt, some Clay, trace Sand	3.24×10^{-8}	0.0028
BH101	4.58 – 5.03	Silt, some Sand, trace Clay	2.30×10^{-7}	0.02
BH101	7.63 – 8.08	Silt, some Sand, trace Clay	4.62×10^{-7}	0.04
BH101	9.15 – 9.46	Sandy Clayey Silt, trace Gravel	4.23×10^{-9}	0.00037
BH101	9.46 – 9.91	Sand and Silt, some Clay, trace Gravel	8.10×10^{-9}	0.0007
BH101	9.91 – 10.37	Sandy Silt, some Clay, some Gravel	8.10×10^{-9}	0.0007
BH101	10.68 – 11.13	Sandy Silt, some Clay, trace Gravel	7.23×10^{-9}	0.00062
BH103	4.58 – 5.03	Silt, trace Clay, trace Sand	1.60×10^{-7}	0.0138
BH103	7.63 – 8.08	Silt, some Sand, trace Clay, trace Gravel	3.97×10^{-7}	0.0343
BH103	9.15 – 9.61	Clayey Silt, some Sand, some Gravel	1.23×10^{-9}	0.00011
BH103	10.68 – 11.13	Silt & Sand, some Clay, trace Gravel	3.03×10^{-9}	0.000261
TH1	1.53 – 1.98	Silt and Sand, trace Clay, trace Gravel	5.93×10^{-7}	0.051
TH2	1.53 – 1.98	Clayey, Sandy Silt, some Gravel	1.23×10^{-7}	0.00011

7. CONSTRUCTION DEWATERING & PERMANENT DRAINAGE

7.1 Construction Dewatering

It was understood that the proposed development will have three underground levels. Based on the geotechnical engineering report and latest site drawings, conventional shallow footings would typically be located at depths of 9.8m (P3) to 12.4m (extended P3) below ground floor. It is expected however that footings will be socketed into the shale bedrock at various elevations. The following assumptions were made in estimating construction dewatering rates:

a. Average grade: 85.22m asl.
b. Lowest P3 basement floor elevation of 74.60m asl.
c. Average footing elevation at 73.60m asl.
d. Average groundwater level of 81.93m asl.
e. Gross floor /excavation area of 2,300m^2.
f. Average hydraulic conductivity 3.76 x 10^{-7}m/s based on single well response tests.

Construction groundwater dewatering flowrate of **26.81m^3/day (26,810 L/day)** was calculated for excavation of three underground levels as shown in Appendix F. Factored construction groundwater dewatering flowrate is **40.22 m^3/day (40,220 L/day)** with FS=1.5.

Seasonal High Groundwater Levels

Groundwater levels were monitored over the period November 2023 to January 2024 and April to June 2024 with additional measurements taken in August and September 2024. The average groundwater level (81.93m asl) was used to calculate construction groundwater dewatering and permanent drainage rate.

Accounting for Accumulated Precipitation

Provisions should be made to pump accumulated water from the excavation areas during construction, particularly following a period of heavy rainfall. For example, 25mm rainfall in 24 hrs may result in accumulation of up to 53m^3 in the excavated area dominated by silt/sandy silt/clayey silt with shale at greater depths. Some of this water is expected to pond based on the types of soils in the excavation area although some will be lost otherwise. A conservative accumulated volume of **15 m^3/day** may be assumed. Accumulated precipitation may be stored on site for subsequent disposal to an MECP-licensed facility. If the water is to be discharged into the public sewer system, then an application for the discharge of private water will have to be made to the Region of Peel/City of Mississauga. The water quality, at the time of

the application, will need to be ascertained to ensure compliance with the Ontario Reg. Mun of Peel Sanitary Bylaw #53-2010 and Peel Storm Sewer By-law #53-201 (Apr 2011).

The maximum construction discharge rates, taking into consideration accumulated precipitation volumes, are:

Unfactored: **41.81 m^3/day (41,810 L/day).**
Factored: **55.22 m^3/day (55,220 L/day).**

7.2 Permanent Drainage

Total permanent groundwater discharge rate of **21.17 m^3/day (21,170 L/day)** was estimated for the building with three underground parking levels. Factored discharge rates of **31.75 m^3/day (31,750 L/day)** using a FS of 1.5 are applicable.

An application for permission to discharge to the municipal/regional sewer will be required unless the subsurface structure of the building is designed as watertight.

7.3 Permit to Take Water (PTTW) and EASR

As the calculated construction dewatering flowrate (including accumulated precipitation), for the building with three underground levels, is more than 50 m^3/day, registration on the MECP Environmental Activity and Sector Registry (EASR) for Water Taking will be required. An application for permission to take water (PTTW) is not required for neither construction dewatering nor permanent drainage as the daily discharge rates are less than 400,000 and 50,000 litres respectively.

7.4 Groundwater Quality

The results of analyses for groundwater quality under the Ontario Reg. Mun of Peel Sanitary Bylaw #53-2010 and Peel Storm Sewer By-law #53-201 (Apr 2011) show compliance with all parameters except as listed in Table 5.

Table 5: Results from Sewer Use Bylaw tests

Parameters	Guide Limits		Results
	Table 1 (Sanitary Sewer)	Table 2 (Storm Sewer)	MW3
Total Suspended Solids, mg/L	350	15	21.4
Manganese, mg/L	5	0.05	0.111

Based on the results, presented in Table 5, *pre-treatment of the groundwater will be required prior to discharging to the storm sewer system*. The groundwater, in its present form, may be discharged to the public sanitary sewer system without treatment.

It should be noted however that testing of groundwater at the depths observed during the investigation would not be representative of the water that might accumulate during a high rainfall event. Any accumulation of precipitation occurring in the excavation during construction, that may require offsite discharge, will have to be tested at the time of the event to determine the quality of water for discharge.

7.5 Dewatering Influence Zone

The estimated construction dewatering quantities are based on the worst-case groundwater conditions that might occur during the construction period. Calculated dewatering influence zones are expected to be up to 11.44m from the edge of the dewatering point for the building with three underground levels.

Based on the field investigation, the soils to the proposed excavation depths are dominated by silt/sandy silt to clayey silt with shale at further depths. Based on the amount of groundwater for construction dewatering and the flowrates encountered during the field work, an active dewatering system will not be required. Consequently, dewatering influence zones will be less than calculated.

Notwithstanding the preceding, it is recommended that a pre-construction survey of adjacent structures/roads be carried out prior to dewatering/shoring construction stage. Potential adverse impact on adjacent structures, due to dewatering/shoring construction, must be assessed, quantified and reviewed during construction.

7.6 Hydrogeological Impact

The calculated dewatering influence zone will not extend beyond the property boundaries. Review of the soils show that the saturated soils for dewatering are dominated by compact to very dense silt to sandy silt till and stiff to very stiff clayey silt, with shale at further depths, in which significant groundwater induced settlement is not expected. A shoring system may be required if sufficient space is not available for safe slopes to be constructed. Dewatering, where required, will take place within the shoring enclosure. It is therefore determined that there will not be any negative impact to the natural environment, City of Mississauga/ Peel Region Sewer works nor surrounding properties due to construction dewatering, assuming the same soil profile in the vicinity of the subject site.

7.7 Impact on Wetland

It is understood that a small unevaluated wetland, located on adjacent property, southeast of the site was identified during fieldwork for an Environmental Impact Study carried out by Azimuth Environmental Consulting Inc as shown in Appendix A (Provided by Azimuth). Groundwater flow, in the shallow monitoring wells would be expected to be predominantly eastward towards Lake Ontario and would not necessarily contribute to water levels in the identified wetland. Consequently, construction groundwater dewatering would not be expected to impact water levels in the wetland.

It is however acknowledged that some amount of surface water from the site could flow onto the identified wetland. Any impact of the development on surface water contribution will need to be quantified during site grading and servicing design stage of the development. In the event that reduction in surface flow to the wetland is identified, then mitigation measures should be implemented to maintain pre-development surface flow to the wetland after construction.

8. DISCUSSION

- Hydraulic conductivity values (k) calculated from onsite single well response tests are 6.05×10^{-8} to 1.05×10^{-6} m/s (0.005 and 0.092 m/day) in the monitoring wells covering three underground levels. These are representative of the water bearing soils consisting of silt/sandy silt/clayey silt/sand and shale at the expected excavation depths.
- Total construction groundwater dewatering and permanent drainage flowrates of 26.81 m^3/day and 21.17 m^3/day were estimated for the proposed building with three underground levels. An additional discharge volume of 15m^3/day of accumulated precipitation should be accounted for during construction dewatering.
- Factors of safety of 1.5 should be applied to both construction groundwater dewatering and permanent drainage rates.
- Registration on the MECP's EASR Website for water taking will be required for construction dewatering. An application for PTTW is not required.
- An active construction dewatering system may not be required for the construction of the three underground levels.
- The groundwater quality determined by laboratory analyses revealed exceedance of storm limits for suspended solids and manganese and consequently pre-treatment of the water will be

required before it can be discharged in the public storm sewer. The groundwater, in its present form, may be discharged to the sanitary sewer without treatment.

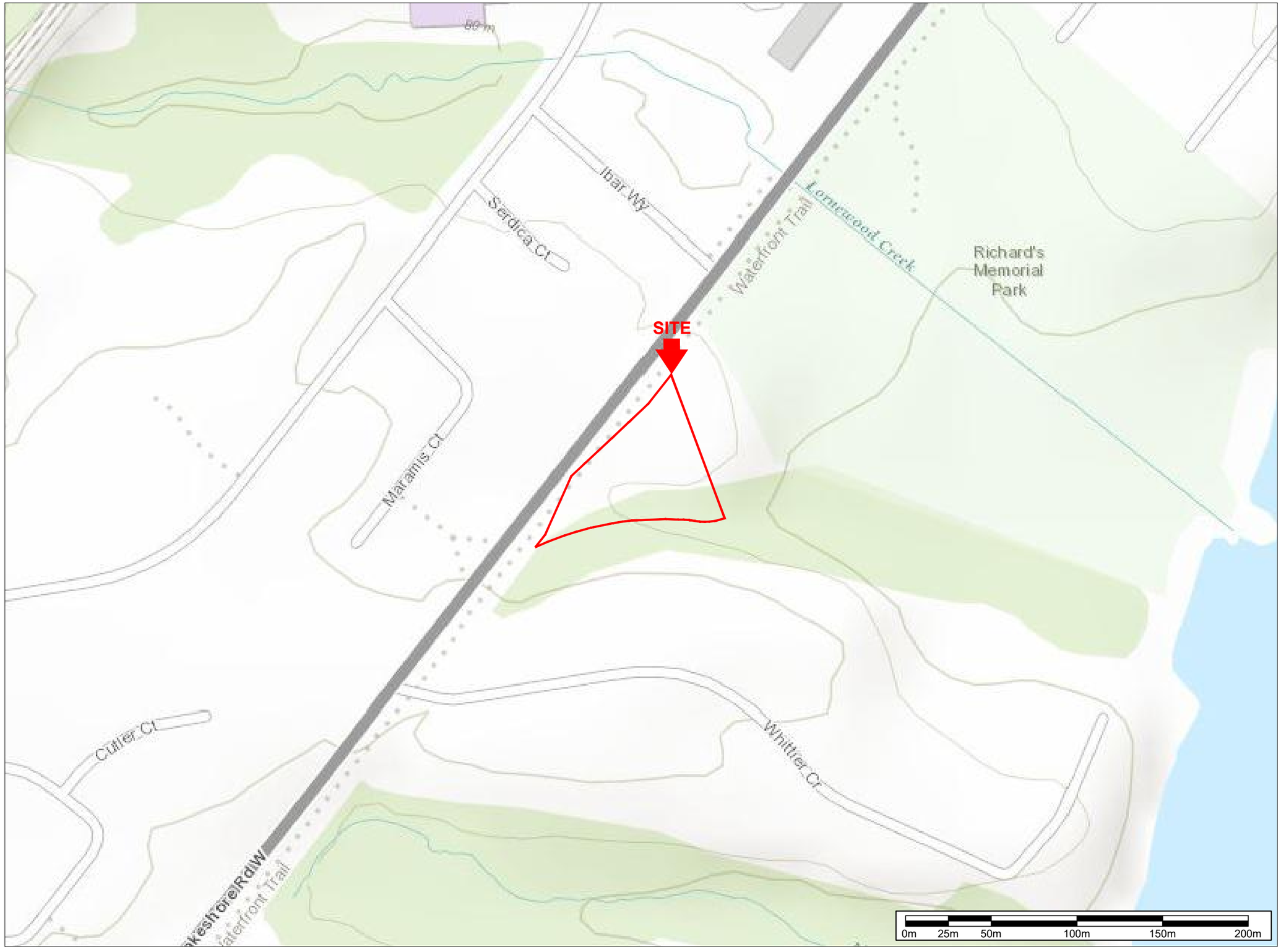
- It should be noted that if it is intended that any accumulated water, following periods of heavy rainfall, be discharged into the public sewer, then a permit to discharge would be required along with laboratory analyses to ensure compliance with City of Mississauga/Peel Region Sewer Use Bylaws.
- Construction groundwater dewatering and permanent drainage rates, given in the preceding, are based on the current site /foundation plans provided to Fisher during the investigation and common practice and our reasonable assumption for the underground level grades. The calculations may be subject to further modification when final building details and, or footing/foundation depth/elevations become available.

9. LIMITATIONS

This report is limited in scope to those items specifically referenced in the text. The discussions and recommendations presented in this report are intended only as guidance for the named client, design engineers and those directly associated with the implementation and monitoring of the project. The information on which these recommendations are based is subject to confirmation by engineering personnel at the time of construction. Localized variations in the subsoil conditions may be present between and beyond the boreholes and should be verified during construction.

As more specific subsurface information becomes available during excavations on the Site, this report should be updated. Contractors bidding on or undertaking the work should decide on their own investigations, as well as their own interpretations of the factual borehole results. This concern specifically applies to the classification of the subsurface soil and the potential reuse of these soils on/off Site. Contractors should draw their own conclusions as to how the near surface and subsurface conditions may affect them.

APPENDIX A – SITE LOCATION MAP AND PLAN



FISHER ENGINEERING

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

Tel: 905 475-7755

NORTH

N

LEGEND

SITE BOUNDARY

PROJECT NAME AND ADDRESS

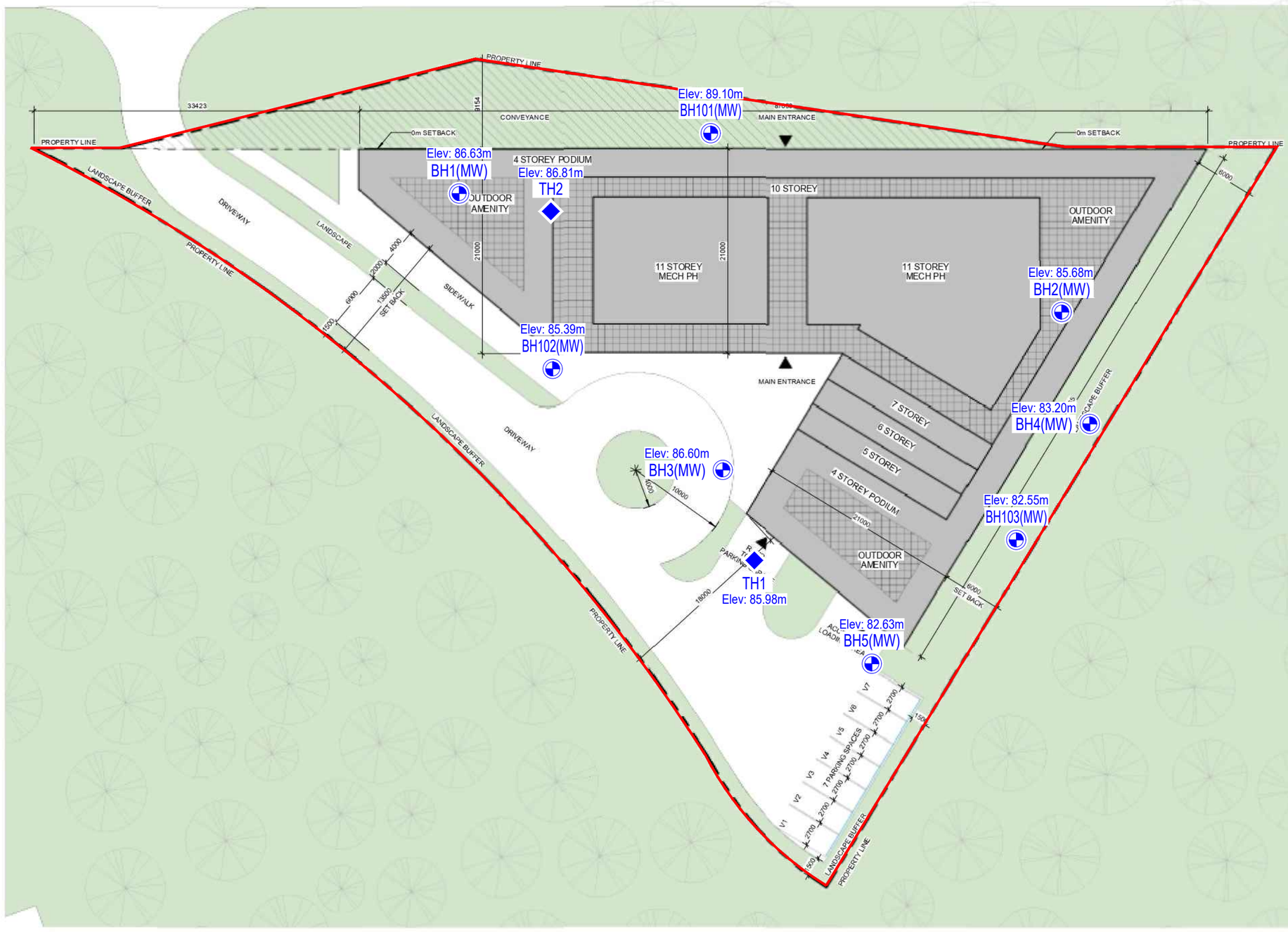
ADDITIONAL HYDROGEOLOGICAL INVESTIGATION

900 Lakeshore Road West, Mississauga, Ontario

FIGURE A1:

SITE LOCATION MAP

PROJECT NO.	SHEET NO.
FE 24-14065	A1
DATE: 9 September, 2024	
SCALE: AS SHOWN	



0m 10m 20m 30m 40m

FISHER ENGINEERING

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

Tel: 905 475-7755

NORTH

LEGEND

- SITE BOUNDARY
- BOREHOLE WITH MONITORING WELL LOCATION
- TEST HOLE LOCATION

PROJECT NAME AND ADDRESS

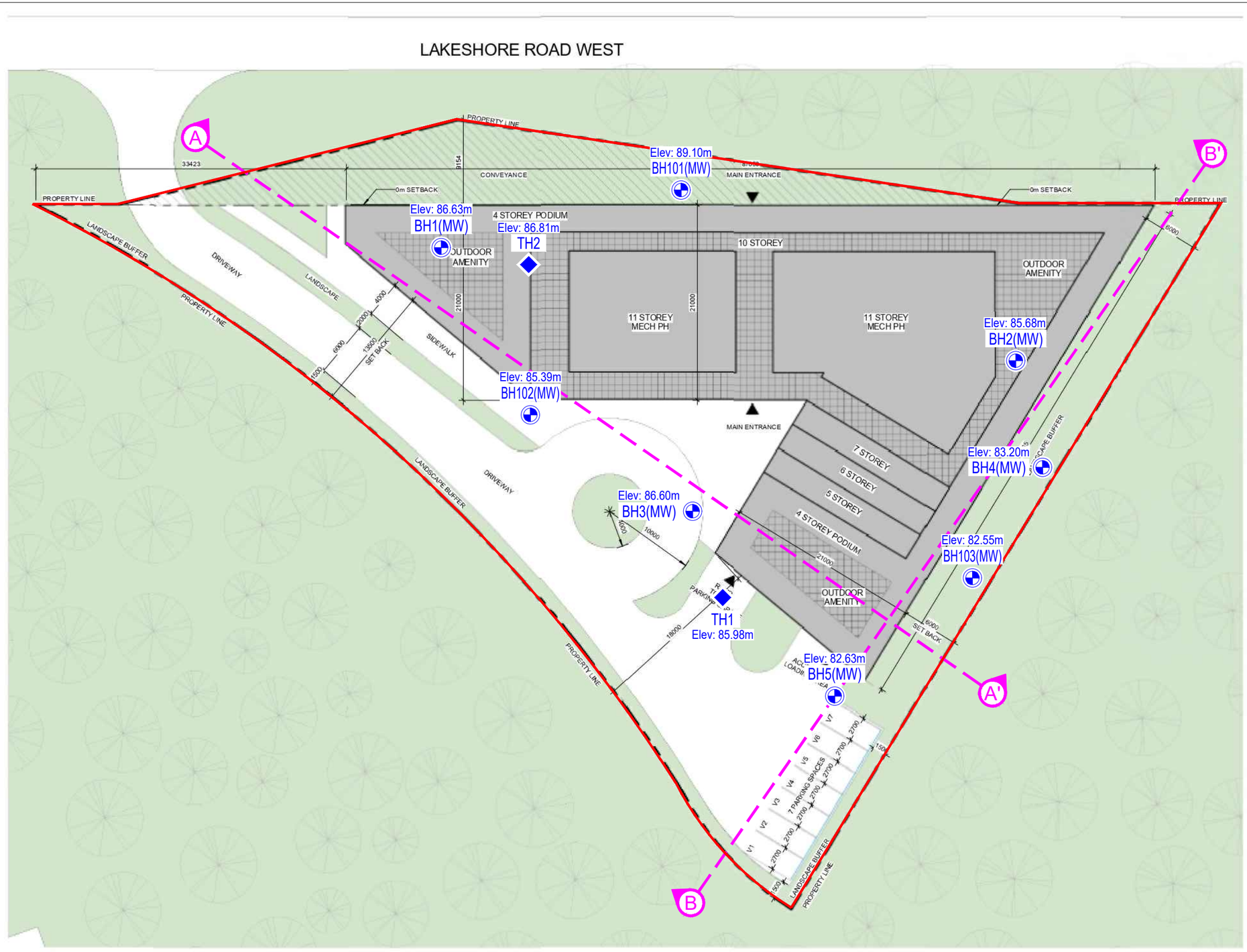
ADDITIONAL HYDROGEOLOGICAL INVESTIGATION

900 Lakeshore Road West, Mississauga, Ontario

FIGURE A2:

SITE PLAN WITH BOREHOLE LOCATIONS

PROJECT NO.	SHEET NO.
FE 24-14065	A2
DATE: 9 September, 2024	
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
- TEST HOLE LOCATION
- CROSS SECTION CUT PLANE

PROJECT NAME AND ADDRESS

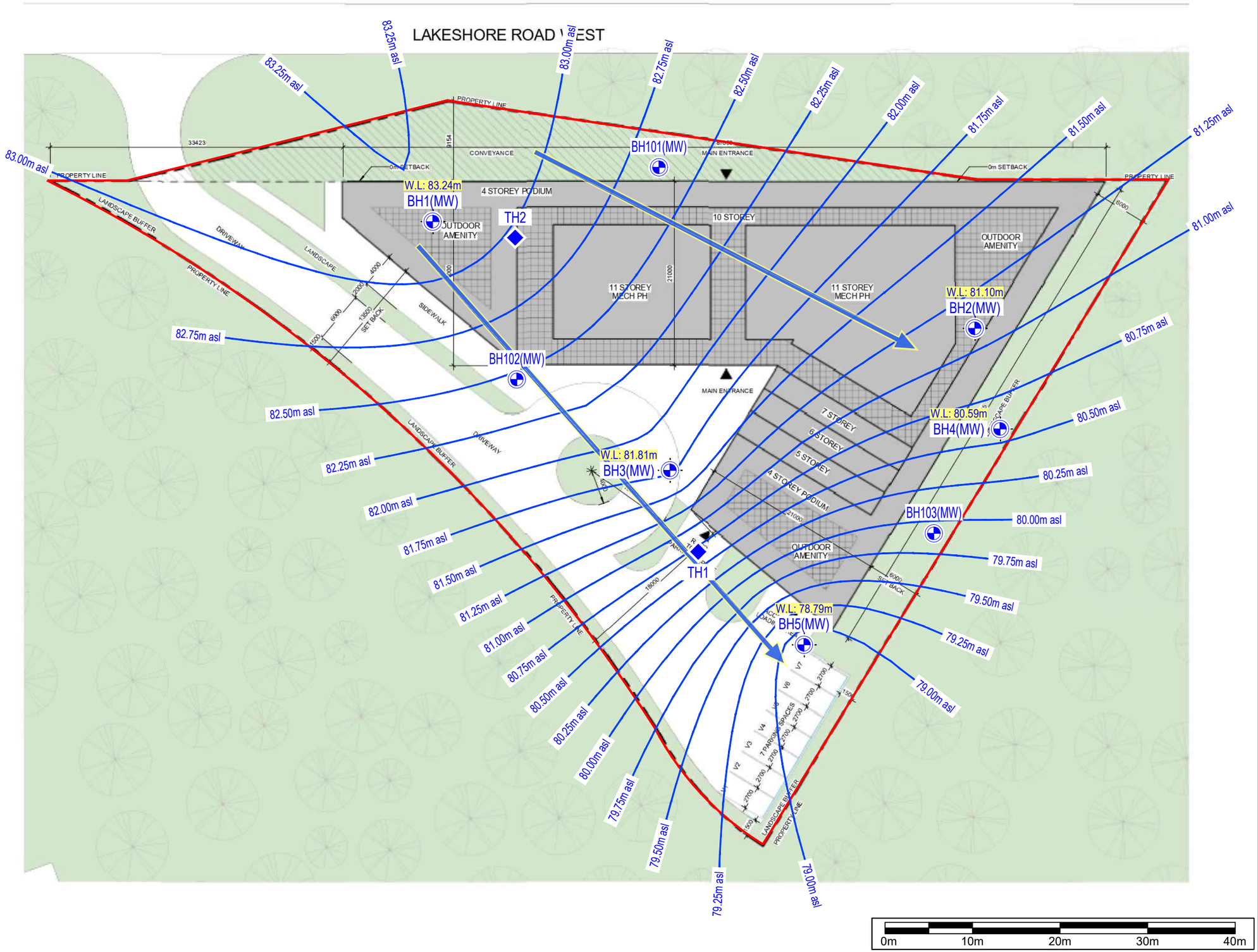
ADDITIONAL HYDROGEOLOGICAL INVESTIGATION

900 Lakeshore Road West, Mississauga, Ontario

FIGURE A3:

SITE PLAN WITH BOREHOLE LOCATIONS

PROJECT NO.	SHEET NO.
FE 24-14065	A3
DATE: 9 September, 2024	
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
- TEST HOLE LOCATION
- GROUNDWATER FLOW DIRECTION BASED ON WATER LEVEL MEASURED IN **15 January 2024**
- GROUNDWATER ELEVATION CONTOUR BASED ON WATER LEVEL MEASURED IN **15 January 2024**
- W.L: 80.59m GROUNDWATER ELEVATION (**15 January 2024**)

PROJECT NAME AND ADDRESS

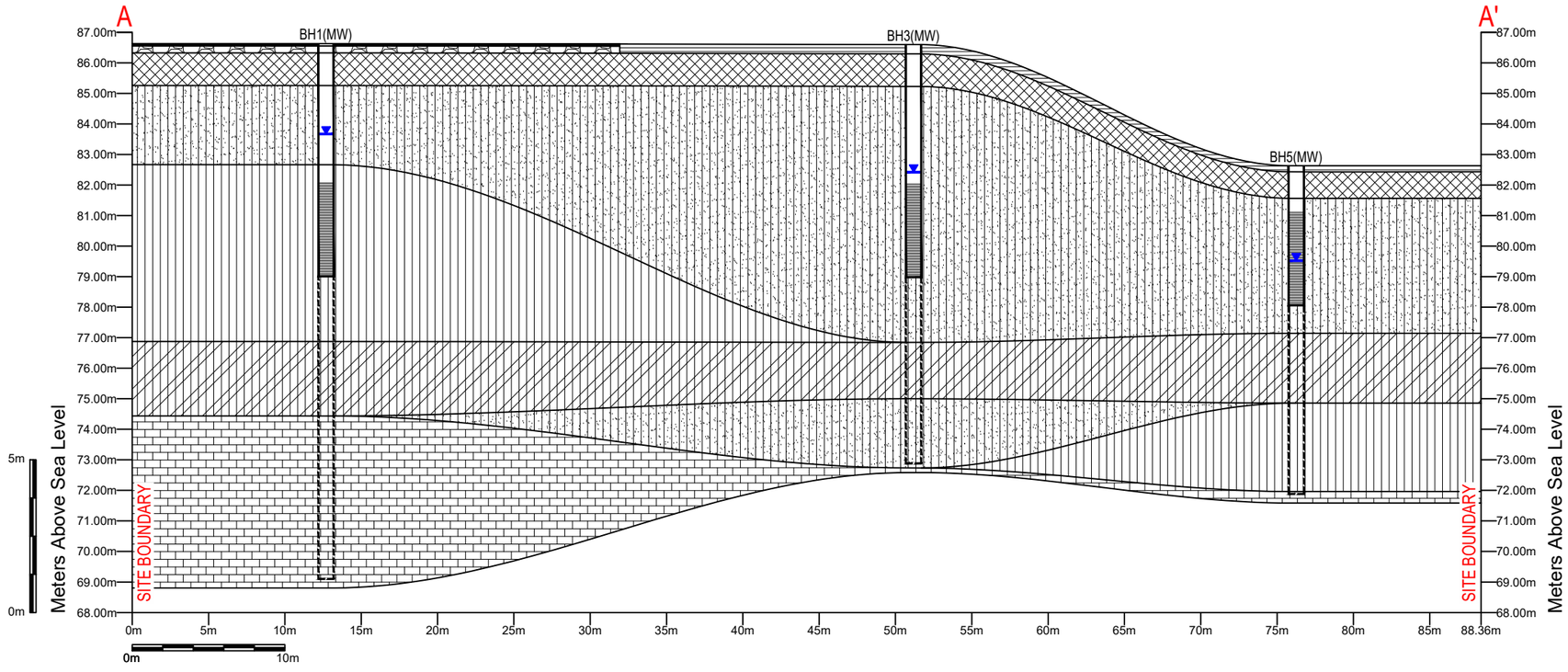
ADDITIONAL HYDROGEOLOGICAL INVESTIGATION

900 Lakeshore Road West, Mississauga, Ontario

FIGURE A4:

SITE PLAN SHOWING GROUNDWATER FLOW DIRECTIONS

PROJECT NO.	SHEET NO.
FE 24-14065	A4
DATE: 9 September, 2024	
SCALE: AS SHOWN	



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

NORTH

LEGEND

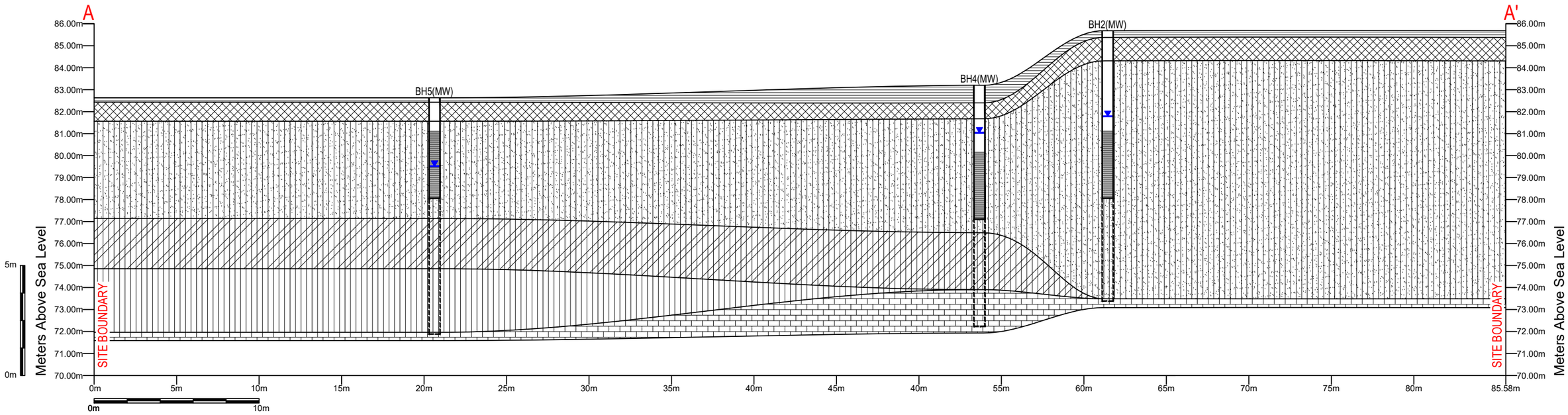
- ASPHALT
- FILL
- TOPSOIL
- GRANULAR
- SAND
- SILT
- CLAY
- BEDROCK
- GROUNDWATER POTENTIOMETRIC LEVEL

PROJECT NAME AND ADDRESS

GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

900 Lakeshore Road West, Mississauga, Ontario

PROJECT NO.	FE-23-13329/30
DATE.	19 October 2023
SCALE.	AS SHOWN
FIGURE A4.1:	**CROSS-SECTION A - A'**
SHEET NO.	A4.1



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

NORTH

LEGEND

- FILL
- TOPSOIL
- GRANULAR
- SAND
- SILT
- CLAY
- BEDROCK
- GROUNDWATER POTENTIOMETRIC LEVEL

PROJECT NAME AND ADDRESS

GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

900 Lakeshore Road West, Mississauga, Ontario

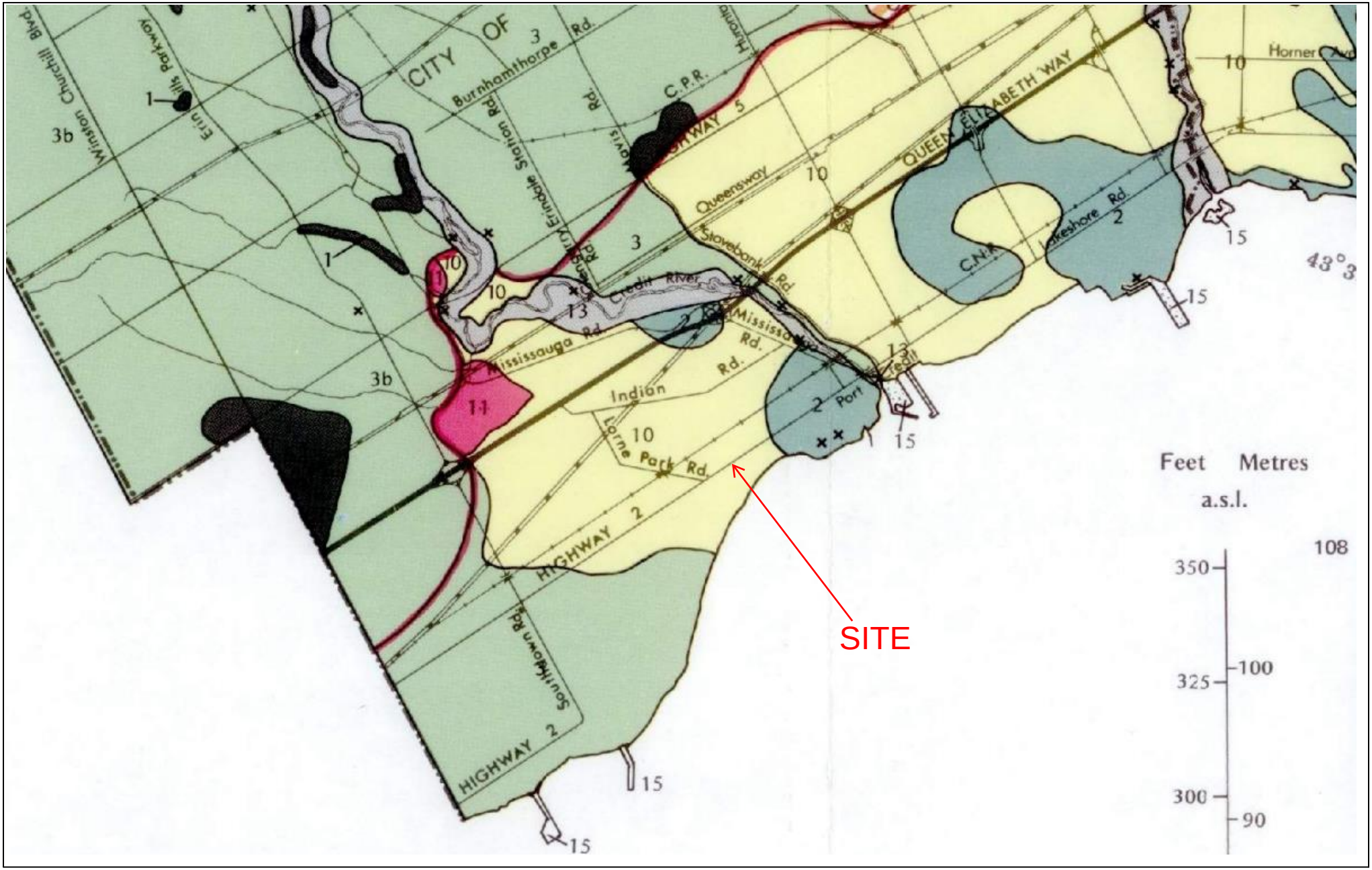
PROJECT NO.
FE-23-13329/30

DATE.
19 October 2023

SCALE.
AS SHOWN

FIGURE A4.2:
CROSS-SECTION B - B'

SHEET NO.
A4.2



FISHER ENGINEERING
400 Esna Park Dr., #15
Markham, Ontario
L3R 3K2
Tel: 905 475-7755
Fax: 905 475-7718

KEY PLAN

LEGEND

Glacial Lake Deposits: Lake Iroquois, shallow water deposits sand, silty sand

PROJECT NAME AND ADDRESS
HYDROGEOLOGICAL INVESTIGATION
900 Lakeshore Road W.,
MISSISSAUGA, ON

PROJECT NO. FH 23 - 13330
DATE JANUARY 2024
SCALE As shown

FIGURE: 5
Surficial Geology Map.

