INFILTRATION TESTING PROGRAM
181 TORONTO STREET SOUTH
UXBRIDGE, ONTARIO
L9P 1R1

REPORT NO.: 5555-21-HD
REPORT DATE: August 25, 2023
REVISION 01

PREPARED FOR:
MAN HOLDINGS LTD.
174 DINNICK CRESCENT
TORONTO, ONTARIO
M4N 1M3

110 KONRAD CRESCENT, UNIT 16, MARKHAM, ONTARIO L3R 9X2
TEL.: 905-940-8509 FAX: 905-940-8192

Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1 Introduction

1.1 Project Background

Toronto Inspection Ltd. (TIL) was retained by Man Holdings Ltd. (the Client) to carry out an infiltration testing program to assess the preliminary design of the proposed Low Impact Development (LID) at 181 Toronto Street South in the Township of Uxbridge, Ontario (the "Site").

The physical address of the Site is as follows:

181 Toronto Street South
Uxbridge, Ontario, L9P 1R1

The is owned by the Client. Relevant information of the Client is as follows.

174 Dinnick Crescent
Toronto, Ontario, M4N 1M3

Based on a review of the Conceptual Site Plan prepared by John G. Williams Ltd. Architect (JGW) dated February 23, 2022, the proposed development at the Site consists of two, 3-storey buildings area to the east. Each building is also understood to have a basement level which is assumed to extend to approximately 2.5 metres below ground surface (mbgs) (8 ft). The Site will connect to municipal water and wastewater services on Toronto Street South. The Conceptual Site Plan prepared by Counterpoint Engineering (2022) is provided in **Appendix A.**

1.2 Site Description

The Site is located immediately east of Toronto Street South, west of Fred Barnaud Way, and approximately 50 m south of the intersection of these two roads. The Site covers an area of approximately 0.515 ha and near rectangular in shape.

The Site is currently vacant and covered by grass, weeds, and scattered trees.

Land uses adjacent to the Site are residential. The Site slightly slopes from south to north.

The location of the Site is shown in **Figure 1**

1.3 Objectives of the Infiltration Testing Program

The objective for the field infiltration testing program was to estimate the saturated field hydraulic conductivity and a representative unfactored infiltration rate within the soil overburden at the invert depths of the proposed low impact development (LID) features.

1.4 Groundwater Levels

A summary of static water level measurements at six monitoring wells in 2021 near the proposed LID are presented in **Table 1-1** and **Table 1-2** in meters below ground surface (mbgs) and in meters above sea level (masl), respectively. The monitoring well locations are provided in **Figure 1**. The borehole logs are provided in **Appendix A**.

Based on the measured groundwater levels between October and July 2021, up to 1.16 m's variability in the groundwater levels within each well was observed. Groundwater varied from a low of 274.12 masl to a high of 276.27 masl. The closest monitoring well to both test pits, 21BH-8 (MW), had a high-water level reading of 274.97 masl.

Table 1-1 Summary of Water Levels (mbgs)

Well ID	Screen Interval	25-Oct-21	7-Jan-22	16-Mar-22	28-Apr-22	04-Jul-22	31-Aug-22
	(mbgs)	(mbgs)	(mbgs)	(mbgs)	(mbgs)	(mbgs)	(mbgs)
21BH-1 (MW)	2.70 – 5.75	2.92	2.85	2.80	2.72	2.98	3.16
21BH-4 (MW)	2.89 – 5.90	2.82	2.77	2.72	2.66	2.89	3.04
21BH-8 (MW)	2.95.- 6.00	2.54	2.53	2.48	2.42	3.27	2.71

1. Water levels are relative to existing ground surface.

Table 1-2 Summary of Water Levels (masl)

Well ID	Screen Interval	25-Oct-21	7-Jan-22	16-Mar-22	28-Apr-22	04-Jul-22	31-Aug-22
	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
21BH-1(MW)	276.29 - 273.24	276.07	276.14	276.19	276.27	276.01	275.83
21BH-4(MW)	275.86 – 272.81	275.89	275.94	275.99	276.05	275.82	275.67
21BH-8(MW)	274.44 - 271.39	274.85	274.86	274.91	274.97	274.12	274.68

2 Testing Location and In-Situ Soil

In total, two (2) test pits (23TP-1 and 23TP-2) were dug by an excavator to document the subsoil conditions and to facilitate field infiltration testing. The locations of the test pit are identified in **Figure 1**.

Based on observations made in the field, the test pits exposed up to 1.42 metre below ground surface (mbgs). At 23TP-1, a dark brown topsoil layer with sand, some gravel, trace silt and rootlets were in contact with ground surface and extends up to 0.18 mbgs. Below the top soil, a fill/ reworked area that consists of brown silty sand layer with some debris such as asphalt and building material, trace gravel and rootlets, followed by a brown sand layer, compact, with some silt, trace gravel, and moist was observed at 1.12 mbgs. 23TP-1 was dug up to 1.42 mbgs, no seepage was observed.

At 23TP-2, a dark brown topsoil layer with sand, some gravel, trace silt and some rootlets and organics was in contact with the ground surface and extends to 0.17 mbgs. Below the top soil, a brown silty sand layer with trace gravel, rootlets, organics, and debris such as asphalt was encountered, followed by a brown sand layer, compact, with some silt, trace gravel, and moist was observed at 1.11 mbgs. 23TP-2 was dug up to 1.41 mbgs, no seepage was observed.

The detailed visual observations from the test pits are presented in **Table 2-1**.

Table 2-1 Test Pit Observations

Test ID	Depth of Investigation (mbgs)	Soil Conditions	Water Seepage Observations
23TP-1	1.42	0 – 0.18 m – topsoil, dark brown, some gravel, rootlets, moist 0.18 – 1.12 m – silty sand, brown, trace gravel, trace rootlets, some debris, trace rootlets, moist 1.12 – 1.42 – sand, compact, brown, some silt, trace gravel	No seepage observed
23TP-2	1.41	0 – 0.17 m – topsoil, dark brown, some gravel, rootlets, organics, moist 0.17 – 1.11 m – silty sand, trace gravel, trace rootlets, trace organics, moist 1.11 – 1.41 m – sand, compact, brown, some silt, trace gravel	No seepage observed

Notes:

3 Laboratory Grain Size Analysis

Grain size analyses for selected soil samples were completed in the laboratory using sieve and hydrometer methods. The purpose of completing the grain size analyses was to determine the particle size distribution of the soil samples collected.

Grain size analyses were conducted using samples from the bottom of each test pit location to assess the particle size distribution at the location of the in-suit infiltration testing. The grain size distribution curves are attached as **Appendix B**. A summary of the results from the analyses are provided in **Table 3-1**.

Table 3-1 Hazen Permeability Summary

Test ID	Test Depth (mbgs)	Soil Category	Hazen Permeability (cm/s)	Laboratory Infiltration Rate (mm/hr)
23TP-1	1.42	Sand	1.4×10^{-5}	94
23TP-2	1.41	Sand	3.3×10^{-5}	75

4 In-situ Infiltration Test

In-situ infiltration testing was carried out using a Guelph Permeameter in accordance with the equipment's operating instructions (Soilmoisture Equipment Corp., 2012)[1]. 6 cm diameter holes were hand-augured at the bottom of each test pit location.

The infiltration test details are summarized in **Table 4-1**. The approximate infiltration test locations are shown on **Figure 1** and the field Guelph Permeameter data tables documenting stabilization of drawdown rates are provided in **Appendix C**.

