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A REPORT TO
2048138 ONTARIO LIMITED

A GEOTECHNICAL INVESTIGATION FOR PROPOSED INDUSTRIAL/COMMERCIAL DEVELOPMENT

6086, 6186, 6230 MAYFILED ROAD AND 12151 AIRPORT ROAD

TOWE OF CALEDON

REFERENCE NO. 2307-S067

SEPTEMBER 2023

TOWN OF CALEDON
PLANNING
RECEIVED
February 28, 2025

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ENCLOSURES

1.0 INTRODUCTION

In accordance with the written authorization dated between July 10 and 12, 2023 from Mr. Jarnail Singh Sidhu (6086 Mayfield Inc.), Mr. Inderjit Dhugga (6230 Mayfield Inc. and Airport 12151 Inc.) and Mr. Mandeep Singh Sahi (2652876 Ontario Limited), a geotechnical investigation was conducted on the multiple land parcels located at the northeast quadrant of Mayfield Road and Airport Road in the Town of Caledon.

The purpose of the investigation was to reveal the subsurface conditions and to determine the engineering properties of the disclosed soils for the design and construction of the proposed industrial development. The findings and resulting geotechnical recommendations are presented in this report.

2.0 SITE AND PROJECT DESCRIPTION

The Town of Caledon is situated on Halton till plain where the drift dominates the soil stratigraphy. In places, lacustrine sand, silt, clay and drift which have been reworked by the water action of Peel Ponding (glacial lake) have modified the drift stratigraphy.

The subject site, consisting of multiple land parcels having municipal addresses of 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, is located at the northeast quadrant of Mayfield Road and Airport Road.

At the time of investigation, majority of the site was gravel covered, used for transportation terminal, vehicle parking and storage of truck container; the remaining areas were vacant and generally grass-covered. Multiple single-storey structures were evident in places. The existing site gradient generally descend towards the southeast and the maximum grade difference of approximately 8 m.

It is understood that the subject site will be utilized for industrial purposes. Details of the developments, however, are not available for review at the time of the report preparation.

3.0 FIELD WORK

The field work, consisting of twenty-four(24) sampled boreholes extending to depths of 6.2 to 8.1 m below grade, was completed between August 3 and 9, 2023. The locations of the boreholes are shown on Drawing No. 1.

The boreholes were advanced at intervals to the sampling depths by a track-mounted machine equipped with split spoon sampler for soil sampling. Split spoon samples were recovered for soil classification and laboratory testing. Standard Penetration Tests, using the procedures described on the enclosed "List of Abbreviations and Terms", were performed at the sampling depths. The test results are recorded as the Standard Penetration Resistance (or 'N' values) of the subsoil. The relative density of the non-cohesive strata and the consistency of the cohesive strata are inferred from the 'N' values. The field work was supervised and the findings recorded by a Geotechnical Technician.

Upon completion of borehole drilling, 50-mm diameter PVC monitoring wells were installed in selected boreholes to facilitate groundwater monitoring and the hydrogeological assessment. Details of the well installation are presented in the corresponding borehole logs.

The geodetic elevation at each of the borehole locations was obtained using the Global Navigation Satellite System (GNSS).

4.0 SUBSURFACE CONDITIONS

The boreholes were drilled across the gravel yard and vacant areas. The investigation has disclosed that beneath the granular fill, a topsoil veneer and a layer of earth fill in places, the site is underlain by strata of silt, silty clay, silty clay till and sandy silt till. Shale bedrock is contacted near the termination depth of Borehole 20.

Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs, comprising Figures 1 to 24, inclusive. The revealed stratigraphy is plotted on the Subsurface Profile, Drawing No. 2 to 4. The engineering properties of the disclosed soils are discussed herein.

4.1 Topsoil

A layer of topsoil, approximately 30 cm to 35 cm in thickness, was encountered at the ground surface of Boreholes 1, 2, 19 and 20. Thicker topsoil may be encountered in treed area or localized low-lying areas beyond the borehole locations.

4.2 Pavement Structure

Boreholes 6, 16, 18, 22, 24 were carried out on the asphalt pavement, which consists of a layer of asphalt, approximately 30 mm to 100 mm in thickness, and a layer of granular fill, approximately 280 to 450 mm in thickness.