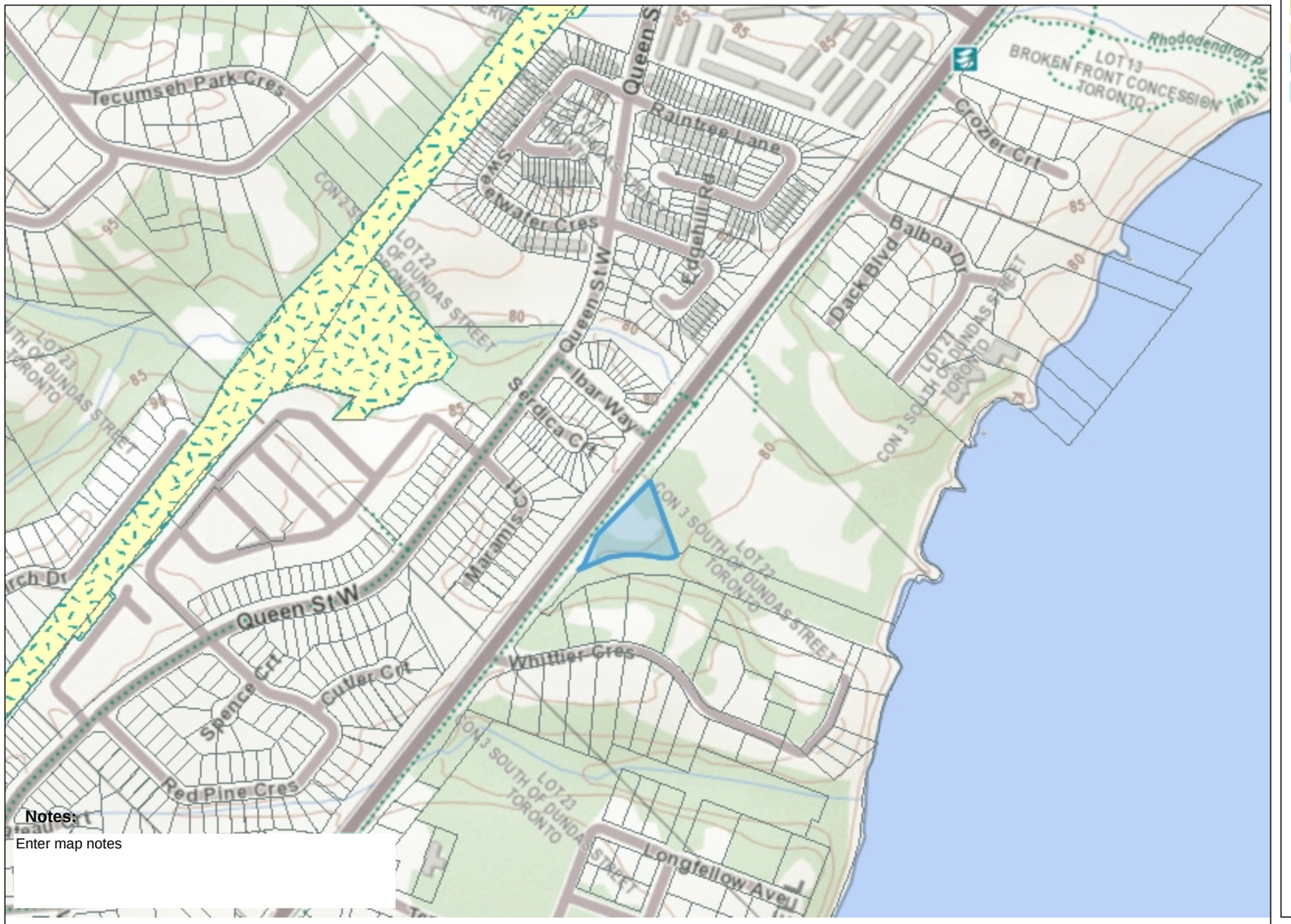
Ontario

Ministry of Natural Resources and Forestry

Make-a-Map: Natural Heritage Areas

900 Lakeshore Rd, Mississauga: Natural Heritage Map

Map created:1/16/2024



Notes:

Enter map notes

Legend

- Assessment Parcel
- ANSI
- Earth Science Provincially Significant/sciences de la terre d'importance provinciale
- Earth Science Regionally Significant/sciences de la terre d'importance régionale
- Life Science Provincially Significant/sciences de la vie d'importance provinciale
- Life Science Regionally Significant/sciences de la vie d'importance régionale
- Conservation Reserve
- Provincial Park
- Natural Heritage System

0.3 0 0.17 0.3 Kilometres

Absence of a feature in the map does not mean they do not exist in this area.

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources and Forestry(OMNRF) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

10 STOREY RESIDENTIAL BUILDING DEVELOPMENT

900 Lake Shore Road West, Mississauga, ON

DRAWING LIST:

Sheet List	
Sheet Number	Sheet Name
A000	COVER PAGE
A001	SITE STATISTICS & CONTEXT
A002	SITE PLAN
A003	SITE PLAN (GF)
A004	3D VIEWS
A102	P3 PLAN
A103	P2 PLAN
A104	P1 PLAN
A105	GROUND FLOOR PLAN
A106	2ND FLOOR PLAN
A107	3RD FLOOR PLAN
A108	4TH FLOOR PLAN
A109	5TH FLOOR PLAN
A110	6TH FLOOR PLAN
A111	7TH FLOOR PLAN
A112	8TH TO 10TH FLOOR PLAN
A113	MECHANICAL PENTHOUSE PLAN
A114	ROOF PLAN
A201	NORTH ELEVATION
A202	SOUTH ELEVATION
A203	EAST ELEVATION
A204	WEST ELEVATION
A301	SECTION AA
A302	SECTION BB
A303	SITE & ROAD SECTION
A901	SUN/SHADOW STUDY JUNE 21ST
A901.2	SUN/SHADOW STUDY JUNE 21ST
A902	SUN/SHADOW STUDY SEPTEMBER 21ST
A902.2	SUN/SHADOW STUDY SEPTEMBER 21ST
A903	SUN/SHADOW STUDY DECEMBER 21ST

Issued for MUDAP

ISSUED DATE: 29.01.2024

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POSTAL CODE:
CONTACT NAME:
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COMPANY:
ADDRESS:
POSTAL CODE:
CONTACT NAME:
PHONE #:
EMAIL:

STRUCTURAL ENGINEER
COMPANY:
ADDRESS:
POSTAL CODE:
CONTACT NAME:
PHONE #:
EMAIL:

PLANNER
COMPANY:
ADDRESS:
POSTAL CODE:
CONTACT NAME:
PHONE #:
EMAIL:

CIVIL ENGINEER
COMPANY:
ADDRESS:
POSTAL CODE:
CONTACT NAME:
PHONE #:
EMAIL:

ELECTRICAL ENGINEER
COMPANY:
ADDRESS:
POSTAL CODE:
CONTACT NAME:
PHONE #:
EMAIL:

TRAFFIC CONSULTANT
COMPANY:
ADDRESS:
POSTAL CODE:
CONTACT NAME:
PHONE #:
EMAIL:

NOISE ENGINEER
COMPANY:
ADDRESS:
POSTAL CODE:
CONTACT NAME:
PHONE #:
EMAIL:

CONSULTANT
COMPANY:
ADDRESS:
POSTAL CODE:
CONTACT NAME:
PHONE #:
EMAIL:

900
LAKESHORE
900 LAKESHORE ROAD WEST
MISSISSAUGA, ON

No.	Description	Date
1	Issued for MUDAP	29.01.2024
	Issued for Coordination	24.06.2024
	issued for Coordination	04.07.2024

CONTEXT KEY PLAN

PROJECT NORTH

STAMP

CLIENT

KFA architects + planners inc.

PROJECT NO: 23016

SCALE:

DATE: 09.01.2024

DRAWN BY: FC

DRAWING TITLE

COVER PAGE

DRAWING NO

A000

900 Lakeshore Statistics

Address: 900 Lakeshore Road West, Mississauga, ON
Project No: 23016
Legal Description: Lot 1, Plan C89 and Part Lot 22, Concession 3 SDS
Review: July 4, 2024

1.0 Official Plan & Zoning

Land Use:	Residential Low Density
City of Mississauga Zoning By-Law:	R2-5
By-Law No:	0225-2007

2.0 Site Statistics

	m	ft	m²	ft²	Hectares	Acres	%
Gross Site Area			4,702.9	*50,623*	0.47	1.16	
Net Site Area			4,702.9	*50,623*	0.47	1.16	
Lot Frontage	123.0	*404*					
Lot Depth	84.8	*278*					
Existing GFA			348.66	*3,753*			

3.0 Building proposal

Building Footprint		2,393.0 m²	
Buiding Height*		32.2 m	**Mech. Pent. Excluded*
Storey		10	
Gross Floor Area	*(Based on GFA - Apartment Zone)*	17,098.0 m²	
Lot Coverage (%)	*(Based on Gross Site Area)*	51%	
Lot Coverage (%)	*(Based on Net Site Area)*	51%	
FSI	*(GFA / Gross Site Area)*	**3.64**	
FSI	*(GFA / Net Site Area)*	**3.64**	

3.1 Setbacks

		Required (0225-2007)	*Proposed*	
Front Yard (m)	(North)	9.0m	1.5 m	*(3m on GF)*
Rear Yard (m)	(South)	n/a	n/a	
Side Yard (m)	(East)	7.9m	4m	
Side Yard (m)	(West)	7.9m	9.6m	

4.0 Proposed Areas

Floor	GCA** * (m²)	*GCA *** (ft²)*	GFA* (m²)	*GFA * (ft²)*	*GFA * exclusions*
P3 Level	2,396.0	*25,790*			
P2 Level	2,396.0	*25,790*			
P1 Level	2,396.0	*25,790*			
Ground Floor	1,402.0	*15,091*	512.0	*5,511*	*890*
2nd Floor	2,383.0	*25,650*	2,157.0	*23,218*	*226*
3rd Floor	2,366.0	*25,467*	2,220.0	*23,896*	*146*
4th Floor	2,163.0	*23,282*	2,028.0	*21,829*	*135*
5th Floor	2,141.0	*23,046*	2,006.0	*21,592*	*135*
6th Floor	2,094.0	*22,540*	1,959.0	*21,086*	*135*
7th Floor	1,659.0	*17,857*	1,554.0	*16,727*	*105*
8th Floor	1,659.0	*17,857*	1,554.0	*16,727*	*105*
9th Floor	1,659.0	*17,857*	1,554.0	*16,727*	*105*
10th Floor	1,659.0	*17,857*	1,554.0	*16,727*	*105*
Mech. P.H	474.0	*5,102*			
Total Proposed GFA*	**19,659.0**	***211,607.5***	**17,098.0**	***184,041***	

***Total GCA excluded parking garage levels**

***Gross Floor Area (GFA)** - Apartment Zone means the sum of the areas of each storey of a building above or below established grade, measured from the exterior of outside walls of the building including floor area occupied by interior walls but excluding any part of the building used for mechanical floor area, stairwells, elevators, motor vehicle parking, bicycle parking, storage lockers, below-grade storage, any enclosed area used for the collection or storage of disposable or recyclable waste generated within the building, common facilities for the use of the residents of the building, a day care and amenity area.*

****Gross Construction Area (GCA)** - The total enclosed area of a floor or building measured to the outside surface of the permanent exterior walls of the building or structure or to a predetermined surface, or plane as in the case of overhangs and projections to the outside surface of the building.*

5.0 Unit Count

	Units	Townhouse	1 Bed	2 Bed	3 Bed
Ground Floor	7	7	0	0	0
2nd Floor	18		15	0	3
3rd Floor	25		19	2	4
4th Floor	25		19	2	4
5th Floor	25		20	3	2
6th Floor	24		18	3	3
7th Floor	16		6	8	2
8th Floor	16		6	8	2
9th Floor	16		6	8	2
10th Floor	16		6	8	2
Total Units	**188**	**7**	**115**	**42**	**24**
		3.7%	*61.2%*	*22.3%*	*12.8%*

6.0 Vehicular Parking

6.1 Parking Required

	Units	Parking	Ratio
Residential	188	207	*1.10*
Visitors	188	38	*0.20*
Total Parking Required		**244**	

6.2 Parking Provided

	At Grade	P1 Level	P2 Level	P3 Level	Sub Total	*Ratio*
Residential	0	31	67	69	167	*0.89*
Visitors	3	35	0	0	38	*0.20*
Total Parking Provided	**3**	**66**	**67**	**69**	**205**	***1.09***

7.0 Bicycle Parking

7.1 Bicycle Parking Required

	Ratio			
Short Term Residential	*0.05*	*x unit*	9	
Long Term Residential	*0.6*	*x unit*	113	
			Tot:	**122**

7.2 Bicycle Parking Provided

	At Grade	P1	P2	P3	TOTAL
Short Term Residential	10	0	0	0	10
Long Term Residential	72	16	16	9	113
Total Bicycle Parking Provided	**82**	**16**	**16**	**9**	**123**

8.0 Proposed Landscaped Areas

	Total (m²)	Total (ft²)
Soft Landscaping	1,000	*10,764*
Hard Landscaping	*1,747*	*18,805*
Green Roof	600	*6,458*
Total Landscape	**3,347**	***36,027***

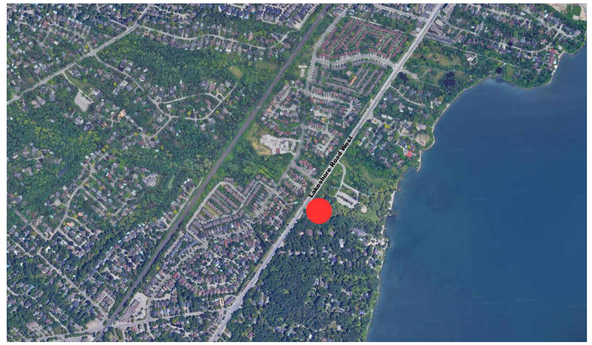
9.0 Amenity Area

9.1 Amenity Area Required

5.6 m² per unit	(Based on Apartment Zone)	1052.8 m²
Total		**1052.8 m²**

9.2 Amenity Area Provided

	Indoor (m²)	Outdoor (m²)	Total (m²)	Total (ft²)
Ground Floor	*428*		*428.0*	*4,607*
Mech PH Floor	*216*	*578*	*794.0*	*8,547*
Total	**644**	**578**	**1222.0**	***13,153***



1. Aerial View Context

2. Aerial View Context

900 LAKESHORE

900 LAKESHORE ROAD WEST
MISSISSAUGA, ON

No.	Description	Date
1	Issued for MUDAP	29.01.2024
	Issued for Client Review	26.04.2024
	Issued for Coordination	24.06.2024
	issued for Coordination	04.07.2024

DRAFT

CONTEXT KEY PLAN

PROJECT NORTH

STAMP

CLIENT

KFA architects + planners inc.

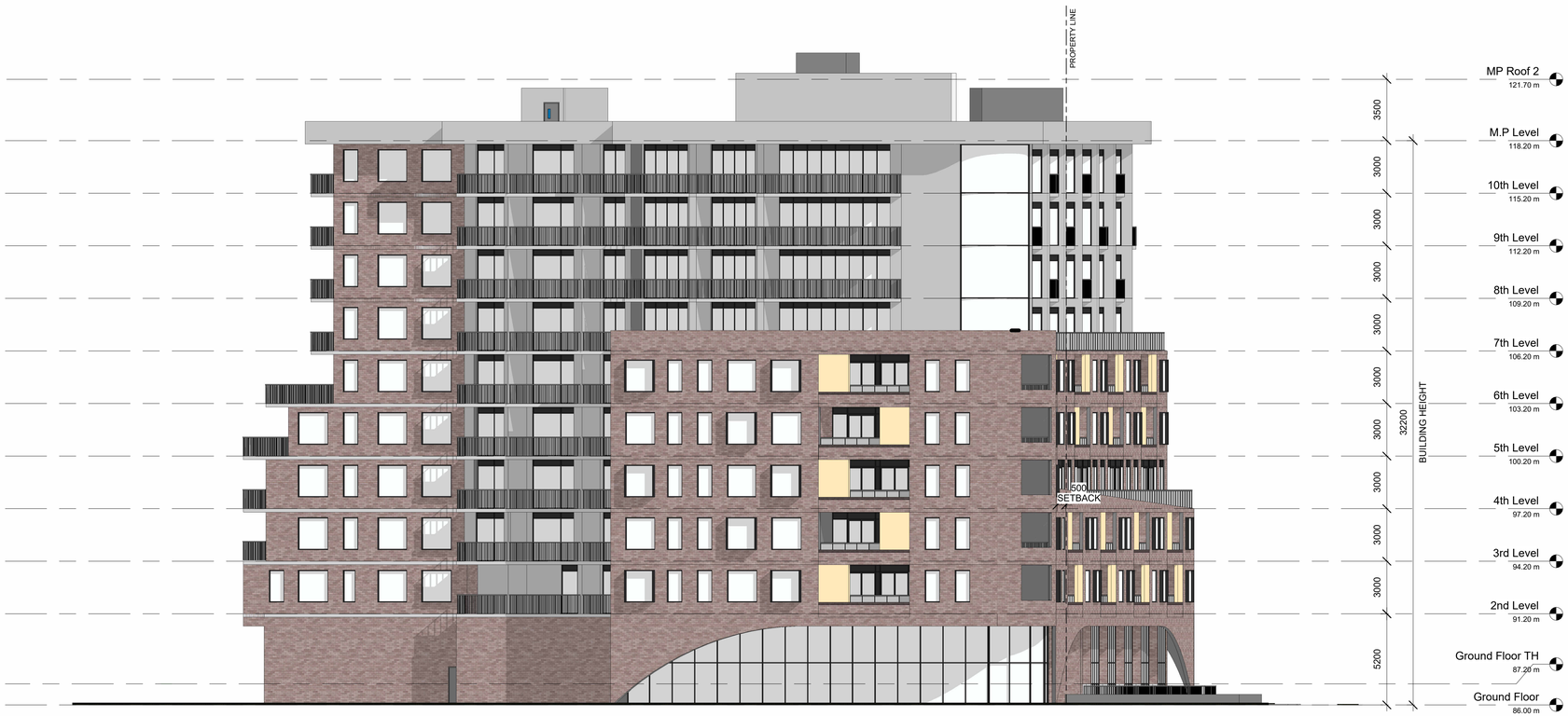
PROJECT NO:	23016
SCALE:	
DATE:	09.01.2024
DRAWN BY:	FC

DRAWING TITLE

SITE STATISTICS & CONTEXT

DRAWING NO

A001



1 East Elevation
1 : 150

900
LAKESHORE

900 LAKESHORE ROAD WEST
MISSISSAUGA, ON

No.	Description	Date
1	Issued for MUDAP	29.01.2024
	Issued for Coordination	24.06.2024
	issued for Coordination	04.07.2024

DRAFT

CONTEXT KEY PLAN

PROJECT NORTH

STAMP

CLIENT

KFA architects + planners inc.

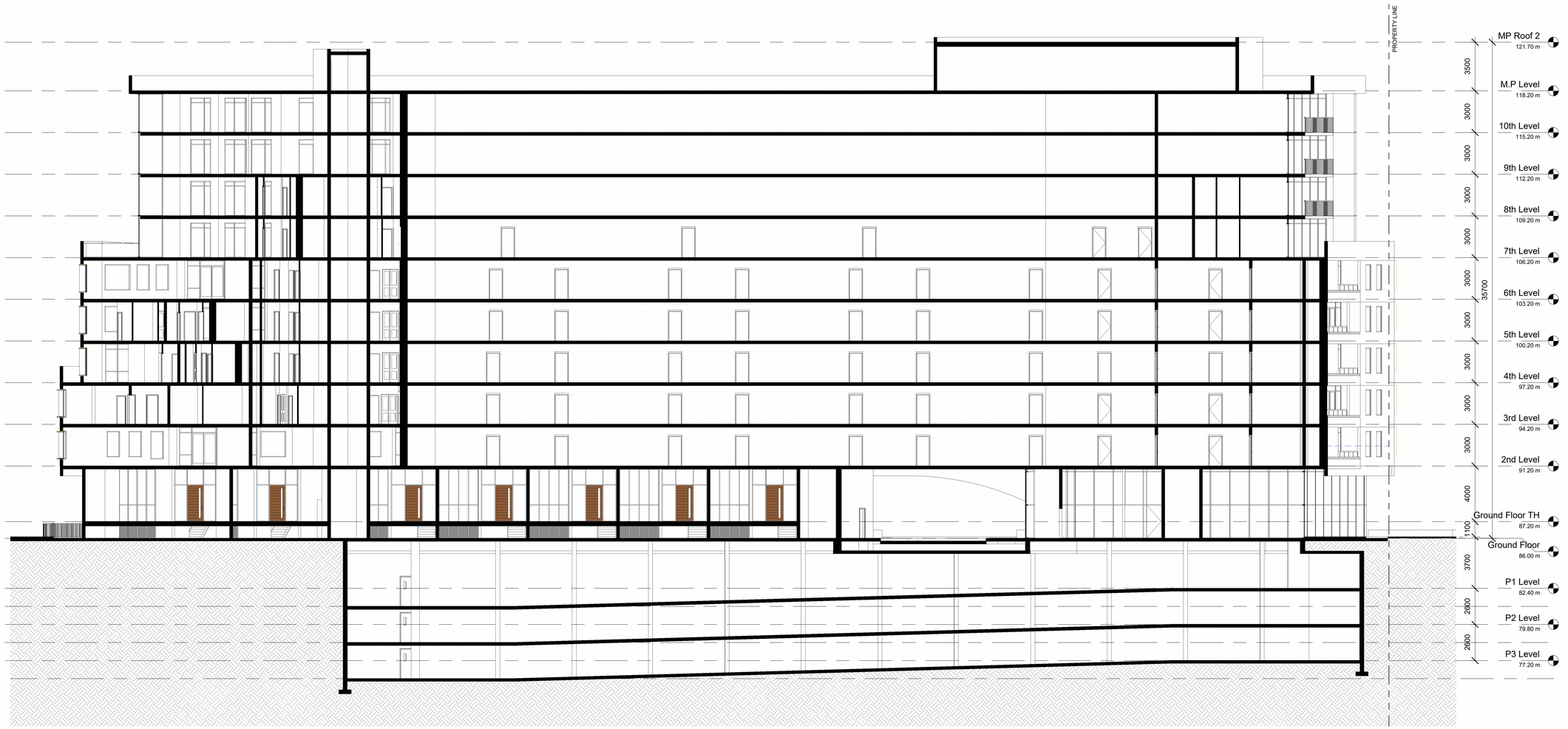
PROJECT NO:	23016
SCALE:	1 : 150
DATE:	09.01.2024
DRAWN BY:	FC

DRAWING TITLE

EAST ELEVATION

DRAWING NO

A203



1 SECTION AA
1 : 150

900
LAKESHORE

900 LAKESHORE ROAD WEST
MISSISSAUGA, ON

No.	Description	Date
1	Issued for MUDAP	29.01.2024
	Issued for Coordination	24.06.2024
	issued for Coordination	04.07.2024

DRAFT

CONTEXT KEY PLAN

PROJECT NORTH

STAMP

CLIENT

KFA architects + planners inc.

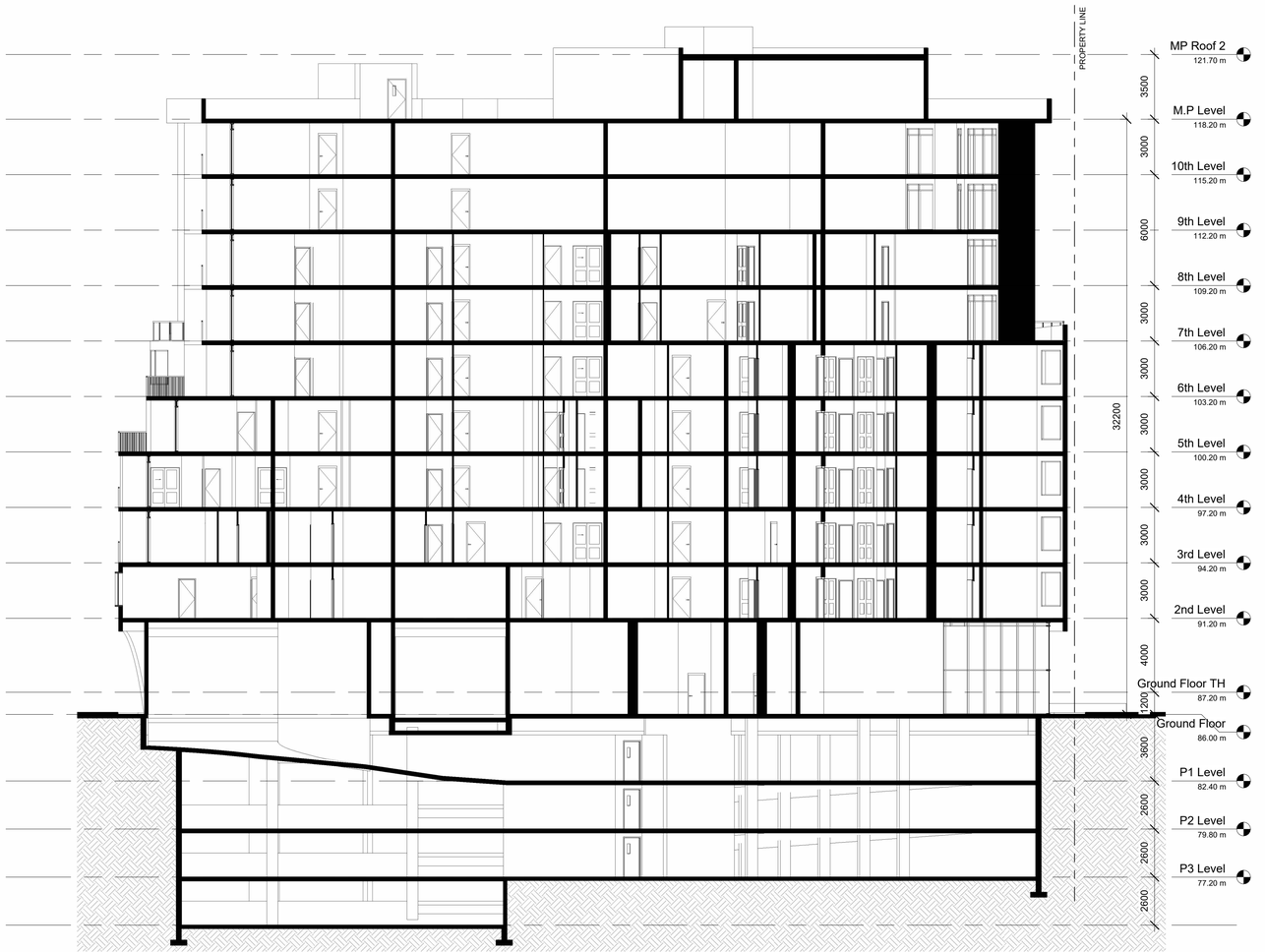
PROJECT NO:	23016
SCALE:	1 : 150
DATE:	09.01.2024
DRAWN BY:	FC

DRAWING TITLE

SECTION AA

DRAWING NO

A301



1 SECTION BB
1 : 150

900
LAKESHORE

900 LAKESHORE ROAD WEST
MISSISSAUGA, ON

No.	Description	Date
1	Issued for MUDAP	29.01.2024
	Issued for Coordination	24.06.2024

DRAFT

CONTEXT KEY PLAN

PROJECT NORTH

STAMP

CLIENT

KFA architects + planners inc.

PROJECT NO:	23016
SCALE:	1 : 150
DATE:	09.01.2024
DRAWN BY:	FC

DRAWING TITLE

SECTION BB

DRAWING NO

A302

QUEEN STREET WEST
SERDICA COURT
IBAR WAY
LAKESHORE ROAD WEST
RICHARD'S MEMORIAL PARK
MARAMIS COURT
WHITTIER CRESCENT
LAKE ONTARIO

UPDATED WOODLAND DRIPLINE
(COHEN & MASTER, SEPTEMBER 2024)

WOODLAND DRIPLINE
(CITY OF MISSISSAUGA, OCT. 2023)

TOP OF BANK
(CVC, 2023)

CVC CONFIRMED WETLAND
BOUNDARY (CVC, 2023)

CVR_1
FODM7–4
MAMM3–1
CVR_1
FODM7–4
CVR_1

1
2
3

LEGEND:

- APPROX. PROPERTY BOUNDARY
- INTERMITTENT DRAINAGE FEATURE/ INDIRECT FISH HABITAT
- WARMWATER THERMAL REGIME
- CULVERT
- TOP OF BANK (CVC, 2023)
- WOODLAND DRIPLINE (CITY OF MISSISSAUGA, OCT 2023)
- UPDATED WOODLAND DRIPLINE (COHEN & MASTER, SEPTEMBER 2024)

ELC UPLAND COMMUNITIES:

CVR_1 — LOW DENSITY RESIDENTIAL
FODM7–4 — FRESH–MOIST BLACK WALNUT LOWLAND DECIDUOUS FOREST

ELC WETLAND COMMUNITIES:

MAMM3–1 — MIXED MINERAL MEADOW MARSH

- CVC CONFIRMED WETLAND BOUNDARY (CVC, 2023)
- BUTTERNUT TREE – CATEGORY 1
- DAWN BREEDING BIRD SURVEY STATION

LOCATION PLAN

0 37.50 75.0
HORIZONTAL SCALE 1:1500

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
ENVIRONMENTAL ASSESSMENTS & APPROVALS

ENVIRONMENTAL FEATURES

900 LAKESHORE ROAD WEST MISSISSAUGA, ON

DATE ISSUED:	*OCTOBER 2024*	Figure No. 2
CREATED BY:	*A.L.*	
PROJECT NO.:	*23-290*	
REFERENCE:	*CITY OF MISSISSAUGA*	

Plotted by: AUL on October 25, 2024 at 9:38am
File: Q:\23 Projects\23-290_900_Lakeshore Rd W Mississauga\04.0 – Drafting\23-290_Site Layout.dwg Layout: EF Plotscale: 1

APPENDIX B – LOG OF BOREHOLES

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH1(MW) SHEET. 1 of 2

PROJECT NO.: FE-P# 23-13329/30

PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 7 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				86.63			
0	0	76mm ASPHALT GRANULAR MATERIAL		0.30 / 86.33		SS-1	12
2	1	FILL: Dark brown to brown sand/silty sand, trace of gravel/roots/topsoil, moist			23-2124-1	SS-2	8
4				1.37 / 85.26			
6	2	SILTY SAND: Brown, trace of clay/gravel, moist, dense				SS-3	41
8						SS-4	34
10	3					SS-5	40
12				3.96 / 82.67			
14	4	SILT: Grey, pockets of sandy silt, trace to some sand, trace to some clay, moist, dense to very dense				SS-6	36
16	5						
18							
20	6					SS-7	65
22	7						
24							
26	8					SS-8	63
28							
30	9					SS-9	55
32				9.75 / 76.88			
	10	CLAYEY SILT: Grey, trace to some sand, very moist, stiff					
34							

PENETRATION TESTING (SPT) ▲ 20 40 60 80

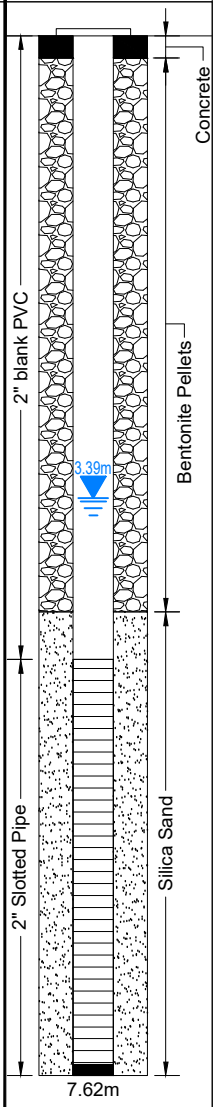
SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

8.9%
10.0%
13.8%
17.7%
17.7%
11.7%
11.1%
18.4%
13.1%

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: 9.14m; 6 December 2023: 2.96m/ On 15 January 2024: 3.39m

DRAWN: A.M LOGGED: K.W. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH1(MW) SHEET. 2 of 2

PROJECT NO.: FE-P# 23-13329/30

PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 7 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE	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
36	11	CLAYEY SILT: Grey, trace to some sand, very moist, stiff				SS-10	13		14.7%	
38	12									
40		WEATHERED SHALE: Grey, dry, hard		12.19/ 74.44		SS-11	100+		4.0%	
42	13									
44						SS-12	100+		6.9%	
46	14					RC-1	Run=0.72m Rec=0.63m, 87.5% RQD=42%			
48		SHALE: Grey, dry, hard		14.48/ 72.15						
50	15					RC-2	Run=1.30m Rec=1.30m, 100.0% RQD=100.0%			
52	16									
54						RC-3	Run=1.55m Rec=1.55m, 100.0% RQD=85.2%			
56	17									
58		End of borehole at 17.53m		17.53/ 69.10						
60	18									
62	19									
64										
66	20									
68										
70	21									

Groundwater Depth (m): on completion: 9.14m; 6 December 2023: 2.96m/ On 15 January 2024: 3.39m

DRAWN: A.M LOGGED: K.W. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH2(MW) SHEET. 1 of 2

PROJECT NO.: FE-P# 23-13329/30

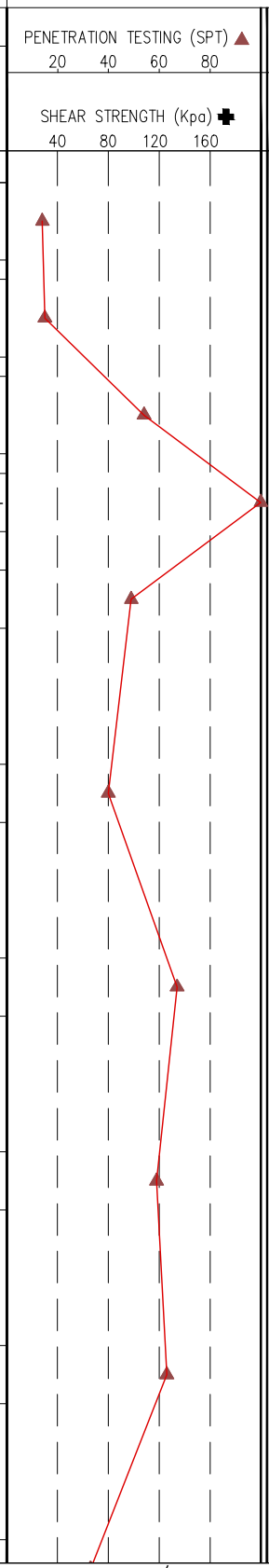
PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

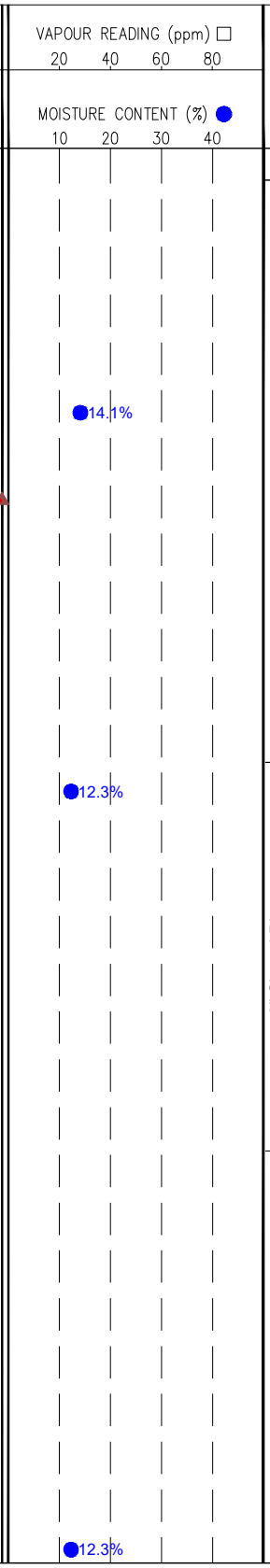
LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

