September 16, 2022 Report No. 210189-G1

11861808 CANADA CORPORATION
1060 Salk Road, Unit 1
Pickering, Ontario
L1W 3C5

Attention: Mr. Nadeem Munir

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL SUBDIVISION
1942 WOODVIEW AVENUE, PICKERING, ONTARIO

Prepared for:

11861808 CANADA CORPORATION

CANADA ENGINEERING SERVICES INC.
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TABLE OF CONTENTS

TITLE SHEET

EXECUTIVE SUMMARY. 1

INTRODUCTION. 2

GEOLOGY. 2

SITE DESCRIPTION. 2

GEOTECHNICAL PROCEDURE. 3

SOIL DESCRIPTION. 3

GROUNDWATER. 4

EXCAVATION FOR SEWERS, WATERMAIN AND FOOTINGS. 6

BACKFILLING. 6

FOUNDATIONS. 7

FLOOR SLAB CONSTRUCTION AND DRAINAGE. 7

LATERAL EARTH PRESSURES ON BASEMENT WALLS. 8

PAVEMENT DESIGN. 8

EARTHQUAKE DESIGN FACTORS. 9

GENERAL COMMENTS. 10

APPENDIX A

DRAWING SHOWING SITE & SURROUNDINGS. . . . Drawing No. 1

DRAWING SHOWING BOREHOLE LOCATIONS. . . . Drawing No. 2

BOREHOLE LOGS. . . . . BH Log Nos. 1 to 8

GRAIN SIZE ANALYSIS GRAPHS. . . . . Figure 1

BACKFILLING AND DRAINAGE DETAILS. . . . Drawing Nos. 3 & 4

GEOTECHNICAL TERMS AND SYMBOLS. . . . . Pages 1 & 2

EXECUTIVE SUMMARY

Re: Geotechnical Investigation for Proposed Residential Subdivision at 1942 Woodview Avenue, Pickering, Ontario

We have completed the geotechnical investigation you requested at the above site and our report is enclosed.

Eight boreholes were put down at the site, four to a depth of 5.0 m - Borehole Numbers 1, 3, 5 and 6 and four to a depth of 6.5 m - Borehole Numbers 2, 4, 7 and 8. The soils found in the boreholes consisted of a surficial topsoil layer, followed by several different native soils, consisting of silty sand, sandy silt till, and sand, which were generally in a loose to compact state in the upper 3.0 m.

Water was encountered in these boreholes, while drilling at depths of 4.8 m, 2.1 m, 2.0 m, 2.1 m, 2.3 m, 1.5 m, 2.2 m and 1.5 m in Borehole Numbers 1 to 8 respectively. The site would require de-watering prior to excavation for footings and for basements if these are included in the design. Details of de-watering are fully addressed in our hydrogeological report which is being issued currently with this report.

Once the site is de-watered, footings for slab on grade type construction for the houses can be founded on any of the native soils at a depth of 1.2 m below ground surface. Or if basements are required, the maximum recommended depth to which such houses should be founded is 2.1 m below existing ground surface or not lower than elevation 131.40 m. This is to avoid difficulty with permanently de-watering the site deeper that this depth. At this recommendation elevation, we believe that sump pumps can be used to lower the water table around the houses while discharging the water around a distance of 7.5 m from the rear walls of the houses, without excessive de-watering.

Conventional strip and pad footings for the proposed subdivision for the proposed residential houses with either slab on grade or with one level basement may be placed on the native soils after de-watering. The recommended bearing capacity of 75 kPa (1500 psf) for serviceability limit states (SLS) and 112.5 kPa (2250 psf) for factored ultimate limit states (ULS) anywhere from the surface of the native soils at the site down to a depth of 3.0 m.

Footings using the recommended bearing capacities would have a maximum settlement of 25 mm and a maximum differential settlement of 20 mm.

The Seismic Site Response Classification for this site has been evaluated as Type D.

INTRODUCTION

Canada Engineering Services Inc., was authorized by Mr. Nadeem Munir, owner of the property located at 1942 Woodview Avenue, in Pickering, Ontario to carry out a Geotechnical Investigation.

It was understood that the owner is proposing to construct an access road to the site and to install municipal water and sanitary sewer services for 21 residential houses at the site.

The purpose of this investigation was to:

(a) determine the subsoil and water table conditions by placing eight boreholes at selected locations representing the site. Four of the eight boreholes were converted into monitoring wells.

(b) provide recommendations for the design of building foundations, floor slab design, pavements and driveways, shoring, excavation, de-watering, bedding and backfilling.

© make recommendations for allowable soil bearing pressures and lateral earth pressures for the proposed residential houses with one level basement and make recommendations for road construction, pavement design and floor slab design.

GEOLOGY

The surficial geology at the site, as published by Ontario Geological Survey, consists of : Halton Till of Pleistocene age consisting of predominantly silt to silty clay matrix, high in matrix carbonate content and clast poor.

SITE DESCRIPTION

The site is located at 1492 Woodview Avenue, Pickering, Ontario, in a rural residential area. It is bounded by Woodview Avenue on the east side, residential lots on the north side and vacant forested lands on the west and south sides, and other scattered residential houses to the east side. Further north beyond the residential lots is a new residential subdivision under construction. The site and surrounding areas are shown on Drawing Number 1.

The subject property is generally, relatively flat, with a gentle slope towards south. The site comprises an area of 4.9 acres.

GEOTECHNICAL PROCEDURE

The field work for the boreholes was carried out with a track-mounted drill rig with solid stem augers on October 14 and 18, 2021. The investigation was supervised by an engineer from Canada Engineering Services Inc.

Eight boreholes were put down at the site to a depth of 5.0 m, 6.6 m, 5.0 m, 6.6 m, 5.0 m, 5.0 m, 6.6 m and 6.6 m in Borehole Numbers 1 to 8 respectively.

From the boreholes, soil samples were taken at 500 mm intervals between ground surface and a depth of 3.0 m and thereafter at 1.5 m intervals to the termination of the boreholes. The samples were taken by means of a split-spoon sampler, in accordance with the requirements of the Standard Penetration Test, (CSA test specifications. A119.1).

Where practical, field penetrometer readings were taken on the samples from the boreholes to estimate the different bearing values of the soils encountered. The approximate bearing pressure values of these are recorded on the borehole logs in the soils description columns, in kPa.

All the samples taken were brought back to our laboratory where moisture content tests, grain size analyses and further visual observations were carried out. Our field and laboratory findings are plotted on the Borehole Log Numbers 1 to 8.

The locations of the boreholes were established by staff from Canada Engineering Services Inc., and are shown on Drawing Number 2. The ground surface elevations of the boreholes were referenced to the elevations of the topographic plan, by Vladimir Dosen Surveying, dated May 1, 2015. The drawings showing the site and surrounding, the borehole locations, the borehole logs, the grain size analysis graphs, the recommended method of de-watering and geotechnical terms and symbols used in this report are shown in Appendix “A”.

SOILS DESCRIPTION

Topsoil

A layer of topsoil was encountered at the surface of all the boreholes. This layer consisted of a dark grey to black silty sand, some organics. It was moist and in a loose state and varied in thickness from 150 mm to 750 mm thick.

Silty Sand

Below the topsoil layer in all the boreholes was a layer of sandy silt fill with trace clay and gravel. This layer was grey in colour, was moist and in a compact state. It extended down to depths of 2.4 m, 2.6 m, 0.9 m, 3.0 m, 2.3 m, 2.4 m, 4.5 m and 2.1 m in Borehole Numbers 1, 2, 3, 4, 5, 6, 7 and 8 respectively.

Sandy Silt Till

Below the silty sand layer was a layer of native sandy silt till, trace gravel in all boreholes except in Borehole Number 3. Occasional sand seams were found in this layer in Borehole Numbers 1, 2 and 7. This layer was grey in colour, was wet and in a loose to dense state. It extended down to depths of 5.0 m, 4.5 m, 4.2 m, 4.4 m, 5.0 m, 6.5 m and 4.2 m in Borehole Numbers 1, 2, 4, 5, 6, 7 and 8 respectively. Borehole Numbers 1, 6 and 7 were terminated in this layer.

Sand

A layer of grey sand was found at the bottom of boreholes, immediately below the sandy silt till layer in Borehole Numbers 2, 4 , 5 and 8, and below the silty sand layer in Borehole Number 3. This layer was wet and in a loose to dense state.

Detailed borehole logs are shown on Borehole Log Numbers 1 to 8, while their locations are shown on Drawing Number 2.