Other boreholes were carried out on unpaved gravel surface, having a layer of granular fill with thickness ranging from 150 mm to 600 mm.

4.3 Earth Fill

Beneath the surface cover, a layer of earth fill was contacted in Boreholes 1, 4, 5, 8, 9, 11, 13, 15, 16, 18, 22, 23, and 24, extending to a depth of 0.8 to 2.0 m below the ground surface. The fill consists of a mixture of silty clay and sandy silt with gravel, organics and topsoil inclusions. Shale fragments were occasionally found within the earth fill.

The recorded 'N' values range from 10 to 45, with a median of 20 blows per 30 cm of penetration, showing that the fill was likely placed with quality control, and that the surface of the fill may have been weakened by weathering at places.

The natural water content values of the fill samples range from 3% to 45%, with a median of 12%, indicating the fill is in damped to moist conditions. Higher moisture values may depict the presence of topsoil/organics or trapped precipitation in the fill.

One must be aware that the samples retrieved from the borehole may not be truly representative of the geotechnical and environmental quality of the earth fill. The extent of the fill and the quality of the fill can be assessed by laboratory testing and/or test pits if necessary.

4.4 Sandy Silt Till

A layer of sandy silt till deposit was contacted at various depth of Boreholes 14, 18 and 19. The till consists of a mixture of clay and gravel, with silt and sand being the dominant fraction.

The recorded 'N' values range from 3 to 100, with a median of 20 blows per 30 cm of penetration, indicating the sandy silt till is very loose to very dense, being generally compact in relative density. The low 'N' values were encountered near the ground surface, indicating that the ground surface is either disturbed and/or weakened by weathering.

The natural water content values range from 7% to 22%, with a median of 13%, indicating that the sandy silt till is generally in moist condition.

The engineering properties of the till deposit are given below:

- High frost susceptibility and low water erodibility.
- The till will be relatively stable in steep excavation; however, prolonged exposure may lead weathering of the sand and silt layers within the till, which may cause localized sloughing.

4.5 Silty Clay Till

The silty clay till deposit was contacted within the investigated depths of all boreholes except Borehole 15. Localized silt and sand layers were occasionally contacted in the lower stratigraphy of the till deposit. The silty clay till consists of a random mixture of particle sizes with clay or silt being the dominant fraction. Grain size analyses were performed on 3 representative samples; and the results are plotted on Figures 25.

Atterberg Limits test was also completed on one (1) sample of the silty clay till. The resulting Liquid Limit and Plastic Limit are 35% and 19% respectively, showing that the silty clay till is medium in plasticity. The natural water content values ranged from 7% to 25% with a median of 19%, showing generally moist condition.

The recorded 'N' values of the soil samples range from 11 to over 100, with a median of 24 blows per 30 cm of penetration, indicating that the silty clay till is stiff to hard, being generally very stiff in consistency.

The engineering properties of the silty clay till are given below:

- High frost susceptibility and high soil-adfreezing potential.
- Low water erodibility.
- In excavation, the silty clay till will generally be stable in relatively steep cuts; however, the silt and sand seams or layers may slough under prolonged exposure.

4.6 Silty Clay

Similar to the silty clay till, the native silty clay stratum was contacted at various depths in most of the boreholes. Grain size analyses were performed on 3 representative samples; and the results are plotted on Figures 26.

The recorded 'N' values range from 10 to 36, with a median of 20 blows per 30 cm of penetration, indicating the silty clay is stiff to hard, being generally very stiff in consistency.

Atterberg Limits test was completed on one (1) sample of the silty clay. The resulting Liquid Limit and Plastic Limit are 40% and 20% respectively, showing that the silty clay is medium in plasticity. The natural water content values range from 13% to 29%, with a median of 23%, indicating that the silty clay is generally in a moist condition.

The engineering properties of silty clay are listed below:

- High frost susceptibility and low water erodibility.
- The clay will be relatively stable in steep excavation; however, shrinkage cracks may develop under prolonged exposure, which may lead to localized sheet collapses

4.7 Silt

A layer of silt deposit was contacted beneath the silty clay till in Borehole 4 extending to a depth from 2.6 m to 4.1 m below the ground surface.