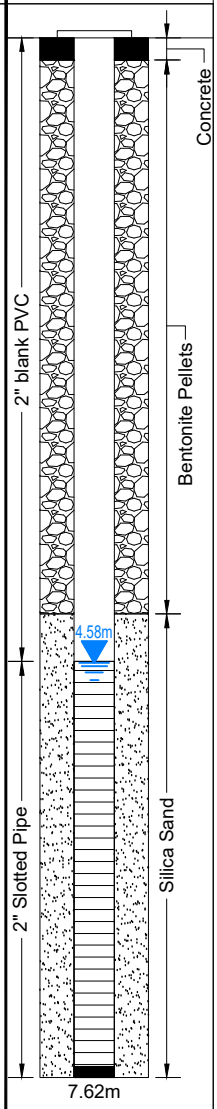
DRILLING DATE: 7 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				85.68			
0	0	TOPSOIL		0.30 / 85.38	23-2124-2	SS-1	14
2	1	FILL: Dark brown to brown sand/silty sand, trace of gravel/roots/topsoil, moist				SS-2	15
4				1.37 / 84.31			
6	2	SILTY SAND: Brown, moist, very dense				SS-3	54
8						SS-4	100+
10	3	SILT TO FINE SANDY SILT: Grey, moist, dense to very dense		3.05 / 82.63		SS-5	49
12	4						
14							
16	5					SS-6	40
18							
20	6					SS-7	67
22	7						
24							
26	8					SS-8	59
28							
30	9					SS-9	63
32	10	SANDY SILT TILL: Grey, pieces of shale, trace of gravel, thin layer of clayey silt around 10m, moist to dry, dense		9.60 / 76.08			
34							





PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry; 6 December 2023: 3.89m/ On 15 January 2024: 4.58m

DRAWN: A.M LOGGED: K.W. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH2(MW) SHEET. 2 of 2

PROJECT NO.: FE-P# 23-13329/30

PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 7 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
36	11	SANDY SILT TILL: Grey, pieces of shale, trace of gravel, moist to dry, dense				SS-10	33
38							
40	12	WEATHERED: Grey, dry, hard		12.19/ 73.49		SS-11	100+
		End of borehole at 12.29m		12.29/ 73.39			
42	13						
44							
46	14						
48							
50	15						
52	16						
54							
56	17						
58							
60	18						
62	19						
64							
66	20						
68							
70	21						

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

● 12.3%

● 8.5%

PIEZOMETER OR WELL CONSTRUCTION

Groundwater Depth (m): on completion: Dry; 6 December 2023: 3.89m/ On 15 January 2024: 4.58m

DRAWN: A.M LOGGED: K.W. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH3(MW) SHEET. 1 of 2

PROJECT NO.: FE-P# 23-13329/30

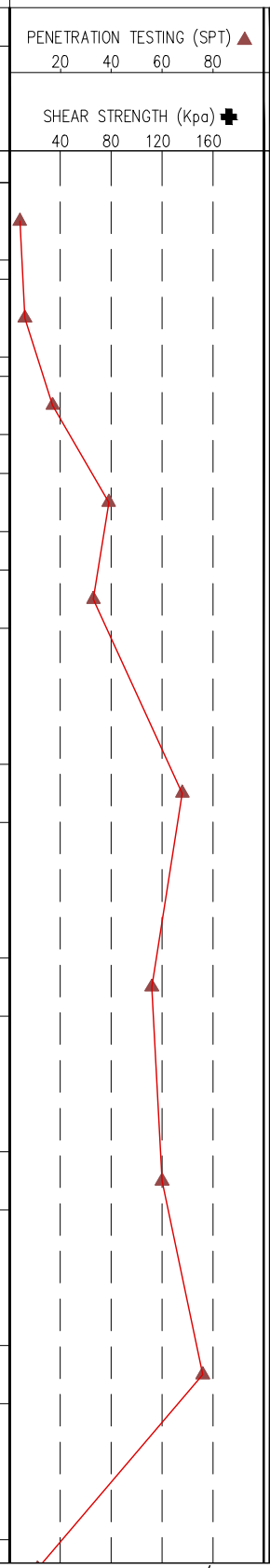
PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

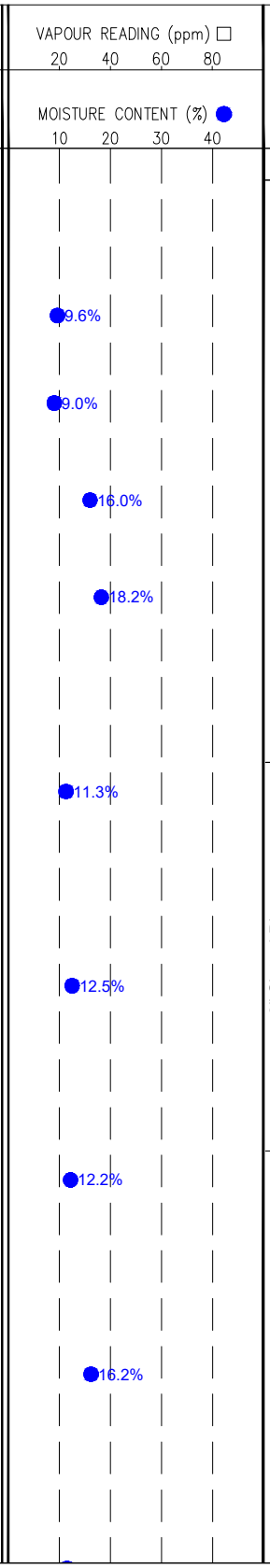
LOCATION: 900 Lakeshore Road W., Mississauga ON

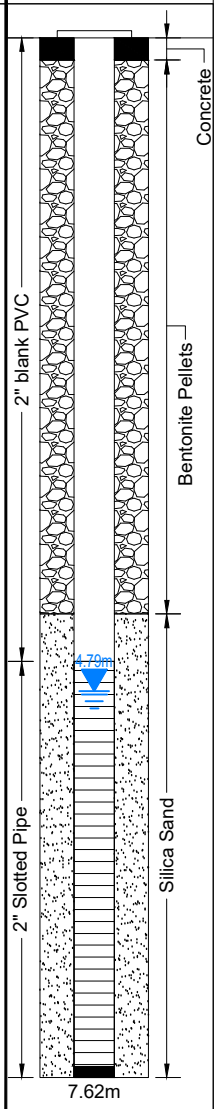
DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 8 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				86.60			
0	0	TOPSOIL		0.30 / 86.30	23-2124-3	SS-1	4
2	1	FILL: Dark brown to brown sand/silty sand, trace of gravel/roots/topsoil, moist				SS-2	6
4				1.37 / 85.23			
6	2	SILTY SAND to SANDY SILT: Brown, moist to very moist, compact to dense				SS-3	17
8						SS-4	39
10	3				23-2124-4	SS-5	33
12	4						
14				4.57 / 82.03			
16	5	SILT TO FINE SANDY SILT: Grey, trace of clay, moist, very dense				SS-6	68
18							
20	6					SS-7	56
22	7						
24							
26	8					SS-8	60
28							
30	9					SS-9	76
32				9.76 / 76.84			
34	10	CLAYEY SILT: Grey, trace to some sand, very moist, stiff					







Groundwater Depth (m): on completion: 10.67m; 6 December 2023: 4.18m/ On 15 January 2024: 4.79m

DRAWN: A.M | LOGGED: K.W. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH3(MW) SHEET. 2 of 2

PROJECT NO.: FE-P# 23-13329/30

PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 8 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
36	11	CLAYEY SILT: Grey, trace to some sand, very moist, stiff				SS-10	11
38				11.60/ 75.00			
	12	SANDY SILT TILL: Grey, trace to some gravel, moist, dense					
40						SS-11	38
42	13						
44		Refusal to spoon @13.72m Possibly due to bedrock				SS-12	100+
		End of borehole at 13.72m		13.72/ 72.88			
46	14						
48							
	15						
50							
52	16						
54							
56	17						
58							
	18						
60							
62	19						
64							
66	20						
68							
	21						
70							

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

11.5%

8.6%

PIEZOMETER OR WELL CONSTRUCTION

Groundwater Depth (m): on completion: 10.67m; 6 December 2023: 4.18m/ On 15 January 2024: 4.79m

DRAWN: A.M LOGGED: K.W. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH4(MW) SHEET. 1 of 2

PROJECT NO.: FE-P# 23-13329/30

PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 6 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				83.20			
0	0	TOPSOIL		0.30 / 82.90		SS-1	5
2	1	FILL: Dark brown to brown sand/silty sand, trace of gravel/roots/topsoil, moist			23-2124-5	SS-2	7
4				1.52 / 81.68			
6	2	SILTY SAND: Brown, trace of clay, moist to very moist, compact to dense				SS-3	17
8						SS-4	41
				2.79 / 80.41			
10	3	SILT TO SANDY SILT: Grey, trace to some clay, moist, dense to very dense				SS-5	53
12							
14	4					SS-6	58
16	5					SS-7	44
18							
20	6					SS-8	92
22				6.71 / 76.49			
24	7	CLAYEY SILT: Grey, some sand, trace of gravel, very moist, stiff to very stiff					
26	8					SS-9	15
28							
30	9			9.30 / 73.90		SS-10	100+
32	10	WEATHERED SHALE: Grey, seam/layers of limestone/ cemented shale, dry, hard					
34						SS-11	100+

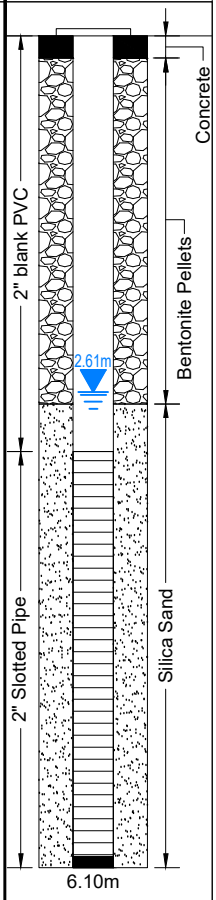
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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; 6 December 2023: 2.16m / On 15 January 2024: 2.61m

DRAWN: A.M LOGGED: K.W. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH4(MW) SHEET. 2 of 2

PROJECT NO.: FE-P# 23-13329/30

PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 6 November, 2023

DEPTH (feet)	DEPTH (meters)	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: LAB ID	Type NO.	"N" VALUE	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
36	11	WEATHERED SHALE: Grey, seam/layers of limestone/ cemented shale, dry, hard		10.97/ 72.23		SS-11	100+			
		End of borehole at 10.97m								
38	12									
40										
42	13									
44										
46	14									
48										
50	15									
52										
54	16									
56	17									
58										
60	18									
62	19									
64										
66	20									
68										
70	21									

Groundwater Depth (m): on completion: Dry; 6 December 2023: 2.16m/ On 15 January 2024: 2.61m

DRAWN: A.M LOGGED: K.W. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH5(MW) SHEET. 1 of 2

PROJECT NO.: FE-P# 23-13329/30

PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 6 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				82.63			
0	0	TOPSOIL		0.20 / 82.43	23-2124-6 23-2124-7 (DUP)	SS-1	1
2	1	FILL: Dark brown to brown sand/silty sand, trace of gravel/roots/topsoil, moist				SS-2	9
4				1.17 / 81.46			
		SILT & SAND: Brown, moist, compact to dense					
6	2					SS-3	31
8				2.59 / 80.04		SS-4	41
		SILT TO FINE SANDY SILT: Grey, trace to some clay, moist to very moist, dense to very dense					
10	3					SS-5	37
12	4						
14							
16	5					SS-6	60
18				5.49 / 77.14			
		CLAYEY SILT: Grey, some sand, occ. trace of gravel, very moist, firm					
20	6					SS-7	7
22	7						
24							
26	8	SANDY SILT TILL: Grey, some clay, trace of gravel, moist, dense to very dense		7.77 / 74.86		SS-8	31
28							
30	9					SS-9	100+
32	10						
34		WEATHERED SHALE: Grey, dry, hard				SS-10	100+
		End of borehole at 10.74m		10.74 / 71.89			

PENETRATION TESTING (SPT) ▲ 20 40 60 80

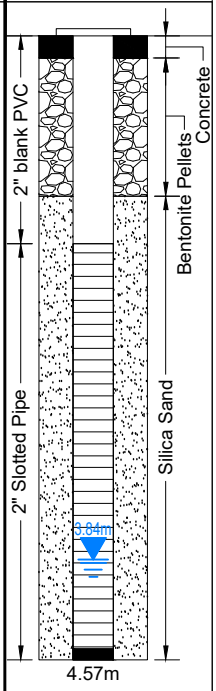
SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

Depth (m)	MOISTURE CONTENT (%)
1.17	13.9%
1.17	17.1%
2.59	13.6%
2.59	12.5%
2.59	12.5%
5.49	13.1%
5.49	12.2%
7.77	23.1%
7.77	13.7%
7.77	8.0%
10.74	8.9%
10.74	2.5%

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: 10.51m; 6 December 2023: 3.11m/ On 15 January 2024: 3.84m

DRAWN: A.M LOGGED: K.W. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. TH1 SHEET. 1 of 1

PROJECT NO.: FE-P# 23-13329/30

PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 7 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				85.98			
		TOPSOIL: Dark brown sand and grass, trace rootlets		0.30 / 85.68			
		FILL: Brown sand		1.52 / 84.46			
		SAND: Brown, dry, dense		1.98 / 84.00		SS-1	43
		End of borehole at 1.98m					

SOIL PROFILE | SAMPLES

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

8.9%

PIEZOMETER OR WELL CONSTRUCTION

Groundwater Depth (m): on completion: N/A

DRAWN: A.M | LOGGED: K.W. | CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. TH2 SHEET. 1 of 1

PROJECT NO.: FE-P# 23-13329/30

PROJECT NAME: HYDROGEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: D-50 Solid Stem Augers

DRILLING DATE: 7 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				86.81			
0	0	TOPSOIL: Dark brown		0.15 / 86.66			
		FILL: Brown to grey sandy silt					
4	1			1.52 / 85.29		SS-1	8
6	2	CLAYEY SILT TILL: Grey, moist, loose, some sand, trace gravel					
		End of borehole at 1.98m		1.98 / 84.83			

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 6%

PIEZOMETER OR WELL CONSTRUCTION

Groundwater Depth (m): on completion: N/A

DRAWN: A.M LOGGED: K.W. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH101(MW) SHEET. 1 of 2

PROJECT NO.: FE- 24-14065/191

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: CME-55 Track Solid Stem

DRILLING DATE: 3 September, 2024

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				89.10			
0	0	127mm TOPSOIL		0.13 / 88.97			
		FILL: Brown sand, trace silt, topsoil, rootlets, moist				SS-1	2
2	1					SS-2	26
4							
6	2			1.91 / 87.19		SS-3	33
		SILTY SAND: Brown, moist, dense to very dense					
8						SS-4	54
10	3					SS-5	49
12	4			3.51 / 85.59			
		SILTY SAND: Grey, moist, very dense					
14							
16	5					SS-6	54
				5.18 / 83.92			
18		SILT to SANDY SILT: Grey, moist, dense to very dense					
20	6					SS-7	38
22	7						
24							
26	8					SS-8	58
28							
30	9					SS-9	58
32							
34	10			10.36 / 78.74			

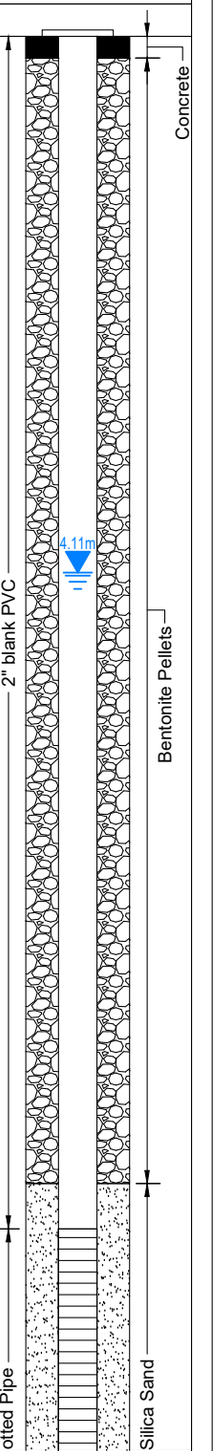
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 9 September 2024: 4.11m

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

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH101(MW) SHEET. 2 of 2

PROJECT NO.: FE- 24-14065/191

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: CME-55 Track Solid Stem

DRILLING DATE: 3 September, 2024

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				78.74			
36	11	CLAYEY SILT TILL: Grey, trace sand, trace gravel, very moist, very stiff				SS-10	27
38							
	12			12.04/ 77.06			
40		WEATHERED SHALE: Grey, limestone seams, dry, moist, hard				SS-11	100+
42							
	13						
44							
				13.82/ 75.28		SS-12	100+
46	14	End of borehole at 13.82m					
48							
	15						
50							
52	16						
54							
56	17						
58							
	18						
60							
62	19						
64							
66	20						
68							
	21						
70							

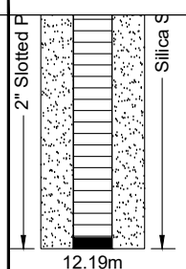
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 9 September 2024: 4.11m

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

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH102(MW) SHEET. 1 of 2

PROJECT NO.: FE- 24-14065/191

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: CME-55 Track Solid Stem

DRILLING DATE: 3 September, 2024

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				85.39			
0	0	152mm TOPSOIL		0.15			
		FILL: Brown to dark brown sand, trace to some silt, fragments organics, topsoil, moist		85.24		SS-1	15
2							
	1					SS-2	15
4							
6	2					SS-3	9
8						SS-4	5
10	3			3.00			
		FILL: Brown sand, some silt, trace topsoil, organics, wet		82.39		SS-5	6
12				3.66			
	4	SAND and SILT: Grey, moist, very dense		81.73			
14							
16	5					SS-6	58
18							
20	6					SS-7	50
22							
24	7						
26	8					SS-8	72
28				8.69			
		CLAYEY SILT TILL: Grey, trace gravel, sand, moist to wet, stiff		76.70			
30	9			9.45		SS-9	15
		SANDY CLAYEY SILT TILL: Grey, trace gravel, moist to wet		75.94			
32				9.91			
	10	SANDY SILT TILL: Grey, trace to some clay, trace gravel, stone fragments, moist, dense		75.48		SS-10	38
34				10.36			
		SHALE: Grey, dry, hard		75.03			

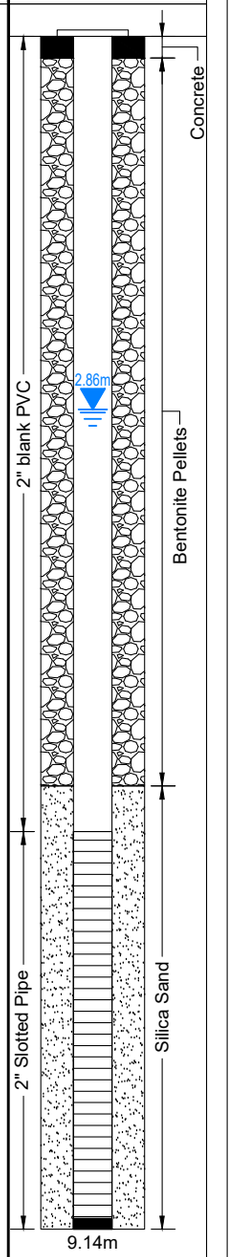
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 9 September 2024: 2.86m

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

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH102(MW) SHEET. 1 of 2

PROJECT NO.: FE- 24-14065/191

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: CME-55 Track Solid Stem

DRILLING DATE: 3 September, 2024

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE	PENETRATION TESTING (SPT) ▲ / SHEAR STRENGTH (Kpa) ✚	VAPOUR READING (ppm) □ / MOISTURE CONTENT (%) ●	PIEZOMETER OR WELL CONSTRUCTION
				75.03				20 40 60 80 / 40 80 120 160	20 40 60 80 / 10 20 30 40	
36	11	SHALE: Grey, dry, hard				SS-11	100+			
38										
40	12			12.19/ 76.91						
		End of borehole at 12.19m								
42	13									
44										
46	14									
48										
50	15									
52	16									
54										
56	17									
58										
60	18									
62	19									
64										
66	20									
68										
70	21									

Groundwater Depth (m): on completion: Dry; on 9 September 2024: 2.86m

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

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH103(MW) SHEET. 1 of 2

PROJECT NO.: FE- 24-14065/191

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: CME-55 Track Solid Stem

DRILLING DATE: 3 September, 2024

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				82.55			
0	0	101mm TOPSOIL		0.10 / 82.45			
		FILL: Brown sand, trace silt, topsoil				SS-1	2
2	1					SS-2	4
4				1.67 / 80.88		SS-3	37
6	2	SILT: Brown, trace to some sand, moist, dense					
8		SILT: Grey, trace to some sand, moist to wet, dense to very dense		2.44 / 80.11		SS-4	44
10	3					SS-5	57
12		SANDY SILT: Grey, wet, very dense		3.66 / 78.89			
14	4						
16	5					SS-6	100+
18		SILTY SAND: Grey, wet, very dense		5.33 / 77.22			
20	6					SS-7	61
22							
24	7	CLAYEY SILT: Grey, trace sand, gravel, wet, hard		7.01 / 75.54			
26	8	SANDY SILT TILL: Grey, trace clay, gravel, wet, very dense		7.72 / 74.83		SS-8	65
28							
30	9	SILTY SAND: Grey, trace gravel, wet, very dense		8.84 / 73.71		SS-9	100+
32	10						
34				10.52 / 72.03			

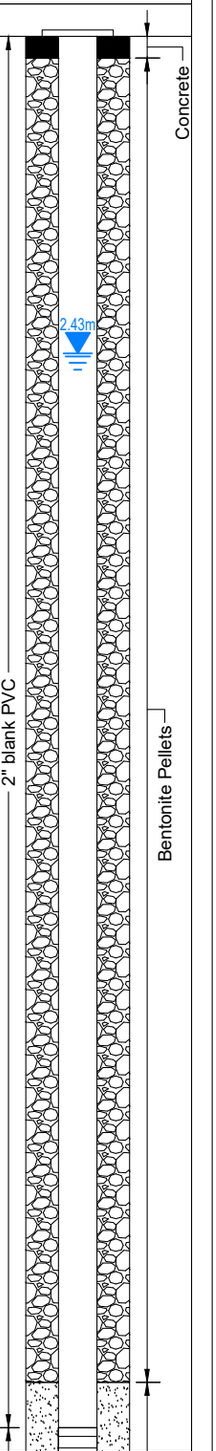
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 9 September 2024: 2.43m

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

FISHER ENGINEERING

LOG OF BOREHOLE

NO. BH103(MW) SHEET. 2 of 2

PROJECT NO.: FE- 24-14065/191

PROJECT NAME: GEOTECHNICAL & HYDROGEOLOGICAL INVESTIGATIONS

LOCATION: 900 Lakeshore Road W., Mississauga ON

DRILLING METHOD: CME-55 Track Solid Stem

DRILLING DATE: 3 September, 2024

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				10.52/ 72.03			
36	11	SHALE: Grey, dry, hard				SS-10	100+
38							
40	12					SS-11	100+
42	13						
44							
46	14					RC-1	Run=1.52m Rec=1.52m, 100% RQD=97%
48							
50	15					RC-2	Run=0.76m Rec=0.68m, 90% RQD=91%
52	16					RC-3	Run=1.75m Rec=1.75m, 100% RQD=92%
54							
56	17						
				17.45/ 65.10			
58	18	End of borehole at 17.45m					
60							
62	19						
64							
66	20						
68							
70	21						

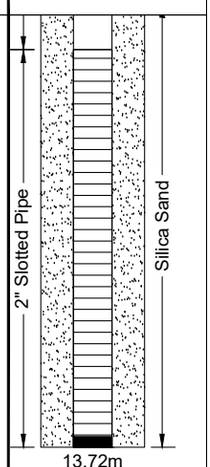
PENETRATION TESTING (SPT) ▲ 20 40 60 80

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 9 September 2024: 2.43m

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

APPENDIX C – MOISTURE CONTENT AND GRAIN SIZE DISTRIBUTION ANALYSES

Project Name:	Geotechnical Investigation	***F.E. Lab #:***	23-971
Client:	1000570027 Ontario Inc.	***Date Sampled:***	7-Nov-2023
Project ID:	23-13330	***Date Received:***	10-Nov-2023
Location:	900 Lakeshore Road West, Mississauga, Ontario	***Date Reported:***	29-Nov-2023

Certificate of Analysis

Analyses	Matrix	Quantity	Testing Date	Method Reference
Moisture Content	Soil	40	14-Nov-23	ASTM D2216
Grain Size (Sieve Analysis)	Soil	7	21-Nov-23	LS-602
Grain Size (Hydrometer)	Soil	7	27-Nov-23	LS-702
Atterberg test	Soil	0	N.A.	LS-703/704

Authorized by: Behnam Sayad-Pour

Behnam Sayad Pour Zanjani
Geo-Lab Supervisor

400 Esna Park Drive, Unit 15, Markham, ON L3R 3K2
Tel:(905) 475-7755 www.fishereng.com

Certificate of Analysis

Analysis Requested:	Moisture Content	***Sample Description:***	40 Soil Sample(s)

Sample Info	BH1 SS2 A	BH1 SS2 B	BH1 SS3	BH1 SS4	BH1 SS5	BH1 SS6
Sample Depth (m)	0.76-1.07	1.07-1.22	1.53-1.98	2.29-2.75	3.05-3.51	4.58-5.03
Moisture Content (%)	8.9	10.0	13.8	17.7	17.7	11.7

Sample Info	BH1 SS7	BH1 SS8	BH1 SS9	BH1 SS10	BH1 SS11	BH1 SS12
Sample Depth (m)	6.1-6.56	7.63-8.08	9.15-9.61	10.68-11.13	12.2-12.35	13.73-13.82
Moisture Content (%)	11.1	18.4	13.1	14.7	4.0	6.9

Sample Info	BH2 SS3	BH2 SS6	BH2 SS10 A	BH2 SS10 B	BH3 SS2	BH3 SS3
Sample Depth (m)	1.53-1.98	4.58-5.03	10.68-10.82	10.82-11.13	0.76-1.22	1.53-1.98
Moisture Content (%)	14.1	12.3	12.3	8.5	9.6	9.0

Sample Info	BH3 SS4	BH3 SS5	BH3 SS6	BH3 SS7	BH3 SS8	BH3 SS9
Sample Depth (m)	2.29-2.75	3.05-3.51	4.58-5.03	6.1-6.56	7.63-8.08	9.15-9.61
Moisture Content (%)	16.0	18.2	11.3	12.5	12.2	16.2

Sample Info	BH3 SS10	BH3 SS11	BH5 SS2 A	BH5 SS2 B	BH5 SS3	BH5 SS4 A
Sample Depth (m)	10.68-11.13	12.2-12.66	0.76-1.07	1.07-1.22	1.53-1.98	2.29-2.59
Moisture Content (%)	11.5	8.6	13.9	17.1	13.6	12.5

Sample Info	BH5 SS4 B	BH5 SS5	BH5 SS6	BH5 SS7	BH5 SS8 A	BH5 SS8 B
Sample Depth (m)	2.59-2.75	3.05-3.51	4.58-5.03	6.1-6.56	7.63-7.78	7.78-8.08
Moisture Content (%)	12.5	13.1	12.2	23.1	13.7	8.0

Sample Info	BH5 SS9	BH5 SS10	TH1	TH2		
Sample Depth (m)	9.15-9.46	10.68-11.13	1.53-1.98	1.53-1.98		
Moisture Content (%)	8.9	2.5	8.9	14.6		

Certificate of Analysis

Analysis Requested:	Grain Size (Sieve Analysis)	***Sample Quantity:***	7	Soil Sample(s)

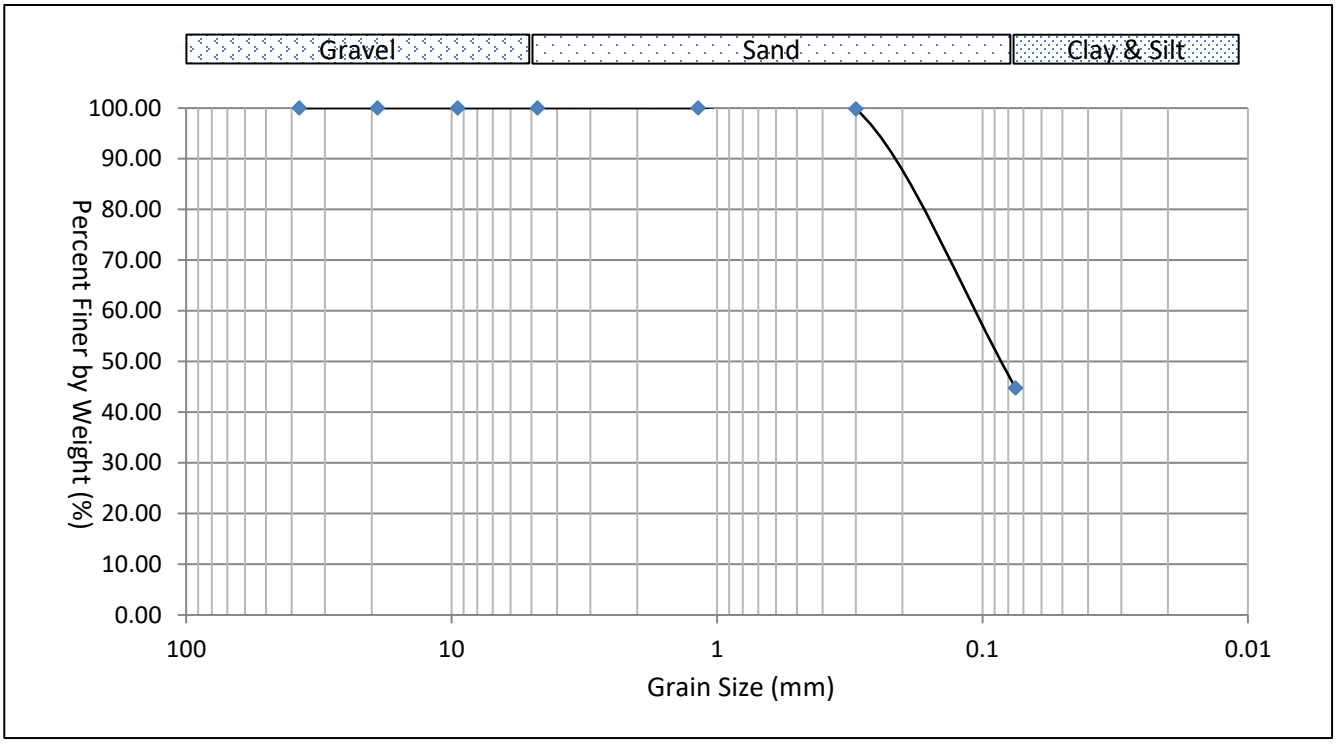
Sample Info	***23-972 BH1 SS3***	***23-973 BH1 SS6***	***23-975 BH2 SS3***	***23-976 BH2 SS6***	***23-978 BH2 SS10 B***	***23-979 BH5 SS3***
Sample Depth (m)	***1.53-1.98***	***4.58-5.03***	***1.53-1.98***	***4.58-5.03***	***10.82-11.13***	***1.53-1.98***
Grain Size (%)						
>19mm	0.0	0.0	0.0	0.0	0.0	0.0
9.5mm-19mm	0.0	0.0	0.0	0.0	3.0	0.0
4.75mm-9.5mm	0.0	0.0	0.0	0.0	4.8	0.0
1.18mm-4.75mm	0.0	0.1	0.0	0.2	10.5	0.3
300um-1.18mm	0.2	0.2	0.0	0.1	11.5	0.3
75um-300um	55.0	11.4	31.8	6.5	12.0	9.2
<75um	44.8	88.4	68.2	93.2	58.2	90.3
Clay and Silt	**44.8**	**88.4**	**68.2**	**93.2**	**58.2**	**90.3**
Sand	**55.2**	**11.6**	**31.8**	**6.8**	**34.0**	**9.7**
Gravel	**0.0**	**0.0**	**0.0**	**0.0**	**7.8**	**0.0**

Sample Info	***23-981 BH5 SS10***					
Sample Depth (m)	***10.68-11.13***					
Grain Size (%)						
>19mm	0.0					
9.5mm-19mm	6.7					
4.75mm-9.5mm	20.1					
1.18mm-4.75mm	24.7					
300um-1.18mm	14.2					
75um-300um	7.1					
<75um	27.2					
Clay and Silt	**27.2**					
Sand	**46.0**					
Gravel	**26.8**					

Grain Size Distribution

Sample ID: 23-972 BH1 SS3 (1.53-1.98m)

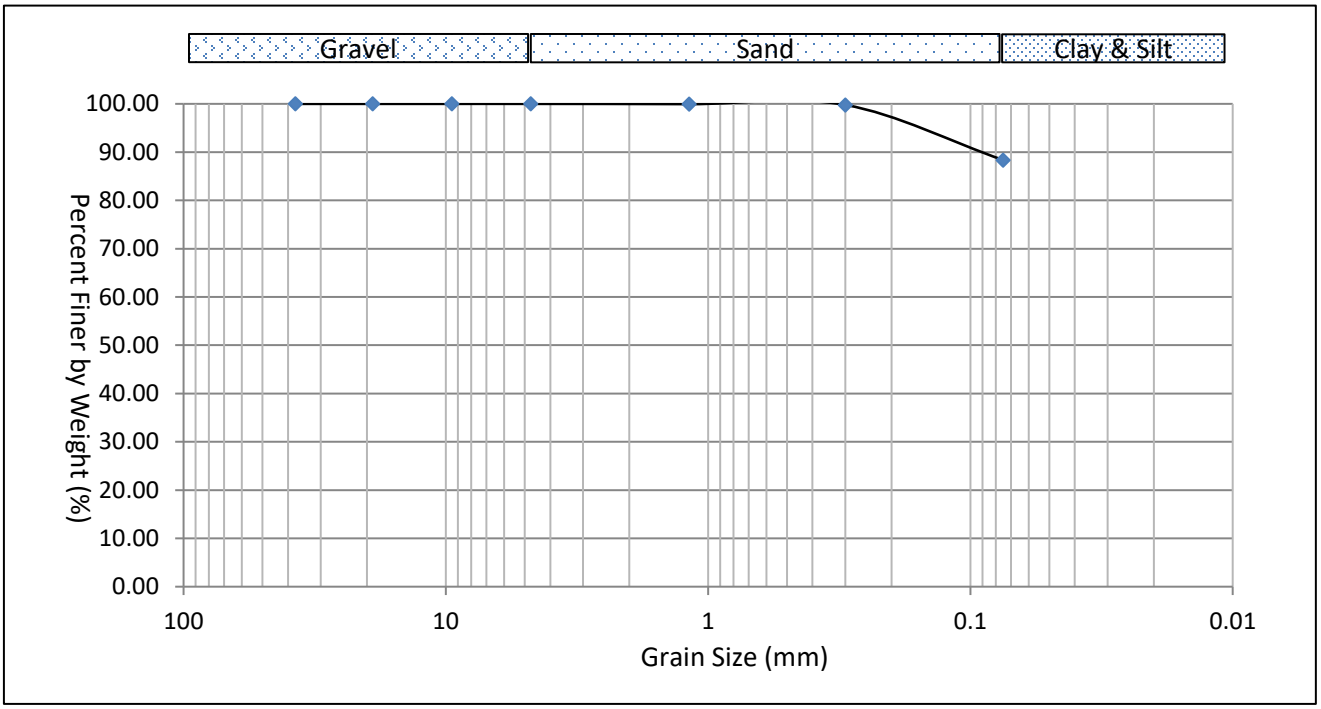
Gravel: 0% Sand: 55.2% Clay and Silt 44.8%



Grain Size Distribution

Sample ID: 23-973 BH1 SS6 (4.58-5.03m)