GROUNDWATER

Groundwater was encountered in all the boreholes upon completion at depths of 4.8 m, 2.1 m, 2.0 m, 2.1 m, 2.3 m, 1.5 m, 2.2 m and 1.5 m in Borehole Numbers 1 to 8 respectively. Four monitoring wells were installed in Borehole Numbers 2, 4, 7 and 8 and water level readings were taken on February 01, 2022, August 8, August 23, 2022. Water level readings obtained from the monitoring wells are illustrated in Table 1 below:

Table Number 1

Borehole ID	Date of reading	Depth of Water Level (m)	Elevation of Water Level Reading (masl)	Remarks
BH 2	Oct. 14, 2021	2.1	132.4	Upon Completion

BH 4	Oct. 18, 2021	2.1	131.3	Upon Completion
BH 7	Oct. 14, 2021	2.2	131.7	Upon Completion
BH 8	Oct. 18, 2021	1.5	131.35	Upon Completion
BH 2	February 1, 2022	1.89	132.61	**Highest Water Level**
BH 4	February 1, 2022	1.2	132.2	
BH 7	February 1, 2022	1.78	132.12	
BH 8	February 1, 2022	0.98	131.87	
BH 2	August 8, 2022	2.79	131.71	
BH 4	August 8, 2022	1.67	131.73	High Water Level
BH 7	August 8, 2022	2.38	131.52	
BH 8	August 8, 2022	1.6	131.25	
BH 2	August 23, 2022	2.89	131.61	
BH 4	August 23, 2022	1.78	131.62	High Water Level
BH 7	August 23, 2022	2.51	131.39	
BH 8	August 23, 2022	1.69	131.16	

Highest water level was found at a depth of 1.89 m (or elevation 132.61 m) in Borehole Number 2.

Water is expected to be a major concern at this site and temporary de-watering will be required at the site using well points for either slab on grade type construction if the house construction includes basements. Permanent de-watering will only be required if basement construction are used. In either case, four-inch diameter underfloor weeping tiles, placed on a grid at 3 m spacing, running in two directions at right angles to each other will be required.

These should be drained to sump pits with sump pumps which can be designed to discharge at the rear of the proposed houses at a minimum distance of 7.5 m away. The weeping tiles should be placed on a 150 mm thick clear stone layer placed directly below the concrete slab on grade or below the basement concrete floor.

In the case of basement floors, they should be designed to be water tight with a double layer of 6 mil polyethylene placed on the clear stone immediately below the concrete floor slab. More details of de-watering are provided in our hydrogeological report, which was prepared concurrently with this geotechnical report.

EXCAVATION FOR SEWERS AND WATERMAINS AND FOOTINGS

Sewers are expected to be installed around 2.0 m to 4.0 m below the final ground surface level, while footings are expected to be at a maximum depth of 2.1 below the existing ground surface, if basements are used. De-watering will also be required for the installation of sewers and watermain. These should be designed to be as high as possible to minimise de-watering for the installation of sewers. It is expected that if basements are used the soils from the excavations for basement will be used to raise the surrounding grades, thereby allowing the basements to be less deep and reducing de-watering from sump pumps below basement floors.

It is expected that all the excavations for the sewers and footings will be primarily within the silty sand and sandy silt till strata below the existing groundwater table. Most likely de-watering will be required and a well point system seems the most likely option. An experienced de-watering contractor should be hired to design and install the de-watering system.

For the excavations for sewers and watermains, the walls of the excavations should be sloped at 45 degrees to the horizontal with no vertical 1.2 m section as is traditionally used. Where the soil is found to be very loose, the angle of repose may have to be increased. The temporary slopes of the excavation should conform to the Occupational Health and Safety Act (OHSA) and all local regulations.

BACKFILLING

The existing native soils can be used to backfill the footings, watermain and sewers. A sand backfill should be used at the bottom and around all pipes to avoid puncturing.

For backfilling around manholes, catch basins and confined spaces, a granular material should be used. If additional fill is required, then it is recommended that an imported fill such as granular "B" be used for backfilling, though the course sand found on site may also be suitable.

Note that the course sand found below the sandy silt till meets OPSS gradation requirements for granular "B" and maybe used as granular "B" subject to additional testing and confirmation of its gradation from a more wide sampling program.

The fill should be compacted in maximum lift thicknesses of 200 mm, with a heavy vibratory compactor to 98% of the standard proctor maximum dry density. The fill operations should be monitored by a geotechnical engineer/technician to ensure that all areas are adequately compacted.

FOUNDATIONS

Conventional strip footings at this site, for the proposed residential houses with slab on grade type construction or with one level basement may be placed on the loose to compact silty sand or sandy silt till layer. The bearing capacity available is 75 kPa (1500 psf) for serviceability limit states (SLS) and 112.5 kPa (2250 psf) for factored ultimate limit states (ULS) anywhere within a depth of 1.2 m to 3.0 m.

The above bearing capacities assume that de-watering will be carried out to at least a depth of 500 mm below the base of footings and all excavations.

All footings on fill must be inspected by Canada Engineering Services Inc., staff to verify the recommended bearing pressures in this report.

Footings which are to be constructed next to each other at different elevations should be located far enough away, such that the slope from the bases of the adjacent sides of the footings is at least 10 horizontal to 7 vertical.

All footings exposed to frost action should be covered with at least 1.2 m of earth cover or an equivalent value of insulation. For slab on grade construction, the exterior footings or any footing exposed to frost action should be insulated with a four-inch thick sheet of insulation placed vertically against the outside of the footings and to a minimum depth of 1.2 m. Footing Design should be reviewed by our office before finalizing their design.

The total and differential settlements from footings designed as per our recommendations above are expected to be less than 25 mm and 20 mm respectively.

FLOOR SLAB CONSTRUCTION AND DRAINAGE

The floor slabs of the proposed townhouses may be constructed as slab on grade providing all deleterious material such as topsoil and organics are removed and any soft areas replaced with an approved fill, compacted to 98% of the standard proctor maximum dry density (SPMDD).

A 150 mm thick layer of clear stone should be used immediately below the floor slab to serve as a moisture barrier. For houses with basement, underfloor weeping tiles will be required and these should be placed on 3.0 m grid running in two directions at right angles to each other. A perimeter

weeping tile wrapped in filter cloth and surrounded top and sides with pea gravel should be used around the proposed buildings. See Appendix A for our recommended drainage and backfilling system for houses with basements.

LATERAL EARTH PRESSURES ON BASEMENT WALLS

If basements are used, the basement walls should be designed for an earth pressure P, as given by:

$$P = 0.65\ Ka\ (\gamma H + q)$$

where P = Earth pressure at depth H
Ka= Coefficient of active earth pressure
γ = Unit weight of the soil behind the wall
H = depth of excavation
q = any surcharge load

The above expression assumes that free draining conditions exist behind the wall. This expression is for sandy soils. For this site the following values may be used:

	FILL	NATIVE UNDISTURBED SOIL
Soil weight above water table (kN/cu. m)	18.5	20.0
Coefficient of active earth pressure (Ka)	0.33	0.3
Coefficient of passive earth pressure (Kp)	3.0	3.3
Coefficient of at rest earth pressure (Ko)	0.50	0.4

All temporary excavations should conform with the Ontario Occupational Health and Safety Act.

PAVEMENT DESIGN

The subgrade for pavement construction along trenched areas at this site is expected to be primarily compacted reworked silty sand and the sandy silt till on-site materials.

The following pavement structure thicknesses are recommended:

Minimum Pavement Design Thickness		
Pavement Layer	**Parking Lots**	**Main Road**
Asphaltic Concrete	40 mm HL 3 50 mm HL 8 (OPSS Form 310)	40 mm HL3 65 mm HL8 (OPSS Form 310)
Granular "A" Base	150 mm	150 mm
Granular "B" Subbase	150 mm	300 mm

The above pavement thickness assumes adequate positive drainage of the subbase, that dry condition prevails during the construction phase. The granular subbase thickness may require adjustment depending upon the subgrade soil condition, weather conditions during construction and the use by heavy construction traffic. If wet weather conditions and heaving and rolling of the subgrade occur, the subbase thicknesses may have to be increased substantially to obtain a stable pavement.

The upper 600 mm of the subgrade should be compacted to at least 98% SPMDD and below the compaction should be to 95% of the SPMDD. The granular subbase and base materials should be compacted to at least 100% SPMDD. Asphaltic concrete should be compacted to 92% of their Maximum Relative Densities.

It is essential that the subgrade be properly crowned and graded to avoid ponding of water along its lengths and sides. In preparing the final subgrade levels, it should be fine graded free from depressions, and made to drain towards catch basins. All runoff water from the asphalt surface should also be channelled away from the edges of the pavements to catch basins.