[1] Soilmoisture Equipment Corp. 2012. 2800 Guelph Permeameter Operating Instructions dated December 2012

Table 4-1 Infiltration Test Summary

Test ID	Test Depth (mbgs)	Well Hole Soil Description	Water Column Height (cm)	Reservoir Used	Method
23TP-1	1.42	Sand, compact, brown, some silt, trace gravel	5 & 10	Combined	Average of Single Heads
23TP-2	1.41	Sand, compact, brown, some silt, trace gravel	5 & 10	Combined	Average of Single Heads

Notes:

5 Test Results

5.1 Soil Condition

Based on the field logging of soil samples, the native subsoil at the base of the proposed LID consists of a layer of sand, compact, brown, some silt, trace gravel, and moist.

5.2 Estimated Field Hydraulic Conductivity and Infiltration Rate

The field saturated hydraulic conductivity (Kfs) was calculated using the "Guelph Permeameter Calculator" prepared by Soilmoisture Equipment Corp (2012) [2].

To determine the corresponding soil infiltration rate, the Kfs must be converted to a rate of infiltration (T). The approximate relationship between Kfs and T is provided in the Toronto and Region Conservation Authority (TRCA) *Stormwater Management Criteria* (TRCA, 2012)[3] to complete this conversion.

It should be noted that the estimated field infiltration rates are specific to the areas tested at the Site and at the point in time when the tests were conducted. Test results may therefore not be applicable to other areas of the Site where subsurface conditions are not consistent with those of the test locations.

A summary of the Kfs from the current investigation is presented in **Table 5-1**. The calculation sheets from the Guelph Permeameter Calculator and field data are included in **Appendix C**.

Table 5-1 Unfactored Infiltration Rate from In-situ Infiltration Testing

Test Pit Location	Depth	Soil Unit	Saturated Hydraulic Conductivity Kfs (cm/s)	Unfactored Infiltration Rate (mm/hr) *
	mbgs			
23TP-1	1.42	Sand	1.15×10^{-3}	89
23TP-2	1.41	Sand	2.97×10^{-4}	61

Notes:

1. * Unfactored Infiltration Rate at tested depth.

[2] Soilmoisture Equipment Corp. 2012. 2800 Guelph Permeameter Operating Instructions dated December 2012

[3] Toronto and Region Conversation Authority (TRCA). 2012. Stormwater Management Criteria August 2012 Version 1.0.

6 Summary and Recommendations

The native subsoil at the base of the LID is observed to be sand, compact, brown, some silt, trace gravel. Based on the grainsize analyses and in-situ infiltration testing completed, an unfactored infiltration rate of 61 mm/hr for the bottom of the LID features is recommended. It will be at the discretion of the civil engineer to select a factor of safety to apply to the unfactored infiltration rate calculated.

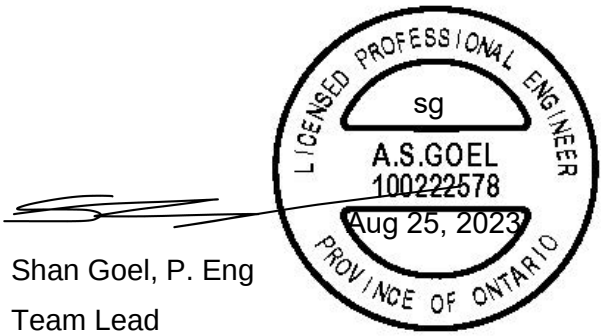
It should also be noted that the field infiltration rates are specific to the areas tested at the Site, at the point in time when the tests were conducted. Test results may therefore not be applicable to other areas of the Site where subsurface conditions are not consistent with those at the test locations.

We trust that the findings from this investigation will meet your needs. Should you have any questions or comments, please do not hesitate to contact the undersigned.

Yours truly,

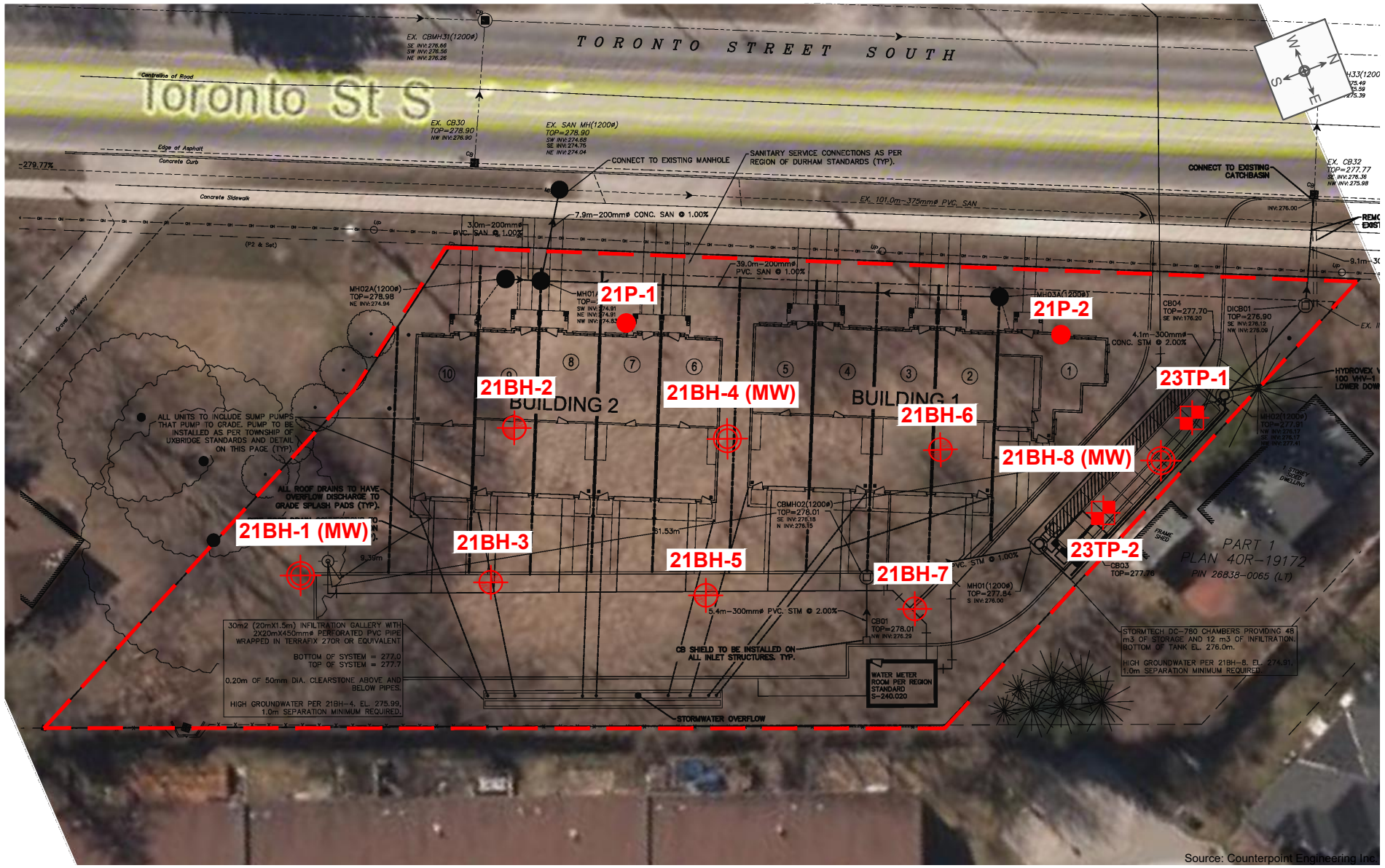
Toronto Inspection Ltd.