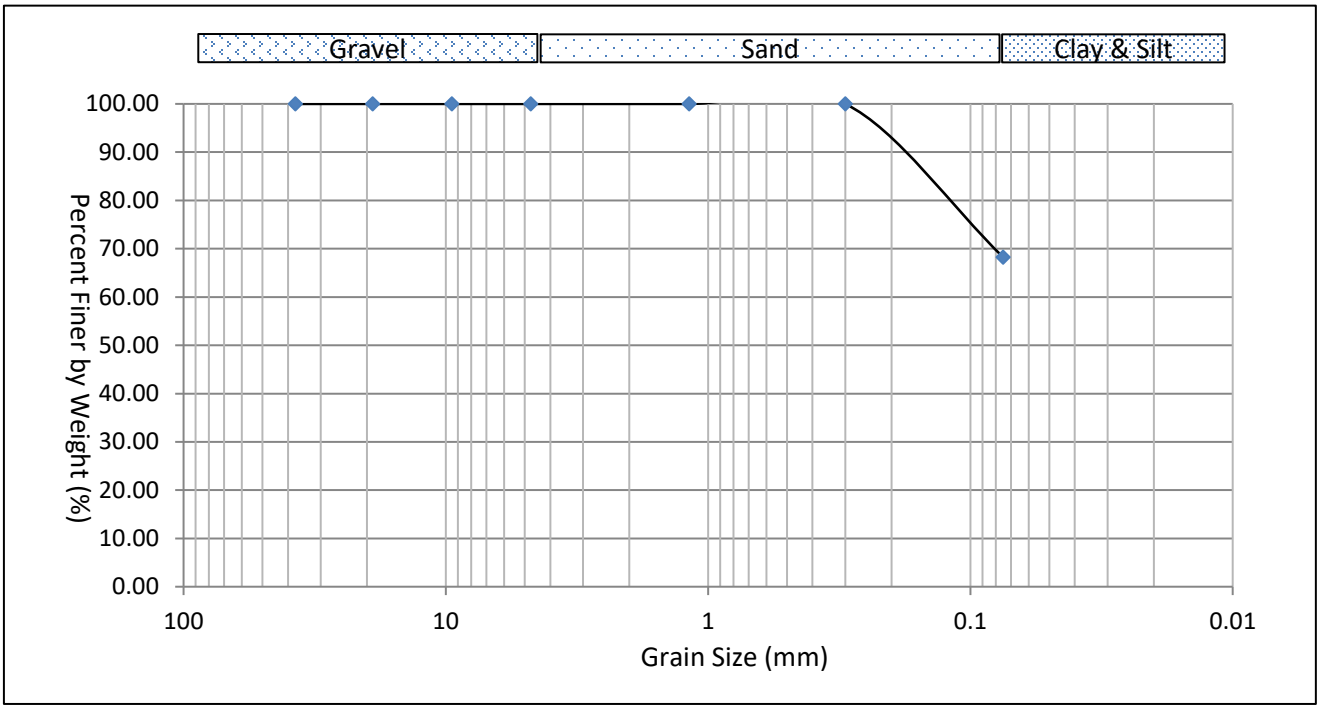
Gravel: 0% Sand: 11.6% Clay and Silt 88.4%



Grain Size Distribution

Sample ID: 23-975 BH2 SS3 (1.53-1.98m)

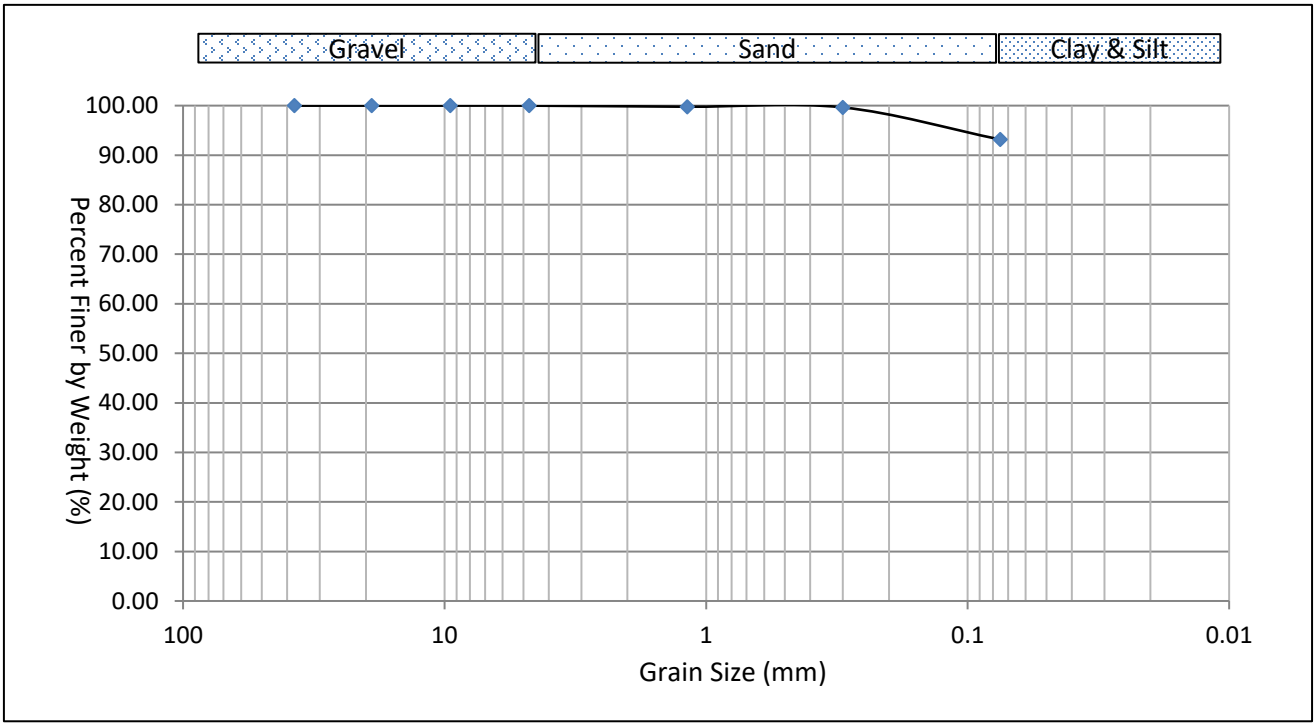
Gravel: 0% Sand: 31.8% Clay and Silt 68.2%



Grain Size Distribution

Sample ID: 23-976 BH2 SS6 (4.58-5.03m)

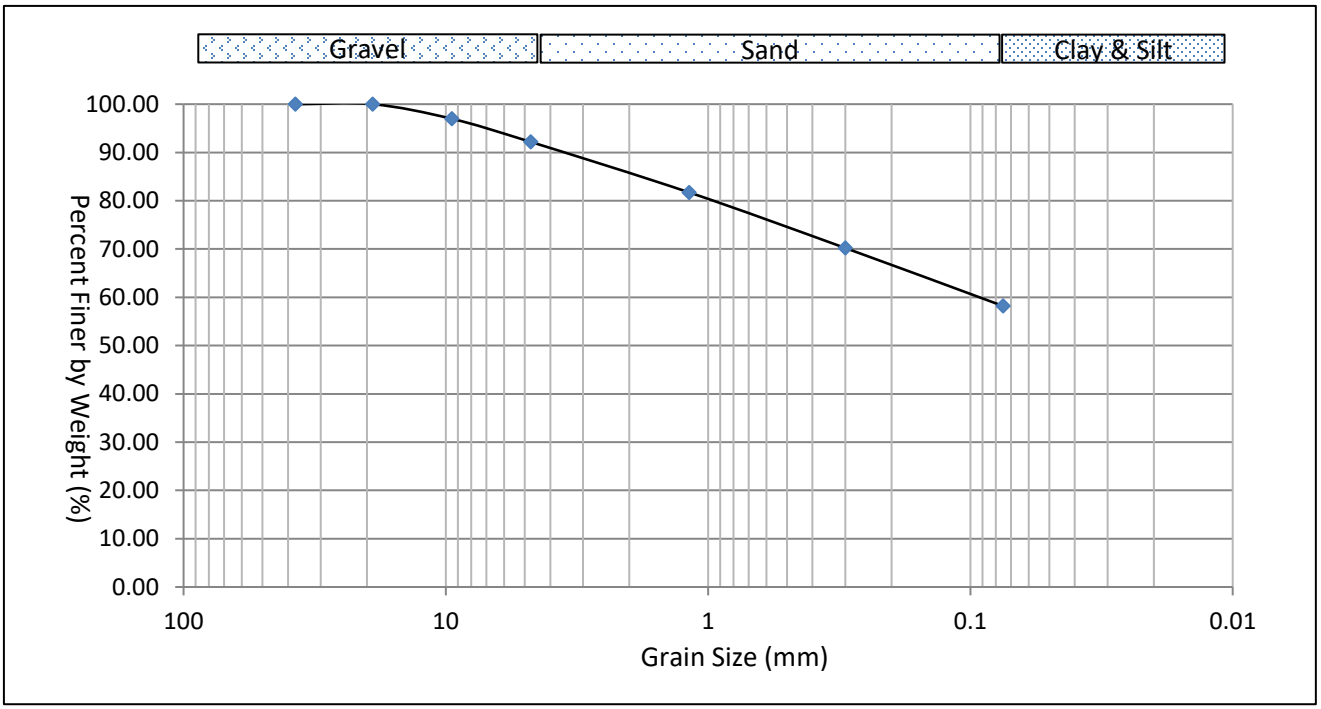
Gravel: 0% Sand: 6.8% Clay and Silt 93.2%



Grain Size Distribution

Sample ID: 23-978 BH2 SS10 B (10.82-11.13m)

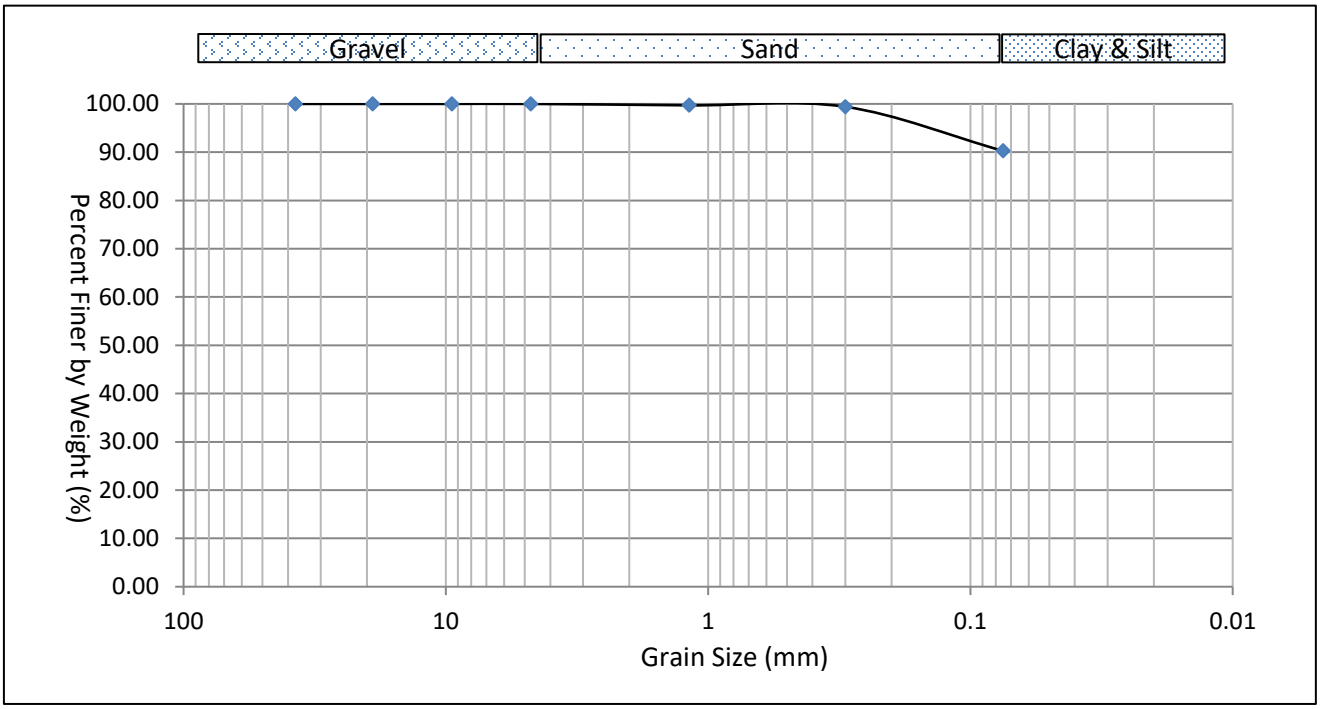
Gravel: 7.8% Sand: 34% Clay and Silt 58.2%



Grain Size Distribution

Sample ID: 23-979 BH5 SS3 (1.53-1.98m)

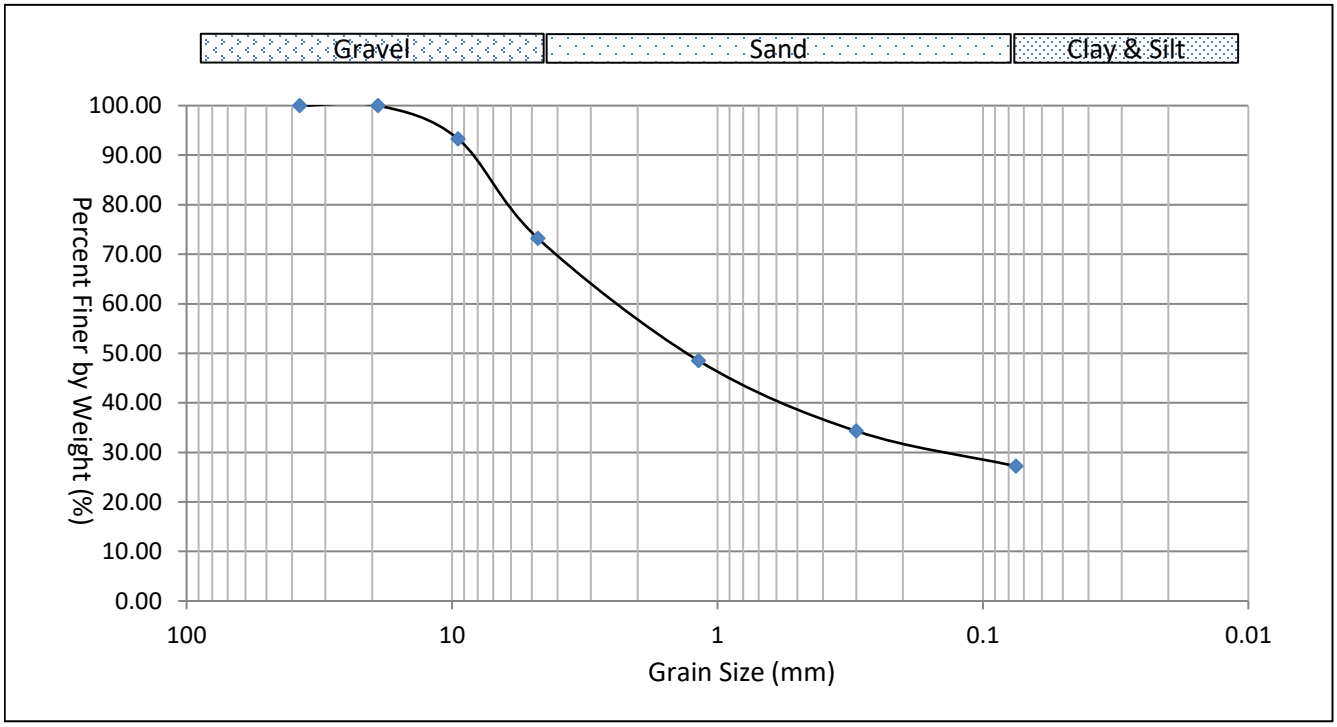
Gravel: 0% Sand: 9.7% Clay and Silt 90.3%



Grain Size Distribution

Sample ID: 23-981 BH5 SS10 (10.68-11.13m)

Gravel: 26.8% Sand: 46% Clay and Silt 27.2%



F.E. Job #: 23-971

Certificate of Analysis

Analysis Requested:	Grain Size (Hydrometer)
Sample Description:	7 Soil Sample(s)

Sample Info	***23-1053 BH1 SS9***	***23-974 BH1 SS10***	***23-977 BH2 SS10 A***	***23-1055 BH3 SS10***	***23-980 BH5 SS6***	***23-982 TH1***
Sample Depth (m)	***9.15-9.61***	***10.68-11.13***	***10.68-10.82***	***10.68-11.13***	***4.58-5.03***	***1.53-1.98***
Grain Size (%)						
>19mm	0.0	0.0	0.0	0.0	0.0	0.0
9.5mm-19mm	0.0	3.8	1.8	2.3	0.0	0.5
4.75mm-9.5mm	0.0	6.8	2.6	1.3	0.0	1.4
1.18mm-4.75mm	0.0	8.0	11.0	1.8	0.2	0.8
300um-1.18mm	0.0	8.8	14.1	1.9	0.2	0.9
75um-300um	8.8	7.9	11.7	2.1	3.8	53.9
5um-75um	77.6	36.3	27.5	52.7	79.3	34.5
2um-5um	4.8	9.9	11.0	14.3	5.9	2.0
<2um	8.9	18.7	20.3	23.6	10.7	5.8
Clay	**8.9**	**18.7**	**20.3**	**23.6**	**10.7**	**5.8**
Silt	**82.3**	**46.2**	**38.5**	**67.0**	**85.2**	**36.5**
Sand	**8.8**	**24.6**	**36.8**	**5.9**	**4.1**	**55.7**
Gravel	**0.0**	**10.6**	**4.4**	**3.6**	**0.0**	**1.9**

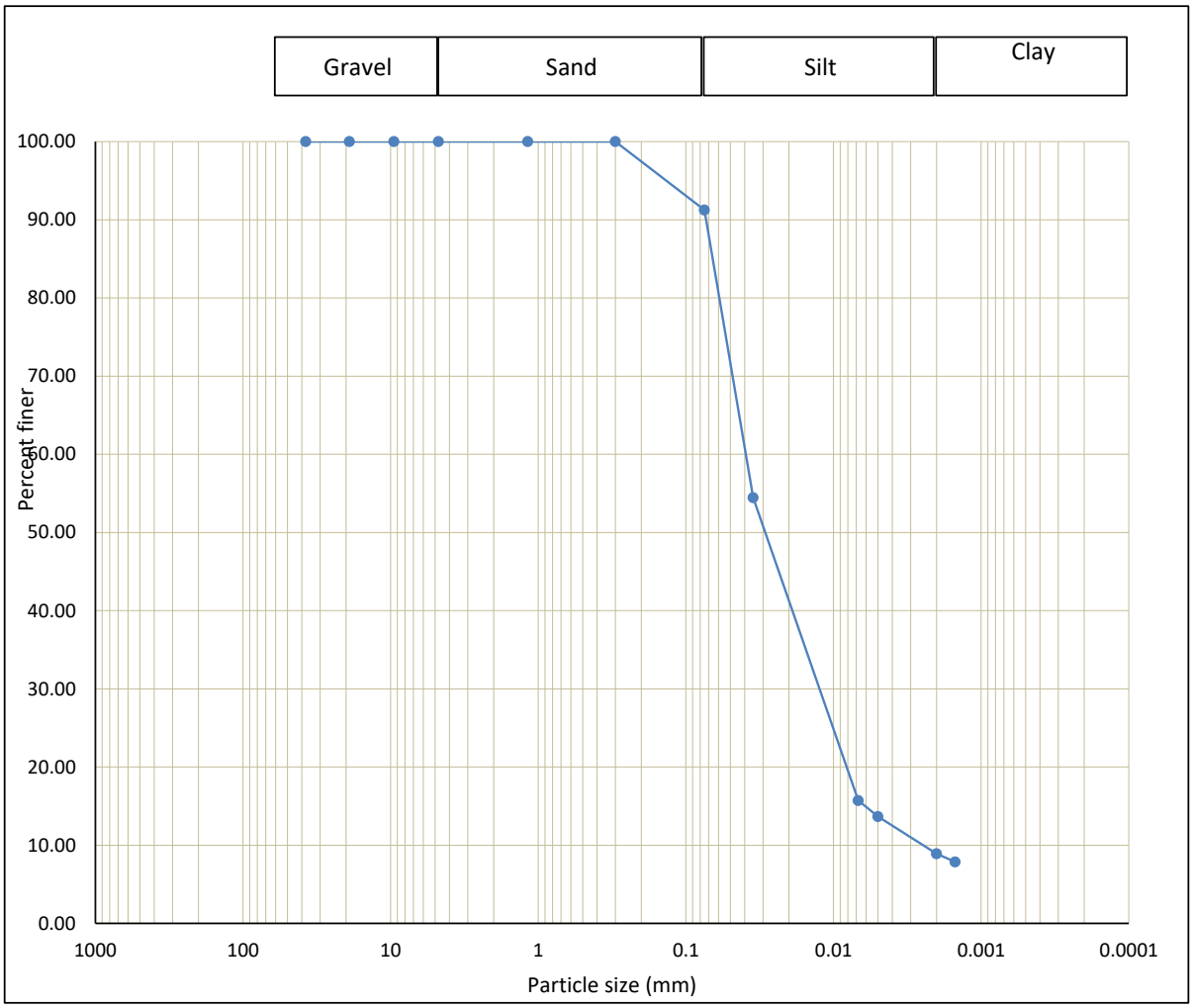
Sample Info	***23-983 TH2***					
Sample Depth (m)	***1.53-1.98***					
Grain Size (%)						
>19mm	0.0					
9.5mm-19mm	13.1					
4.75mm-9.5mm	5.5					
1.18mm-4.75mm	6.7					
300um-1.18mm	7.8					
75um-300um	12.2					
5um-75um	25.7					
2um-5um	6.3					
<2um	22.7					
Clay	**22.7**					
Silt	**31.9**					
Sand	**26.7**					
Gravel	**18.6**					

F.E. Job #: 23-971

Grain Size Distribution

Sample ID: 23-1053 BH1 SS9 (9.15-9.61m)

Gravel: 0% Sand: 8.8% Silt: 82.3% Clay: 8.9%

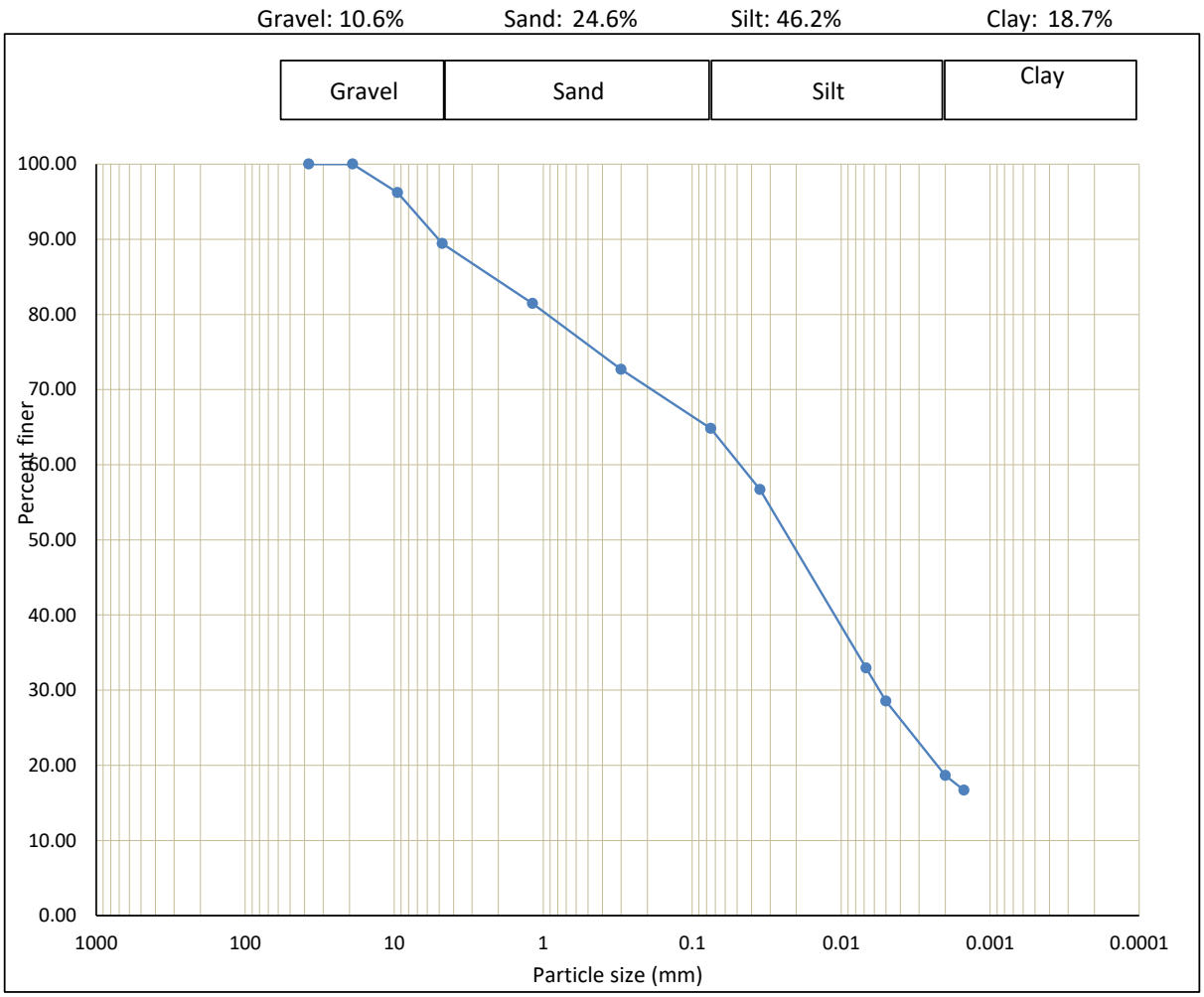


Sample ID: 23-1053 BH1 SS9 (9.15-9.61m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	0.0	Gravel
1.18mm-4.75mm	0.0	Coarse Sand
300um-1.18mm	0.0	Medium Sand
75um-300um	8.8	Fine Sand
5um-75um	77.6	Silt
2um-5um	4.8	
<2um	8.9	Clay

F.E. Job #: 23-971

Grain Size Distribution

Sample ID: 23-974 BH1 SS10 (10.68-11.13m)



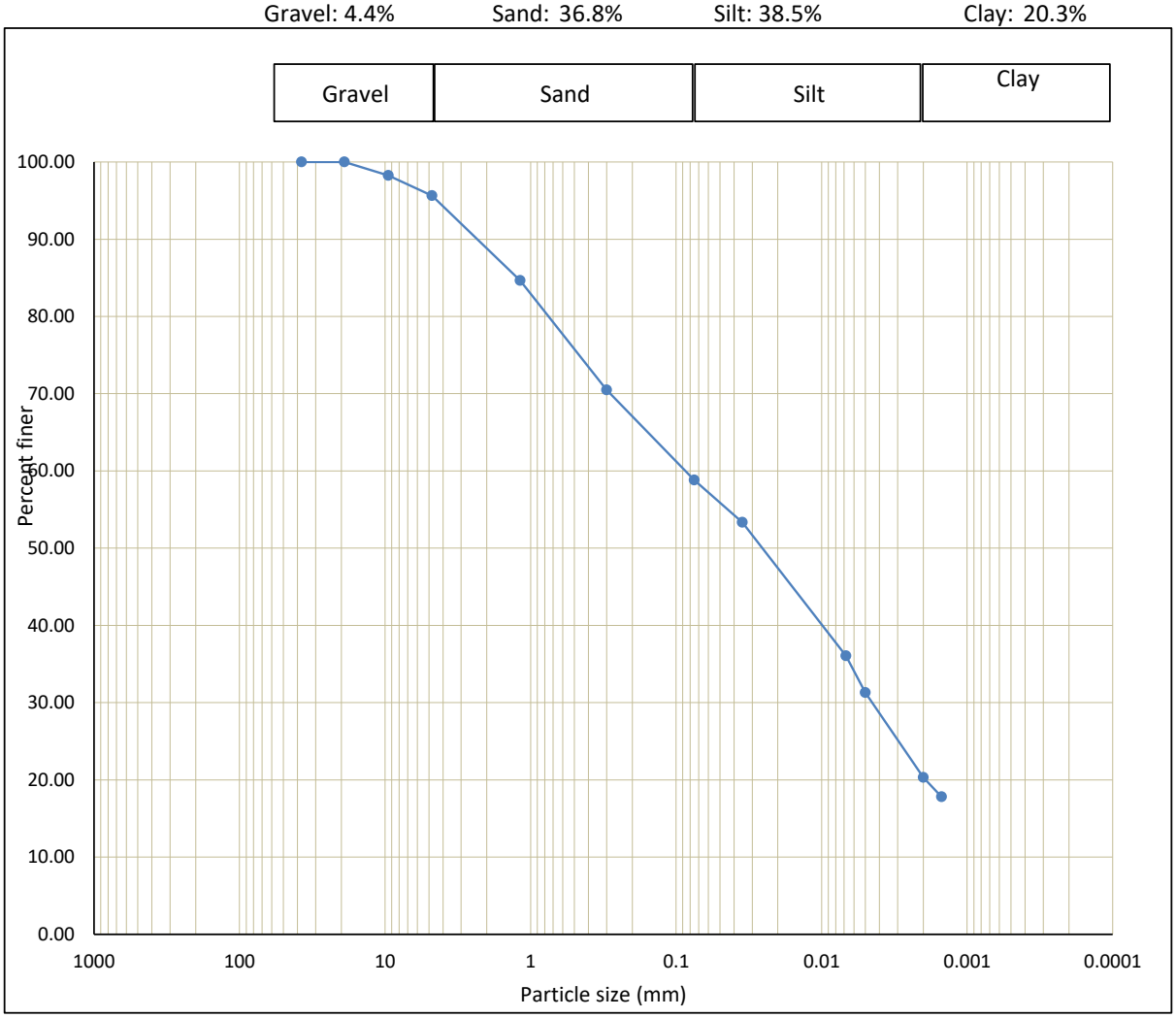
Sample ID: 23-974 BH1 SS10 (10.68-11.13m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	10.6	Gravel
1.18mm-4.75mm	8.0	Coarse Sand
300um-1.18mm	8.8	Medium Sand
75um-300um	7.9	Fine Sand
5um-75um	36.3	Silt
2um-5um	9.9	
<2um	18.7	Clay

F.E. Job #: 23-971

Grain Size Distribution

Sample ID: 23-977 BH2 SS10 A (10.68-10.82m)

Gravel: 4.4% Sand: 36.8% Silt: 38.5% Clay: 20.3%



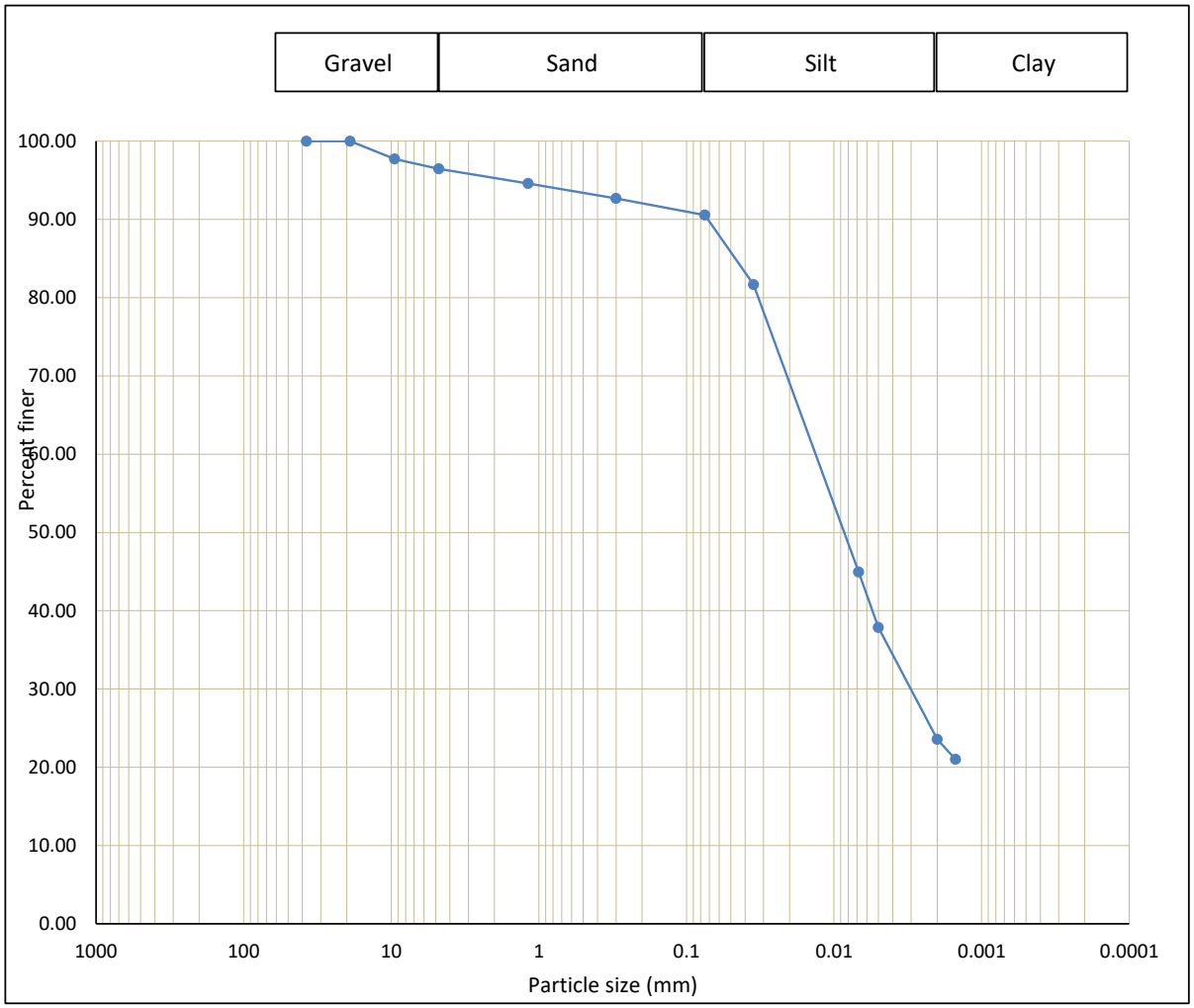
Sample ID: 23-977 BH2 SS10 A (10.68-10.82m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	4.4	Gravel
1.18mm-4.75mm	11.0	Coarse Sand
300um-1.18mm	14.1	Medium Sand
75um-300um	11.7	Fine Sand
5um-75um	27.5	Silt
2um-5um	11.0	
<2um	20.3	Clay

F.E. Job #: 23-971

Grain Size Distribution

Sample ID: 23-1055 BH3 SS10 (10.68-11.13m)

Gravel: 3.6% Sand: 5.9% Silt: 67% Clay: 23.6%

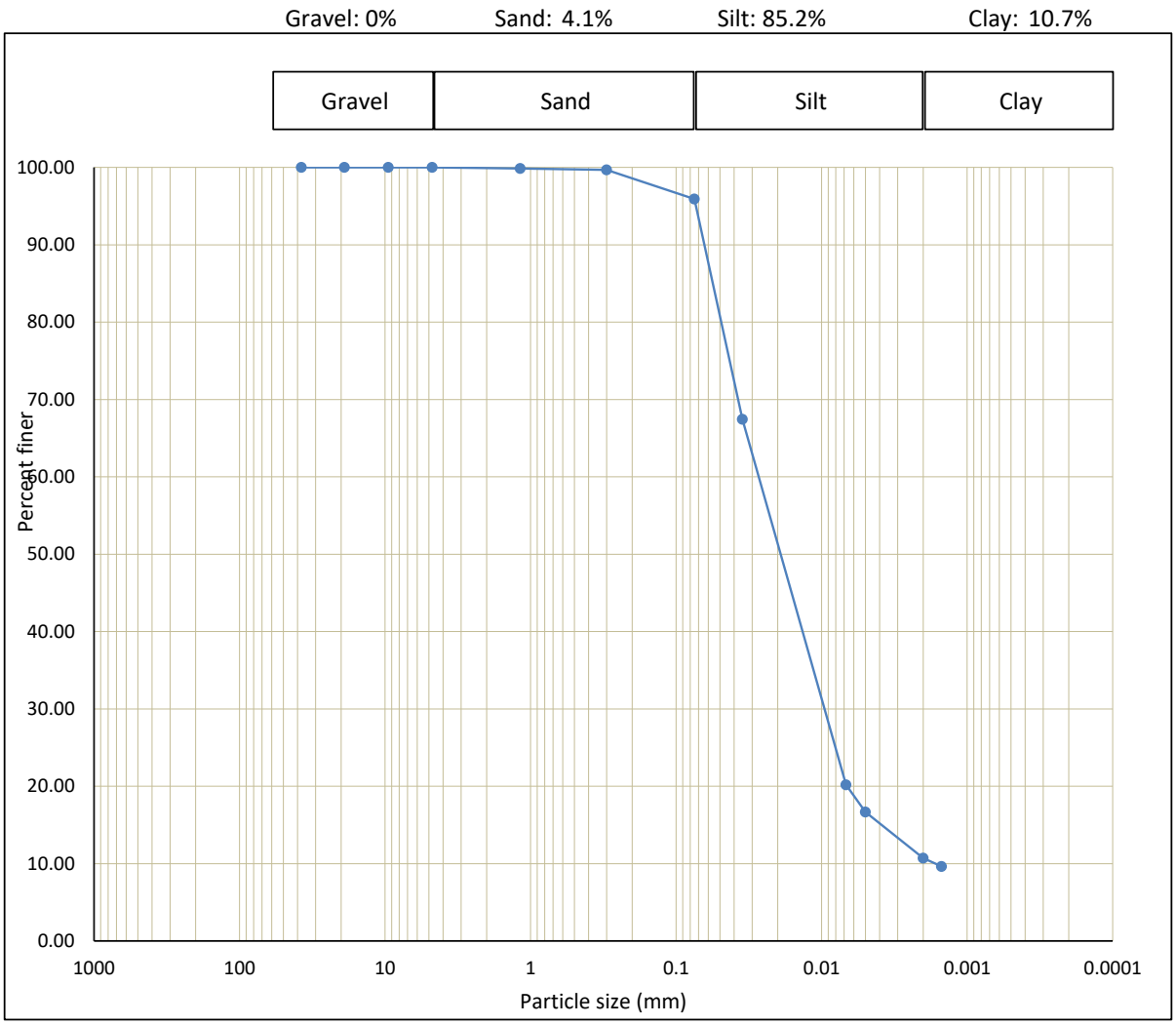


Sample ID: 23-1055 BH3 SS10 (10.68-11.13m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	3.6	Gravel
1.18mm-4.75mm	1.8	Coarse Sand
300um-1.18mm	1.9	Medium Sand
75um-300um	2.1	Fine Sand
5um-75um	52.7	Silt
2um-5um	14.3	
<2um	23.6	Clay