EARTHQUAKE DESIGN FACTORS

According to the Ontario Building Code (2012), The Seismic Site Response Classification for strip and pad foundations at this site has been evaluated as Type D.

GENERAL COMMENTS

It is possible that the soil and water conditions between boreholes are quite different from those found at the borehole locations. Any interpretation of data for areas between boreholes should be viewed with this in mind. The accuracy of our report is limited to the findings at specific borehole locations.

The inspections and reviews of data described above were carried out based on the terms of reference as outlined earlier in this report. It was prepared specifically for the use of 11861808 CANADA CORPORATION or Orient Builders and their consultants. Contractors bidding on the site services should carry out their own investigations to determine how the soil conditions at this site will affect their performance.

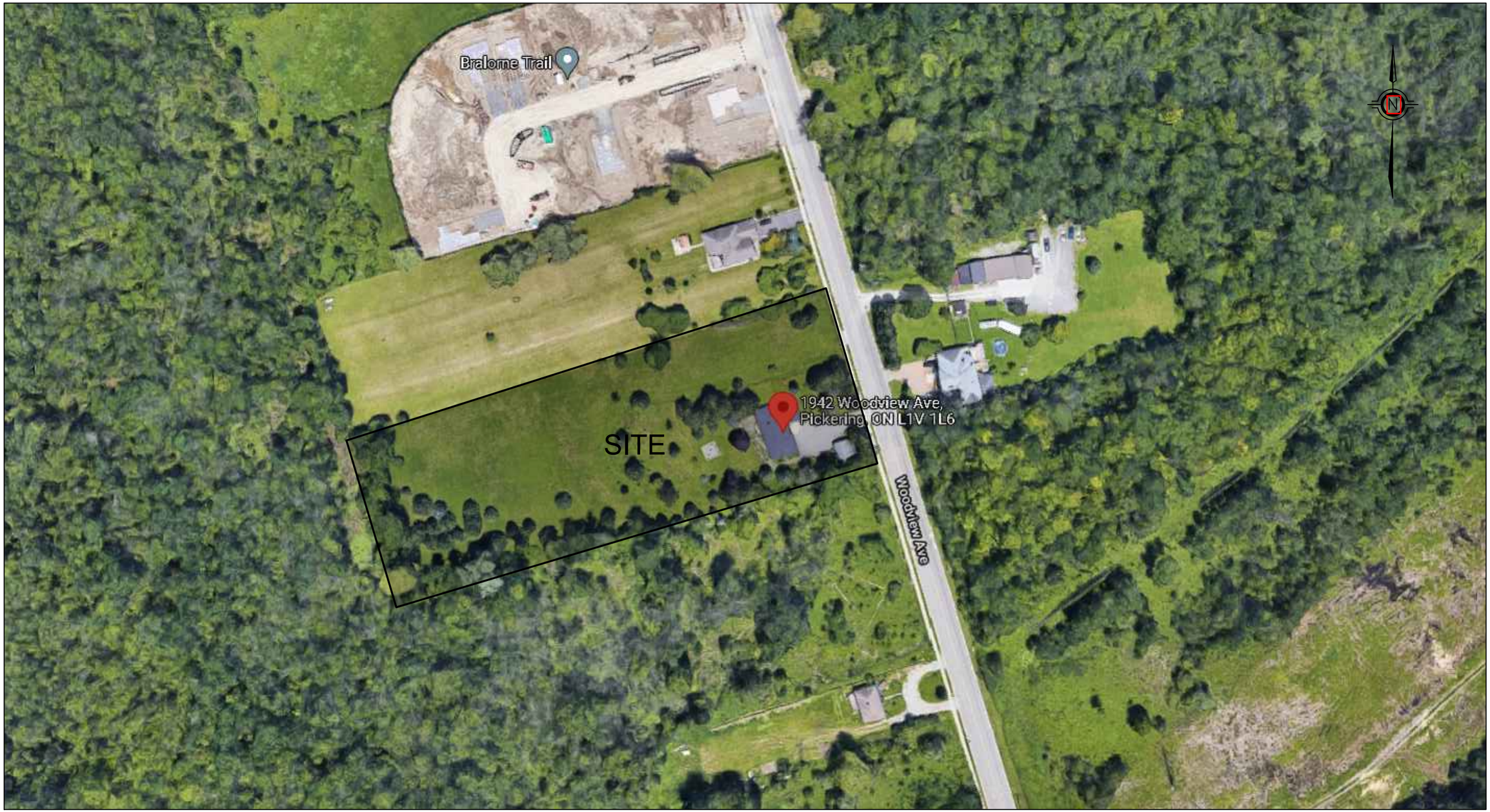
This report was prepared from limited data of the proposed subdivision design. Should there be any design or construction changes that would require a review of the geotechnical analyses or any questions regarding the geotechnical aspects of any codes or standards, then this office should be consulted. This may necessitate a supplementary investigation and report for our recommendations to be reliable.

Sincerely,
CANADA ENGINEERING SERVICES INC.

Mahesh Khanal, MSc.
Geotechnical Project Manager

Ram Jagdat. P. Eng.
Consulting Engineer
Principal

APPENDIX A



CLIENT: 11861808 CANADA CORP 1400 BAYLY STREET PICKERING, ON L1W 3R2	PROJECT: GEOTECHNICAL INVESTIGATION 1942 WOODVIEW AVENUE PICKERING, ON L1V 1L6	TITLE: KEY PLAN SHOWING SITE AND SURROUND AREA	SCALE: AS SHOWN DRAWING NO: 1	DATE: SEP 16/22 PROJECT No: 210189

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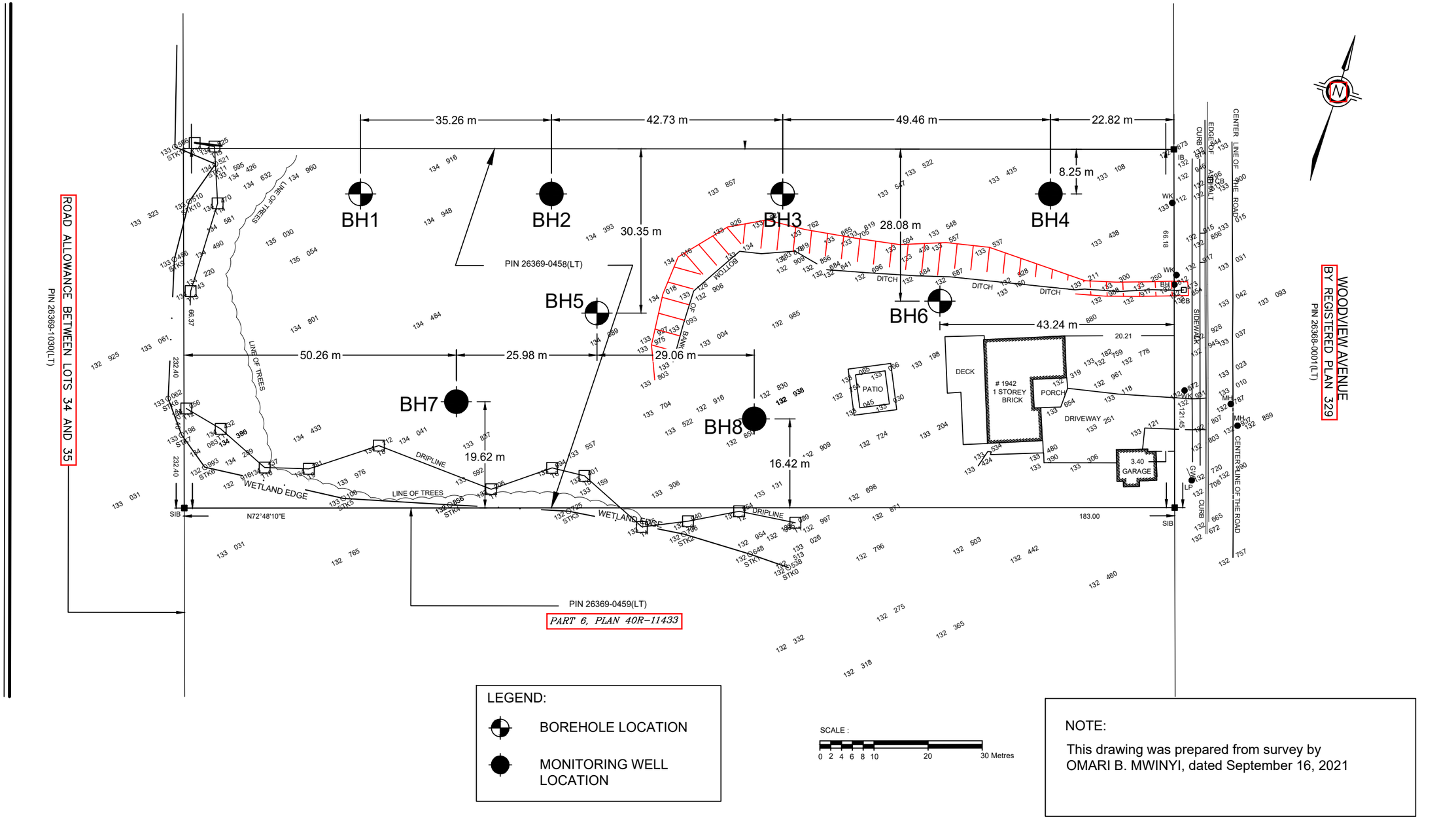