Kevin Nankisore, B.Sc., G.I.T.
Environmental Scientist



Shan Goel, P. Eng
Team Lead

FIGURES



Source: Counterpoint Engineering Inc.

LEGEND:

Borehole and Monitoring Well Location | Percolation Test Location | Test Pit Location | Site Boundary

NOT TO SCALE

TorontoInspection LTD.
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent,
Unit 16
Markham, Ontario
L3R 9X2

Tel: 905-940 8509 Fax: 905-940 8192 Email : TIL@torontoinspection.com

TITLE:	Borehole, Monitoring Well, and Test Pit Location Plan
LOCATION:	181 Toronto Street South, Uxbridge, Ontario
PROJECT NO.	5555-21-GC
DATE :	July 2023
DRAWING NO:	1

APPENDIX A

Borehole Logs

Project No. 5555-21-GC

Log of Borehole 21BH-1 (MW)

Dwg No. 2

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

Date Drilled: 4/8/21

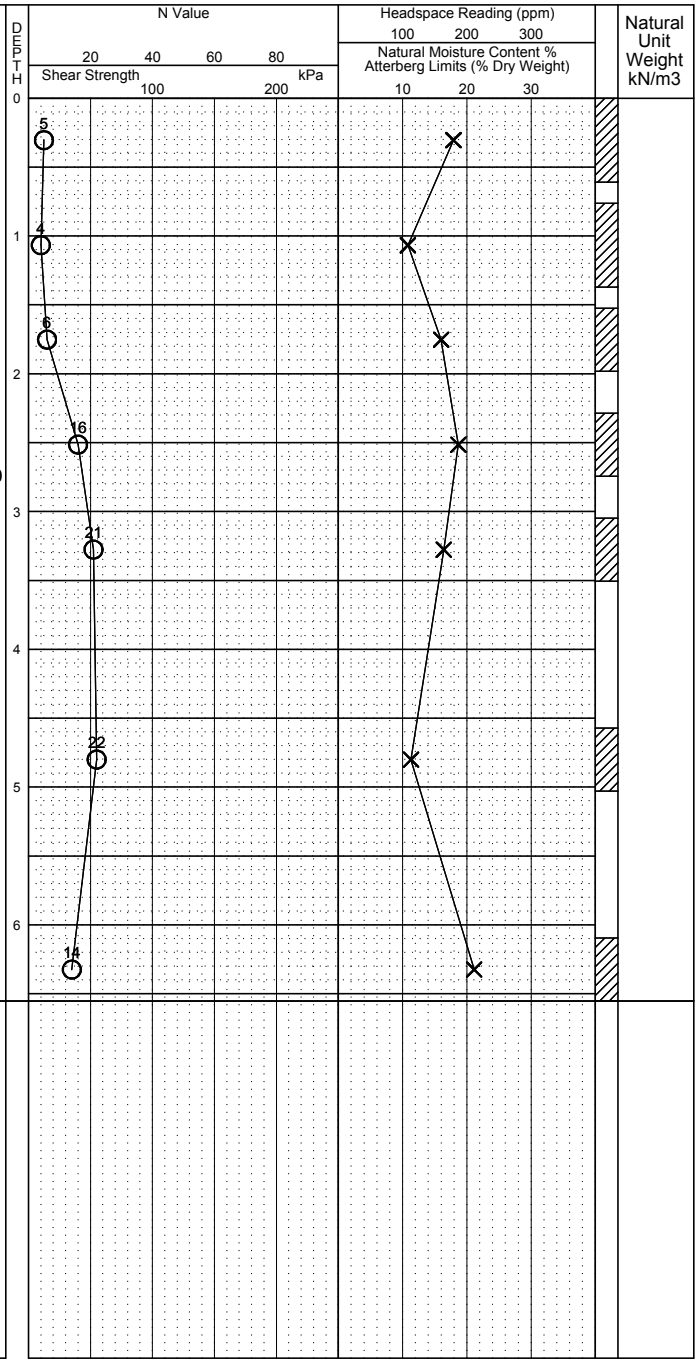
Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	278.99
		TOPSOIL	278.79
		FILL - brown sand - trace rootlets, trace topsoil - some sandy silt, trace gravel - very moist	
			276.86
		SILTY SAND - compact, brown - some gravel, trace clayey silt - gravelly sand from 3.3m to 5.2m - very moist, wet below 3.0m	276.20
			272.44
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 4.0m - cave-in at 4.6m	



Natural Unit Weight kN/m3

LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
April 16, 2021	2.8m	

Project No. 5555-21-GC

Log of Borehole 21BH-2

Dwg No. 3

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

Date Drilled: 4/8/21

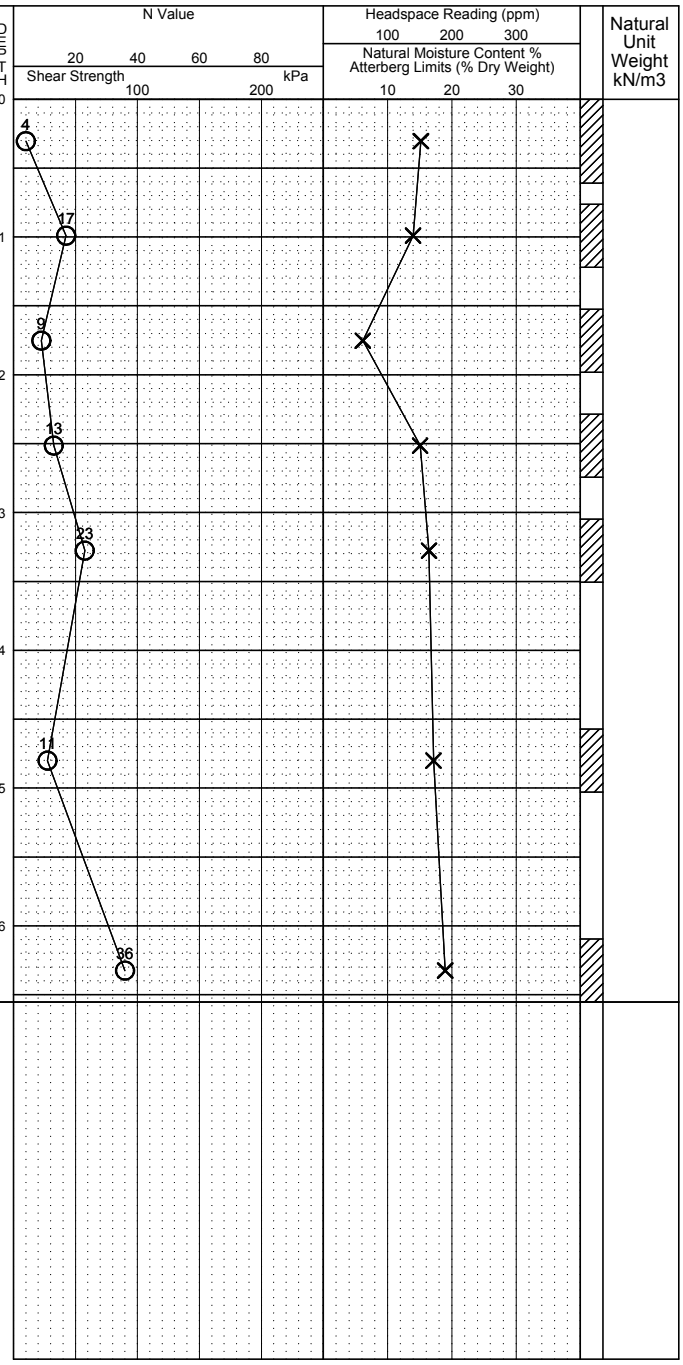
Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	278.75
		TOPSOIL	278.55
		FILL - brown sandy silt - trace rootlets, pockets of topsoil - trace clayey silt, trace gravel - very moist	277.68
▼		**SAND** - loose to dense, brown - fine to medium grained - some silt, trace gravel - moist to very moist, wet below 2.3m	276.05
			272.20
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 2.7m - cave-in at 3.7m	