F.E. Job #: 23-971

Grain Size Distribution

Sample ID: 23-980 BH5 SS6 (4.58-5.03m)

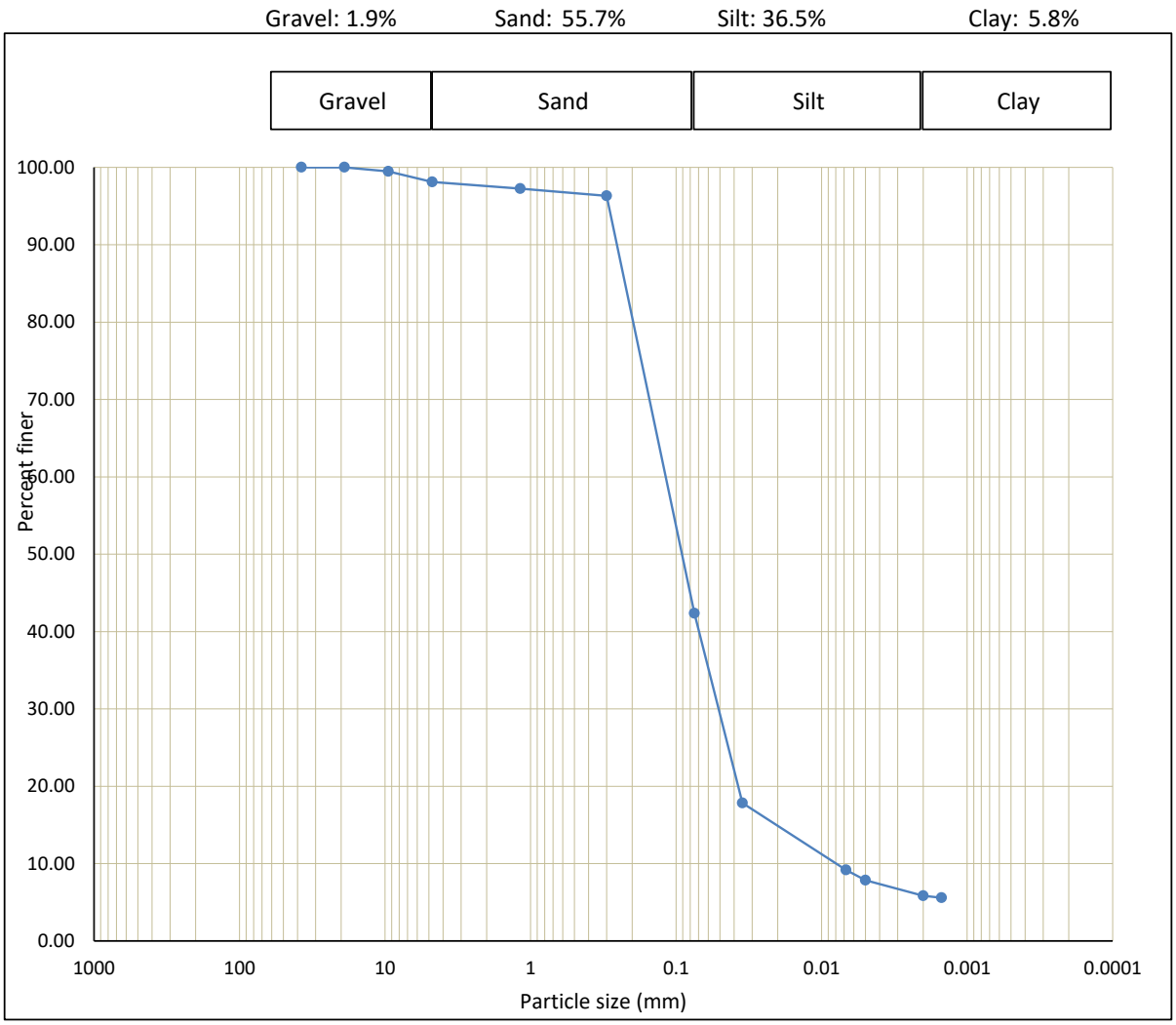


Sample ID: 23-980 BH5 SS6 (4.58-5.03m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	0.0	Gravel
1.18mm-4.75mm	0.2	Coarse Sand
300um-1.18mm	0.2	Medium Sand
75um-300um	3.8	Fine Sand
5um-75um	79.3	Silt
2um-5um	5.9	
<2um	10.7	Clay

F.E. Job #: 23-971

Grain Size Distribution

Sample ID: 23-982 TH1 (1.53-1.98m)

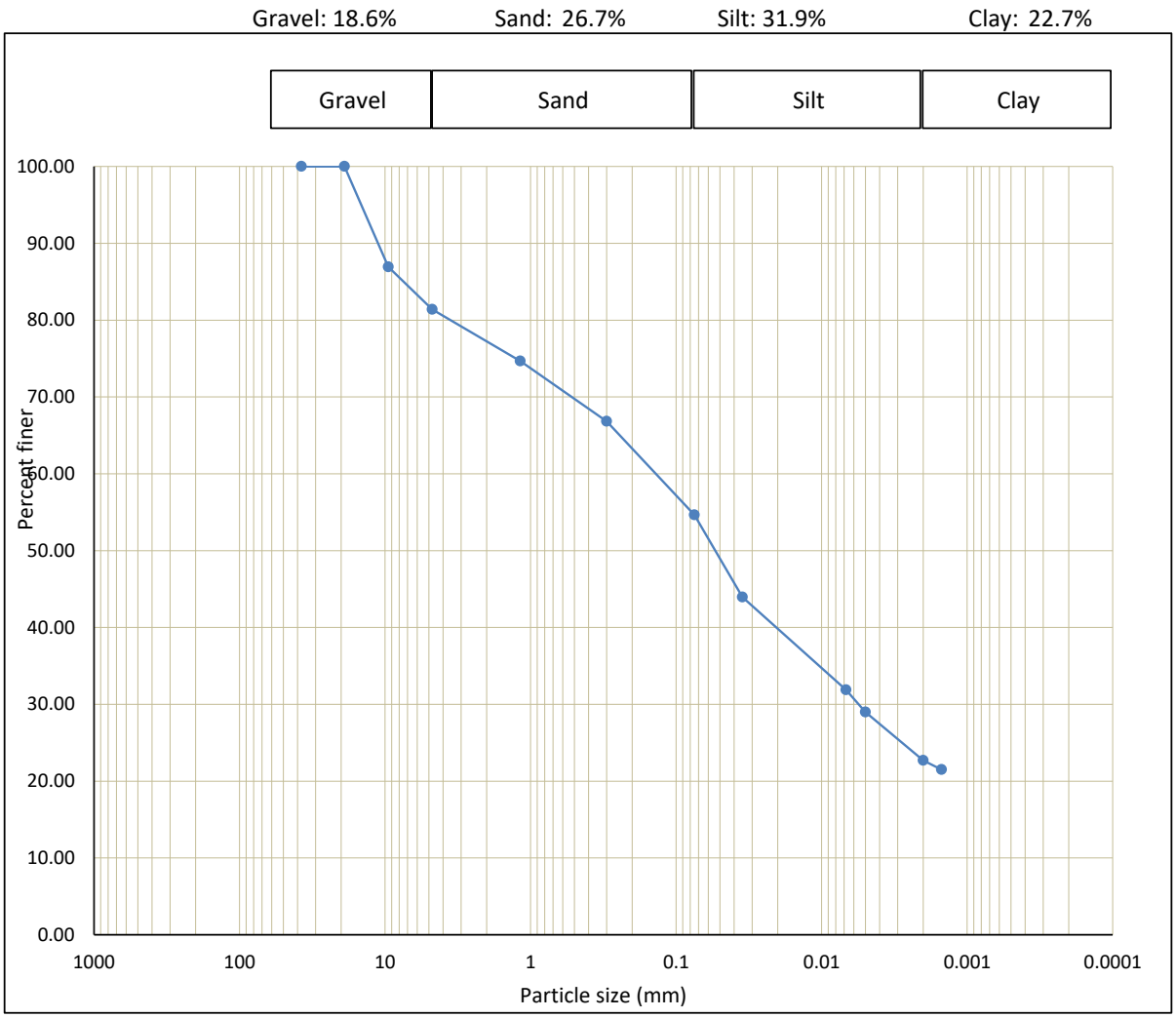


Sample ID: 23-982 TH1 (1.53-1.98m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	1.9	Gravel
1.18mm-4.75mm	0.8	Coarse Sand
300um-1.18mm	0.9	Medium Sand
75um-300um	53.9	Fine Sand
5um-75um	34.5	Silt
2um-5um	2.0	
<2um	5.8	Clay

F.E. Job #: 23-971

Grain Size Distribution

Sample ID: 23-983 TH2 (1.53-1.98m)



Sample ID: 23-983 TH2 (1.53-1.98m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	18.6	Gravel
1.18mm-4.75mm	6.7	Coarse Sand
300um-1.18mm	7.8	Medium Sand
75um-300um	12.2	Fine Sand
5um-75um	25.7	Silt
2um-5um	6.3	
<2um	22.7	Clay

Project Name:	Hydrogeological Investigation	***F.E. Lab #:***	24-598
Client:	1000570027 Ontario Inc.	***Date Sampled:***	3-Sep-2024
Project ID:	24-14065	***Date Received:***	5-Sep-2024
Location:	900 Lakeshore Road, Mississauga, Ontario	***Date Reported:***	23-Sep-2024

Certificate of Analysis

Analyses	Matrix	Quantity	Testing Date	Method Reference
Moisture Content	Soil	20	05-Sep-24	ASTM D2216
Grain Size (Sieve Analysis)	Soil	0	N.A.	LS-602
Grain Size (Hydrometer)	Soil	10	09-Sep-24	LS-702
Compressive test on rock core	Soil	1	16-Sep-24	ASTM D7012

Authorized by: Behnam Sayad-Pour

Behnam Sayad Pour Zanjani
Geo-Lab Supervisor

400 Esna Park Drive, Unit 15, Markham, ON L3R 3K2
Tel:(905) 475-7755 www.fishereng.com

Certificate of Analysis

Analysis Requested:	Moisture Content	***Sample Description:***	20 Soil Sample(s)

Sample Info	BH101 SS2	BH101 SS3	BH101 SS4	BH101 SS5	BH101 SS6	BH101 SS7
Sample Depth (m)	0.76-1.22	1.53-1.98	2.29-2.75	3.05-3.51	4.58-5.03	6.1-6.56
Moisture Content (%)	11.6	12.5	11.0	21.0	12.7	13.4

Sample Info	BH101 SS8	BH101 SS9 A	BH101 SS9 B	BH101 SS10	BH101 SS11	BH103 SS2
Sample Depth (m)	7.63-8.08	9.15-9.46	9.46-9.61	9.91-10.37	10.68-11.13	0.76-1.22
Moisture Content (%)	13.7	16.2	12.6	7.4	7.8	12.0

Sample Info	BH103 SS3	BH103 SS4	BH103 SS5	BH103 SS6	BH103 SS7	BH103 SS8
Sample Depth (m)	1.53-1.98	2.29-2.75	3.05-3.51	4.58-5.03	6.1-6.56	7.63-8.08
Moisture Content (%)	10.4	11.9	12.8	11.3	13.3	21.2

Sample Info	BH103 SS9	BH103 SS10				
Sample Depth (m)	9.15-9.61	10.68-11.13				
Moisture Content (%)	12.8	6.4				

F.E. Job #: 24-598

Certificate of Analysis

Analysis Requested:	Grain Size (Hydrometer)
Sample Description:	10 Soil Sample(s)

Sample Info	***24-599 BH101 SS6***	***24-600 BH101 SS8***	***24-601 BH101 SS9 A***	***24-602 BH101 SS9 B***	***24-603 BH101 SS10***	***24-604 BH101 SS11***
Sample Depth (m)	***4.58-5.03***	***7.63-8.08***	***9.15-9.46***	***9.46-9.61***	***9.91-10.37***	***10.68-11.13***
Grain Size (%)						
>19mm	0.0	0.0	0.0	0.0	0.0	0.0
9.5mm-19mm	0.0	0.0	0.0	2.6	11.6	3.5
4.75mm-9.5mm	0.0	0.0	4.4	5.4	4.9	6.5
1.18mm-4.75mm	0.0	0.0	10.3	12.3	9.8	11.7
300um-1.18mm	0.1	0.1	9.7	13.5	10.3	11.0
75um-300um	10.1	10.0	8.8	10.7	10.7	11.3
5um-75um	79.6	82.3	35.3	29.2	27.3	31.7
2um-5um	4.4	3.1	10.8	10.8	9.7	9.7
<2um	5.7	4.5	20.7	15.5	15.8	14.6
Clay	**5.7**	**4.5**	**20.7**	**15.5**	**15.8**	**14.6**
Silt	**84.0**	**85.4**	**46.1**	**40.0**	**37.0**	**41.4**
Sand	**10.2**	**10.1**	**28.8**	**36.5**	**30.8**	**34.0**
Gravel	**0.0**	**0.0**	**4.4**	**8.0**	**16.4**	**9.9**

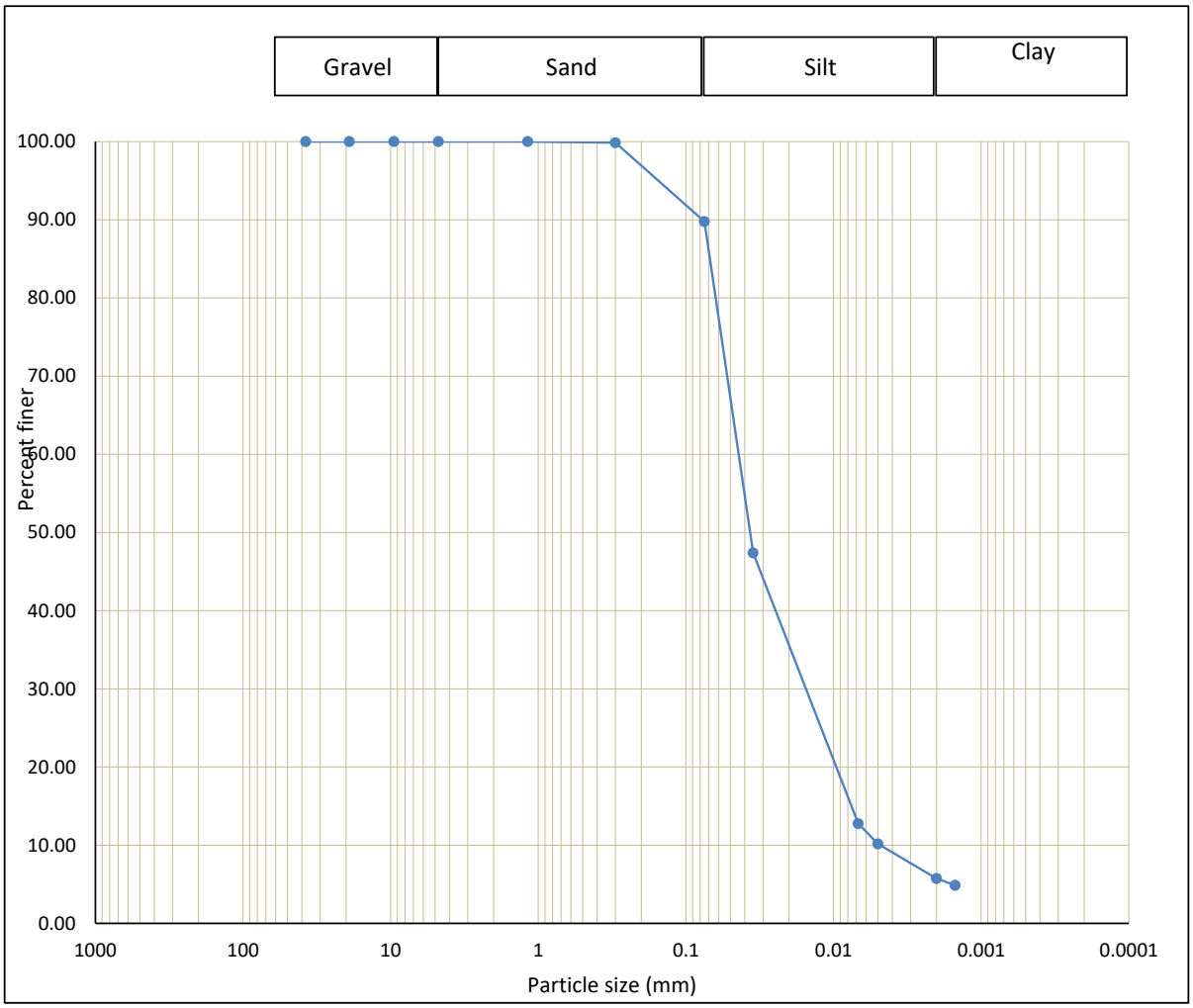
Sample Info	***24-605 BH103 SS6***	***24-606 BH103 SS8***	***24-607 BH103 SS9***	***24-608 BH103 SS10***		
Sample Depth (m)	***4.58-5.03***	***7.63-8.08***	***9.15-9.61***	***10.68-11.13***		
Grain Size (%)						
>19mm	0.0	0.0	8.6	0.0		
9.5mm-19mm	0.0	0.0	0.7	2.7		
4.75mm-9.5mm	0.0	1.6	8.4	5.1		
1.18mm-4.75mm	0.0	2.9	6.8	15.7		
300um-1.18mm	0.1	3.5	5.8	15.6		
75um-300um	6.0	4.7	4.2	3.7		
5um-75um	82.6	79.6	28.8	32.4		
2um-5um	4.7	3.0	11.3	8.0		
<2um	6.6	4.7	25.3	16.7		
Clay	**6.6**	**4.7**	**25.3**	**16.7**		
Silt	**87.3**	**82.6**	**40.1**	**40.4**		
Sand	**6.1**	**11.1**	**16.8**	**35.1**		
Gravel	**0.0**	**1.6**	**17.7**	**7.8**		

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-599 BH101 SS6 (4.58-5.03m)

Gravel: 0% Sand: 10.2% Silt: 84% Clay: 5.7%

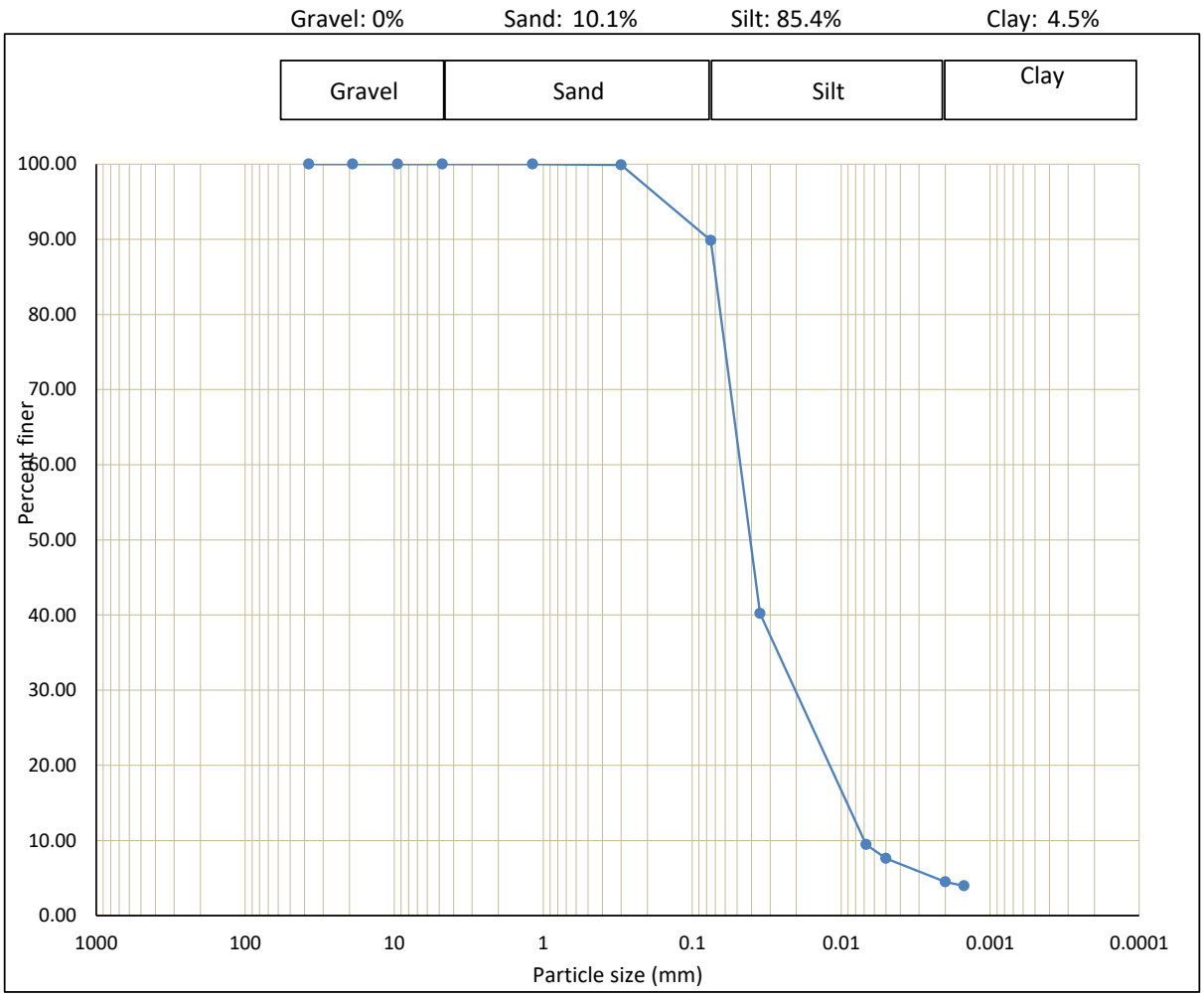


Sample ID: 24-599 BH101 SS6 (4.58-5.03m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	0.0	Gravel
1.18mm-4.75mm	0.0	Coarse Sand
300um-1.18mm	0.1	Medium Sand
75um-300um	10.1	Fine Sand
5um-75um	79.6	Silt
2um-5um	4.4	
<2um	5.7	Clay

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-600 BH101 SS8 (7.63-8.08m)



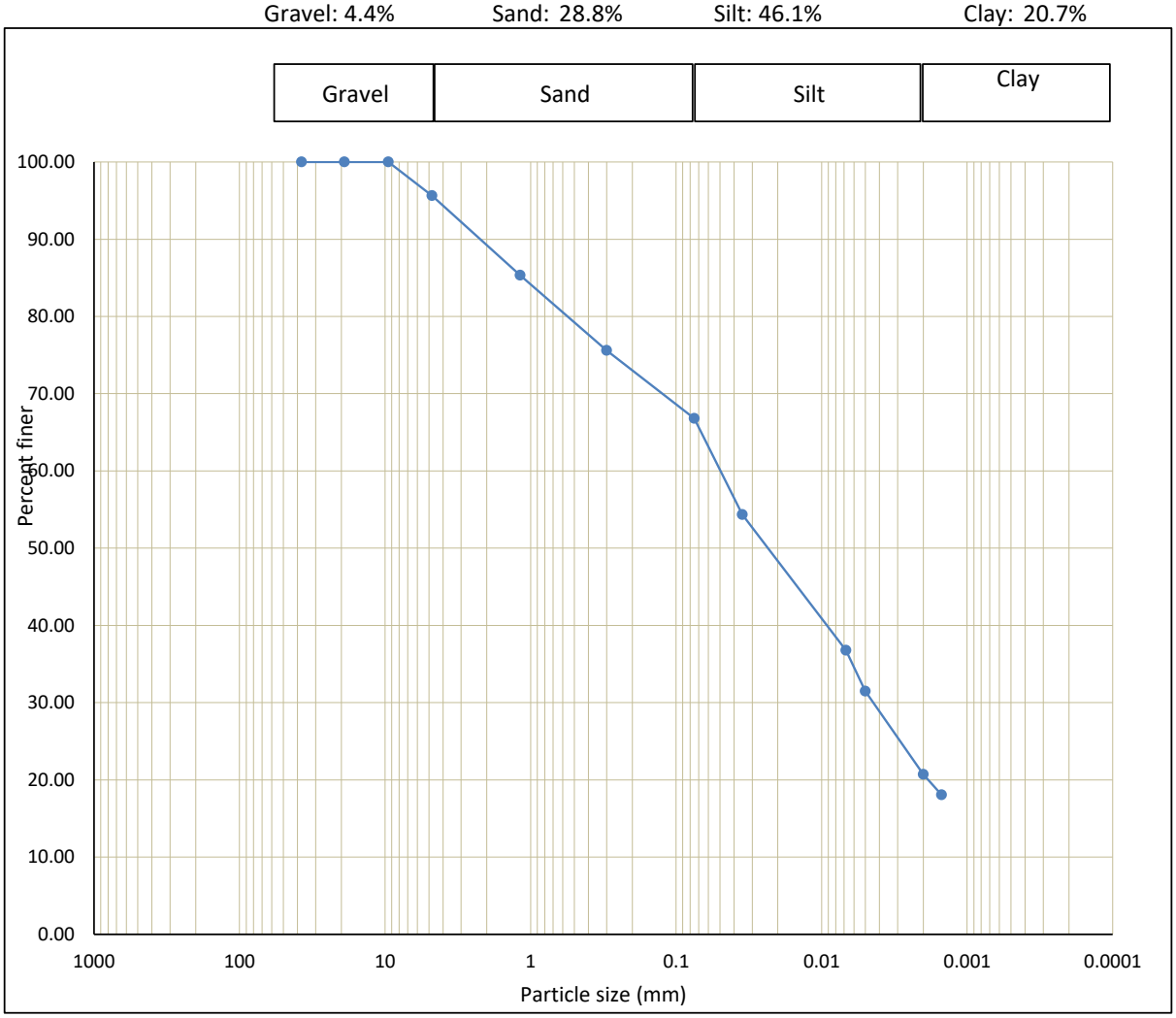
Sample ID: 24-600 BH101 SS8 (7.63-8.08m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	0.0	Gravel
1.18mm-4.75mm	0.0	Coarse Sand
300um-1.18mm	0.1	Medium Sand
75um-300um	10.0	Fine Sand
5um-75um	82.3	Silt
2um-5um	3.1	
<2um	4.5	Clay

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-601 BH101 SS9 A (9.15-9.46m)

Gravel: 4.4% Sand: 28.8% Silt: 46.1% Clay: 20.7%



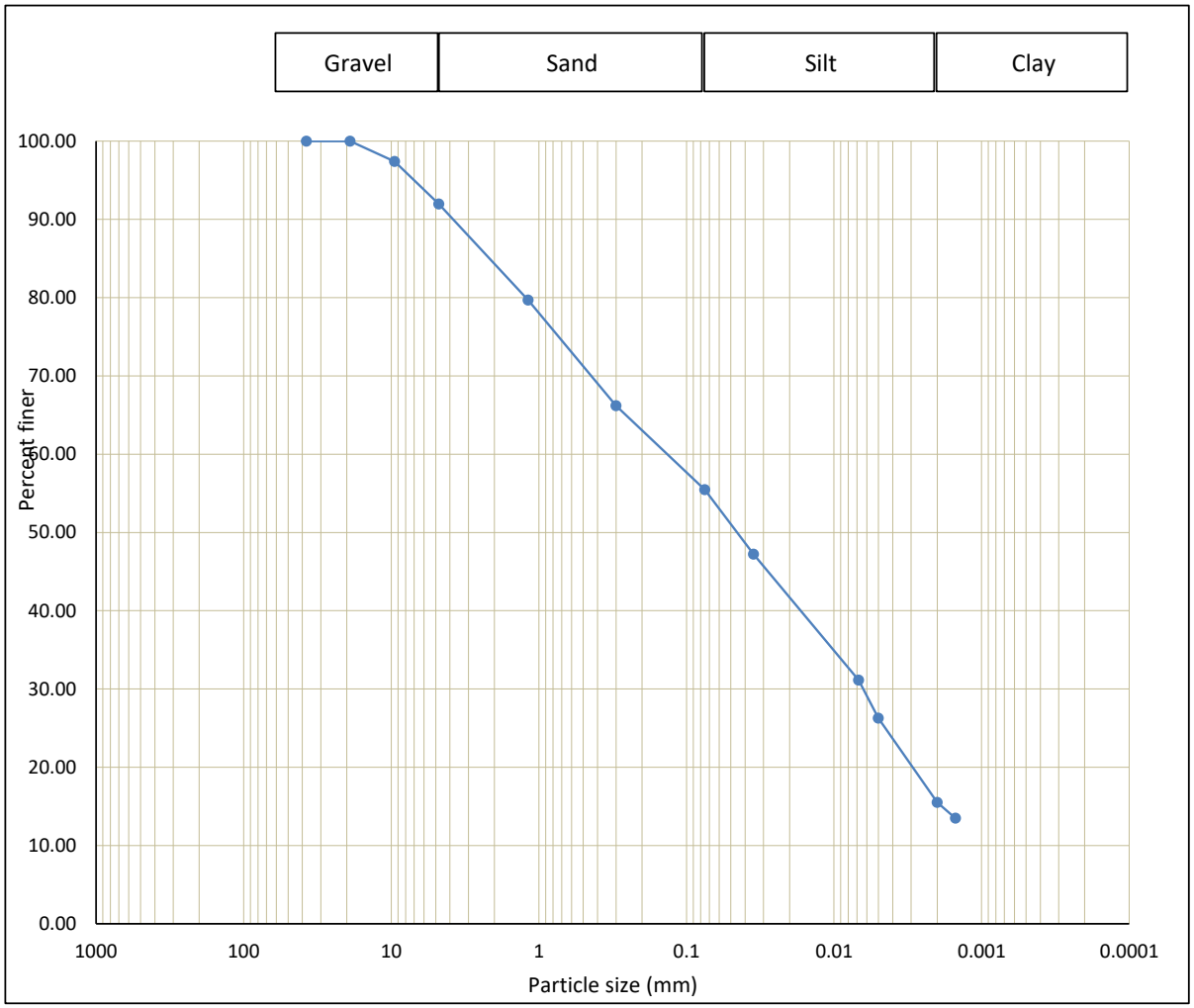
Sample ID: 24-601 BH101 SS9 A (9.15-9.46m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	4.4	Gravel
1.18mm-4.75mm	10.3	Coarse Sand
300um-1.18mm	9.7	Medium Sand
75um-300um	8.8	Fine Sand
5um-75um	35.3	Silt
2um-5um	10.8	
<2um	20.7	Clay

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-602 BH101 SS9 B (9.46-9.61m)

Gravel: 8% Sand: 36.5% Silt: 40% Clay: 15.5%

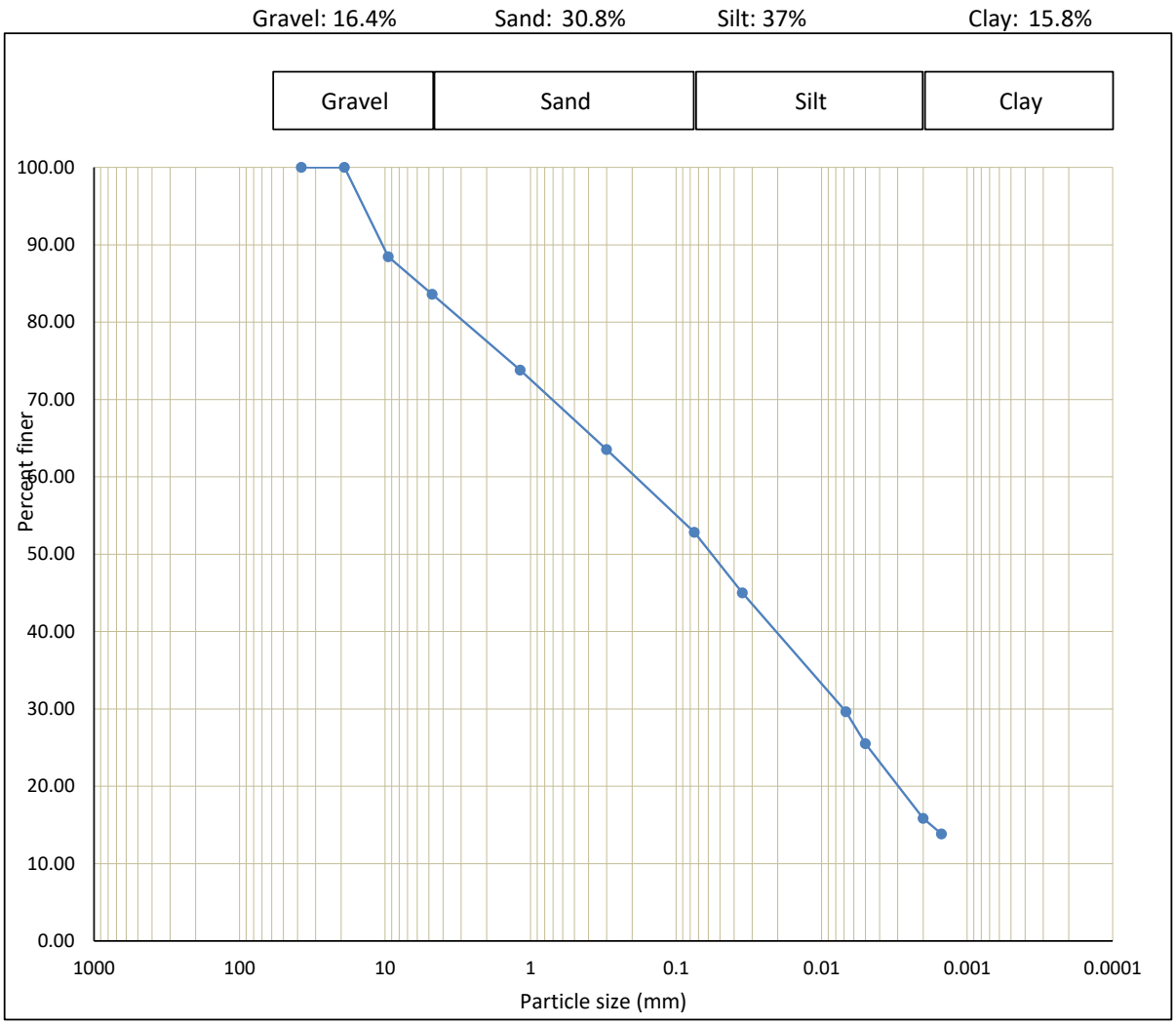


Sample ID: 24-602 BH101 SS9 B (9.46-9.61m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	8.0	Gravel
1.18mm-4.75mm	12.3	Coarse Sand
300um-1.18mm	13.5	Medium Sand
75um-300um	10.7	Fine Sand
5um-75um	29.2	Silt
2um-5um	10.8	
<2um	15.5	Clay

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-603 BH101 SS10 (9.91-10.37m)