LEGEND:

- BOREHOLE LOCATION
- MONITORING WELL LOCATION

SCALE : 0 2 4 6 8 10 20 30 Metres

NOTE:

This drawing was prepared from survey by OMARI B. MWINYI, dated September 16, 2021

CLIENT: 11861808 CANADA CORP 1400 BAYLY STREET PICKERING, ON L1W 3R2	PROJECT: GEOTECHNICAL INVESTIGATION 1942 WOODVIEW AVENUE PICKERING, ON L1V 1L6	TITLE: SITE PLAN SHOWING BOREHOLE LOCATIONS	SCALE: AS SHOWN DATE: SEP 16/22 DRAWING NO: 2 PROJECT No: 210189

CANADA ENGINEERING SERVICES INC.
39 DAVISBROOK BOULEVARD
SCARBOROUGH, ONTARIO M1T 2H6
Ph: 416 492 4000 Fax: 416 492 4001
E-mail address: cesi@cesi.ca

Project No: 210189

Log of Borehole No. 1

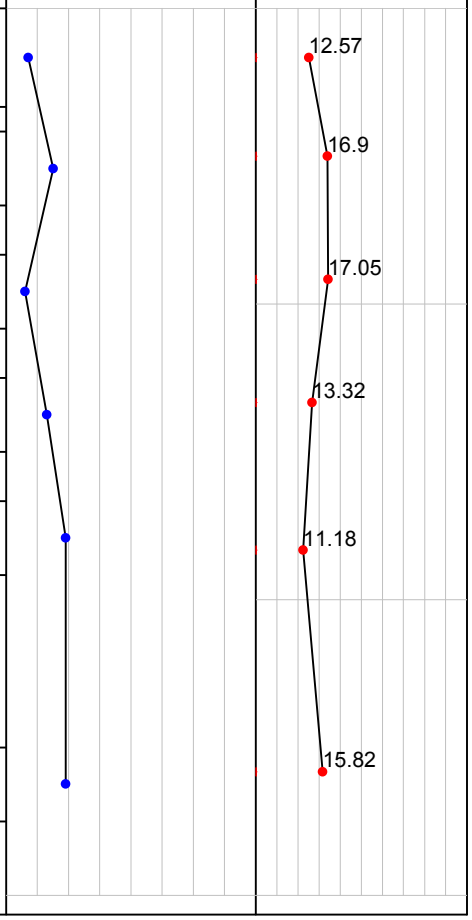
Project: Proposed Residential Development

Client: 11861808 Canada Corp.

Engineer: AG

Location: 1942 Woodview Avenue, Pickering, Ontario

Depth (ft / m)	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY
0 / 0	Ground Surface	134.95				
0–2 / 0–0.6	**TOP SOIL** Dark grey sandy silt, some organics, moist, loose	134.19	1	SS	7	100
3–7 / 1–2	**SILTY SAND** Brown silty fine sand,moist, loose to compact	132.51	2	SS	15	100
			3	SS	6	100
8–16 / 2.5–5	**SANDY SILT TILL** Grey sandy silt till,cohesive, wet, compact Occasional sand seams in between Pocket penetrometer reading at 3.5 m = 450 kPa Pocket penetrometer reading at 4.5 m = 200 kPa	129.92	4	SS	13	100
			5	SS	19	100
			6	SS	19	100
17 / 5.2	**END OF BOREHOLE** Borehole open up to 5.1 m upon completion Water level upon completion = 4.8 m					



Drill Method: Track mounted drill rig

Drill Date: 14 Oct 2021

Hole Size: 150 mm diameter

Canada Engineering Services Inc.
39 Davisbrook Blvd.
Scarborough, Ontario
M1T 2H6

Checked By: RJ

Datum: Geodetic elevation of boreholes obtained from survey map by Omari B. Mwinyi, dated Sept 22, 2021

Project No: 210189

Log of Borehole No. 2

Project: Proposed Residential Development

Client: 11861808 Canada Corp.

Technologist: AG

Location: 1942 Woodview Avenue, Pickering, Ontario

Depth (ft / m)	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	WELL	Standard Penetration Test (10 20 30 40 50)	Moisture Content % (10 20 30 40 50)
0 / 0	Ground Surface	134.50							
1 /	**TOP SOIL** Dark grey sandy silt, some organics, moist, loose	134.04	1	SS	6	100	SEAL		8.76
2 /	**SILTY SAND** Brown to mottled silty sand with organics, moist, loose to compact								
3 / 1			2	SS	8	100	BACKFILL		19.82
4 /									
5 /			3	SS	5	100			25.39
6 / 2	Water encountered at 2.1 m Pocket penetrometer reading at 2.2 m = 350 kPa								
7 /									
8 /		131.91	4	SS	22	100	SEAL		8
9 /	**SANDY SILT TILL** Grey sandy silt till,cohesive, wet, dense Occasional sand seams in between								
10 / 3			5	SS	42	100			8.67
11 /	Pocket penetrometer reading at 3.5 m = 450 kPa								
12 /									
13 / 4									
14 /									
15 /		129.93							
16 /	**SAND** Grey sand, some gravel, trace silt, wet, dense to compact		6	SS	44	100	SAND FILLING		11.36
17 / 5									
18 /									
19 /									
20 / 6									
21 /		127.95	7	SS	18	100			7.78
22 /	**END OF BOREHOLE** Borehole open up to 4.5 m upon completion Water level upon completion = 2.1 m								
23 / 7									
24 /									
25 /									

Drill Method: Track mounted drill rig

Drill Date: 14 Oct 2021

Hole Size: 150 mm diameter

Canada Engineering Services Inc.
39 Davisbrook Blvd.
Scarborough, Ontario
M1T 2H6

Checked By: RJ

Datum: Geodetic elevation of boreholes obtained from survey map by Omari B. Mwinyi, dated Sept 22, 2021

Project No: 210189

Log of Borehole No. 3

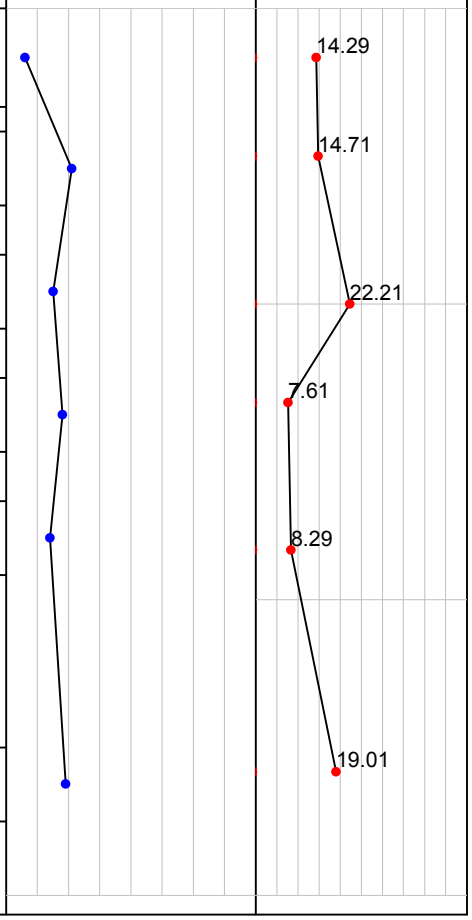
Project: Proposed Residential Development

Client: 11861808 Canada Corp.