Natural Unit Weight kN/m3

LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-3

Dwg No. 4

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

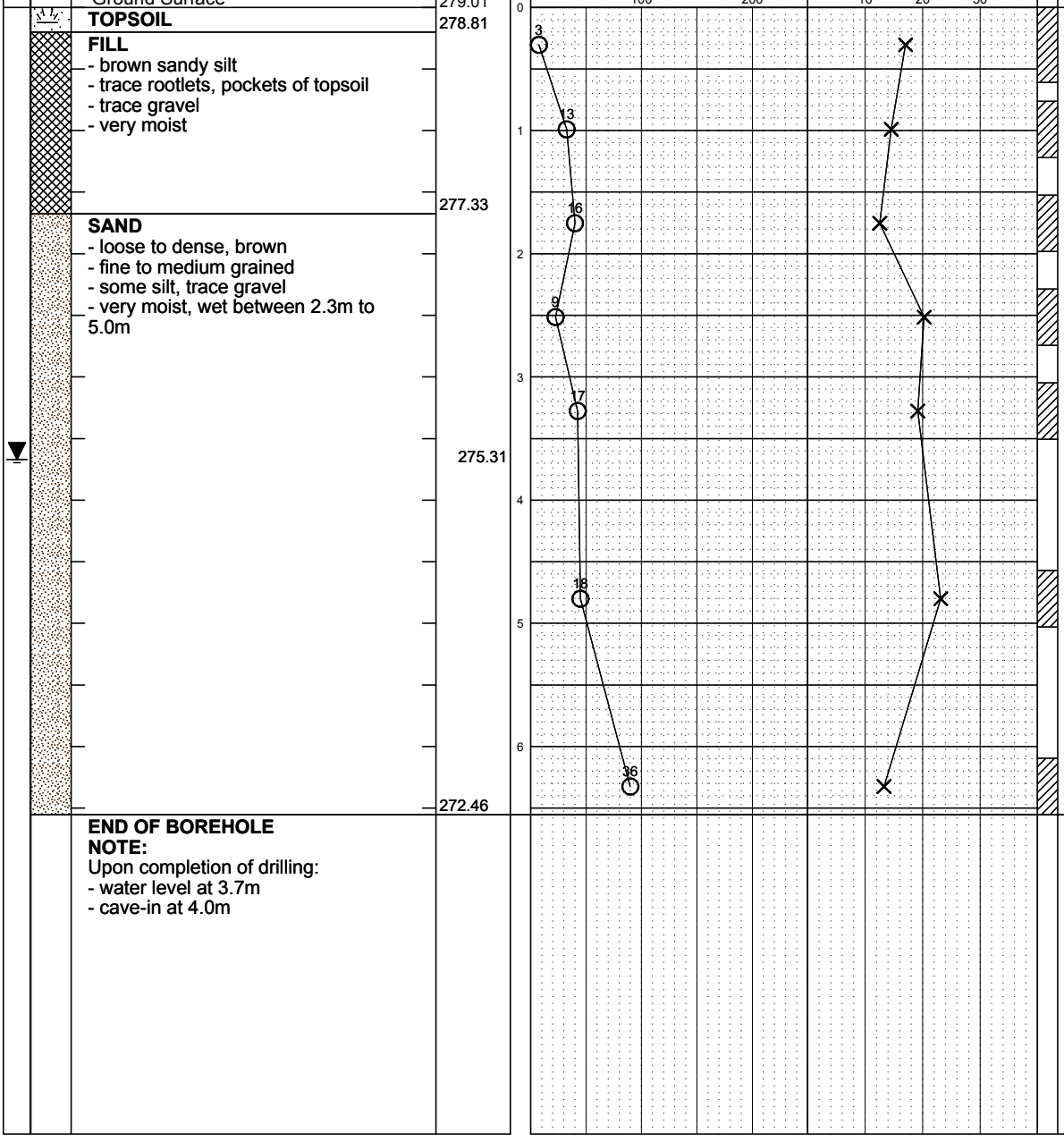
Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		Ground Surface	279.01	0
		TOPSOIL	278.81	
		FILL - brown sandy silt - trace rootlets, pockets of topsoil - trace gravel - very moist		1
			277.33	
		SAND - loose to dense, brown - fine to medium grained - some silt, trace gravel - very moist, wet between 2.3m to 5.0m		2
▼			275.31	3
				4
				5
				6
			272.46	
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 3.7m - cave-in at 4.0m		

N Value: 20 40 60 80
Shear Strength: 100 200 kPa

Headspace Reading (ppm): 100 200 300
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

Natural Unit Weight kN/m3



LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-4 (MW)

Dwg No. 5

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

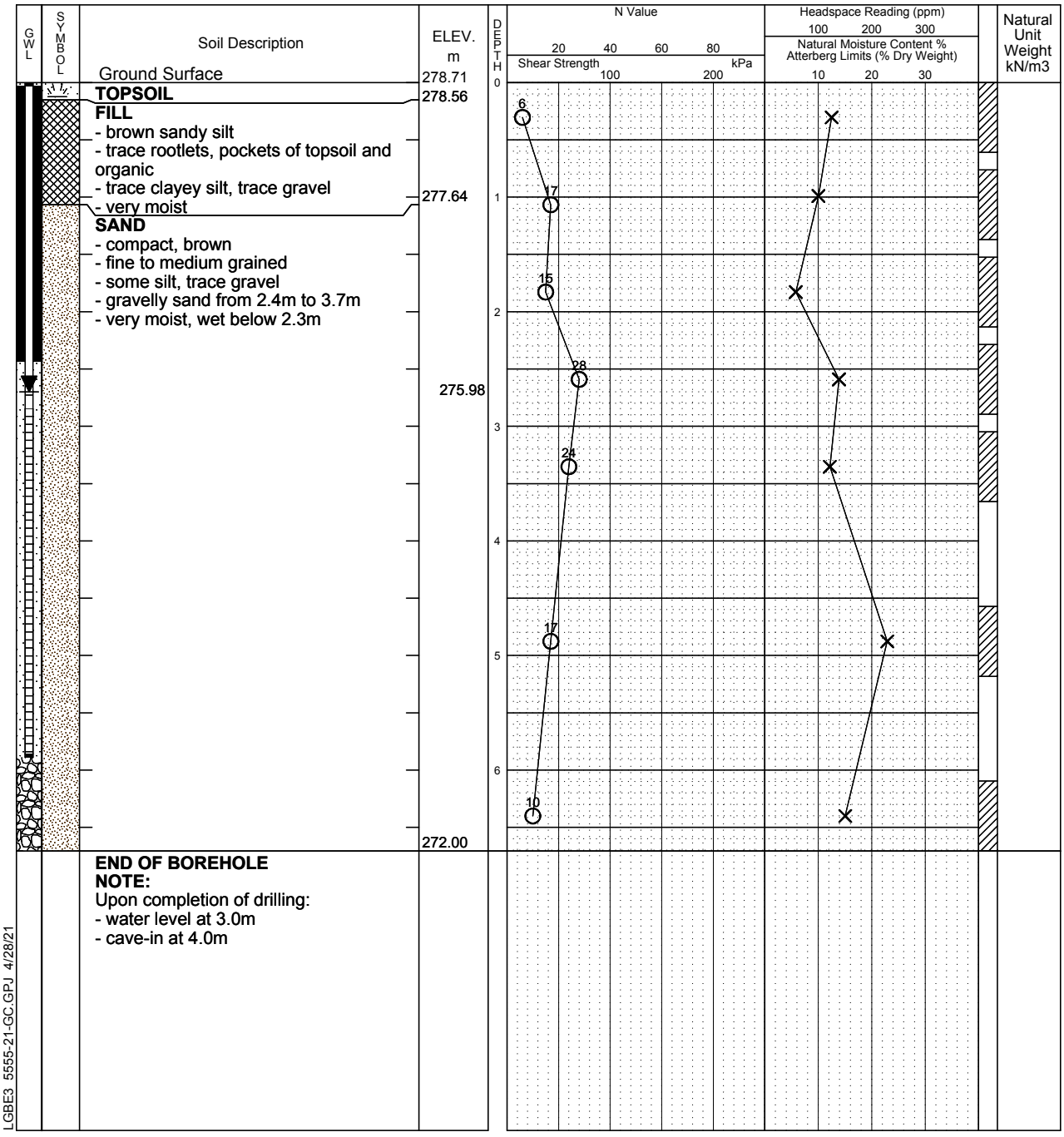
Date Drilled: 4/9/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample ☒
SPT (N) Value ○ ▨
Dynamic Cone Test —
Shelby Tube ■
Field Vane Test ✚ S