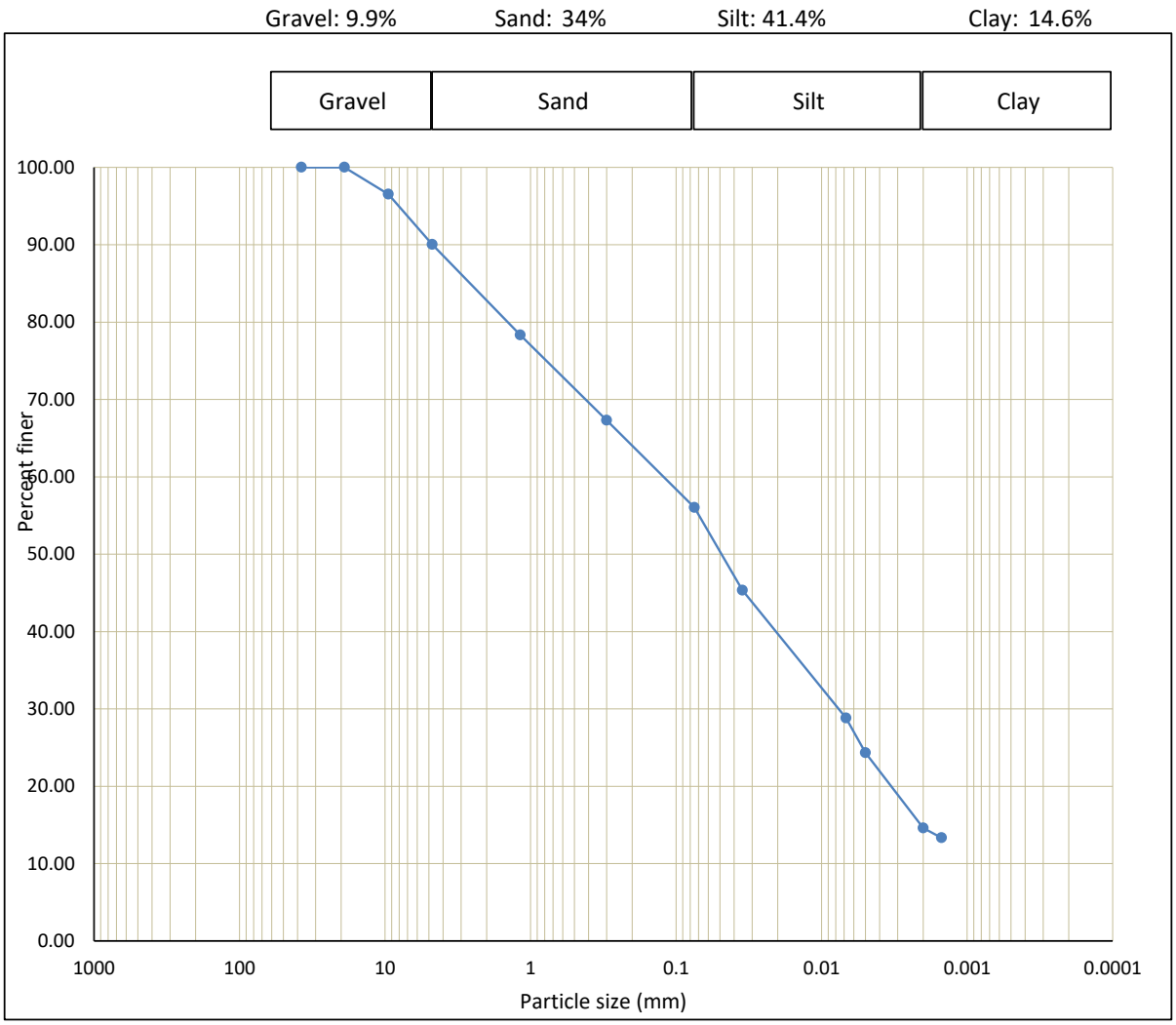


Sample ID: 24-603 BH101 SS10 (9.91-10.37m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	16.4	Gravel
1.18mm-4.75mm	9.8	Coarse Sand
300um-1.18mm	10.3	Medium Sand
75um-300um	10.7	Fine Sand
5um-75um	27.3	Silt
2um-5um	9.7	
<2um	15.8	Clay

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-604 BH101 SS11 (10.68-11.13m)

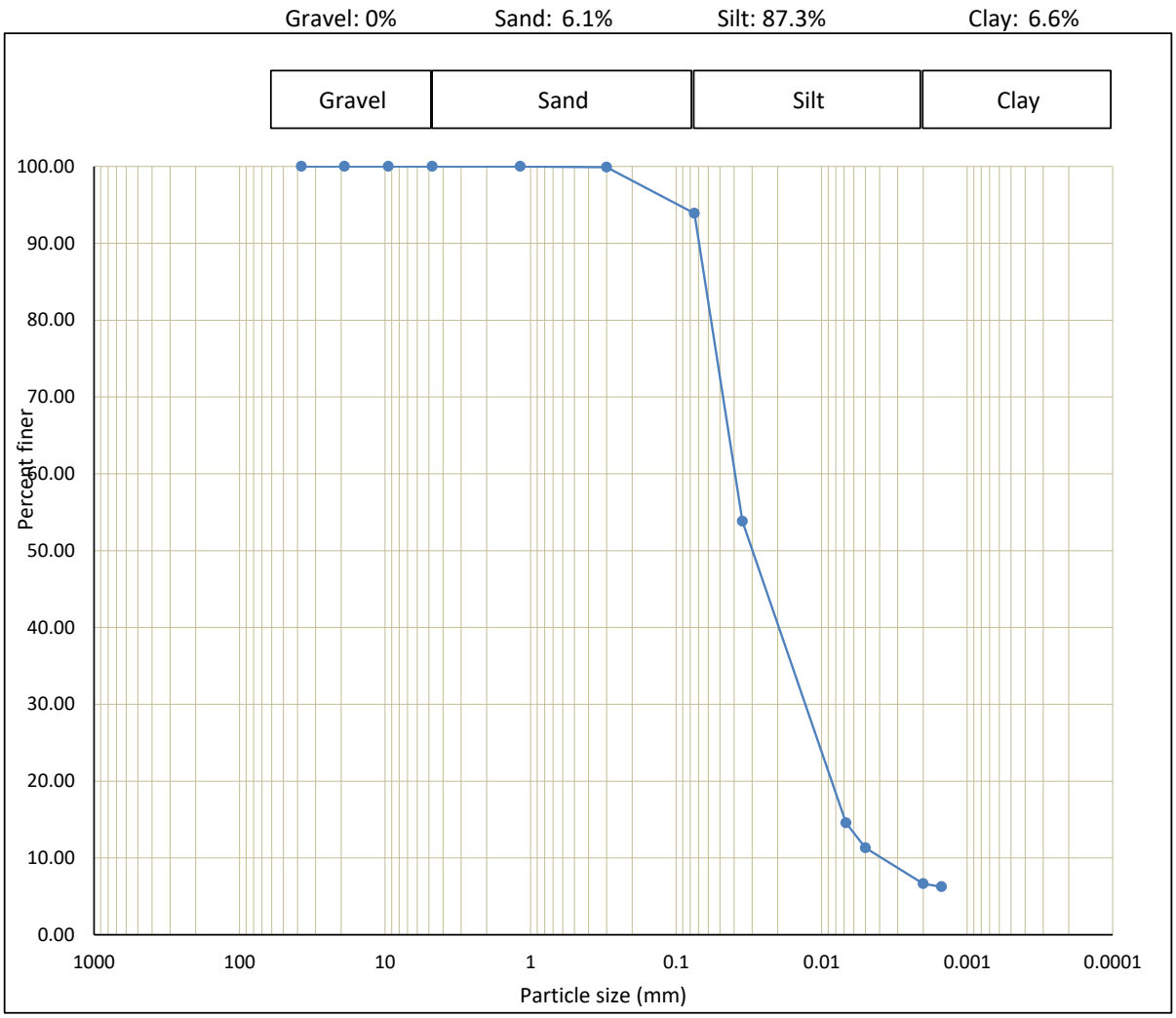


Sample ID: 24-604 BH101 SS11 (10.68-11.13m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	9.9	Gravel
1.18mm-4.75mm	11.7	Coarse Sand
300um-1.18mm	11.0	Medium Sand
75um-300um	11.3	Fine Sand
5um-75um	31.7	Silt
2um-5um	9.7	
<2um	14.6	Clay

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-605 BH103 SS6 (4.58-5.03m)

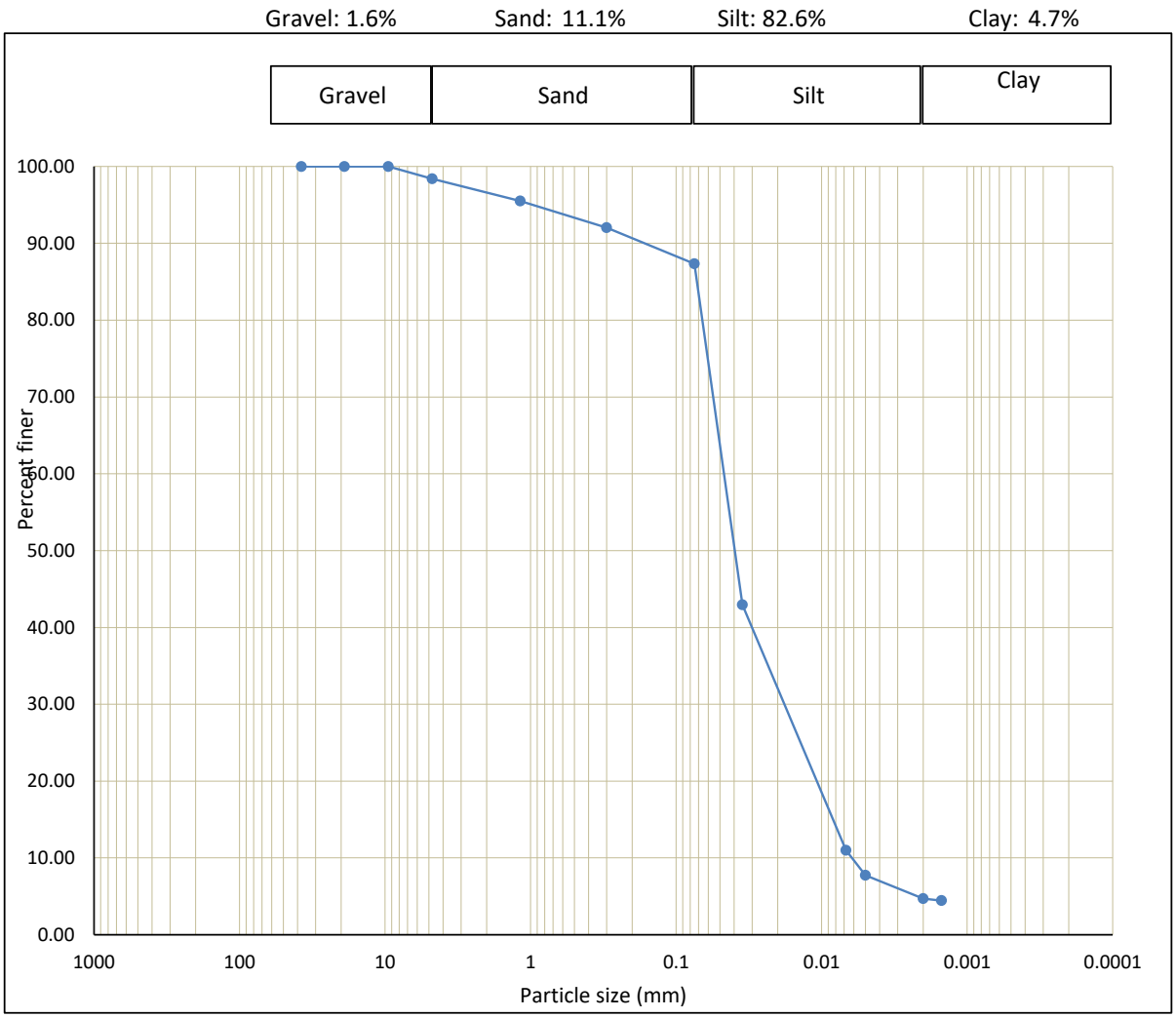


Sample ID: 24-605 BH103 SS6 (4.58-5.03m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	0.0	Gravel
1.18mm-4.75mm	0.0	Coarse Sand
300um-1.18mm	0.1	Medium Sand
75um-300um	6.0	Fine Sand
5um-75um	82.6	Silt
2um-5um	4.7	
<2um	6.6	Clay

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-606 BH103 SS8 (7.63-8.08m)

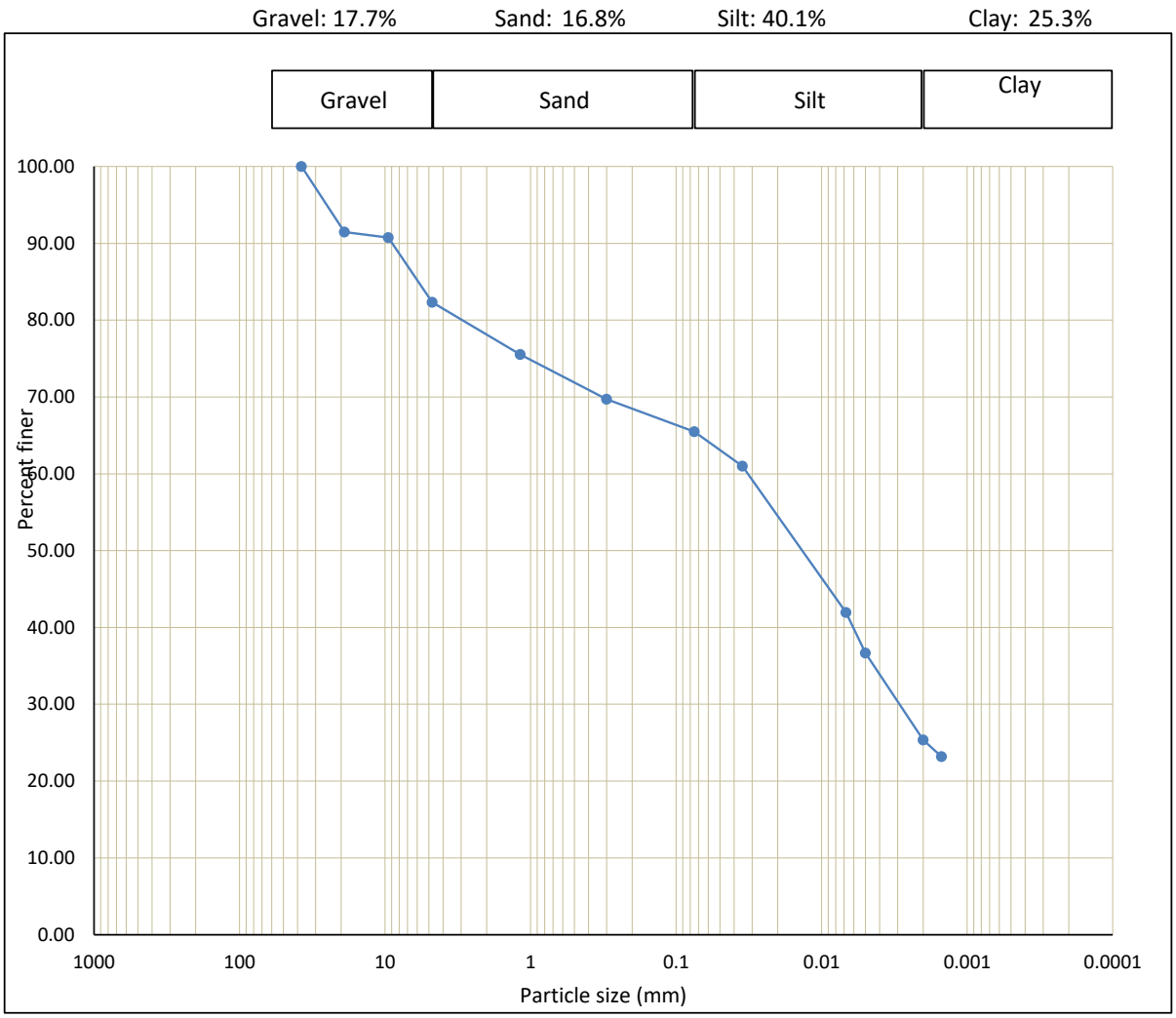


Sample ID: 24-606 BH103 SS8 (7.63-8.08m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	1.6	Gravel
1.18mm-4.75mm	2.9	Coarse Sand
300um-1.18mm	3.5	Medium Sand
75um-300um	4.7	Fine Sand
5um-75um	79.6	Silt
2um-5um	3.0	
<2um	4.7	Clay

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-607 BH103 SS9 (9.15-9.61m)

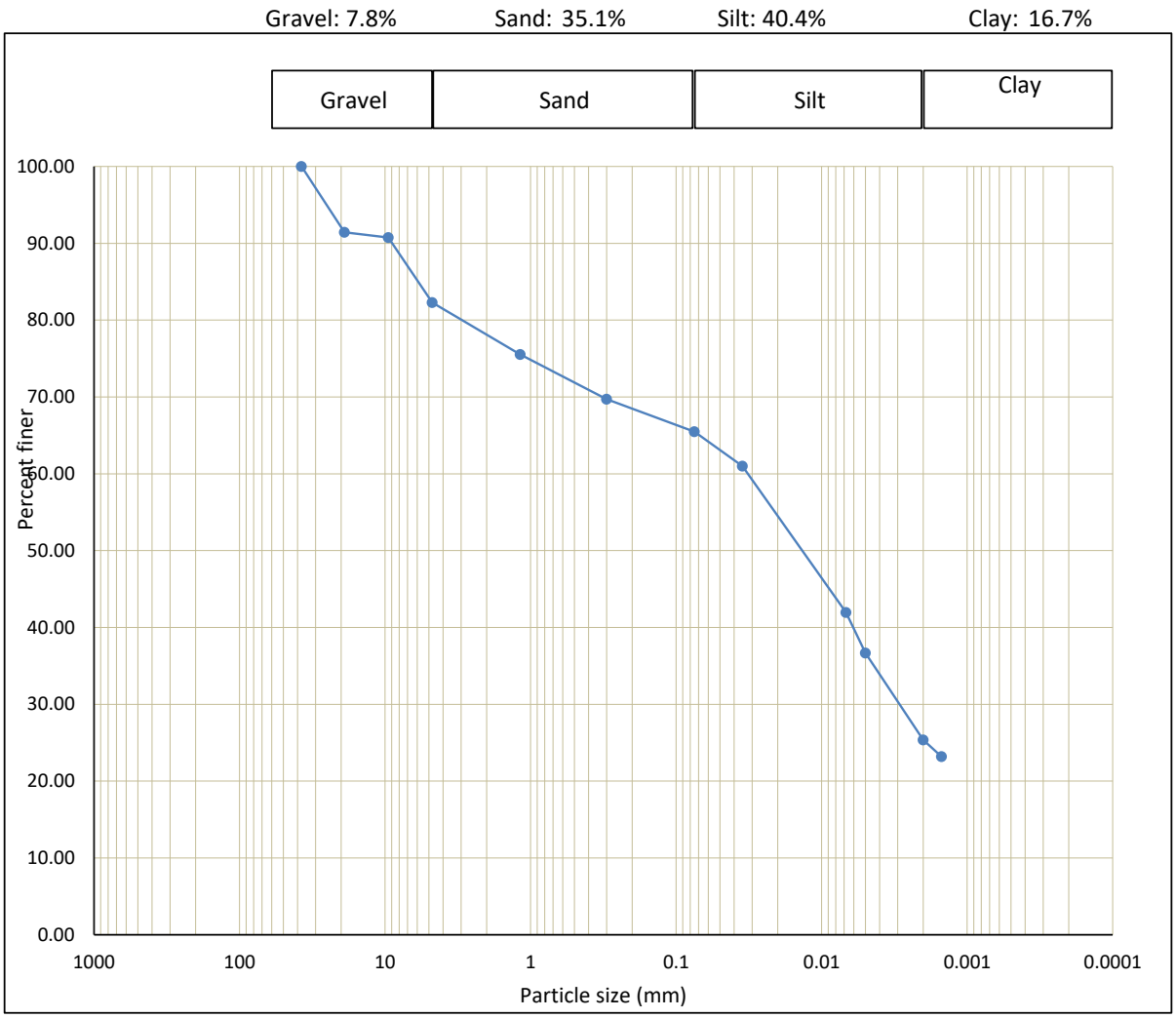


Sample ID: 24-607 BH103 SS9 (9.15-9.61m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	17.7	Gravel
1.18mm-4.75mm	6.8	Coarse Sand
300um-1.18mm	5.8	Medium Sand
75um-300um	4.2	Fine Sand
5um-75um	28.8	Silt
2um-5um	11.3	
<2um	25.3	Clay

F.E. Job #: 24-598

Grain Size Distribution

Sample ID: 24-608 BH103 SS10 (10.68-11.13m)



Sample ID: 24-608 BH103 SS10 (10.68-11.13m)		
Diameter	***Weight (%)***	***Grain Size***
>4.75mm	7.8	Gravel
1.18mm-4.75mm	15.7	Coarse Sand
300um-1.18mm	15.6	Medium Sand
75um-300um	3.7	Fine Sand
5um-75um	32.4	Silt
2um-5um	8.0	
<2um	16.7	Clay

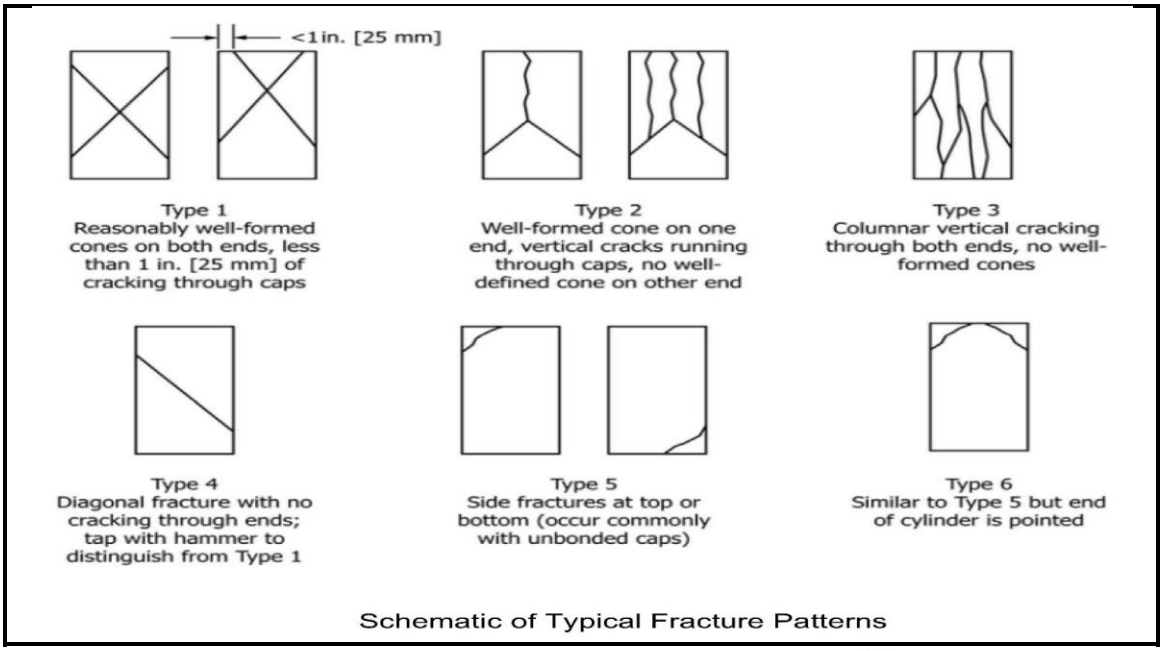
Rock Core Compressive Strength Test Report

Lab No.	Sample Location	Coring Date	Date Received in Lab	Date Reported	Density (kg/m^3)	Load (KN)	Correction Coefficent	Sample Strength (MPa)	Sample Diameter (mm)	Sample Height (mm)	Type of Fracture
24-660	BH103(52'-53')	03-Sep-24	05-Sep-24	23-Sep-24	2674	77.4	1	24.8	63	126.4	1

Project Number: **24-14065**

Project: **900 Lakeshore Road, Mississauga**

Client: **1000570027 Ontario Inc.**



Schematic of Typical Fracture Patterns

Tested and Reported By:

Behnam Sayad-Pour

Behnam Sayad-Pour
Laboratory Supervisor

15-400 Esna Park Drive, Markham, ON L3R 3K2
www.fishereng.com
Tel: (905) 475-7755
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FISHER ENGINEERING

GEOTECHNICAL-LABORATORY

T. 905 475-7755 fisher@fishereng.com
15-400 Esna Park Drive • Markham, ON • L3R 3K2
Hours: 9AM - 5PM M-F
Call for Emergency Response

LAB JOB No: 24-598

Standard Laboratory Request Form: Chain of Custody

CLIENT INFORMATION
Name:
Contact:
Address: 900 Lakshore Road Mississauga
Email:
Fax: Fax results ☐
Phone: Email results ☑

PROJECT INFORMATION
Project Name: Hydrogeological Investigation
Project ID: 24-14065
Sampled By: David

BILLING INFORMATION
Purchase Order No:
Verbal Authorization:
Credit Card Type (e.g. MC/Visa/AMEX...):
Credit Card #:
Expiry Date:

TURNAROUND TIME (TAT): Check ONE if all samples are the same/or see below.

STD - Standard (5-7 bus. days)	~~STD~~	Standard Charge	Reg. Business Hrs. 9am to 5pm. Samples received after 2pm are considered next day orders.
3D - Three-Day (72 hrs.)		+25% SURCHARGES MAY APPLY. Custom quotations (if applicable) will be reflected on final billing. CALL for: Emergencies, Bulk Quotes, or other Questions.	

LAB SAMPLE ID	CLIENT'S SAMPLE ID AND DESCRIPTION	SAMPLING DATE/TIME	SAMPLE MATRIX	CONTAINER NO. and TYPE	TAT (Above)	ANALYSIS REQUESTED (Check or Specify): Moisture Content	Sieve Analysis	Hydrometer	Atterberg Limits	Proctor	Compressive Test				NOTES
	BH 102 & BH103	Sep 3	Soil	Bag	~~STD~~	✓									
	(2.5-4')														
	(5-6.5')														
	(7.5-9')														
	(10-11.5')														
	(15-16.5')							✓							
	(20-21.5')														
	(25-26.5')							✓							
	(30-31.5')							✓							
	(35-36.5')							✓							
	Rock Core					✓					✓				

Relinquished by:
Name: (print)
Signature: Clive
Date & Time:
Method of Shipment: Sep 5, 2024

Client's Comments:

Regulatory Requirements:
OPSS Reg.

Received by (Internal):
Name:
Date & Time:

Arrival Temperature ° C:
Laboratory Remarks:

Purpose for sampling:
Road Base
Road Subbase
Subgrade
Backfill
Engineering Fill
Soil Classification
Other

APPENDIX D – SEWER BYLAW RESULTS

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WT2337187**	Page	: 1 of 6
Client	: **Fisher Engineering Limited**	Laboratory	: ALS Environmental - Waterloo
Contact	: Clive Wiggan	Account Manager	: Emily Hansen
Address	: 15-400 Esna Park Drive Markham ON Canada L3R 3K2	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 905 475 7755, Ext. 29	Telephone	: +1 519 886 6910
Project	: 23-13330	Date Samples Received	: 14-Nov-2023 15:45
PO	: ----	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 20-1084040	Issue Date	: 21-Nov-2023 23:55
Sampler	: CLIENT		
Site	: ----		
Quote number	: FISHER ENVIRONMENTAL - ALS 2022 STANDING OFFER		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Jeremy Gingras	Supervisor - Semi-Volatile Instrumentation	Organics, Waterloo, Ontario
John Tang	Lab Analyst	Inorganics, Waterloo, Ontario
Rachel Cameron	Supervisor - Semi-Volatile Extractions	Organics, Waterloo, Ontario
Ruby Sujeepan	Analyst	Microbiology, Waterloo, Ontario
Sanja Risticevic	Department Manager - LCMS	LCMS, Waterloo, Ontario
Sarah Birch	VOC Section Supervisor	VOC, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Inorganics, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Metals, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/L	micrograms per litre
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit .

Qualifiers

Qualifier	*Description*
BODL	*Limit of Reporting for BOD was increased to account for the largest volume of sample tested.*
RRR	*Refer to report comments for issues regarding this analysis.*

Analytical Results

Sub-Matrix: **Groundwater**
(Matrix: **Water**)

Analyte	Method/Lab	LOR	Unit	Client sample ID: 900 LAKESHORE RD, MW3 (UNFILTERED)	RMPSUB SAN	RMPSUB STM	--	--	--	--
				Sampling date/time: 14-Nov-2023 00:00						
				WT2337187-001						
Physical Tests										
pH	E108/WT	0.10	pH units	7.82	5.5 - 10 pH units	6 - 9 pH units	--	--	--	--
Solids, total suspended [TSS]	E160/WT	3.0	mg/L	21.4	350 mg/L	15 mg/L	--	--	--	--
Anions and Nutrients										
Fluoride	E235.F/WT	0.020	mg/L	0.173	10 mg/L	--	--	--	--	--
Kjeldahl nitrogen, total [TKN]	E318/WT	0.050	mg/L	0.264	100 mg/L	1 mg/L	--	--	--	--
Phosphorus, total	E372-U/WT	0.0020	mg/L	0.0357	10 mg/L	0.4 mg/L	--	--	--	--
Sulfate (as SO4)	E235.SO4/WT	0.30	mg/L	84.0	1500 mg/L	--	--	--	--	--
Cyanides										
Cyanide, strong acid dissociable (Total)	E333/WT	0.0020	mg/L	<0.0020	2 mg/L	0.02 mg/L	--	--	--	--
Microbiological Tests										
Coliforms, Escherichia coli [E. coli]	E012A.EC/WT	1	CFU/100mL	1	--	200 CFU/100mL	--	--	--	--
Total Metals										
Aluminum, total	E420/WT	0.0030	mg/L	0.267	50 mg/L	--	--	--	--	--
Antimony, total	E420/WT	0.00010	mg/L	0.00068	5 mg/L	--	--	--	--	--
Arsenic, total	E420/WT	0.00010	mg/L	0.00126	1 mg/L	0.02 mg/L	--	--	--	--
Cadmium, total	E420/WT	0.0000050	mg/L	0.0000404	0.7 mg/L	0.008 mg/L	--	--	--	--
Chromium, total	E420/WT	0.00050	mg/L	0.00065	5 mg/L	0.08 mg/L	--	--	--	--
Cobalt, total	E420/WT	0.00010	mg/L	0.00041	5 mg/L	--	--	--	--	--
Copper, total	E420/WT	0.00050	mg/L	0.00123	3 mg/L	0.05 mg/L	--	--	--	--
Lead, total	E420/WT	0.000050	mg/L	0.000258	3 mg/L	0.12 mg/L	--	--	--	--
Manganese, total	E420/WT	0.00010	mg/L	0.111	5 mg/L	0.05 mg/L	--	--	--	--
Mercury, total	E508/WT	0.0000050	mg/L	<0.0000050	0.01 mg/L	0.0004 mg/L	--	--	--	--
Molybdenum, total	E420/WT	0.000050	mg/L	0.00825	5 mg/L	--	--	--	--	--
Nickel, total	E420/WT	0.00050	mg/L	0.00129	3 mg/L	0.08 mg/L	--	--	--	--
Selenium, total	E420/WT	0.000050	mg/L	0.000172	1 mg/L	0.02 mg/L	--	--	--	--
Silver, total	E420/WT	0.000010	mg/L	<0.000010	5 mg/L	0.12 mg/L	--	--	--	--
Tin, total	E420/WT	0.00010	mg/L	0.00063	5 mg/L	--	--	--	--	--
Titanium, total	E420/WT	0.00030	mg/L	0.00806	5 mg/L	--	--	--	--	--

Analyte	Method/Lab	LOR	Unit	WT2337187-001 (Continued)	RMPSUB SAN	RMPSUB STM	--	--	--	--
Total Metals - Continued										
Zinc, total	E420/WT	0.0030	mg/L	0.0048	3 mg/L	0.04 mg/L	--	--	--	--
Aggregate Organics										
Carbonaceous biochemical oxygen demand [CBOD]	E555/WT	2.0	mg/L	<3.0 BODL	300 mg/L	15 mg/L	--	--	--	--
Oil & grease (gravimetric)	E567/WT	5.0	mg/L	<5.0	--	--	--	--	--	--
Oil & grease, animal/vegetable (gravimetric)	EC567A.SG/WT	5.0	mg/L	<5.0	150 mg/L	--	--	--	--	--
Oil & grease, mineral (gravimetric)	E567SG/WT	5.0	mg/L	<5.0	15 mg/L	--	--	--	--	--
Phenols, total (4AAP)	E562/EO	0.0010	mg/L	<0.0010	1 mg/L	0.008 mg/L	--	--	--	--
Volatile Organic Compounds										
Benzene	E611D/WT	0.50	µg/L	<0.50	10 µg/L	2 µg/L	--	--	--	--
Chloroform	E611D/WT	0.50	µg/L	<0.50	40 µg/L	2 µg/L	--	--	--	--
Dichlorobenzene, 1,2-	E611D/WT	0.50	µg/L	<0.50	50 µg/L	5.6 µg/L	--	--	--	--
Dichlorobenzene, 1,4-	E611D/WT	0.50	µg/L	<0.50	80 µg/L	6.8 µg/L	--	--	--	--
Dichloroethylene, cis-1,2-	E611D/WT	0.50	µg/L	<0.50	4000 µg/L	5.6 µg/L	--	--	--	--
Dichloromethane	E611D/WT	1.0	µg/L	<1.0	2000 µg/L	5.2 µg/L	--	--	--	--
Dichloropropylene, trans-1,3-	E611D/WT	0.30	µg/L	<0.30	140 µg/L	5.6 µg/L	--	--	--	--
Ethylbenzene	E611D/WT	0.50	µg/L	<0.50	160 µg/L	2 µg/L	--	--	--	--
Methyl ethyl ketone [MEK]	E611D/WT	20	µg/L	<20	8000 µg/L	--	--	--	--	--
Styrene	E611D/WT	0.50	µg/L	<0.50	200 µg/L	--	--	--	--	--
Tetrachloroethane, 1,1,2,2-	E611D/WT	0.50	µg/L	<0.50	1400 µg/L	17 µg/L	--	--	--	--
Tetrachloroethylene	E611D/WT	0.50	µg/L	<0.50	1000 µg/L	4.4 µg/L	--	--	--	--
Toluene	E611D/WT	0.50	µg/L	<0.50	270 µg/L	2 µg/L	--	--	--	--
Trichloroethylene	E611D/WT	0.50	µg/L	<0.50	400 µg/L	8 µg/L	--	--	--	--
Xylene, m+p-	E611D/WT	0.40	µg/L	<0.40	--	--	--	--	--	--
Xylene, o-	E611D/WT	0.30	µg/L	<0.30	--	--	--	--	--	--
Xylenes, total	E611D/WT	0.50	µg/L	<0.50	1400 µg/L	4.4 µg/L	--	--	--	--
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	E611D/WT	1.0	%	95.3	--	--	--	--	--	--
Difluorobenzene, 1,4-	E611D/WT	1.0	%	98.8	--	--	--	--	--	--
Phthalate Esters										
bis(2-Ethylhexyl) phthalate [DEHP]	E655F/WT	2.0	µg/L	<4.4 RRR	12 µg/L	8.8 µg/L	--	--	--	--
Di-n-butyl phthalate	E655F/WT	1.0	µg/L	<1.0	80 µg/L	15 µg/L	--	--	--	--
Semi-Volatile Organics Surrogates										
Fluorobiphenyl, 2-	E655F/WT	1.0	%	87.9	--	--	--	--	--	--

Analyte	Method/Lab	LOR	Unit	WT2337187-001 (Continued)	RMPSUB SAN	RMPSUB STM	--	--	--	--
Semi-Volatile Organics Surrogates - Continued										
Terphenyl-d14, p-	E655F/WT	1.0	%	99.0	--	--	--	--	--	--
Phenolics Surrogates										
Tribromophenol, 2,4,6-	E655F/WT	0.20	%	118	--	--	--	--	--	--
Nonylphenols										
Nonylphenol diethoxylates [NP2EO]	E749B/WT	0.10	µg/L	<0.10	--	--	--	--	--	--
Nonylphenol ethoxylates, total	E749B/WT	2.0	µg/L	<2.0	200 µg/L	--	--	--	--	--
Nonylphenol monoethoxylates [NP1EO]	E749B/WT	2.0	µg/L	<2.0	--	--	--	--	--	--
Nonylphenols [NP]	E749A/WT	1.0	µg/L	<1.0	20 µg/L	--	--	--	--	--
Polychlorinated Biphenyls										
Aroclor 1016	E687/WT	0.020	µg/L	<0.020	--	--	--	--	--	--
Aroclor 1221	E687/WT	0.020	µg/L	<0.020	--	--	--	--	--	--
Aroclor 1232	E687/WT	0.020	µg/L	<0.020	--	--	--	--	--	--
Aroclor 1242	E687/WT	0.020	µg/L	<0.020	--	--	--	--	--	--
Aroclor 1248	E687/WT	0.020	µg/L	<0.020	--	--	--	--	--	--
Aroclor 1254	E687/WT	0.020	µg/L	<0.020	--	--	--	--	--	--
Aroclor 1260	E687/WT	0.020	µg/L	<0.020	--	--	--	--	--	--
Aroclor 1262	E687/WT	0.020	µg/L	<0.020	--	--	--	--	--	--
Aroclor 1268	E687/WT	0.020	µg/L	<0.020	--	--	--	--	--	--
Polychlorinated biphenyls [PCBs], total	E687/WT	0.060	µg/L	<0.060	1 µg/L	0.4 µg/L	--	--	--	--
Decachlorobiphenyl	E687/WT	0.1	%	113	--	--	--	--	--	--
Tetrachloro-m-xylene	E687/WT	0.1	%	86.5	--	--	--	--	--	--

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
900 LAKESHORE RD, MW3 (UNFILTERED)	Water	Solids, total suspended [TSS]		RMPSUB	STM	21.4 mg/L	15 mg/L
	Water	Manganese, total		RMPSUB	STM	0.111 mg/L	0.05 mg/L

Sample Comments

Sample	Client Id	Comment
WT2337187-001	900 LAKESHORE RD, MW3 (UNFILTERED)	RRR: Bis(2-Ethylhexyl) phthalate Detection limit raised due to bias high analyte response in continuing calibration standard.