Engineer: AG

Location: 1942 Woodview Avenue, Pickering, Ontario

Depth (ft / m)	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY
0 / 0		Ground Surface	133.82				
0		TOP SOIL Grey sandy silt, some organics, moist, loose	133.67	1	SS	6	100
2		SILTY SAND Brown silty sand, trace gravel, moist, compact	132.91	2	SS	21	100
3 / 1		SAND Coarse sand, some gravel, trace silt, moist to wet, compact		3	SS	15	100
6 / 2		Water encountered at 2.0 m		4	SS	18	100
10 / 3				5	SS	14	100
13 / 4				6	SS	19	100
16 / 5			128.79				
17		END OF BOREHOLE Borehole open upon completion Water level upon completion = 2.0 m					



Drill Method: Track mounted drill rig

Drill Date: 18 Oct 2021

Hole Size: 150 mm diameter

Canada Engineering Services Inc.
39 Davisbrook Blvd.
Scarborough, Ontario
M1T 2H6

Checked By: RJ

Datum: Geodetic elevation of boreholes obtained from survey map by Omari B. Mwinyi, dated Sept 22, 2021

Project No: 210189

Log of Borehole No. 4

Project: Proposed Residential Development

Client: 11861808 Canada Corp.

Technologist: AG

Location: 1942 Woodview Avenue, Pickering, Ontario

Depth (ft / m)	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY
0 / 0	Ground Surface	133.40				
0 – 3	**TOP SOIL** Grey silty sand, some organics, moist, loose		1	SS	9	100
1 – 3	**SILTY SAND** Grey silty sand, moist to wet, compact to loose		2	SS	12	100
2 – 6	Water encountered at 2.1 m		3	SS	8	100
3 – 8			4	SS	7	100
3 – 10		130.35				
3 – 11	**SANDY SILT TILL** Grey sandy silt, trace gravel, wet, compact		5	SS	27	100
4 – 13		129.13				
4 – 14	**SAND** Sand, some gravel, trace silt, wet, compact		6	SS	25	100
6 – 20			7	SS	17	100
6 – 21		126.85				
7 – 22	**END OF BOREHOLE** Borehole open upon completion Water level upon completion = 2.1 m					

WELL: SEAL; BACKFILL; SEAL; SAND FILLING

Standard Penetration Test (10 20 30 40 50)

Moisture Content (% — 10 20 30 40 50): 20.7; 1.89; 12.71; 10; 12.05; 12.96; 17.94

Drill Method: Track mounted drill rig

Drill Date: 18 Oct 2021

Hole Size: 150 mm diameter

Canada Engineering Services Inc.
39 Davisbrook Blvd.
Scarborough, Ontario
M1T 2H6

Checked By: RJ

Datum: Geodetic elevation of boreholes obtained from survey map by Omari B. Mwinyi, dated Sept 22, 2021

Project No: 210189

Log of Borehole No. 5

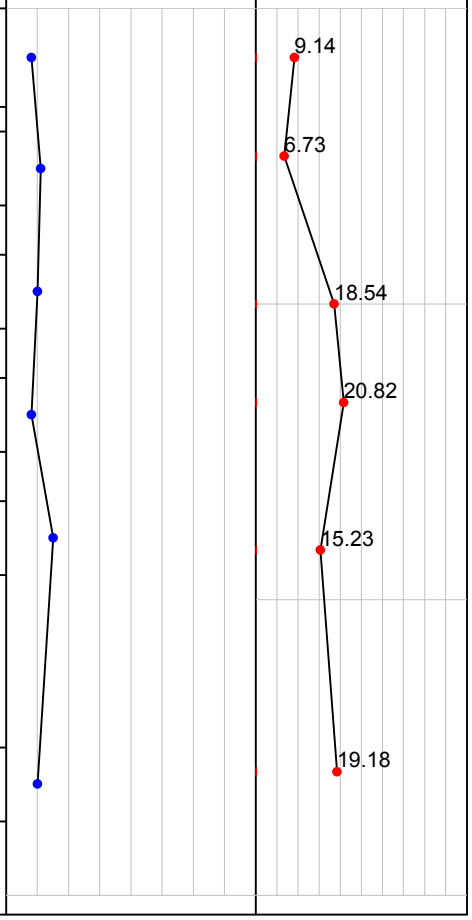
Project: Proposed Residential Development

Client: 11861808 Canada Corp.

Engineer: AG

Location: 1942 Woodview Avenue, Pickering, Ontario

Depth (ft)	Depth (m)	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY
0	0		Ground Surface	134.08				
0	0		TOP SOIL Grey silty sand with trace gravel, some organics, moist, loose	133.93	1	SS	8	100
2			SILTY SAND Grey silty sand, moist to wet, loose Water encountered at 2.3 m		2	SS	11	100
6	2				3	SS	10	100
7				131.79				
8			SANDY SILT TILL Grey sandy silt till, wet, loose		4	SS	8	100
10	3				5	SS	15	100
14				129.66				
15			SAND Grey sand, some gravel, trace silt, wet, loose to compact		6	SS	10	100
16	5			129.05				
17			END OF BOREHOLE Borehole open upon completion Water level upon completion = 2.3 m					
18								



Drill Method: Track mounted drill rig

Drill Date: 18 Oct 2021

Hole Size: 150 mm diameter

Canada Engineering Services Inc.
39 Davisbrook Blvd.
Scarborough, Ontario
M1T 2H6

Checked By: RJ

Datum: Geodetic elevation of boreholes obtained from survey map by Omari B. Mwinyi, dated Sept 22, 2021

Project No: 210189

Log of Borehole No. 6

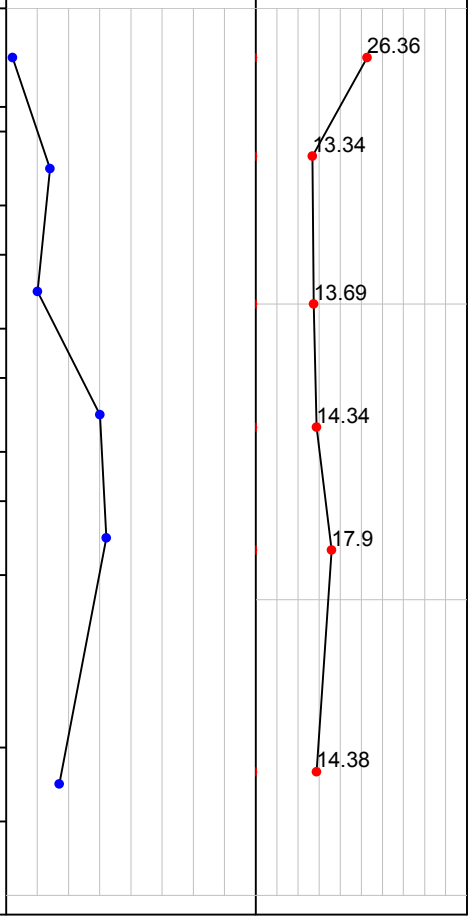
Project: Proposed Residential Development

Client: 11861808 Canada Corp.

Engineer: AG

Location: 1942 Woodview Avenue, Pickering, Ontario

Depth (ft)	Depth (m)	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY
0	0	Ground Surface	132.68				
0–2	0–0.6	**TOP SOIL** Grey black silty sand, loose, moist	131.92	1	SS	2	100
3–8	1–2	**SILTY SAND** Brown to grey silty sand, loose, moist Stone encountered at 0.9 m Pocket penetrometer reading at 2.1 m = 200kPa Water encountered at 2.4 m	130.24	2	SS	14	100
				3	SS	10	100
8–16	2–5	**SANDY SILT TILL** Grey sandy silt till, some gravel, non-cohesive, wet, compact	127.65	4	SS	30	100
				5	SS	32	100
				6	SS	17	100
17–18	5–6	**END OF BOREHOLE** Borehole open upon completion Water level upon completion = 1.5 m					



Drill Method: Track mounted drill rig

Drill Date: 14 Oct 2021

Hole Size: 150 mm diameter

Canada Engineering Services Inc.
39 Davisbrook Blvd.
Scarborough, Ontario
M1T 2H6

Checked By: RJ

Datum: Geodetic elevation of boreholes obtained from survey map by Omari B. Mwinyi, dated Sept 22, 2021

Project No: 210189

Log of Borehole No. 7

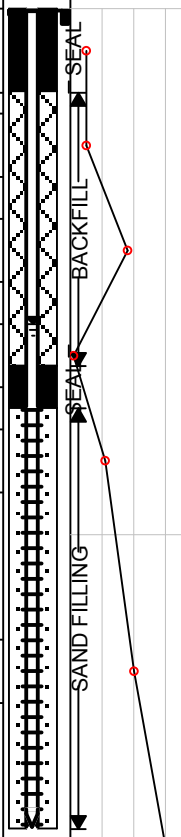
Project: Proposed Residential Development

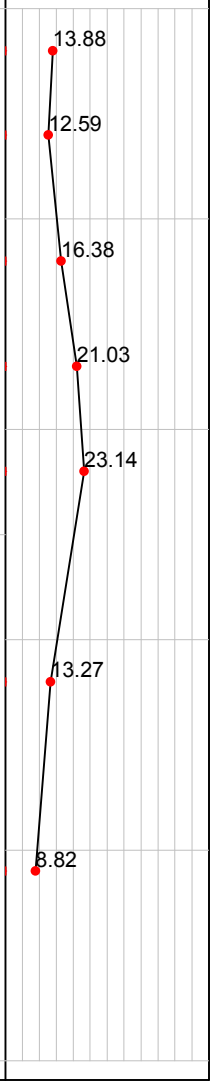
Client: 11861808 Canada Corp.