Headspace Reading (ppm) •
Natural Moisture ×
Plastic and Liquid Limit ⊢—⊣
Unconfined Compression % Strain at Failure ⊗
Penetrometer ▲



LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
April 16, 2021	2.7m	

Project No. 5555-21-GC

Log of Borehole 21BH-5

Dwg No. 6

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

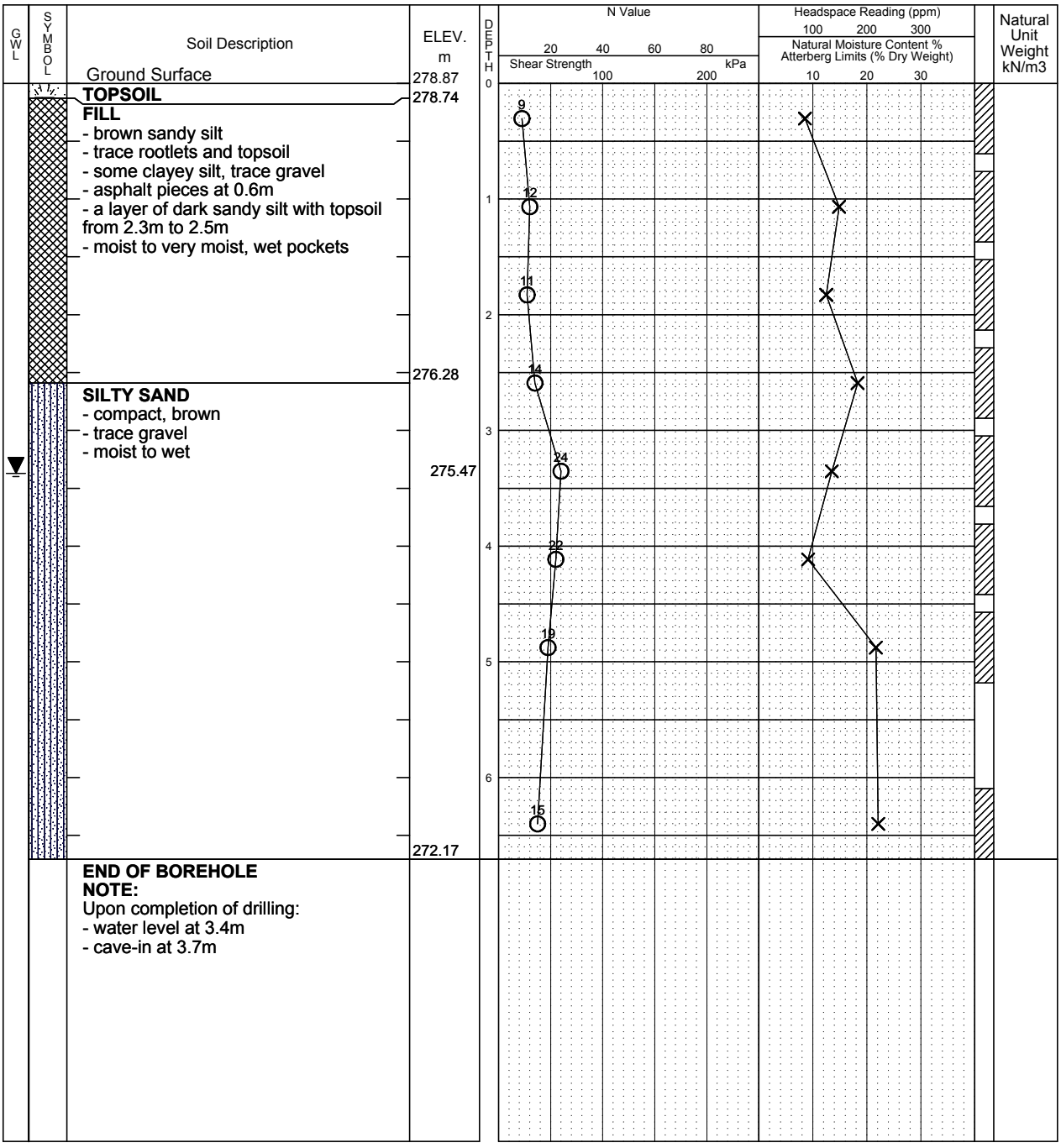
Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer



LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-6

Dwg No. 7

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

Date Drilled: 4/9/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		Ground Surface	278.35	0
		TOPSOIL	278.20	
		FILL - brown sandy silt - trace rootlets, trace organics - some sand, trace gravel - a layer of dark sandy silt with minor rootlets at 2.0m, 150mm in thickness - very moist		1 2
			276.06	
		SILTY SAND - loose to compact, brown - fine grained - trace gravel - gravelly sand from 2.3m to 3.7m - moist to very moist, wet below 3.0m		3
▼			274.55	4
				5
				6
			271.64	
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 3.8m - cave-in at 4.0m		

N Value: 20 40 60 80
Shear Strength: 100 200 kPa
Headspace Reading (ppm): 100 200 300
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
Natural Unit Weight kN/m3