The recorded 'N' value is 28 blows per 30 cm of penetration, indicating the silt is compact in relative density. The natural water content value is 20%, indicating that the silt is generally in a very moist condition.

The engineering properties of silt are listed below:

- High frost susceptibility, with high soil-adfreezing potential.
- High water erodibility; the fine particles are susceptible to migration through small openings, particularly under seepage pressure.
- The shear strength is derived from internal friction and is soil density dependent. Due to their dilatancy, the strength of the wet silts is susceptible to impact disturbance; i.e. the disturbance will induce a build-up of pore pressure within the soil mantle, resulting in soil dilation and a reduction in shear strength.
- In excavation, the silt will slowly slump, run with groundwater seepage, and boil under a piezometric head of 0.4 m.

4.8 Shale

Weathered shale was observed at the lower stratigraphy within the investigated depth of Borehole 20.

The recorded 'N' value is over 50 blows per 15 cm of penetration, indicating the shale is being generally very dense in relative density. The natural water content value is 6%.

The quality and strength of the shale, are however, not determined as they are not part of the scope of work.

5.0 GROUNDWATER CONDITION

Upon completion of borehole drilling, groundwater was not evident in all boreholes except for Boreholes 4, 11, 17 and 24, where the recorded groundwater level ranged from 3.1 to 4.9 m below prevailing ground surface.

On August 18, 2023, approximately 2 weeks after well installation, groundwater level was measured from the monitoring wells. The findings were summarized in Table 1.

Table 1- Groundwater Level from Monitoring Wells

BH/MW No.	Ground Elevation (m)	Well Depth (m)	Measured Groundwater on August 18, 2023	
			Depth (m)	Elevation (m)
1	237.6	6.1	Dry	231.5
2	237.2	6.3	6.1	231.1
5	236.0	6.1	4.5	231.5
7	233.6	5.9	1.8	231.8
8	233.8	6.1	0.6	233.2
9	231.5	6.1	5.2	226.3
10	233.2	6.2	3.7	229.5
11	232.4	6.2	1.0	231.4
13	233.4	6.1	0.5	232.9
19	229.6	6.1	5.3	224.3
20	227.9	5.9	5.5	222.4
21	230.9	6.1	0.7	230.2
22	231.0	6.1	1.5	229.5

Groundwater level from the monitoring wells was recorded at the depths ranging from 0.5 to 6.1 m below the prevailing ground surface, or between El. 222.4 m and El. 236.3 m, which is subject to seasonal fluctuations. Detailed groundwater condition within the investigated area will be discussed in the hydrogeological report, under separate cover.

6.0 DISCUSSION AND RECOMMENDATIONS

The investigation has disclosed that beneath the pavement structure and a layer of earth fill or a topsoil veneer, the site is underlain by strata of silty clay and silty clay till with localized sandy silt till, silt and weathered shale layers.

Groundwater level from the monitoring wells was recorded at the depths ranging from 0.5 to 6.1 m below the prevailing ground surface, or between El. 222.4 m and El. 236.3 m, which is subject to seasonal fluctuations.

It is understood that the subject site will be utilized for industrial purposes. Details of the developments, however, are not available for review at the time of the report preparation. The geotechnical findings warranting special consideration for the proposed development are presented below:

1. The topsoil must be stripped for site development. It can only be reused in the landscaped area. Otherwise, it must be removed off-site.
2. The cavity of any demolished structure must be properly backfilled with compacted inorganic soil prior to site grading. All debris must be removed off-site.
3. The existing earth fill and granular fill consisted excessive amount of recycled material, which is considered unsuitable for supporting any structures sensitive to movement. It must be subexcavated, sorted free of organics and other deleterious material before reusing for structural backfill or engineered fill construction. If they cannot be segregated, they must be removed off site.
4. Where the site will be graded with additional fill, the earth fill can be constructed in an engineered manner for foundation, slab-on-grade, site services and pavement construction.
5. While detailed design is not available for review, it is anticipated that the site will be constructed with single-storey slab-on-grade industrial buildings. These buildings can be supported on conventional spread and strip footings, founded on the engineered fill and/or sound native soils. The foundation subgrade must be inspected by a geotechnical engineer before pouring the concrete foundation.
6. A Class ‘B’ bedding, consisting of compacted 19-mm Crusher-Run Limestone (CRL) or equivalent, is recommended for the construction of the underground services. The service pipes must consist of leak-proof joints, or the joints must be wrapped with a waterproof membrane.
7. Any excavation must be carried out in accordance with the O.Reg. 213/91.