Technologist:

Location: 1942 Woodview Avenue, Pickering, Ontario

Depth (ft / m)	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY
0 / 0	Ground Surface	133.90				
0–2 / 0	**TOP SOIL** Dark grey silty sand, trace gravel, some organics, moist, loose	133.14	1	SS	5	100
2–15 / 1–4	**SILTY SAND** Grey silty sand,non-cohesive, moist to wet, loose to compact Water encountered at 2.2 m Occasional sand seams in between	129.33	2 3 4 5	SS SS SS SS	5 18 1 11	100 100 100 100
15–21 / 5–6	**SANDY SILT TILL** Grey sandy silt till, cohesive, compact, wet Occasional sand seams in between	127.35	6 7	SS SS	20 32	100 100
21–25 / 6–7	**END OF BOREHOLE** Borehole open up to 5.9 m upon completion Water level upon completion = 2.2 m					





Drill Method: Track mounted drill rig

Drill Date: 14 Oct 2021

Hole Size: 150 mm diameter

Canada Engineering Services Inc.
39 Davisbrook Blvd.
Scarborough, Ontario
M1T 2H6

Checked By: RJ

Datum: Geodetic elevation of boreholes obtained from survey map by Omari B. Mwinyi, dated Sept 22, 2021

Project No: 210189

Log of Borehole No. 8

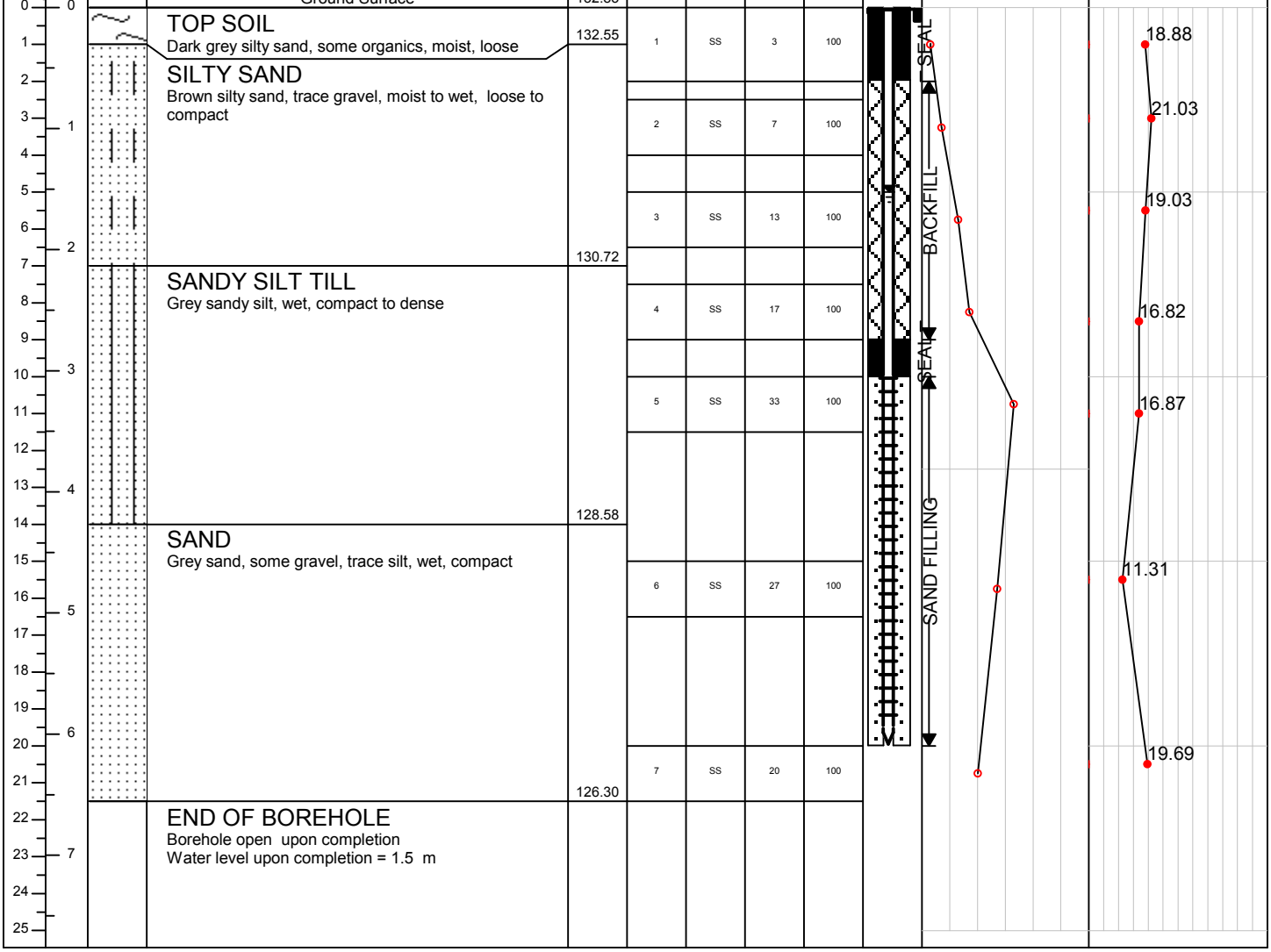
Project: Proposed Residential Development

Client: 11861808 Canada Corp.

Technologist: AG

Location: 1942 Woodview Avenue, Pickering, Ontario

Depth (ft / m)	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	WELL
0 / 0	Ground Surface	132.85					
0–3 / 0–1	**TOP SOIL** Dark grey silty sand, some organics, moist, loose	132.55	1	SS	3	100	SEAL
2–7 / 1–2	**SILTY SAND** Brown silty sand, trace gravel, moist to wet, loose to compact	130.72	2 3	SS SS	7 13	100 100	BACKFILL
7–13 / 2–4	**SANDY SILT TILL** Grey sandy silt, wet, compact to dense	128.58	4 5	SS SS	17 33	100 100	SEAL
13–20 / 4–6	**SAND** Grey sand, some gravel, trace silt, wet, compact	126.30	6 7	SS SS	27 20	100 100	SAND FILLING
20–23 / 6–7	**END OF BOREHOLE** Borehole open upon completion Water level upon completion = 1.5 m						