Key:

RMPSUB	Ontario Reg.Mun. of Peel Sewer Bylaw #53-2010 (APR, 2019)
SAN	Peel Sanitary Sewer (53-2010)
STM	Peel Storm Sewer (53-2010)

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2337187**	Page	: 1 of 11
Client	: **Fisher Engineering Limited**	Laboratory	: ALS Environmental - Waterloo
Contact	: Clive Wiggan	Account Manager	: Emily Hansen
Address	: 15-400 Esna Park Drive Markham ON Canada L3R 3K2	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 905 475 7755, Ext. 29	Telephone	: +1 519 886 6910
Project	: 23-13330	Date Samples Received	: 14-Nov-2023 15:45
PO	: ----	Issue Date	: 21-Nov-2023 23:55
C-O-C number	: 20-1084040		
Sampler	: CLIENT		
Site	: ----		
Quote number	: FISHER ENVIRONMENTAL - ALS 2022 STANDING OFFER		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Phthalate Esters	QC-MRG4-1236836 002	----	bis(2-Ethylhexyl) phthalate [DEHP]	117-81-7	E655F	148 % LCS-H	50.0-140%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
LCS-H	*Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT-4d] 900 LAKESHORE RD, MW3 (UNFILTERED)	E555	14-Nov-2023	----	----	----		15-Nov-2023	4 days	1 days	✓
Aggregate Organics : Mineral Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) 900 LAKESHORE RD, MW3 (UNFILTERED)	E567SG	14-Nov-2023	17-Nov-2023	28 days	4 days	✓	17-Nov-2023	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) 900 LAKESHORE RD, MW3 (UNFILTERED)	E567	14-Nov-2023	17-Nov-2023	28 days	4 days	✓	17-Nov-2023	40 days	0 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E562	14-Nov-2023	20-Nov-2023	28 days	7 days	✓	20-Nov-2023	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E235.F	14-Nov-2023	17-Nov-2023	28 days	3 days	✓	17-Nov-2023	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E235.SO4	14-Nov-2023	17-Nov-2023	28 days	3 days	✓	17-Nov-2023	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E318	14-Nov-2023	20-Nov-2023	28 days	6 days	✓	20-Nov-2023	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E372-U	14-Nov-2023	17-Nov-2023	28 days	4 days	✓	20-Nov-2023	28 days	7 days	✓
Cyanides : Total Cyanide										
UV-inhibited HDPE - total (sodium hydroxide) 900 LAKESHORE RD, MW3 (UNFILTERED)	E333	14-Nov-2023	15-Nov-2023	14 days	2 days	✓	15-Nov-2023	14 days	2 days	✓
Microbiological Tests : E. coli (MF-mFC-BCIG)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E012A.EC	14-Nov-2023	----	----	----		15-Nov-2023	48 hrs	32 hrs	✓
Nonylphenols : Nonylphenol Ethoxylates in Water by LC-MS-MS Positive Mode										
Amber glass/Teflon lined cap - LCMS 900 LAKESHORE RD, MW3 (UNFILTERED)	E749B	14-Nov-2023	20-Nov-2023	7 days	7 days	✓	20-Nov-2023	7 days	0 days	✓
Nonylphenols : Nonylphenol, Octylphenol and BPA in Water by LC-MS-MS Negative Mode										
Amber glass/Teflon lined cap - LCMS 900 LAKESHORE RD, MW3 (UNFILTERED)	E749A	14-Nov-2023	20-Nov-2023	7 days	7 days	✓	20-Nov-2023	7 days	0 days	✓
Phthalate Esters : BNA (Ontario Sanitary Sewer SVOC Target List) by GC-MS										
Amber glass/Teflon lined cap [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E655F	14-Nov-2023	14-Nov-2023	14 days	1 days	✓	15-Nov-2023	40 days	1 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E108	14-Nov-2023	17-Nov-2023	14 days	3 days	✓	17-Nov-2023	14 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E160	14-Nov-2023	----	----	----		15-Nov-2023	7 days	2 days	✓
Polychlorinated Biphenyls : PCB Aroclors by GC-MS										
Amber glass/Teflon lined cap [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E687	14-Nov-2023	14-Nov-2023	14 days	1 days	✓	15-Nov-2023	40 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) [ON MECP] 900 LAKESHORE RD, MW3 (UNFILTERED)	E508	14-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	0 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) 900 LAKESHORE RD, MW3 (UNFILTERED)	E420	14-Nov-2023	15-Nov-2023	180 days	1 days	✓	15-Nov-2023	180 days	1 days	✓
Volatile Organic Compounds : VOCs (Eastern Canada List) by Headspace GC-MS										
Glass vial (sodium bisulfate) 900 LAKESHORE RD, MW3 (UNFILTERED)	E611D	14-Nov-2023	15-Nov-2023	14 days	1 days	✓	15-Nov-2023	14 days	1 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1237905	1	20	5.0	5.0	✓
E. coli (MF-mFC-BCIG)	E012A.EC	1237299	1	12	8.3	5.0	✓
Fluoride in Water by IC	E235.F	1241125	1	10	10.0	5.0	✓
Nonylphenol Ethoxylates in Water by LC-MS-MS Positive Mode	E749B	1244618	1	20	5.0	5.0	✓
Nonylphenol, Octylphenol and BPA in Water by LC-MS-MS Negative Mode	E749A	1244617	1	20	5.0	5.0	✓
pH by Meter	E108	1241120	1	16	6.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1244291	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1241124	1	9	11.1	5.0	✓
Total Cyanide	E333	1237825	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1241224	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1237173	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1236881	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1241225	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1238121	1	19	5.2	4.7	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1237029	1	15	6.6	5.0	✓
Laboratory Control Samples (LCS)							
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1237905	1	20	5.0	5.0	✓
BNA (Ontario Sanitary Sewer SVOC Target List) by GC-MS	E655F	1236838	2	9	22.2	5.0	✓
Fluoride in Water by IC	E235.F	1241125	1	10	10.0	5.0	✓
Mineral Oil & Grease by Gravimetry	E567SG	1237242	1	19	5.2	5.0	✓
Nonylphenol Ethoxylates in Water by LC-MS-MS Positive Mode	E749B	1244618	1	20	5.0	5.0	✓
Nonylphenol, Octylphenol and BPA in Water by LC-MS-MS Negative Mode	E749A	1244617	1	20	5.0	5.0	✓
Oil & Grease by Gravimetry	E567	1237241	1	19	5.2	5.0	✓
PCB Aroclors by GC-MS	E687	1236830	1	9	11.1	4.7	✓
pH by Meter	E108	1241120	1	16	6.2	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1244291	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1241124	1	9	11.1	5.0	✓
Total Cyanide	E333	1237825	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1241224	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1237173	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1236881	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1241225	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1238121	1	19	5.2	4.7	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1237029	1	15	6.6	5.0	✓
Method Blanks (MB)							

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1237905	1	20	5.0	5.0	✓
BNA (Ontario Sanitary Sewer SVOC Target List) by GC-MS	E655F	1236838	2	9	22.2	5.0	✓
E. coli (MF-mFC-BCIG)	E012A.EC	1237299	1	12	8.3	5.0	✓
Fluoride in Water by IC	E235.F	1241125	1	10	10.0	5.0	✓
Mineral Oil & Grease by Gravimetry	E567SG	1237242	1	19	5.2	5.0	✓
Nonylphenol Ethoxylates in Water by LC-MS-MS Positive Mode	E749B	1244618	1	20	5.0	5.0	✓
Nonylphenol, Octylphenol and BPA in Water by LC-MS-MS Negative Mode	E749A	1244617	1	20	5.0	5.0	✓
Oil & Grease by Gravimetry	E567	1237241	1	19	5.2	5.0	✓
PCB Aroclors by GC-MS	E687	1236830	1	9	11.1	4.7	✓
Phenols (4AAP) in Water by Colorimetry	E562	1244291	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1241124	1	9	11.1	5.0	✓
Total Cyanide	E333	1237825	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1241224	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1237173	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1236881	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1241225	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1238121	1	19	5.2	4.7	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1237029	1	15	6.6	5.0	✓
Matrix Spikes (MS)							
Fluoride in Water by IC	E235.F	1241125	1	10	10.0	5.0	✓
Nonylphenol Ethoxylates in Water by LC-MS-MS Positive Mode	E749B	1244618	1	20	5.0	5.0	✓
Nonylphenol, Octylphenol and BPA in Water by LC-MS-MS Negative Mode	E749A	1244617	1	20	5.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	1244291	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1241124	1	9	11.1	5.0	✓
Total Cyanide	E333	1237825	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1241224	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1237173	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1236881	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1241225	1	20	5.0	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1237029	1	15	6.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
E. coli (MF-mFC-BCIG)	E012A.EC ALS Environmental - Waterloo	Water	ON E3433 (mod)	Following filtration (0.45 µm), and incubation at 44.5±0.2°C for 24 hours, colonies exhibiting characteristic morphology of the target organism are enumerated.
pH by Meter	E108 ALS Environmental - Waterloo	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Waterloo	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Fluoride in Water by IC	E235.F ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Waterloo	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Total Cyanide	E333 ALS Environmental - Waterloo	Water	ISO 14403 (mod)	Total or Strong Acid Dissociable (SAD) Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line UV digestion followed by colourmetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Waterloo	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Waterloo	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Mercury in Water by CVAAS	E508 ALS Environmental - Waterloo	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555 ALS Environmental - Waterloo	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Nitrification inhibitor is added to samples to prevent nitrogenous compounds from consuming oxygen resulting in only carbonaceous oxygen demand being reported by this method. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Phenols (4AAP) in Water by Colorimetry	E562 ALS Environmental - Edmonton	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K3Fe(CN)6) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
Oil & Grease by Gravimetry	E567 ALS Environmental - Waterloo	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane and the extract is evaporated to dryness. The residue is then weighed to determine Oil and Grease.
Mineral Oil & Grease by Gravimetry	E567SG ALS Environmental - Waterloo	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane, followed by silica gel treatment after which the extract is evaporated to dryness. The residue is then weighed to determine Mineral Oil and Grease.
VOCs (Eastern Canada List) by Headspace GC-MS	E611D ALS Environmental - Waterloo	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BNA (Ontario Sanitary Sewer SVOC Target List) by GC-MS	E655F ALS Environmental - Waterloo	Water	EPA 8270E (mod)	BNA are analyzed by GC-MS.
PCB Aroclors by GC-MS	E687 ALS Environmental - Waterloo	Water	EPA 8270E (mod)	PCB Aroclors are analyzed by GC-MS
Nonylphenol, Octylphenol and BPA in Water by LC-MS-MS Negative Mode	E749A ALS Environmental - Waterloo	Water	J. Chrom A849 (1999) p.467-482	An aliquot of 5.0 ± 0.10 mL of filtered sample is spiked with Nonylphenol-D4, Nonylphenol Diethoxylate 13C6, and Bisphenol A 13C12 internal standards and analyzed by LC-MS/MS.
Nonylphenol Ethoxylates in Water by LC-MS-MS Positive Mode	E749B ALS Environmental - Waterloo	Water	J. Chrom A849 (1999) p.467-482	Water samples are filtered and analyzed on LCMS/MS by direct injection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Animal & Vegetable Oil & Grease by Gravimetry	EC567A.SG ALS Environmental - Waterloo	Water	APHA 5520 (mod)	Animal & vegetable oil and grease is calculated as follows: Oil & Grease (gravimetric) minus Mineral Oil & Grease (gravimetric)

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in water	EP318 ALS Environmental - Waterloo	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Waterloo	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Oil & Grease Extraction for Gravimetry	EP567 ALS Environmental - Waterloo	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane by liquid-liquid extraction.
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Waterloo	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
BNA Extraction	EP655 ALS Environmental - Waterloo	Water	EPA 3510C (mod)	SVOCs are extracted from aqueous sample using DCM liquid-liquid extraction.
Pesticides, PCB, and Neutral Extractable Chlorinated Hydrocarbons Extraction	EP660 ALS Environmental - Waterloo	Water	EPA 3511 (mod)	Samples are extracted from aqueous sample using an organic solvent liquid-liquid extraction.
Preparation of Nonylphenol and Nonylphenol Ethoxylates	EP749 ALS Environmental - Waterloo	Water	J. Chrom A849 (1999) p.467-482	An aliquot of 5.0 ± 0.10 mL of filtered sample is spiked with Nonylphenol-D4, Nonylphenol Diethoxylate 13C6, and Bisphenol A 13C12 internal standards and analyzed by LC-MS/MS.

QUALITY CONTROL REPORT

Work Order	: **WT2337187**	Page	: 1 of 12
Client	: Fisher Engineering Limited	Laboratory	: ALS Environmental - Waterloo
Contact	: Clive Wiggan	Account Manager	: Emily Hansen
Address	: 15-400 Esna Park Drive Markham ON Canada L3R 3K2	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	:	Telephone	: +1 519 886 6910
Project	: 23-13330	Date Samples Received	: 14-Nov-2023 15:45
PO	: ----	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 20-1084040	Issue Date	: 21-Nov-2023 23:55
Sampler	: CLIENT 905 475 7755, Ext. 29		
Site	: ----		
Quote number	: FISHER ENVIRONMENTAL - ALS 2022 STANDING OFFER		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Brooke Miller	Laboratory Analyst	Edmonton Inorganics, Edmonton, Alberta
Jeremy Gingras	Supervisor - Semi-Volatile Instrumentation	Waterloo Organics, Waterloo, Ontario
John Tang	Lab Analyst	Waterloo Inorganics, Waterloo, Ontario
Rachel Cameron	Supervisor - Semi-Volatile Extractions	Waterloo Organics, Waterloo, Ontario
Ruby Sujeepan	Analyst	Waterloo Microbiology, Waterloo, Ontario
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Sarah Birch	VOC Section Supervisor	Waterloo VOC, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Waterloo Inorganics, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Waterloo Metals, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1238121)											
WT2337276-002	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	8.8	9.0	0.2	Diff <2x LOR	----
Physical Tests (QC Lot: 1241120)											
WT2337278-005	Anonymous	pH	----	E108	0.10	pH units	7.65	7.70	0.651%	4%	----
Anions and Nutrients (QC Lot: 1241124)											
WT2337278-005	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	18.3	18.4	0.184%	20%	----
Anions and Nutrients (QC Lot: 1241125)											
WT2337278-005	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.560	0.560	0.0268%	20%	----
Anions and Nutrients (QC Lot: 1241224)											
WT2337088-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.500	mg/L	30.6	29.6	3.22%	20%	----
Anions and Nutrients (QC Lot: 1241225)											
WT2337123-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	2.20	2.19	0.184%	20%	----
Cyanides (QC Lot: 1237825)											
EO2310450-006	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.0020	mg/L	0.0029	0.0029	0.00004	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1237299)											
WT2337187-001	900 LAKESHORE RD, MW3 (UNFILTERED)	Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	1	<1	0	Diff <2x LOR	----
Total Metals (QC Lot: 1236881)											
WT2337118-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0989	0.0995	0.618%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00038	0.00037	0.000009	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00054	0.00054	0.000007	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000096	0.0000108	0.0000012	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	0.00064	0.00058	0.00006	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00028	0.00028	0.000002	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00250	0.00250	0.000002	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000296	0.000291	0.000005	Diff <2x LOR	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0532	0.0533	0.156%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00156	0.00151	3.76%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00156	0.00154	0.00002	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000122	0.000124	0.000002	Diff <2x LOR	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1236881) - continued											
WT2337118-001	Anonymous	Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00300	mg/L	<0.00300	<0.00300	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0150	0.0148	0.0002	Diff <2x LOR	----
Total Metals (QC Lot: 1237173)											
TY2311815-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1237905)											
WT2337025-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2.0	mg/L	5.1	5.2	1.9%	30%	----
Aggregate Organics (QC Lot: 1244291)											
TY2311007-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1237029)											
WT2337083-001	Anonymous	Benzene	71-43-2	E611D	0.50	µg/L	1.71	2.38	0.67	Diff <2x LOR	----
		Chloroform	67-66-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611D	0.50	µg/L	4.83	4.91	1.64%	30%	----
		Dichloromethane	75-09-2	E611D	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611D	0.50	µg/L	51.4	51.9	0.967%	30%	----
		Methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		Styrene	100-42-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611D	0.50	µg/L	6.72	6.70	0.298%	30%	----
		Toluene	108-88-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611D	0.50	µg/L	3.01	2.98	0.03	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611D	0.40	µg/L	16.6	16.7	0.240%	30%	----
		Xylene, o-	95-47-6	E611D	0.30	µg/L	20.2	20.4	0.935%	30%	----
Nonylphenols (QC Lot: 1244617)											
WP2329679-001	Anonymous	Nonylphenols [NP]	84852-15-3	E749A	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
Nonylphenols (QC Lot: 1244618)											
WP2329679-001	Anonymous	Nonylphenol diethoxylates [NP2EO]	n/a	E749B	0.10	µg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Nonylphenol monoethoxylates [NP1EO]	n/a	E749B	50.0	µg/L	<50.0	<50.0	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1238121)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1241124)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1241125)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1241224)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1241225)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Cyanides (QCLot: 1237825)						
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1237299)						
Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	<1	----
Total Metals (QCLot: 1236881)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Total Metals (QCLot: 1237173)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1237173) - continued						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 1237241)						
Oil & grease (gravimetric)	----	E567	5	mg/L	<5.0	----
Aggregate Organics (QCLot: 1237242)						
Oil & grease, mineral (gravimetric)	----	E567SG	5	mg/L	<5.0	----
Aggregate Organics (QCLot: 1237905)						
Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 1244291)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Volatile Organic Compounds (QCLot: 1237029)						
Benzene	71-43-2	E611D	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611D	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611D	1	µg/L	<1.0	----
Dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	<0.30	----
Ethylbenzene	100-41-4	E611D	0.5	µg/L	<0.50	----
Methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	----
Styrene	100-42-5	E611D	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	<0.50	----
Tetrachloroethylene	127-18-4	E611D	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611D	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611D	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611D	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611D	0.3	µg/L	<0.30	----
Phthalate Esters (QCLot: 1236838)						
bis(2-Ethylhexyl) phthalate [DEHP]	117-81-7	E655F	2	µg/L	<2.0	----
Di-n-butyl phthalate	84-74-2	E655F	1	µg/L	<1.0	----
Phthalate Esters (QCLot: 1244113)						
bis(2-Ethylhexyl) phthalate [DEHP]	117-81-7	E655F	2	µg/L	<2.0	----
Di-n-butyl phthalate	84-74-2	E655F	1	µg/L	<1.0	----
Nonylphenols (QCLot: 1244617)						
Nonylphenols [NP]	84852-15-3	E749A	1	µg/L	<1.0	----
Nonylphenols (QCLot: 1244618)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Nonylphenols (QCLot: 1244618) - continued						
Nonylphenol diethoxylates [NP2EO]	n/a	E749B	0.1	µg/L	<0.10	----
Nonylphenol monoethoxylates [NP1EO]	n/a	E749B	2	µg/L	<2.0	----
Polychlorinated Biphenyls (QCLot: 1236830)						
Aroclor 1016	12674-11-2	E687	0.02	µg/L	<0.020	----
Aroclor 1221	11104-28-2	E687	0.02	µg/L	<0.020	----
Aroclor 1232	11141-16-5	E687	0.02	µg/L	<0.020	----
Aroclor 1242	53469-21-9	E687	0.02	µg/L	<0.020	----
Aroclor 1248	12672-29-6	E687	0.02	µg/L	<0.020	----
Aroclor 1254	11097-69-1	E687	0.02	µg/L	<0.020	----
Aroclor 1260	11096-82-5	E687	0.02	µg/L	<0.020	----
Aroclor 1262	37324-23-5	E687	0.02	µg/L	<0.020	----
Aroclor 1268	11100-14-4	E687	0.02	µg/L	<0.020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1238121)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	98.0	85.0	115	----
Physical Tests (QCLot: 1241120)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 1241124)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1241125)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1241224)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	93.2	75.0	125	----
Anions and Nutrients (QCLot: 1241225)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.393 mg/L	99.1	80.0	120	----
Cyanides (QCLot: 1237825)									
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	0.25 mg/L	86.7	80.0	120	----
Total Metals (QCLot: 1236881)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	98.3	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	102	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	107	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	101	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.0125 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.0125 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.0125 mg/L	104	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	104	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.0125 mg/L	102	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.0125 mg/L	108	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	102	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	100	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	102	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.0125 mg/L	102	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	100	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1237173)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	109	80.0	120	----
Aggregate Organics (QCLot: 1237241)									
Oil & grease (gravimetric)	----	E567	5	mg/L	200 mg/L	97.4	70.0	130	----
Aggregate Organics (QCLot: 1237242)									
Oil & grease, mineral (gravimetric)	----	E567SG	5	mg/L	100 mg/L	91.0	70.0	130	----
Aggregate Organics (QCLot: 1237905)									
Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2	mg/L	198 mg/L	99.7	85.0	115	----
Aggregate Organics (QCLot: 1244291)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	98.1	85.0	115	----
Volatile Organic Compounds (QCLot: 1237029)									
Benzene	71-43-2	E611D	0.5	µg/L	100 µg/L	93.1	70.0	130	----
Chloroform	67-66-3	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	100 µg/L	94.8	70.0	130	----
Dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	100 µg/L	96.8	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	100 µg/L	96.6	70.0	130	----
Dichloromethane	75-09-2	E611D	1	µg/L	100 µg/L	102	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	100 µg/L	92.3	70.0	130	----
Ethylbenzene	100-41-4	E611D	0.5	µg/L	100 µg/L	92.1	70.0	130	----
Methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	100 µg/L	89.3	70.0	130	----
Styrene	100-42-5	E611D	0.5	µg/L	100 µg/L	90.4	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
Tetrachloroethylene	127-18-4	E611D	0.5	µg/L	100 µg/L	87.5	70.0	130	----
Toluene	108-88-3	E611D	0.5	µg/L	100 µg/L	89.2	70.0	130	----
Trichloroethylene	79-01-6	E611D	0.5	µg/L	100 µg/L	90.9	70.0	130	----
Xylene, m+p-	179601-23-1	E611D	0.4	µg/L	200 µg/L	95.0	70.0	130	----
Xylene, o-	95-47-6	E611D	0.3	µg/L	100 µg/L	93.1	70.0	130	----
Phthalate Esters (QCLot: 1236838)									
bis(2-Ethylhexyl) phthalate [DEHP]	117-81-7	E655F	2	µg/L	6.4 µg/L	# 148	50.0	140	LCS-H
Di-n-butyl phthalate	84-74-2	E655F	1	µg/L	6.4 µg/L	114	50.0	140	----
Phthalate Esters (QCLot: 1244113)									
bis(2-Ethylhexyl) phthalate [DEHP]	117-81-7	E655F	2	µg/L	6.4 µg/L	110	50.0	140	----
Di-n-butyl phthalate	84-74-2	E655F	1	µg/L	6.4 µg/L	103	50.0	140	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Nonylphenols (QCLot: 1244617)									
Nonylphenols [NP]	84852-15-3	E749A	1	µg/L	10 µg/L	115	75.0	125	----
Nonylphenols (QCLot: 1244618)									
Nonylphenol diethoxylates [NP2EO]	n/a	E749B	0.1	µg/L	1 µg/L	98.8	75.0	125	----
Nonylphenol monoethoxylates [NP1EO]	n/a	E749B	2	µg/L	20 µg/L	93.9	75.0	125	----
Polychlorinated Biphenyls (QCLot: 1236830)									
Aroclor 1016	12674-11-2	E687	0.02	µg/L	0.2 µg/L	114	60.0	140	----
Aroclor 1221	11104-28-2	E687	0.02	µg/L	0.2 µg/L	114	60.0	140	----
Aroclor 1232	11141-16-5	E687	0.02	µg/L	0.2 µg/L	114	60.0	140	----
Aroclor 1242	53469-21-9	E687	0.02	µg/L	0.2 µg/L	114	60.0	140	----
Aroclor 1248	12672-29-6	E687	0.02	µg/L	0.2 µg/L	84.4	60.0	140	----
Aroclor 1254	11097-69-1	E687	0.02	µg/L	0.2 µg/L	103	60.0	140	----
Aroclor 1260	11096-82-5	E687	0.02	µg/L	0.2 µg/L	116	60.0	140	----
Aroclor 1262	37324-23-5	E687	0.02	µg/L	0.2 µg/L	116	60.0	140	----
Aroclor 1268	11100-14-4	E687	0.02	µg/L	0.2 µg/L	116	60.0	140	----

Qualifiers

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1241124)										
WT2337278-005	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	103 mg/L	100 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1241125)										
WT2337278-005	Anonymous	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1241224)										
WT2337088-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1241225)										
WT2337123-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.1 mg/L	ND	70.0	130	----
Cyanides (QCLot: 1237825)										
EO2310450-006	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.214 mg/L	0.25 mg/L	85.5	75.0	125	----
Total Metals (QCLot: 1236881)										
WT2337121-001	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0514 mg/L	0.05 mg/L	103	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0519 mg/L	0.05 mg/L	104	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00479 mg/L	0.005 mg/L	95.8	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0123 mg/L	0.0125 mg/L	98.6	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0124 mg/L	0.0125 mg/L	99.2	70.0	130	----
		Copper, total	7440-50-8	E420	0.0120 mg/L	0.0125 mg/L	96.5	70.0	130	----
		Lead, total	7439-92-1	E420	0.0247 mg/L	0.025 mg/L	99.0	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0129 mg/L	0.0125 mg/L	103	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0244 mg/L	0.025 mg/L	97.4	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0512 mg/L	0.05 mg/L	102	70.0	130	----
		Silver, total	7440-22-4	E420	0.00488 mg/L	0.005 mg/L	97.6	70.0	130	----
		Tin, total	7440-31-5	E420	0.0230 mg/L	0.025 mg/L	92.0	70.0	130	----
		Titanium, total	7440-32-6	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		Zinc, total	7440-66-6	E420	ND mg/L	0.025 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1237173)										
TY2311815-002	Anonymous	Mercury, total	7439-97-6	E508	0.000114 mg/L	0.0001 mg/L	114	70.0	130	----
Aggregate Organics (QCLot: 1244291)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Aggregate Organics (QCLot: 1244291) - continued										
TY2311007-001	Anonymous	Phenols, total (4AAP)	----	E562	0.0206 mg/L	0.02 mg/L	103	75.0	125	----
Volatile Organic Compounds (QCLot: 1237029)										
WT2337083-001	Anonymous	Benzene	71-43-2	E611D	93.0 µg/L	100 µg/L	93.0	60.0	140	----
		Chloroform	67-66-3	E611D	102 µg/L	100 µg/L	102	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611D	93.0 µg/L	100 µg/L	93.0	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611D	91.3 µg/L	100 µg/L	91.3	60.0	140	----
		Dichloroethylene, cis-1,2-	156-59-2	E611D	97.1 µg/L	100 µg/L	97.1	60.0	140	----
		Dichloromethane	75-09-2	E611D	107 µg/L	100 µg/L	107	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611D	95.6 µg/L	100 µg/L	95.6	60.0	140	----
		Ethylbenzene	100-41-4	E611D	88.6 µg/L	100 µg/L	88.6	60.0	140	----
		Methyl ethyl ketone [MEK]	78-93-3	E611D	108 µg/L	100 µg/L	108	60.0	140	----
		Styrene	100-42-5	E611D	87.9 µg/L	100 µg/L	87.9	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	111 µg/L	100 µg/L	111	60.0	140	----
		Tetrachloroethylene	127-18-4	E611D	78.4 µg/L	100 µg/L	78.4	60.0	140	----
		Toluene	108-88-3	E611D	84.2 µg/L	100 µg/L	84.2	60.0	140	----
		Trichloroethylene	79-01-6	E611D	87.0 µg/L	100 µg/L	87.0	60.0	140	----
		Xylene, m+p-	179601-23-1	E611D	178 µg/L	200 µg/L	89.1	60.0	140	----
		Xylene, o-	95-47-6	E611D	90.0 µg/L	100 µg/L	90.0	60.0	140	----
Nonylphenols (QCLot: 1244617)										
WP2329679-001	Anonymous	Nonylphenols [NP]	84852-15-3	E749A	9.1 µg/L	10 µg/L	91.3	60.0	140	----
Nonylphenols (QCLot: 1244618)										
WP2329679-001	Anonymous	Nonylphenol diethoxylates [NP2EO]	n/a	E749B	1.02 µg/L	1 µg/L	102	60.0	140	----
		Nonylphenol monoethoxylates [NP1EO]	n/a	E749B	12.5 µg/L	20 µg/L	62.7	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

COC Number:

Pa

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Environmental Division Waterloo

Work Order Reference

WT2337187

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report
Company:	Fisher Engineering
Contact:	Clwe
Phone:	905-475-7755
	Company address below will appear on the final report
Street:	15-400 Esna Park Drive
City/Province:	Markham, ON
Postal Code:	L3R 3K2
Invoice To	Same as Report To ☒ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	Fisher Engineering
Contact:	Clwe

Reports / Recipients

Select Report Format: ☒ PDF ☐ EXCEL ☐ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: Clwe@Fishereng.com

Email 2

Email 3

Invoice Recipients

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Turnaround Time (TAT) Requested

☒ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge mini

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge mir

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge mir

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge min

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. may apply to rush requests on weekends, statutory holidays and n

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:

Job #: 23-13330

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (ALS use only):

ALS Contact: Emily Hansen Sampler: Nnamdi

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS: Peel Sewer discharge bylaws (Sanitary & Storm) MW 3 (Unfiltered)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	900 Lakeshore Rd Mississauga Peel Sewer discharge bylaws (Sanitary & Storm) MW 3 (Unfiltered)	14-11-23		GW				

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☒ NO

Are samples for human consumption/ use? ☐ YES ☒ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☒ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	0.6

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Nnamdi	14-11-23	

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
TS	NOV 14/23	1545

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

OS-080 VW-234 N-~~005~~ 437

OGG-071 SCN-485 MM-128

OR-461 B-246 L-005 EC

PRINT PW!

APPENDIX E – HYDRAULIC CONDUCTIVITY ANALYSES

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: *900 Laksehore Road, Mississauga*
Project: *FH 23-13329*
Test Date: *11/28/2023*
Tested by: *CAW*
Well No: *MW1*

Equilibrium Water level (from top of pipe) HE	*317*	*cm*
Initial Water level (from top of pipe) Ho	*633*	*cm*
Monitoring well inner Dia D	*0.05*	*m*
Initial Time offset To	*1*	*second*
Reverse of Luthin's reference system Ru = Ho - HE	*316.00*	*cm*
Slope of Log((ho-he)/(ht-he)) / T	*7.00E-05*	

G = Ru / (HT - HE)

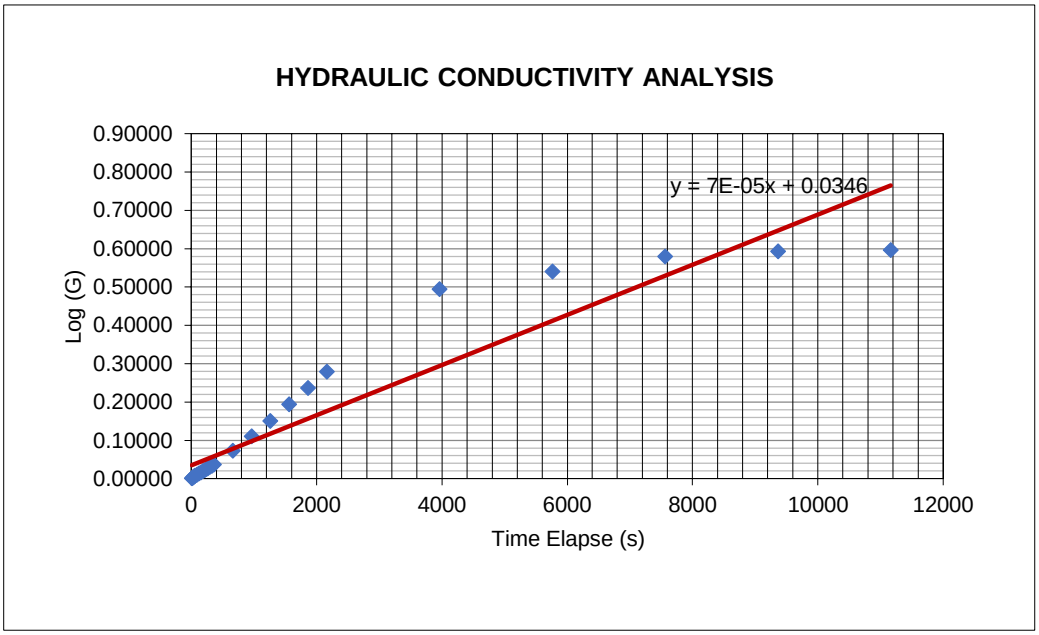
Hydraulic conductivity computed k = 0.0001059 cm/s
1.06E-06 m/s
0.092 m/day

Time		HT (Water Drop)		G	LOG (G)
(Interval s)	(Elapsed s)	(m)	(cm)		
0	0	6.330			
10	10	6.320	632.0	1.00317	0.00138
10	20	6.310	631.0	1.00637	0.00276
10	30	6.300	630.0	1.00958	0.00414
10	40	6.290	629.0	1.01282	0.00553
10	50	6.280	628.0	1.01608	0.00693
10	60	6.270	627.0	1.01935	0.00833
30	90	6.250	625.0	1.02597	0.01114
30	120	6.230	623.0	1.03268	0.01397
30	150	6.210	621.0	1.03947	0.01681
30	180	6.190	619.0	1.04636	0.01968
30	210	6.170	617.0	1.05333	0.02257
30	240	6.150	615.0	1.06040	0.02547
30	270	6.130	613.0	1.06757	0.02840
30	300	6.110	611.0	1.07483	0.03134
30	330	6.090	609.0	1.08219	0.03430
30	360	6.070	607.0	1.08966	0.03729
300	660	5.840	584.0	1.18352	0.07318
300	960	5.62	562.0	1.28980	0.11052
300	1260	5.4	540.0	1.41704	0.15138
300	1560	5.19	519.0	1.56436	0.19434
300	1860	5	500.0	1.72678	0.23724
300	2160	4.83	483.0	1.90361	0.27958
1800	3960	4.18	418.0	3.12871	0.49537

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***900 Laksehore Road, Mississauga***
Project: ***FH 23-13329***
Test Date: ***11/28/2023***
Tested by: ***CAW***
Well No: ***MW1***



FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: *900 Laksehore Road, Mississauga*
Project: *FH 23-13329*
Test Date: *11/28/2023*
Tested by: *CAW*
Well No: *MW3*

Equilibrium Water level (from top of pipe) HE	*531*	*cm*
Initial Water level (from top of pipe) Ho	*782*	*cm*
Monitoring well inner Dia D	*0.05*	*m*
Initial Time offset To	*1*	*second*
Reverse of Luthin's reference system Ru = Ho - HE	*251.00*	*cm*
Slope of Log((ho-he)/(ht-he)) / T	*4.00E-05*	

G = Ru / (HT - HE)