N Value: 6, 5, 6, 25, 20, 14, 21

LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-7

Dwg No. 8

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

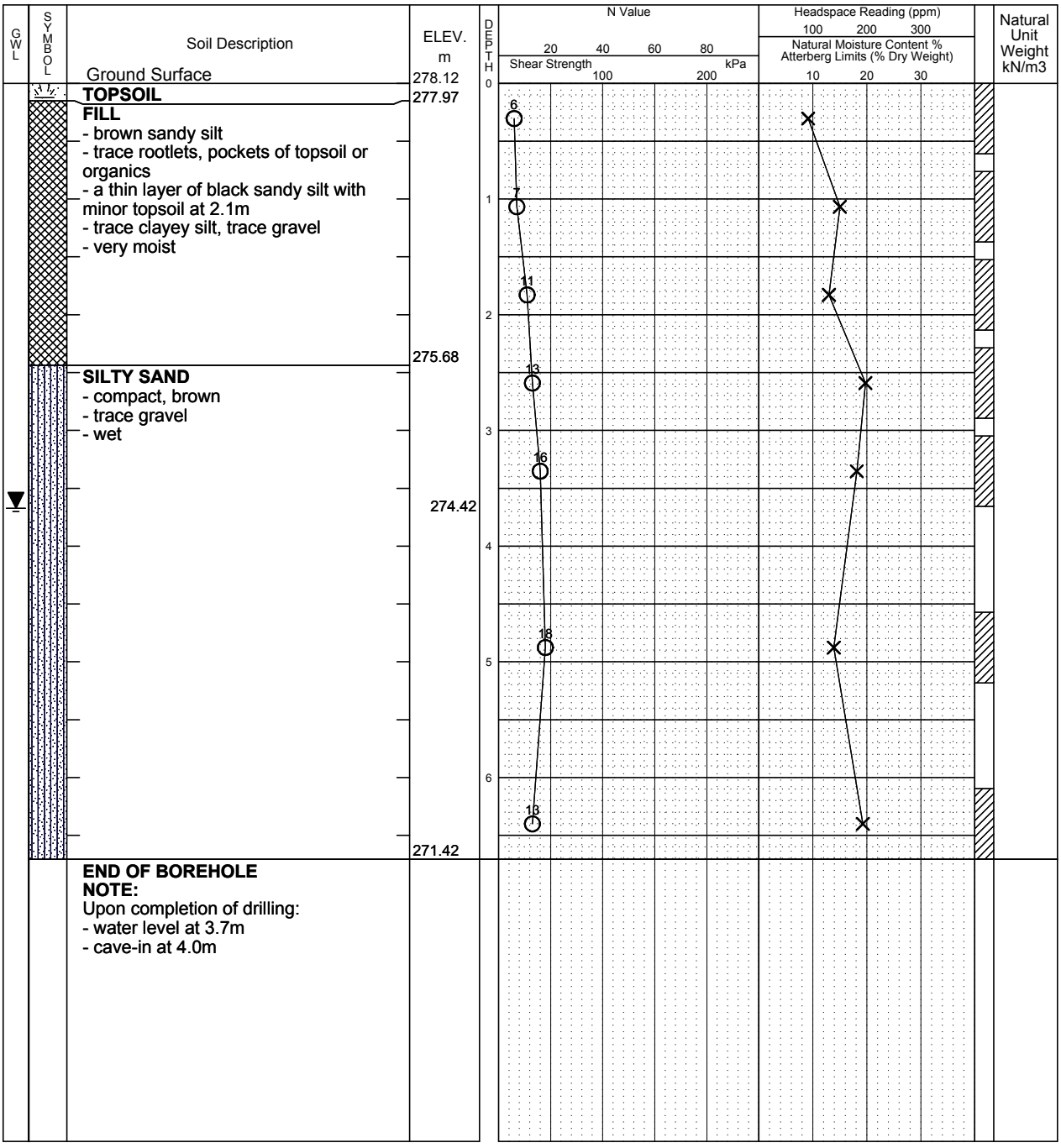
Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer



LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21BH-8 (MW)

Dwg No. 9

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

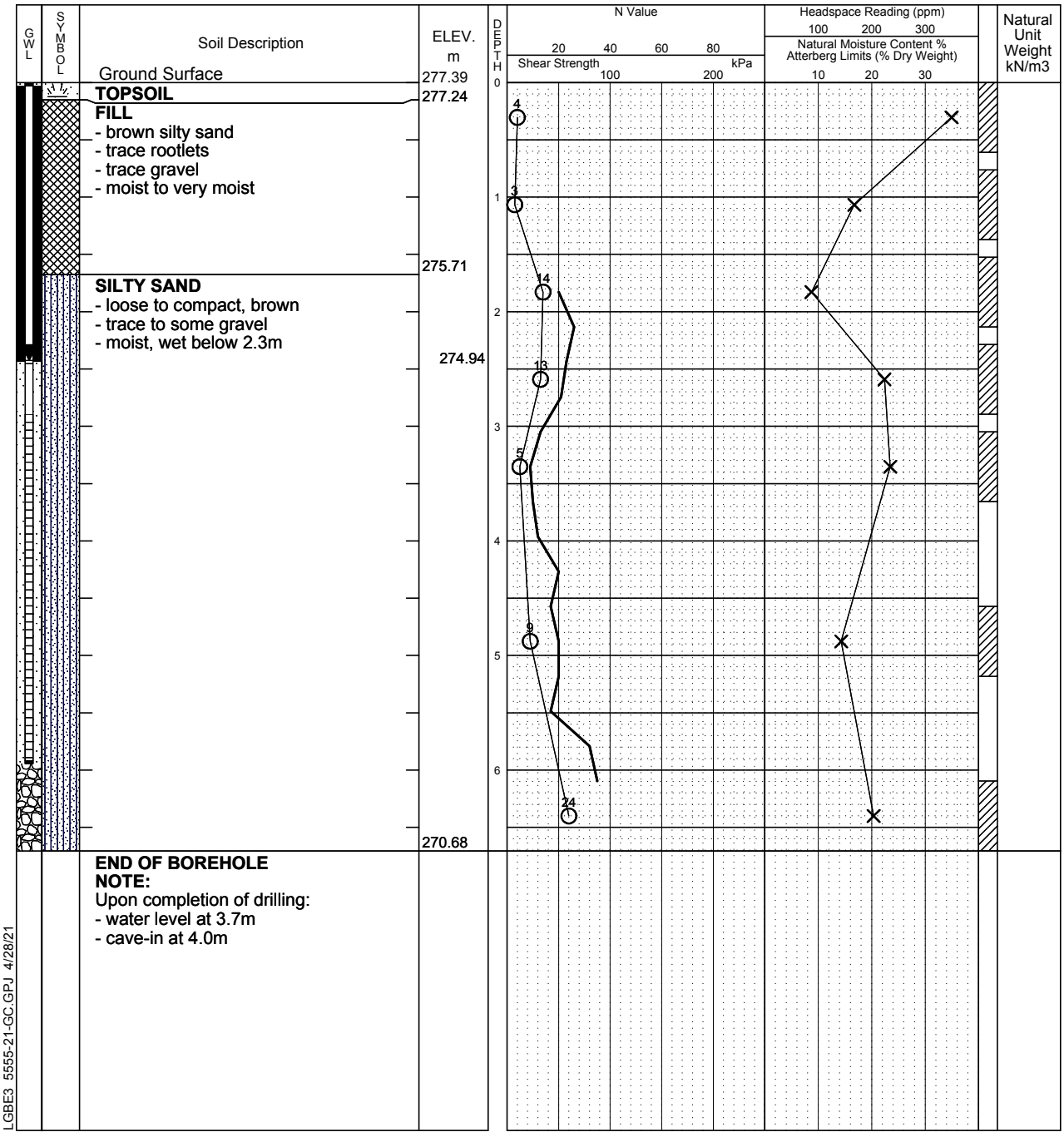
Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer



LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
April 16, 2021	2.4m	

Project No. 5555-21-GC

Log of Borehole 21P-1

Dwg No. 10

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

Date Drilled: 4/9/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Headspace Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	Natural Unit Weight kN/m3
		Ground Surface	278.54	0	N Value 20 40 60 80; Shear Strength 100 200 kPa	100 200 300; Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	
		NO SAMPLING					
			277.32	1			
		SAND - loose, brown - fine to medium grained - gravelly - trace silt - moist			5		
			276.87				
		END OF BOREHOLE **NOTE:** Upon completion of drilling:					

LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5555-21-GC

Log of Borehole 21P-2

Dwg No. 11

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 181 Toronto Street South, Uxbridge, Ontario

Date Drilled: 4/8/21

Drill Type: Track Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (kPa)	Headspace Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	Natural Unit Weight kN/m3
		Ground Surface	277.72	0	N Value: 20 40 60 80; Shear Strength: 100 200 kPa	Headspace Reading (ppm): 100 200 300; Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30	
		NO SAMPLING		1			
			275.89				
		SAND - dense, brown - some gravel, some silt - moist		2	34	×	
			275.43				
		END OF BOREHOLE **NOTE:** Upon completion of drilling:					

LGBE3 5555-21-GC.GPJ 4/28/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

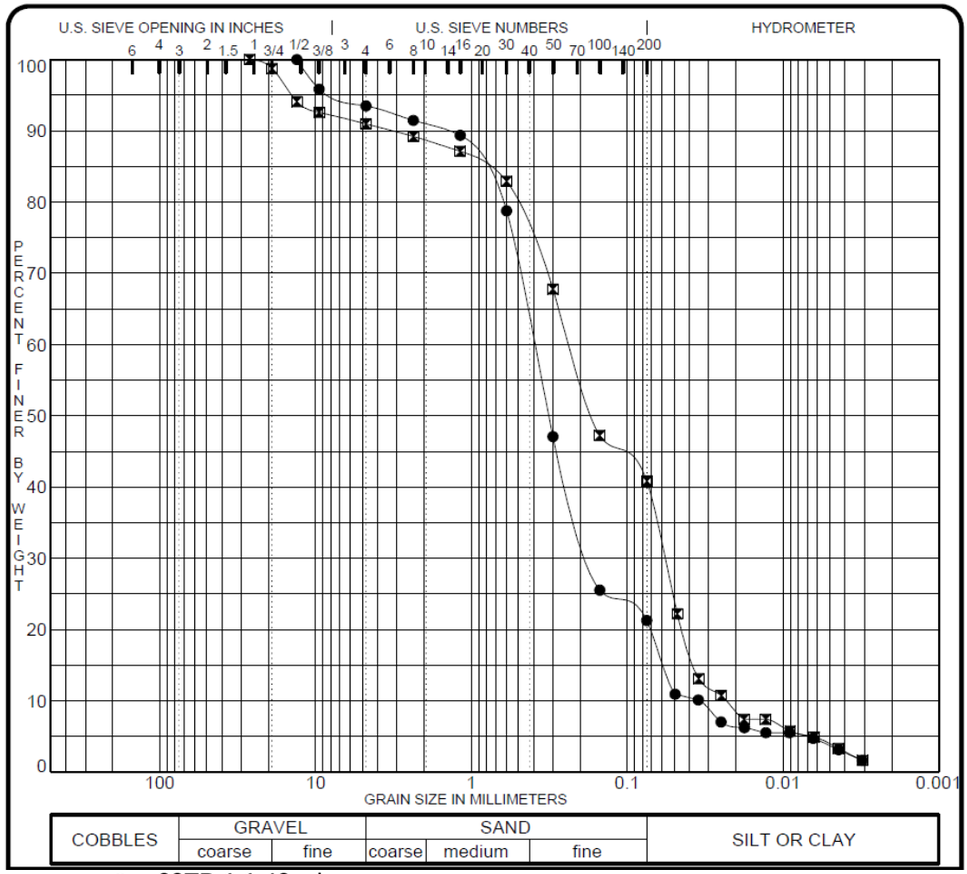
Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

APPENDIX B

Grain Size Analysis Gradation Curve

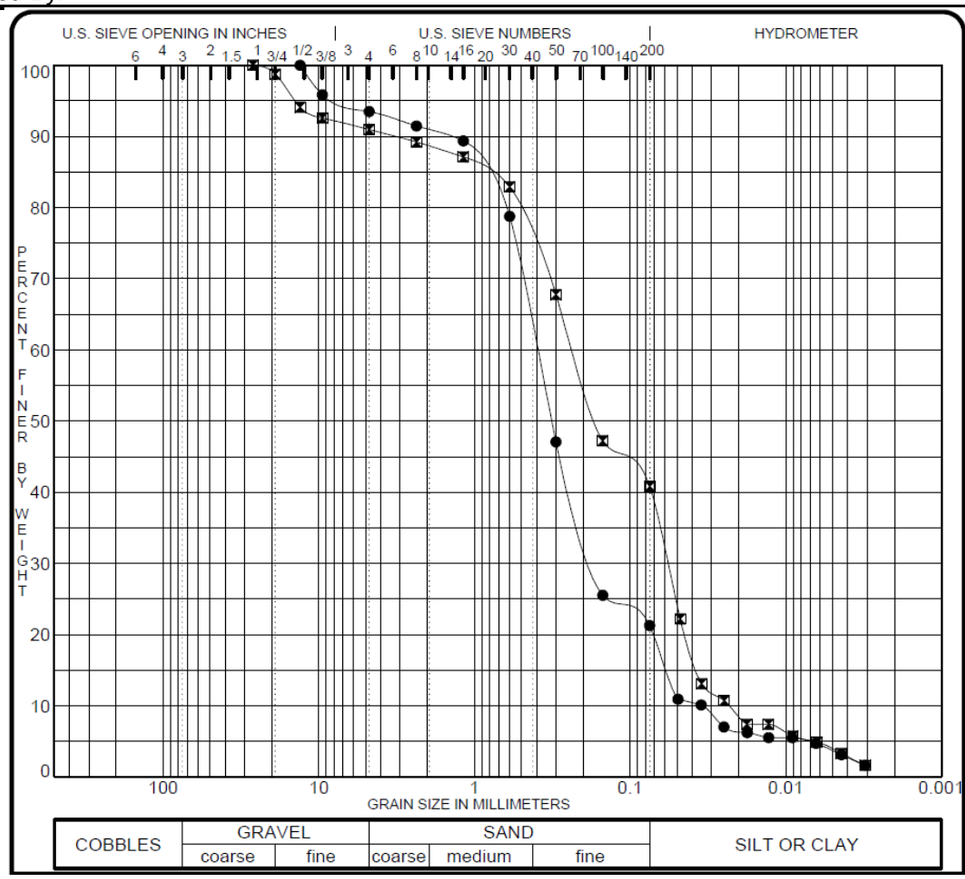
Grainsize Analyses:	**23TP-1 1.42 mbgs**
Company:	TIL
Client:	Man Holdings Ltd.
Project:	5555
Location:	181 Toronto Street South, Uxbridge, ON
Test Well:	23TP-1 1.42 mbgs
Test Date:	10-Jul-23
Test Conducted By:	KN



Legend: ● 23TP-1 1.42 mbgs

Sampled Unit:	#N/A	**Sampled Depth (mbgs):**	1.42 mbgs
% Gravel	6.5	**D100:**	13.2000
% Sand	72.2	**D60**	0.4000
% Silt	17.6	**D30:**	0.1730
% Clay	3.6	**D10:**	0.0346
K (m/s)	1.4E-05	**Temperature (°C):**	10