Drill Method: Track mounted drill rig

Drill Date: 18 Oct 2021

Hole Size: 150 mm diameter

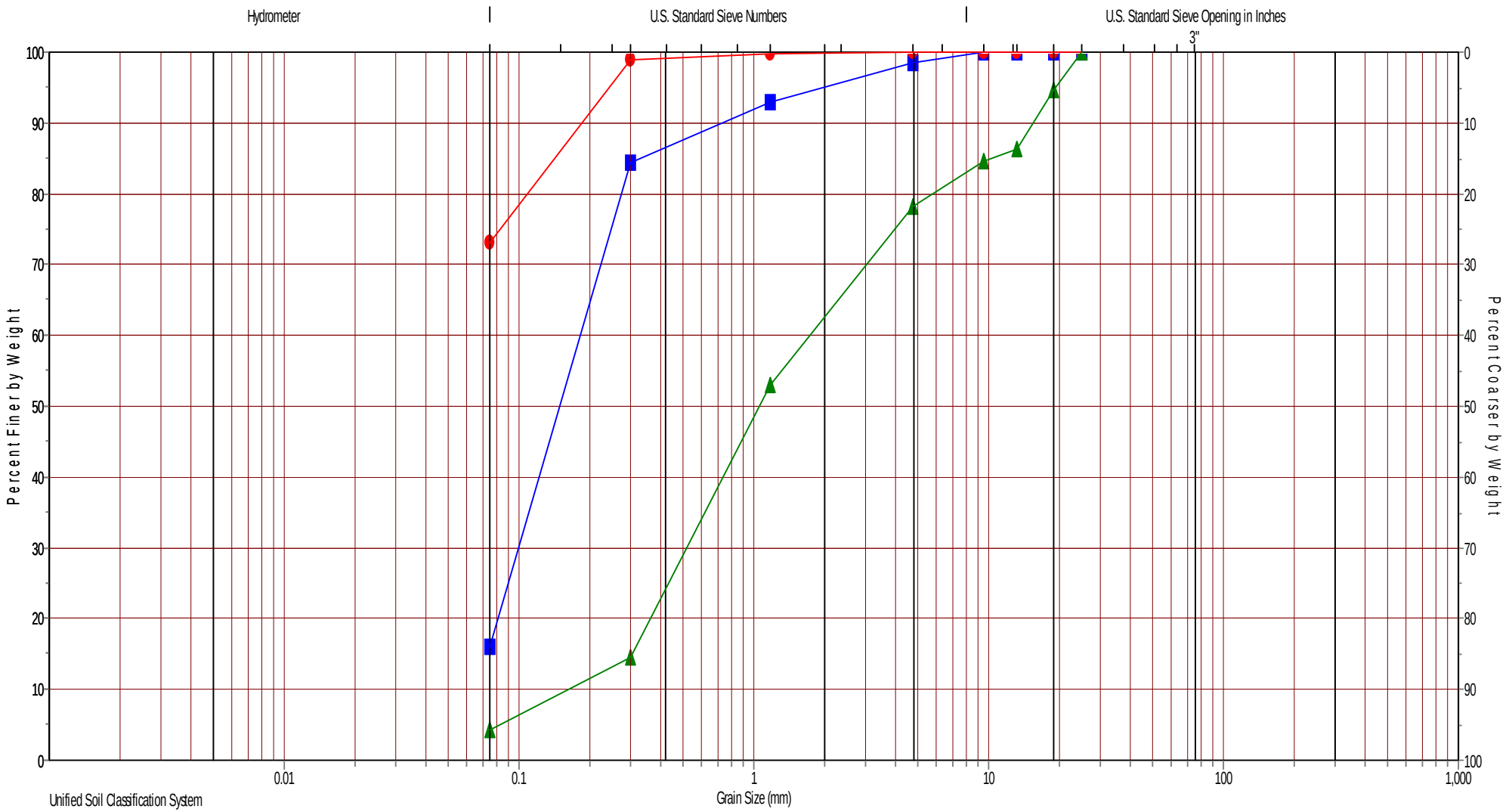
Canada Engineering Services Inc.
39 Davisbrook Blvd.
Scarborough, Ontario
M1T 2H6

Checked By: RJ

Datum: Geodetic elevation of boreholes obtained from survey map by Omari B. Mwinyi, dated Sept 22, 2021

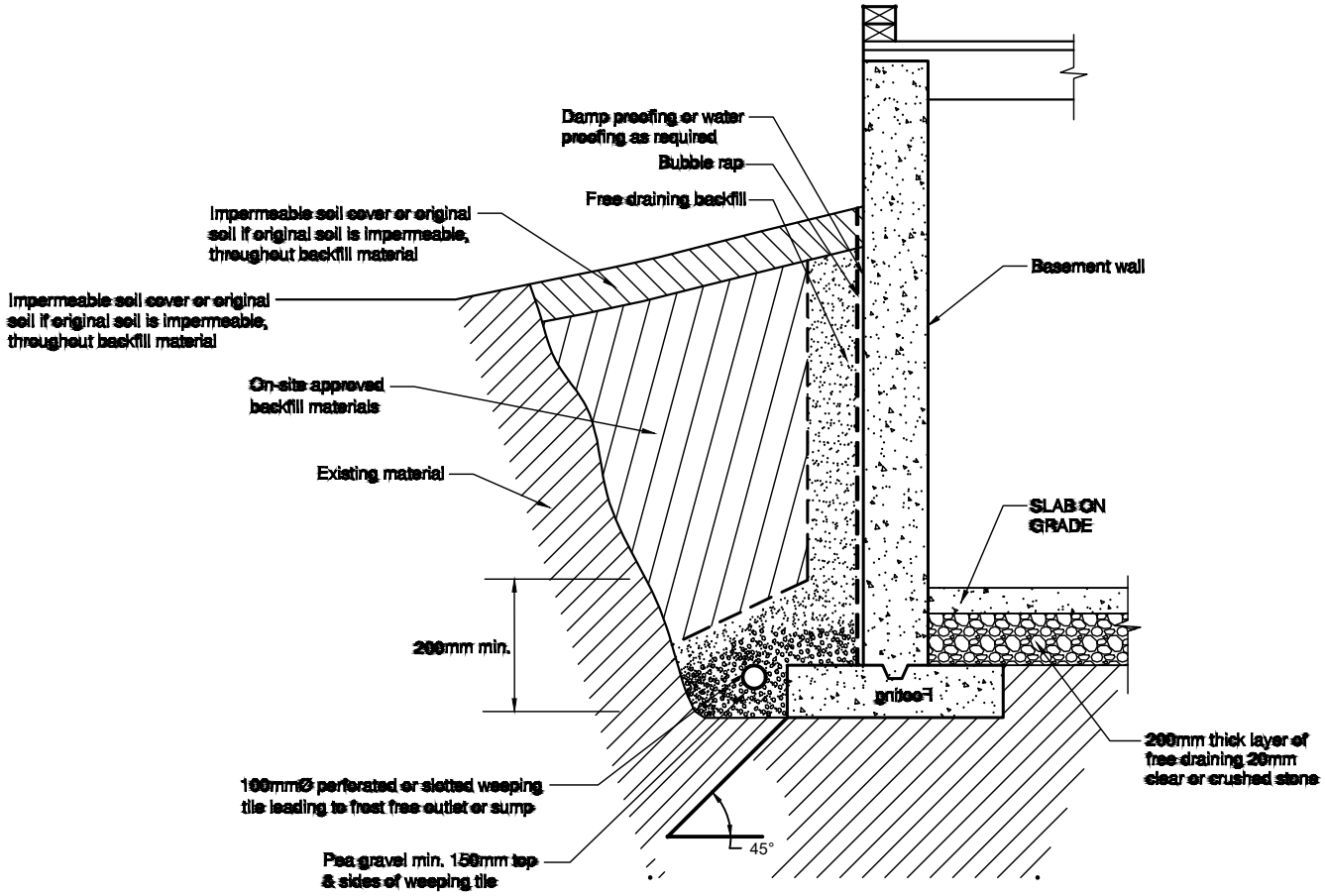
Figure 1	Project No.: 210189	GRAINSIZE DISTRIBUTION GRAPH
	Location: 1942 Woodview Avenue	Tested By: SK
	Client: 10861808 Canada Corp.	Test Date: 21-Oct-2021

Symbol	Sample No.	% Clay	% Silt	% Fine Sand	% Medium Sand	% Coarse Sand	% Fine Gravel	% Coarse Gravel	% Cobbles
■	BH8 SA3	<16.0	<16.0	68.3	8.7	5.7	1.5	0.0	0.0
●	BH8 SA5	<73.2	<73.2	25.8	0.9	0.3	0.0	0.0	0.0
▲	BH8 SA6	<4.3	<4.3	10.2	38.6	25.1	16.4	5.4	0.0



Unified Soil Classification System

SILT or CLAY		SAND			GRAVEL		COBBLES	BOULDERS
Clay	Silt	fine	medium	coarse	fine	coarse		