Hydraulic conductivity computed k =

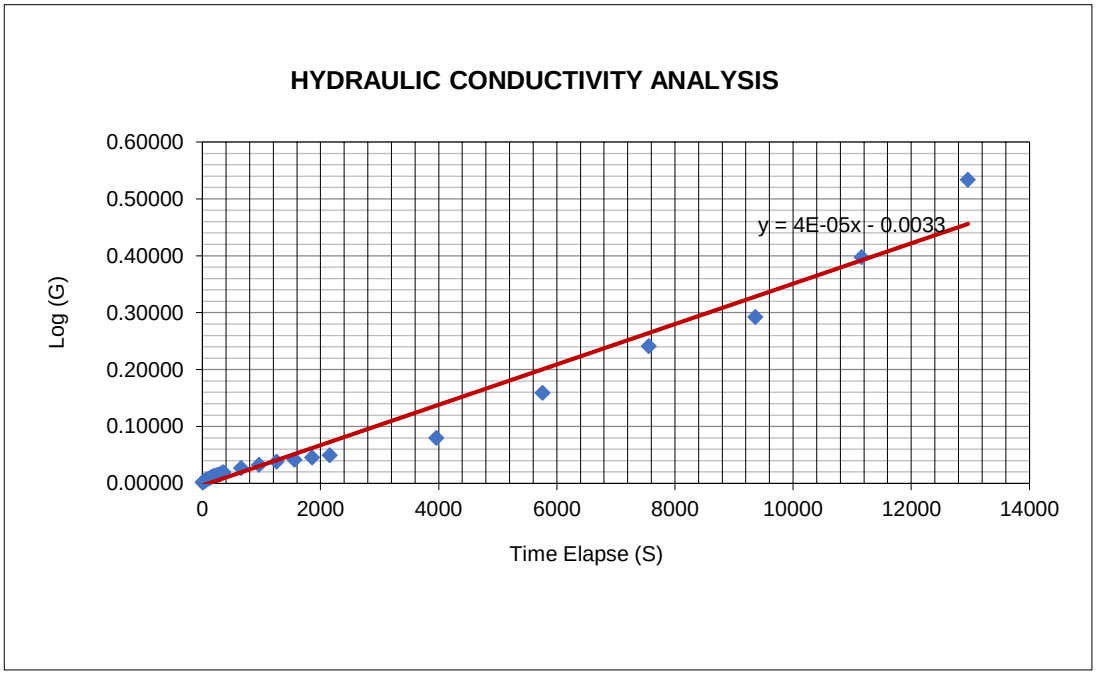
0.0000605	**cm/s**
6.05E-07	**m/s**
0.052	**m/day**

Time	HT (Water Drop)			G	LOG (G)
(Interval s)	(Elapsed s)	(m)	(cm)		
0	0	7.820			
10	10	7.810	781.0	1.00400	0.00173
10	20	7.805	780.5	1.00601	0.00260
10	30	7.800	780.0	1.00803	0.00347
10	40	7.795	779.5	1.01006	0.00435
10	50	7.790	779.0	1.01210	0.00522
10	60	7.785	778.5	1.01414	0.00610
30	90	7.780	778.0	1.01619	0.00698
30	120	7.770	777.0	1.02033	0.00874
30	150	7.760	776.0	1.02449	0.01051
30	180	7.750	775.0	1.02869	0.01228
30	210	7.745	774.5	1.03080	0.01317
30	240	7.740	774.0	1.03292	0.01407
30	270	7.735	773.5	1.03505	0.01496
30	300	7.730	773.0	1.03719	0.01586
30	330	7.720	772.0	1.04149	0.01766
30	360	7.710	771.0	1.04583	0.01946
300	660	7.670	767.0	1.06356	0.02676
300	960	7.640	764.0	1.07725	0.03232
300	1260	7.610	761	1.09130	0.03795
300	1560	7.59	759	1.10088	0.04174
300	1860	7.570	757.0	1.11062	0.04557
300	2160	7.550	755	1.12054	0.04943
1800	3960	7.400	740	1.20096	0.07953
1800	5760	7.050	705.0	1.44253	0.15912
1800	7560	6.750	675	1.74306	0.24131
1800	9360	6.590	659	1.96094	0.29246
1800	11160	6.315	631.5	2.49751	0.39751
1800	12960	6.045	604.5	3.41497	0.53339

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: *900 Laksehore Road, Mississauga*
Project: *FH 23-13329*
Test Date: *11/28/2023*
Tested by: *CAW*
Well No: *MW3*



FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***900 Laksehore Road, Mississauga***
Project: ***FH 23-13329***
Test Date: ***11/28/2023***
Tested by: ***CAW***
Well No: ***MW4***

Equilibrium Water level (from top of pipe) HE	***320***	***cm***
Initial Water level (from top of pipe) Ho	***647***	***cm***
Monitoring well inner Dia D	***0.05***	***m***
Initial Time offset To	***1***	***second***
Reverse of Luthin's reference system Ru = Ho - HE	***327.00***	***cm***
Slope of Log((ho-he)/(ht-he)) / T	***2.00E-05***	

G = Ru / (HT - HE)

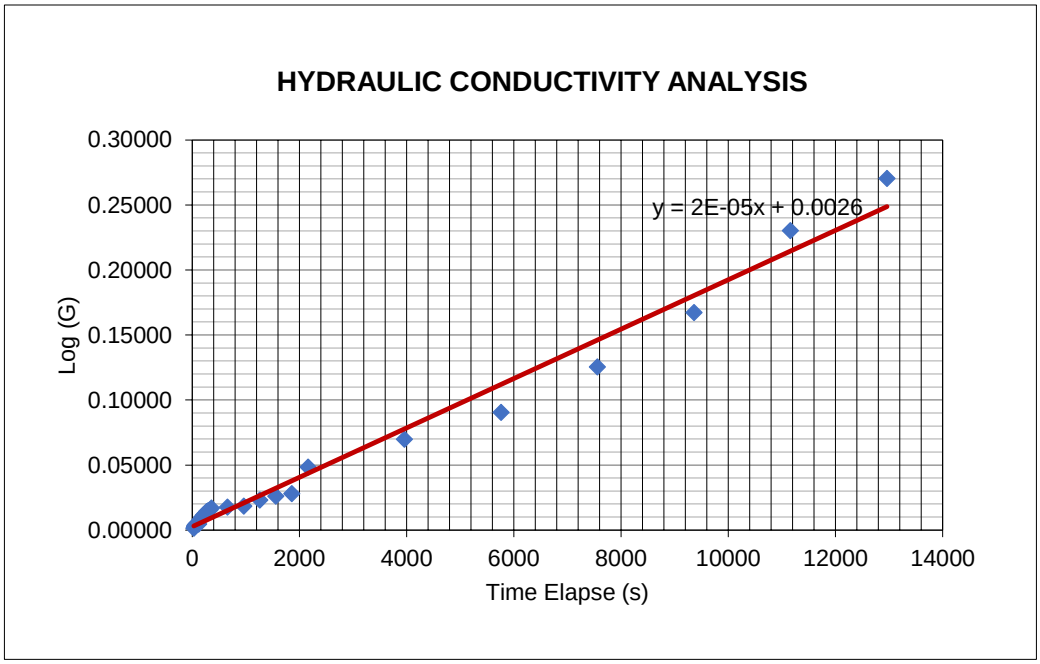
Hydraulic conductivity computed k = 0.0000303 cm/s
3.03E-07 m/s
0.026 m/day

Time	HT (Water Drop)			G	LOG (G)
(Interval s)	(Elapsed s)	(m)	(cm)		
0	0	6.470			
10	10	6.460	646.0	1.00307	0.00133
10	20	6.450	645.0	1.00615	0.00266
10	30	6.445	644.5	1.00770	0.00333
10	40	6.440	644.0	1.00926	0.00400
10	50	6.430	643.0	1.01238	0.00535
10	60	6.435	643.5	1.01082	0.00467
30	90	6.410	641.0	1.01869	0.00804
30	120	6.395	639.5	1.02347	0.01008
30	150	6.385	638.5	1.02669	0.01144
30	180	6.375	637.5	1.02992	0.01280
30	210	6.365	636.5	1.03318	0.01417
30	240	6.360	636.0	1.03481	0.01486
30	270	6.355	635.5	1.03645	0.01555
30	300	6.345	634.5	1.03975	0.01693
30	330	6.340	634.0	1.04140	0.01762
30	360	6.335	633.5	1.04306	0.01831
300	660	6.300	630.0	1.05484	0.02319
300	960	6.280	628.0	1.06169	0.02600
300	1260	6.267	626.7	1.06636	0.02790
300	1560	6.125	612.5	1.11795	0.04842
300	1860	5.985	598.5	1.17415	0.06972
300	2160	5.855	585.5	1.23164	0.09048
1800	3960	5.650	565.0	1.33469	0.12538

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***900 Laksehore Road, Mississauga***
Project: ***FH 23-13329***
Test Date: ***11/28/2023***
Tested by: ***CAW***
Well No: ***MW4***



FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***900 Laksehore Road, Mississauga***
Project: ***FH 24-14065***
Test Date: ***9/5/2024***
Tested by: ***CAW***
Well No: ***MW101***

Equilibrium Water level (from top of pipe) HE	*409*	*cm*
Initial Water level (from top of pipe) Ho	*1005*	*cm*
Monitoring well inner Dia D	*0.05*	*m*
Initial Time offset To	*1*	*second*
Reverse of Luthin's reference system Ru = Ho - HE	*596.00*	*cm*
Slope of Log((ho-he)/(ht-he)) / T	*6.00E-06*	

G = Ru / (HT - HE)

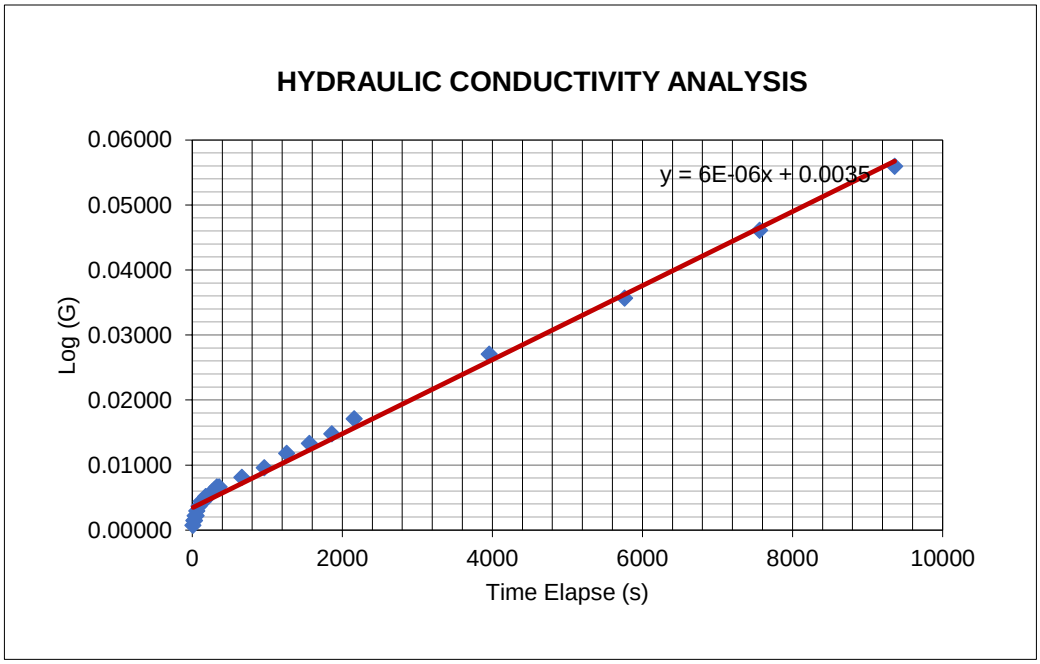
Hydraulic conductivity computed k = 0.0000091 cm/s
9.08E-08 m/s
0.008 m/day

Time	HT (Water Drop)			G	LOG (G)
(Interval s)	(Elapsed s)	(m)	(cm)		
0	0	10.050			
10	10	10.040	1004.0	1.00168	0.00073
10	20	10.030	1003.0	1.00337	0.00146
10	30	10.030	1003.0	1.00337	0.00146
10	40	10.020	1002.0	1.00506	0.00219
10	50	10.020	1002.0	1.00506	0.00219
10	60	10.010	1001.0	1.00676	0.00292
30	90	10.000	1000.0	1.00846	0.00366
30	120	9.990	999.0	1.01017	0.00439
30	150	9.990	999.0	1.01017	0.00439
30	180	9.980	998.0	1.01188	0.00513
30	210	9.980	998.0	1.01188	0.00513
30	240	9.975	997.5	1.01274	0.00550
30	270	9.970	997.0	1.01361	0.00587
30	300	9.965	996.5	1.01447	0.00624
30	330	9.960	996.0	1.01533	0.00661
30	360	9.960	996.0	1.01533	0.00661
300	660	9.940	994.0	1.01880	0.00809
300	960	9.920	992.0	1.02230	0.00958
300	1260	9.890	989.0	1.02759	0.01182
300	1560	9.870	987.0	1.03114	0.01332
300	1860	9.850	985.0	1.03472	0.01482
300	2160	9.820	982.0	1.04014	0.01709
1800	3960	9.690	969.0	1.06429	0.02706
1800	5760	9.580	958.0	1.08561	0.03567
1800	7560	9.450	945.0	1.11194	0.04608
1800	9360	9.330	933.0	1.13740	0.05591

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***900 Laksehore Road, Mississauga***
Project: ***FH 24-14065***
Test Date: ***9/5/2024***
Tested by: ***CAW***
Well No: ***MW101***



FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***900 Laksehore Road, Mississauga***
Project: ***FH 24-14065***
Test Date: ***9/5/2024***
Tested by: ***CAW***
Well No: ***MW102***

Equilibrium Water level (from top of pipe) HE	*285*	*cm*
Initial Water level (from top of pipe) Ho	*1039.5*	*cm*
Monitoring well inner Dia D	*0.05*	*m*
Initial Time offset To	*1*	*second*
Reverse of Luthin's reference system Ru = Ho - HE	*754.50*	*cm*
Slope of Log((ho-he)/(ht-he)) / T	*4.00E-06*	

G = Ru / (HT - HE)

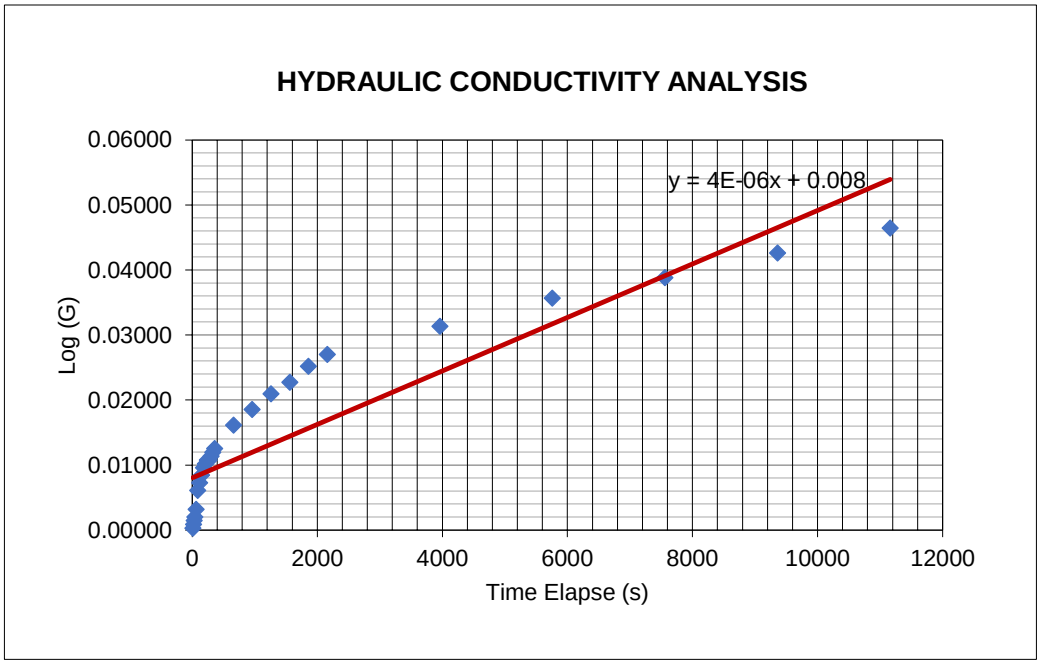
Hydraulic conductivity computed k = 0.0000061 cm/s
6.05E-08 m/s
0.005 m/day

Time	HT (Water Drop)			G	LOG (G)
(Interval s)	(Elapsed s)	(m)	(cm)		
0	0	10.395			
10	10	10.390	1039.0	1.00066	0.00029
10	20	10.380	1038.0	1.00199	0.00086
10	30	10.370	1037.0	1.00332	0.00144
10	40	10.360	1036.0	1.00466	0.00202
10	50	10.650	1065.0	0.96731	-0.01444
10	60	10.340	1034.0	1.00734	0.00318
30	90	10.290	1029.0	1.01411	0.00609
30	120	10.270	1027.0	1.01685	0.00726
30	150	10.250	1025.0	1.01959	0.00843
30	180	10.230	1023.0	1.02236	0.00960
30	210	10.220	1022.0	1.02374	0.01019
30	240	10.210	1021.0	1.02514	0.01078
30	270	10.210	1021.0	1.02514	0.01078
30	300	10.200	1020.0	1.02653	0.01137
30	330	10.190	1019.0	1.02793	0.01196
30	360	10.180	1018.0	1.02933	0.01256
300	660	10.120	1012.0	1.03783	0.01612
300	960	10.080	1008.0	1.04357	0.01852
300	1260	10.040	1004.0	1.04937	0.02093
300	1560	10.010	1001.0	1.05377	0.02275
300	1860	9.970	997.0	1.05969	0.02518
300	2160	9.940	994.0	1.06417	0.02701
1800	3960	9.870	987.0	1.07479	0.03132
1800	5760	9.800	980.0	1.08561	0.03567
1800	7560	9.750	975.0	1.09348	0.03881
1800	9360	9.690	969.0	1.10307	0.04260
1800	11160	9.630	963.0	1.11283	0.04643

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***900 Laksehore Road, Mississauga***
Project: ***FH 24-14065***
Test Date: ***9/5/2024***
Tested by: ***CAW***
Well No: ***MW102***



FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***900 Laksehore Road, Mississauga***
Project: ***FH 24-14065***
Test Date: ***9/5/2024***
Tested by: ***CAW***
Well No: ***MW102***

Equilibrium Water level (from top of pipe) HE	*240*	*cm*
Initial Water level (from top of pipe) Ho	*14395*	*cm*
Monitoring well inner Dia D	*0.05*	*m*
Initial Time offset To	*1*	*second*
Reverse of Luthin's reference system Ru = Ho - HE	*14155.00*	*cm*
Slope of Log((ho-he)/(ht-he)) / T	*9.00E-06*	

G = Ru / (HT - HE)

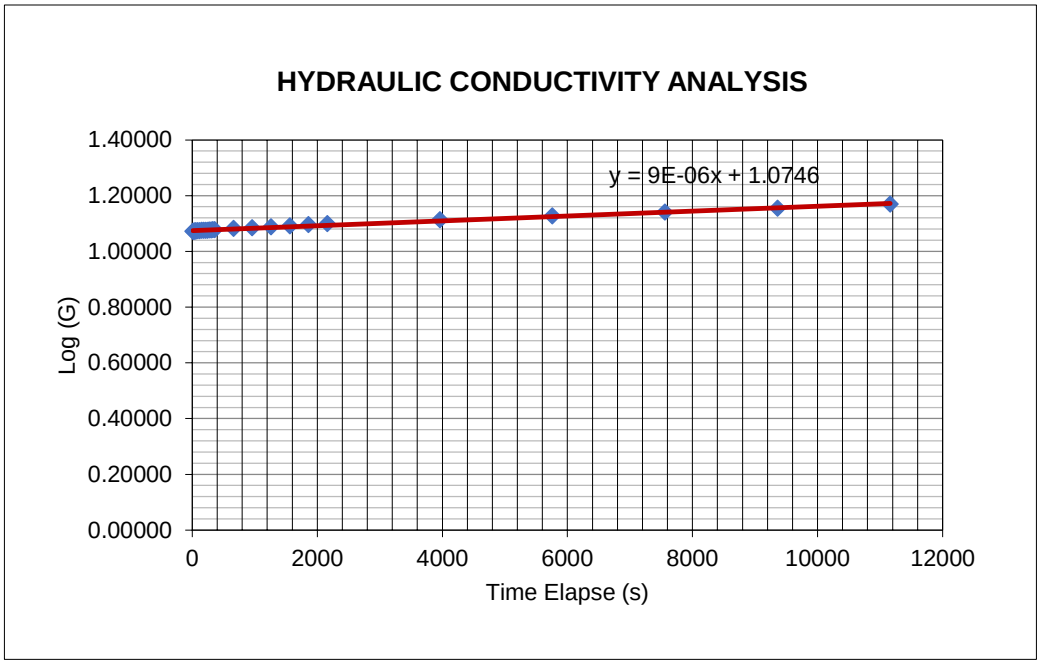
Hydraulic conductivity computed k = 0.0000136 cm/s
1.36E-07 m/s
0.012 m/day

Time	HT (Water Drop)			G	LOG (G)
(Interval s)	(Elapsed s)	(m)	(cm)		
0	0	14.395			
10	10	14.390	1439.0	11.80567	1.07209
10	20	14.380	1438.0	11.81553	1.07245
10	30	14.380	1438.0	11.81553	1.07245
10	40	14.370	1437.0	11.82540	1.07282
10	50	14.370	1437.0	11.82540	1.07282
10	60	14.360	1436.0	11.83528	1.07318
30	90	14.340	1434.0	11.85511	1.07391
30	120	14.320	1432.0	11.87500	1.07463
30	150	14.310	1431.0	11.88497	1.07500
30	180	14.300	1430.0	11.89496	1.07536
30	210	14.290	1429.0	11.90496	1.07573
30	240	14.280	1428.0	11.91498	1.07609
30	270	14.270	1427.0	11.92502	1.07646
30	300	14.260	1426.0	11.93508	1.07683
30	330	14.245	1424.5	11.95019	1.07737
30	360	14.230	1423.0	11.96534	1.07793
300	660	14.120	1412.0	12.07765	1.08198
300	960	14.040	1404.0	12.16065	1.08496
300	1260	13.960	1396.0	12.24481	1.08795
300	1560	13.850	1385.0	12.36245	1.09210
300	1860	13.750	1375.0	12.47137	1.09591
300	2160	13.660	1366.0	12.57105	1.09937
1800	3960	13.300	1330.0	12.98624	1.11348
1800	5760	12.950	1295.0	13.41706	1.12766
1800	7560	12.620	1262.0	13.85029	1.14146
1800	9360	12.310	1231.0	14.28355	1.15484
1800	11160	11.980	1198.0	14.77557	1.16954

FISHER ENGINEERING

HYDRAULIC CONDUCTIVITY ANALYSIS

Location: ***900 Laksehore Road, Mississauga***
Project: ***FH 24-14065***
Test Date: ***9/5/2024***
Tested by: ***CAW***
Well No: ***MW102***



APPENDIX F – CONSTRUCTION DEWATERING RATES AND PERMANENT DRAINAGE

Construction Dewatering Calculation

Location: *900 Laksehore Road, Mississauga*
Project: *FH 24-14065*
Date: *9/15/2024*

Dupuit Forcheimer for Radial Flow to a Closely Welled System or Excavation

Construction Units	Finished lowest floor elevation (m asl)	Average Grade (m asl)	Lowest Footing Elevation (m asl)	Required Dewatering Elevation (m asl)	Average Static water level		Well base elevation	H (m)	h_w (m)	H-h_w (m)	R_0 (m)		r_w	ab (m^2)	K (m/s)	H^2-h_w^2	lnR_0	lnr_w	Q_r (m^3/s)	Q_r (m^3/day)
					BGS (m)	Elevation (m asl)	(m)				Model	Adjusted								
Building with three UG levels	74.60	85.22	73.60	72.60	3.29	81.93	72.30	9.63	0.3	9.33	11.44	38.50	27.06	2300	3.76E-07	92.71	3.65	3.30	3.10E-04	26.81

Dupuit Forcheimer Equation

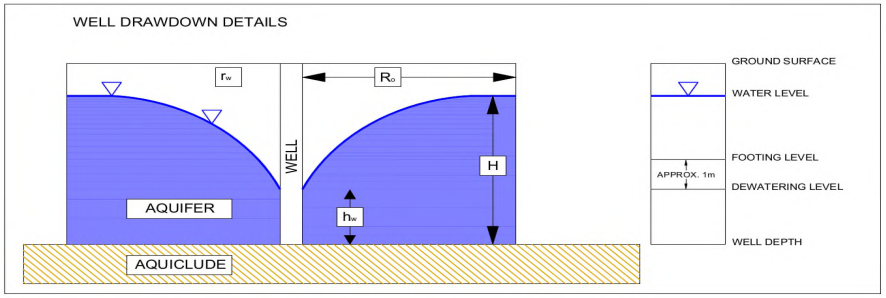
$$Q = \frac{\pi K(H^2 - h_w{}^2)}{lnR_0 - lnr_w}$$

Equivalent radius of well, r_w

$$r_w = \sqrt{\frac{ab}{\pi}}$$

Radius of influence in m, calculated from Sichardt's equation

$$R_0 = 2000(H - h_w)\sqrt{k}$$



Where:

r_w = equivalent radius of the well in m,
H = hydraulic head of the original water table (total saturated aquifer thickness) in m,
h_w = hydraulic head at maximum dewatering (proposed drawdown) in m,
R_0 = radius of influence in m, calculated from Sichardt's equation, and
K = hydraulic conductivity, in m/s
a = length of excavation area in m
b = width of excavation area in m

Permanent Drainage

Location: *900 Laksehore Road, Mississauga*
Project: *FH 24-14065*
Date: *9/15/2024*

Dupuit Forcheimer for Radial Flow to a Closely Welled System or Excavation

Construction Units	Finished lowest floor elevation (m asl)	Average Grade (m asl)	Lowest Footing Elevation (m asl)	Required Dewatering Elevation (m asl)	Static water level		Well base elevation	H (m)	h_w (m)	H-h_w (m)	R_0 (m)		r_w	ab (m^2)	K (m/s)	H^2-h_w^2	lnR_0	lnr_w	Q, (m^3/s)	Q, (m^3/day)
					BGS (m)	Elevation (m asl)	(m)				Model	Adjusted								
Building with three UG levels	74.60	85.22	73.60	74.35	3.29	81.93	74.10	7.83	0.3	7.58	9.30	36.36	27.06	2300	3.76E-07	61.30	3.59	3.30	2.45E-04	21.17

Dupuit Forcheimer Equation

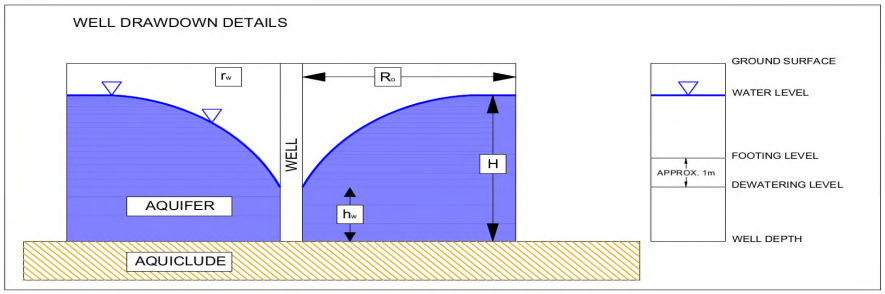
$$Q = \frac{\pi K(H^2 - h_w{}^2)}{lnR_0 - lnr_w}$$

Equivalent radius of well, r_w

$$r_w = \sqrt{\frac{ab}{\pi}}$$

Radius of influence in m, calculated from Sichardt's equation

$$R_0 = 2000(H - h_w)\sqrt{k}$$



Where:

r_w = equivalent radius of the well in m,
H = hydraulic head of the original water table (total saturated aquifer thickness) in m,
h_w = hydraulic head at maximum dewatering (proposed drawdown) in m,
R_0 = radius of influence in m, calculated from Sichardt's equation, and
K = hydraulic conductivity, in m/s
a = length of excavation area in m
b = width of excavation area in m

APPENDIX G – DRAINAGE DESIGN

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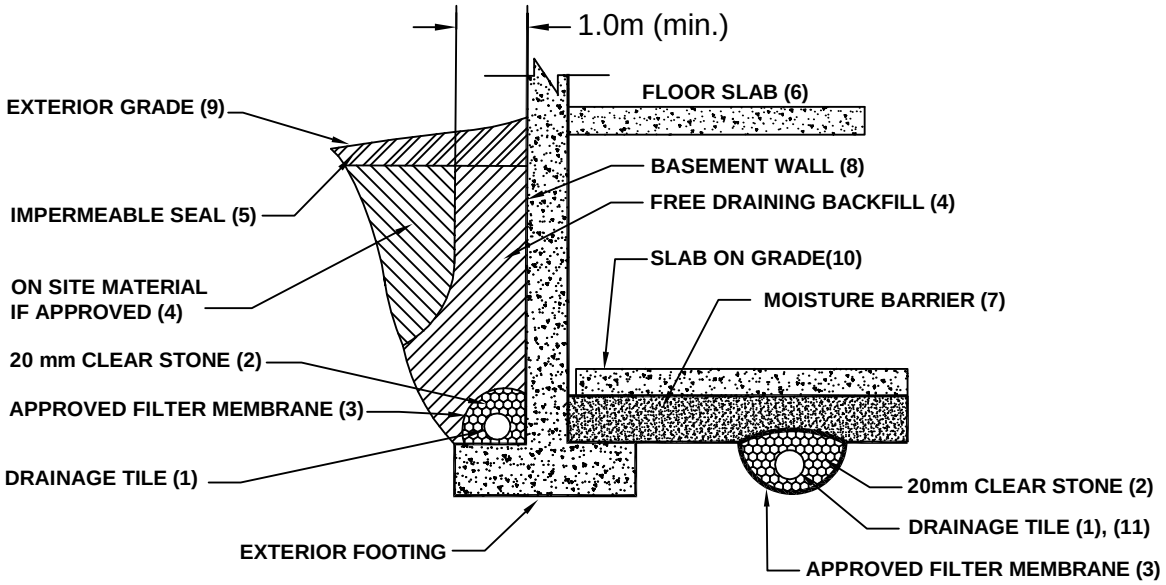


NOTES:

(1) DRAINAGE TILE TO CONSIST OF 100mm (4") DIAMETER WEEPING TILE OR EQUIVALENT PERFORATED PIPE LEADING TO A POSITIVE SUMP OR OUTLET.

(2) 20mm (3/4") CLEAR STONE - 150mm (6") TOP AND SIDE OF DRAIN. IF DRAIN IS NOT ON FOOTING, PLACE 100mm (4") OF STONE BELOW DRAIN.

(3) WRAP THE CLEAR STONE WITH AN APPROVED FILTER MEMBRANE (TERRAFIX 279R OR EQUIVALENT).

(4) FREE DRAINING BACKFILL - OPSS GRANULAR B OR EQUIVALENT COMPACTED TO THE SPECIFIED DENSITY. DO NOT USE HEAVY COMPACTION EQUIPMENT WITHIN 1.8m (6') OF WALL.

(5) IMPERMEABLE BACKFILL SEAL - COMPACTED CLAY, CLAYEY SILT OR EQUIVALENT. IF ORIGINAL SOIL IS FREE-DRAINING, SEAL MAY BE OMITTED. MAXIMUM THICKNESS OF SEAL TO BE 0.5m.

(6) DO NOT BACKFILL UNTIL WALL IS SUPPORTED BY BASEMENT AND FLOOR SLABS OR ADEQUATE BRACING.

(7) MOISTURE BARRIER TO BE AT LEAST 200mm (8") OF COMPACTED CLEAR 20mm (3/4") STONE OR EQUIVALENT FREE DRAINING MATERIAL. A VAPOUR BARRIER MAY BE REQUIRED FOR SPECIALTY FLOORS.

(8) BASEMENT WALL TO BE DAMP PROOFED.

(9) EXTERIOR GRADE TO SLOPE AWAY FROM BUILDING.

(10) SLAB ON GRADE SHOULD NOT BE STRUCTURALLY CONNECTED TO THE WALL OR FOOTING

(11) UNDERFLOOR DRAIN INVERT TO BE AT LEAST 300mm (12") BELOW UNDERSIDE OF FLOOR SLAB. DRAINAGE TILE PLACED IN PARALLEL ROWS 6 TO 8m (20-25') CENTERS ONE WAY. PLACE DRAIN ON 100mm (4") CLEAR STONE WITH 150mm (6") OF CLEAR STONE ON TOP AND SIDES. ENCLOSE STONE WITH FILTER FABRIC AS NOTED IN (3)

(12) THE ENTIRE SUBGRADE TO BE SEALED WITH APPROVED FILER FABRIC (TERRAFIX 270R OR EQUIVALENT) IF NON-COHESIVE(SANDY) SOILS BELOW GROUND WATER TABLE ENCOUNTERED.

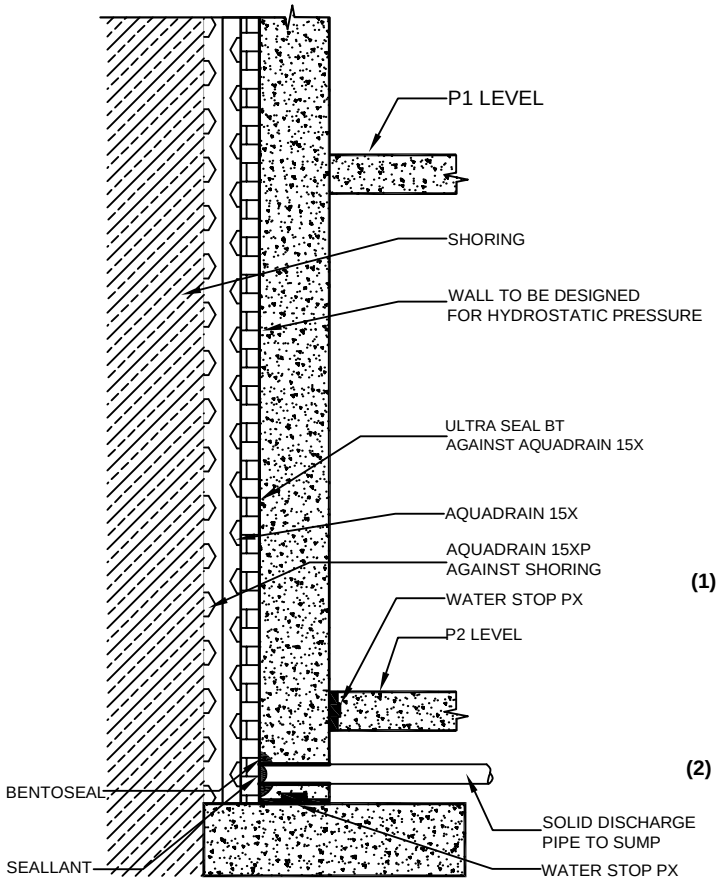
(13) DO NOT CONNECT THE UNDERFLOOR DRAINS TO PERIMETER DRAINS.

(14) REVIEW THE GEOTECHNICAL REPORT FOR SPECIFIC DETAILS.

DRAINAGE AND BACKFILL RECOMMENDATIONS

BASEMENT WITH UNDERFLOOR DRAINAGE

(NOT TO SCALE)



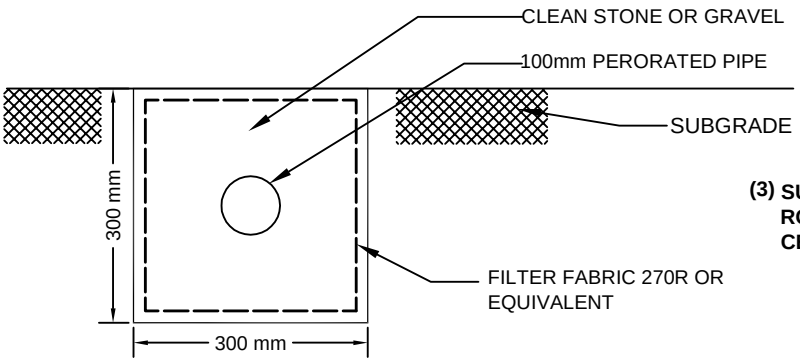
NOTES:

(1) ALL PERMANENT DRAINAGE PIPES MUST HAVE GEOTEXTILE FILTER SLEEVE TO PREVENT LONG TERM SILTING. TO FURTHER MINIMIZE SILTATION OF THE DRAINAGE SYSTEM, ALL DRAINAGE PIPE CONNECTION MUST BE SOLID PVC ELBOWS AND Ts. NO "BUTT" END CONNECTIONS SHOULD BE PERMITTED.

(2) PERIMETER COLLECTION PIPE TO BE SOLID PIPE,

SUGGESTED EXTERIOR DRAINAGE AGAINST SHORING

(NOT TO SCALE)



(3) SUBGRADE DRAIN TO BE PLACED IN PARALLEL ROWS 6-8 m (20'-25'), FROM CENTERLINE TO CENTERLINE.

DETAIL OF SUBGRADE DRAIN

(NOT TO SCALE)