Grainsize Analyses:	**23TP-2 1.41 mbgs**
Company:	TIL
Client:	Man Holdings Ltd.
Project:	5555
Location:	181 Toronto Street South, Uxbridge, ON
Test Well:	23TP-2 1.41 mbgs
Test Date:	10-Jul-23
Test Conducted By:	KN



Legend: 23TP-2 1.41 mbgs

Sampled Unit:	#N/A	**Sampled Depth (mbgs):**	1.41 mbgs
% Gravel	9.0	**D100:**	26.5000
% Sand	50.1	**D60**	0.2300
% Silt	37.0	**D30:**	0.0580
% Clay	3.9	**D10:**	0.0232
K (m/s)	6.2E-06	**Temperature (°C):**	10

APPENDIX C

Infiltration Test Calculations and Guelph Permeameter Field Data

Guelph Permeameter

Input
Result

Single Head Method (1)

Reservoir Cross-sectional area in cm^2
(enter "35.22" for Combined and "2.16" for Inner reservoir): 35.22
Enter water Head Height ("H" in cm): 5
Enter the Borehole Radius ("a" in cm): 3

Enter the soil texture-structure category (enter one of the below numbers): 3

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macropors, etc

Steady State Rate of Water Level Change ("R" in cm/min): 1.2000

Res Type	35.22		
H	5		
a	3	α^*=	0.12 cm^{-1}
H/a	1.667		
a*	0.12	C =	0.80315
C0.01	0.809	Q =	0.7044
C0.04	0.842		
C0.12	0.803	K_{fs} =	1.28E-03 cm/sec
C0.36	0.803		7.69E-02 cm/min
C	0.803		1.28E-05 m/sec
R	1.200		3.03E-02 inch/min
Q	0.704		5.04E-04 inch/sec
pi	3.142		
		Φ_m =	1.07E-02 cm^2/min

Single Head Method (2)

Reservoir Cross-sectional area in cm^2
(enter "35.22" for Combined and "2.16" for Inner reservoir): 35.22
Enter water Head Height ("H" in cm): 10
Enter the Borehole Radius ("a" in cm): 3

Enter the soil texture-structure category (enter one of the below numbers): 3

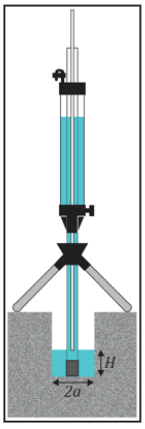
1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macropors, etc

Steady State Rate of Water Level Change ("R" in cm/min): 1.6000

Res Type	35.22		
H	10		
a	3	α^*=	0.12 cm^{-1}
H/a	3.33333		
a*	0.12	C =	1.28754
C0.01	1.21841	Q =	0.9392
C0.04	1.29023		
C0.12	1.28754	K_{fs} =	1.02E-03 cm/sec
C0.36	1.28754		6.11E-02 cm/min
C	1.28754		1.02E-05 m/ses
R	1.600		2.40E-02 inch/min
Q	0.9392		4.01E-04 inch/sec
pi	3.1415		
		Φ_m =	8.48E-03 cm^2/min

Average

K_{fs} =	1.15E-03	cm/sec
	6.90E-02	cm/min
	1.15E-05	m/s
	2.72E-02	inch/min
	4.53E-04	inch/sec
Φ_m =	9.58E-03	cm^2/min



Infiltration Test Calculation at 23TP-1 at 1.42 mbgs

Table 1: Guelph Permeameter Data at 23TP-1 at 1.42 mbgs

5 cm Head			10 cm Head		
Combined Reservoir			Combined Reservoir		
Time (min)	Reading (cm)	Rate (cm/min)	Time (min)	Reading (cm)	Rate (cm/min)
0	0		0	12.9	
1	4.9	4.9	1	20	7.1
2	6.2	1.3	4	22	2
3	7.8	1.5	6	23.8	1.8
4	9.0	1.2	8	25.8	2.0
5	10.2	1.2	9	27.4	1.6
6	11.4	1.2	10	29.5	1.5
7	12.6	1.2	11	31.2	1.7
			12	33.4	2.2
			13	35	1.6
			14	36.6	1.6
			15	38.2	1.6
			16	39.8	1.6

Guelph Permeameter

Input

Result

Single Head Method (1)

Reservoir Cross-sectional area in cm^2 (enter "35.22" for Combined and "2.16" for Inner reservoir): 35.22
Enter water Head Height ("H" in cm): 5
Enter the Borehole Radius ("a" in cm): 3

Enter the soil texture-structure category (enter one of the below numbers): 3

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macropors, etc

Steady State Rate of Water Level Change ("R" in cm/min): 0.3000

Res Type	35.22		
H	5		
a	3	α^* = 0.12	cm^{-1}
H/a	1.667		
a*	0.12	C = 0.80315	
C0.01	0.809	Q = 0.1761	
C0.04	0.842		
C0.12	0.803	K_{fs} = 3.20E-04	cm/sec
C0.36	0.803	1.92E-02	cm/min
C	0.803	3.20E-06	m/sec
R	0.300	7.57E-03	inch/min
Q	0.176	1.26E-04	inch/sec
pi	3.142		
		Φ_m = 2.67E-03	cm^2/min

Single Head Method (2)

Reservoir Cross-sectional area in cm^2 (enter "35.22" for Combined and "2.16" for Inner reservoir): 35.22
Enter water Head Height ("H" in cm): 10
Enter the Borehole Radius ("a" in cm): 3

Enter the soil texture-structure category (enter one of the below numbers): 3

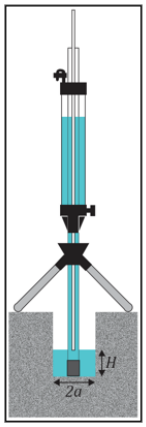
1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macropors, etc

Steady State Rate of Water Level Change ("R" in cm/min): 0.4000

Res Type	35.22		
H	10		
a	3	α^* = 0.12	cm^{-1}
H/a	3.33333		
a*	0.12	C = 1.28754	
C0.01	1.21841	Q = 0.2348	
C0.04	1.29023		
C0.12	1.28754	K_{fs} = 2.54E-04	cm/sec
C0.36	1.28754	1.53E-02	cm/min
C	1.28754	2.54E-06	m/ses
R	0.400	6.01E-03	inch/min
Q	0.2348	1.00E-04	inch/sec
pi	3.1415		
		Φ_m = 2.12E-03	cm^2/min

Average

K_{fs} =	2.87E-04	cm/sec
	1.72E-02	cm/min
	2.87E-06	m/s
	6.79E-03	inch/min
	1.13E-04	inch/sec
Φ_m =	2.39E-03	cm^2/min



Infiltration Test Calculation at 23TP-2 at 1.41 mbgs

Table 2: Guelph Permeameter Data at 23TP-2 at 1.41 mbgs

5 cm Head			10 cm Head		
Combined Reservoir			Combined Reservoir		
Time (min)	Reading (cm)	Rate (cm/min)	Time (min)	Reading (cm)	Rate (cm/min)
0	0		0	3.5	
1	1.7	1.7	1	5.1	4.0
2	1.9	1.15	2	5.8	2.0
3	2.0	1.85	3	6.0	3.0
4	2.5	0.5	4	6.1	3.5
5	3.0	0.5	5	6.6	3.5
6	3.5	0.5	6	8.2	3.5
			7	10.0	1.8
			8	11.0	1.0
			9	12.0	1.0
			10	13.0	1.0