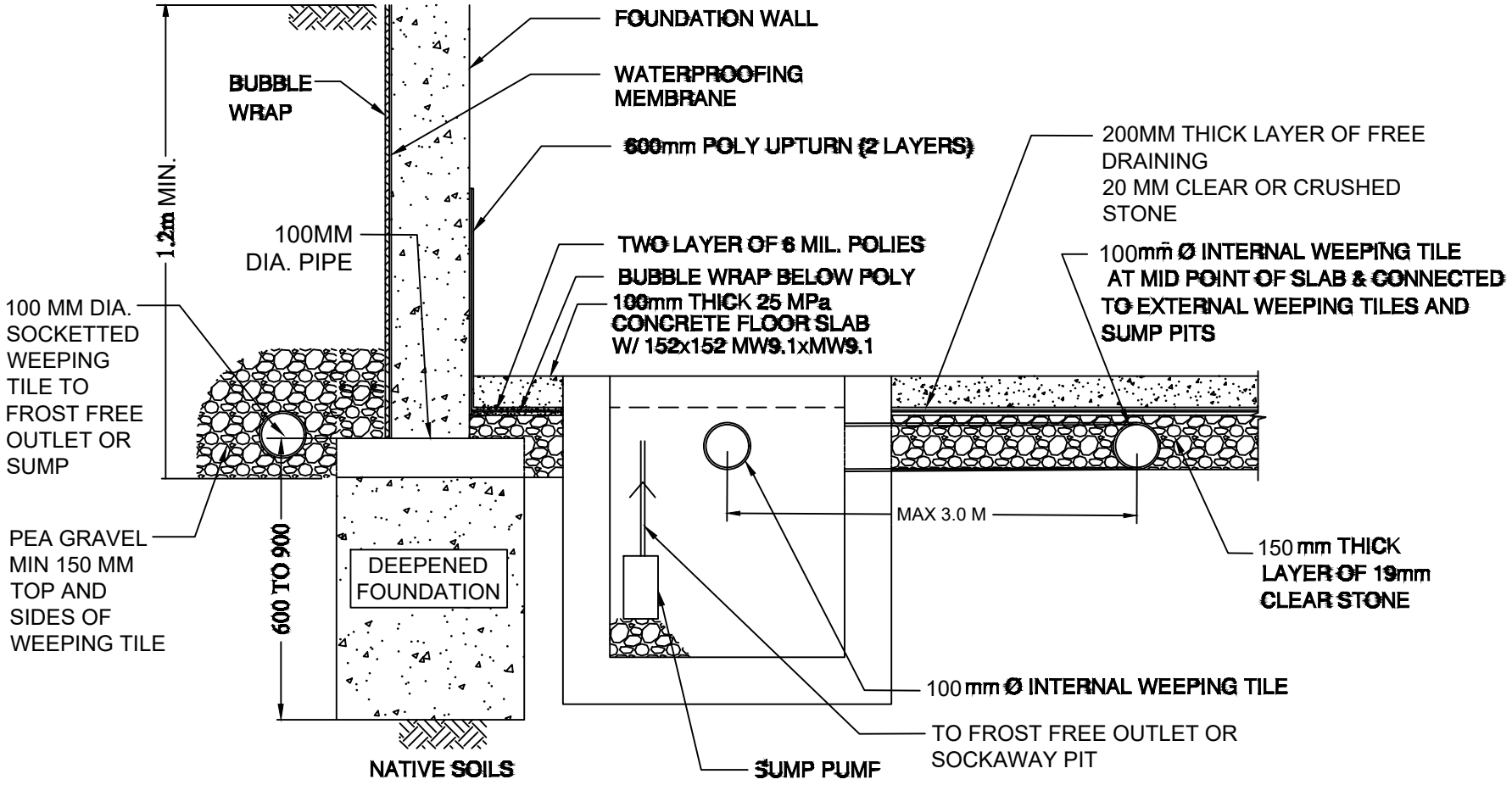
NOTES:

1. Drainage tiles to consist of 100mm (4") dia. weeping tile or equivalent perforated pipe leading to a postive sump or outlet. Invert to be minimum of 150mm (6") below underside of floor slab.
2. Pea gravel 150mm (6") top and sides of drain. If drain is not on footing, 100mm (4") of pea gravel below drain. 20mm (3/4") clear or crushed stone may be used provided it is covered by an approved porous membrane (Terrafix 270R or equivalent)
3. C.S.A fine concrete aggregate to act as filler material. Minimum 300mm (12") top and sides of tile drain. This may be replaced by an approved porous membrane as indicated in 2.
4. Free-draining backfill - Class B pit-run gravel or equivalent compacted to 90-95% Standard Proctor density. Do not exceed 95% Standard Proctor density. Do not compact closer than 1.8m (6') from wall with heavy equipment. Use hand controlled light compaction equipment within 1.8m (6') of wall.
5. Impermeable backfill seal - compacted clay, clay silt or equivalent. If original soil is free-draining materials seal may be omitted.
6. Do not backfill until wall is supported by basement and floor or adequate bracing.
7. Moisture barrier to consist of 20mm (3/4") compacted crushed stone or equivalent free-draining material. Layer to be 200mm (8") thick.
8. Basement wall to be damp-proofed.
9. Exterior grade to slope away from wall.
10. Slab on grade should not be structually connected to wall or footing.
11. Underfloor drain invert to be at least 300mm (1') below underside of floor slab. Tile placed in parallel rows 6-8m (20'-25') on centres one way.
12. Do not connect the underfloor drain to perimeter drains.
13. If the 20mm (3/4") stone requires surface blinding, use 6mm (1/4") stone chips.

BACK FILLING AND DRAINAGE DETAILS

CANADA ENGINEERING SERVICES INC.

DRAWING NO. 3



DEEPENING OF FOUNDATION ADJACENT TO SUMP PUMP AND WEEPING TILE CONNECTION DETAILS

CANADA ENGINEERING SERVICES INC.

DRAWING NO. 4

GEOTECHNICAL SYMBOLS AND TERMS USED IN BOREHOLE/TEST PIT LOGS

Soil Description

Terminology describing soil types:

Topsoil	-	Mixture of soil and humus capable of supporting good vegetative growth
Peat	-	Fibrous fragments of visible and invisible decayed organic matter
Till	-	Unstratified and unsorted glacial deposit which may include any particle sizes Such as clay, silt, sand, stone, cobbles and boulders
Fill	-	Materials not identified as deposited by natural geological processes

Terminology describing soil structure:

Desiccated	-	Having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	-	Material breaks along plane of fracture
Varved	-	Composed of regular alternating layers of silt and clay
Laminated	-	Alternating layers of beds less than 6 mm thick
Stratified	-	Alternating layers of beds greater than 6 mm thick
Blocky	-	Material can be broken into small and hard angular lumps
Lensed	-	Irregular shaped pockets of soil having different particle size, texture, or colour from materials above and below
Well Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes
Uniformly Graded		Predominantly one grain size

Soil descriptions and classification are based on the Unified Soil Classification System (USCS) (ASTM D-2488), which classifies soils on the basis of engineering properties. The system divides soils into three major categories: (1) coarse grained, (2) fine-grained, and (3) highly organic. The soil is then subdivided based on either gradation or plasticity characteristics. This system provides a group symbol (eg. SM) and group name (eg. silty sand) for identification. The classification excludes particles larger than 76 mm.

Terminology describing materials outside the USCS, (eg. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

Trace	- Trace sand, trace silt, etc.	Less than 10%
Some	- Some sand, some silt, etc.	10 - 20%
Adjective	- Gravelly, sandy, silty, clayey, etc.	20 - 30%
“And”	- and gravel, and silt, etc.	> 35%
Noun	- Gravel, Sand, Silt, Clay	> 35% and main fraction

The standard terminology to describe cohesionless soils includes the compactness as determined by the Standard Penetration Test “N” -value.

Compactness	**“N” Value**
Very Loose	< 4
Loose	4 - 10
Compact	10 - 30
Dense	30 - 50
Very Dense	> 50

GEOTECHNICAL SYMBOLS AND TERMS USED IN BOREHOLE/TEST PIT LOGS

The standard terminology to describe cohesive soils includes consistency, which is based on undrained shear strength as measured by in-situ vane tests, penetrometer tests, unconfined compression tests or similar field and laboratory analysis. Standard Penetration Test "N" values can also be used to provide an approximate indication of the consistency and shear strength of fine grained, cohesive soils.

Consistency	Undrained Shear Strength (kPa)	"N" Value	Field Identification
Very Soft	< 12.5	< 2	Easily penetrated several cm by the fist
Soft	12.5 - 25	2 - 4	Easily penetrated several cm by the thumb
Firm	25 - 50	4 - 8	Can be penetrated several cm by the thumb with moderate effort
Stiff	50 - 100	8 - 15	Readily indented by the thumb but penetrated only with great effort
Very Stiff	100 - 200	15 - 30	Readily indented by the thumb nail
Hard	> 200	> 30	Indented with difficulty by the thumbnail

Note: "N" Value - The Standard Penetration Test records the number of blows of a 140 lb (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler 1 foot (305 mm). For split spoon samples where full penetration is not achieved, the number of blows is reported over the sampler penetration in millimeters (eg. 50/75).

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:

Asphalt Concrete Topsoil Fill Peat Clay Silt Sand Gravel

WATER LEVEL MEASUREMENTS

Open Borehole or Test Pit

Monitoring Well, Piezometer or Standpipe

SAMPLE TYPE

SS Split spoon sample (obtained from the Standard Penetration Test)

AS Auger sample

ST Thin Wall Sample or Shelby Tube

VS Shovel sample