The recommendations appropriate for the project are presented herein. One must be aware that the subsurface conditions may vary. Should this become apparent during construction, a geotechnical engineer must be consulted to determine whether the following recommendations require revision.

6.1 Site Preparation

Topsoil must be stripped for site development and can be used for landscaping purpose only. Any surplus must be removed off-site. The existing structures must be demolished and the cavities should be properly backfilled with inorganic soil, compacted to engineered fill specifications.

The existing earth fill is not suitable for supporting the proposed structures at its current state. It must be subexcavated, sorted free of organics and properly compacted to engineered fill specifications.

Where the site will be re-graded with additional fill, the fill can be constructed as engineered fill for foundation, site services and pavement construction. The engineering requirements for a certifiable fill are presented below:

1. The exposed subgrade must be inspected and proof-rolled prior to any fill placement. Badly weathered soil should be sorted free of organics or deleterious material, if any, aerated prior to reuse for engineered fill construction.
2. Inorganic soils must be used, and they must be uniformly compacted in 20 cm thick lifts to at least 98% SPDD up to the proposed finished grade. The soil moisture must be properly controlled near the optimum. If the foundations are to be built soon after the fill placement, the densification process for the engineered fill must be increased to 100% SPDD.
3. If the engineered fill is compacted with the water content on the wet side of the optimum, the underground services and pavement construction should not begin until the pore pressure within the fill mantle has completely dissipated. This must be further assessed at the time of the engineered fill construction.
4. If imported fill is to be used, it should be inorganic soils, free of deleterious or any material with environmental issue (contamination). Any potential imported earth fill from off site must be reviewed for geotechnical and environmental quality by the appropriate personnel as authorized by the developer or agency, before it is hauled to the site.
5. The engineered fill must not be placed during the period where freezing ambient temperatures occur either persistently or intermittently. This is to ensure that the fill is

free of frozen soils, ice and snow. If the engineered fill is to be left over the winter months, adequate earth cover, or equivalent, must be provided for protection against frost action.

6. The fill operation must be supervised and monitored in full time basis by a technician under the direction of a geotechnical engineer.
7. The engineered fill envelope and finished elevations must be clearly and accurately defined in the field, and they must be precisely documented.
8. Any excavation carried out in certified engineered fill must be reported to the geotechnical consultant who supervised the fill replacement in order to document the locations of the excavation and/or to supervise reinstatement of the excavated areas to engineered fill status. If construction on the engineered fill does not commence within a period of 2 years from the date of certification, the condition of the engineered fill must be assessed for re-certification.
9. Foundations founded on the engineered fill must be reinforced and should be designed by a structural engineer to allow distribution of stress induced by the abrupt differential settlement (about 20 mm) in the engineered fill.
10. The foundation and underground services subgrade must be inspected by the geotechnical consulting firm that supervised the engineered fill placement. This is to ensure that the foundations and service pipes are placed within the engineered fill envelope, and the integrity of the fill has not been compromised by interim construction, environmental degradation and/or disturbance by the footing excavation.

6.2 **Foundations**

The proposed structures can be supported by conventional spread and strip footings, founded on engineered fill or sound native soil stratum. The recommended bearing pressures for the design of conventional footings are presented below.

- Maximum Soil Bearing Pressure at Serviceability Limit State (SLS) = 150 kPa
- Factored Ultimate Bearing Pressure at Ultimate Limit State (ULS) = 250 kPa

The total and differential settlements of the footings designed using bearing pressure at SLS are estimated to be 25 mm and 20 mm, respectively.

The foundation subgrade should be inspected by the geotechnical engineer or a senior geotechnical technician to ensure that the revealed conditions are compatible with the foundation design requirements.

Higher soil bearing pressures may be available for foundation design, subject to review of the site grading plan, which is currently not available for review.

Foundations exposed to weathering and in unheated areas must have at least 1.2 m of earth cover for frost protection, or must be properly insulated.

The building foundation should meet the requirements specified in the latest Ontario Building Code and the structures should be designed to resist an earthquake force using Site Classification 'D' (stiff soil).

The foundation walls must be backfilled with free-draining, non frost susceptible granular material, compacted to 98% SPDD, in lifts no more than 200 mm in thickness. Alternatively, where inorganic soil is used for foundation wall backfill, the foundation walls must be shielded with a polyethylene slip membrane extending to the frost penetration depth.

6.3 Slab-On-Grade Construction

The subgrade for slab-on-grade construction must be constructed on sound native soil or properly compacted engineered fill. The subgrade should be inspected and assessed by proof-rolling. Any loose subgrade identified should be subexcavated and replaced with inorganic material, compacted to at least 98% SPDD, in lifts no more than 20 cm in thickness.

The concrete slab should be constructed on a granular base of minimum 200 mm thick, consisting of 19-mm Crusher- Run Limestone (CRL), or equivalent, compacted to 100% SPDD. A Modulus of Subgrade Reaction of 25 MPa/m can be used for the design of the slab-on-grade.

The exterior grading around the structure must be such that it directs runoff away from the structure.

6.4 Truck Loading Docks

In the loading dock area, the subgrade soil will be subject to freezing temperature. It is recommended that the backfill behind the loading dock should consist of non-frost susceptible granular material and a 50-mm thick rigid foam insulation should be placed behind the concrete walls exposed to freezing. The foundation walls at the truck loading docks should be designed as a retaining structure using the soil parameters presented in Section 6.8 of this report.

Concrete apron is recommended at the truck loading area and ramp. The apron should be constructed on a compacted granular bedding, 300 mm in thickness, consisting of 19-mm CRL, or equivalent. Perforated subdrain may be used to drain the subsurface water around the concrete pad to prevent any excessive seasonal ground movement.

6.5 Underground Services

The subgrade for underground services should consist of native soil or compacted inorganic earth fill. Where weathered or soft soils are encountered, these materials must be subexcavated and replaced with properly compacted bedding material.

A Class 'B' bedding, consisting of compacted 19-mm CRL, is recommended for the construction of the underground services. The joints connecting into manholes and catch basins should be leak-proof or wrapped with an appropriate waterproof membrane to prevent subgrade migration.

In order to prevent pipe floatation when the sewer trench is deluged with water, a soil cover with a thickness equal to the diameter of the pipe should be in place at all times after completion of the pipe installation. Openings to subdrains and catch basins should be shielded with a fabric filter to prevent blockage by silting.

All metal fittings for the underground services should be protected against soil corrosion. In determining the mode of protection, an estimated electrical resistivity of the disclosed soil can be used. This should be confirmed by testing the soil along the pipe alignment at the time of services construction and must meet the minimum requirement as specified by the municipality.

6.6 Trench Backfilling and Excavated Areas

The in-situ inorganic soils are suitable for use as trench backfill. However, wet soils, if any, should be aerated prior to placement of backfill and compaction. The backfill in the trenches and excavated areas should be compacted to at least 95% SPDD. In the zone within 1.0 m below the pavement subgrade and slab-on-grade, the material should be compacted to at least 98% SPDD with the water content 2% to 3% drier than the optimum. The lift of each backfill layer should either be limited to a thickness of 20 cm, or the thickness should be determined by test strips.

The narrow trenches should be cut at 1 vertical:2 or + horizontal so that the backfill can be effectively compacted. Otherwise, soil arching will prevent the achievement of proper compaction. In normal construction practice, the problem areas of ground settlement largely occur adjacent to manholes, catch basins, service crossings, foundation walls and columns. In areas which are inaccessible to a heavy compactor, sand backfill should be used and compacted using light equipment.

6.7 Pavement Design

The recommended pavement design is presented in Table 2.

Table Error! Bookmark not defined. - Pavement Design

Course	Thickness (mm)	OPS Specifications
Asphalt Surface	40	HL3
Asphalt Binder - Light-Duty Parking - Collector and Heavy-Duty	 65 110	HL8
Granular Base	150	Granular 'A' or equivalent
Granular Sub-base - Light-Duty Parking - Collector and Heavy-Duty	 350 450	Granular 'B' or equivalent

It is necessary to provide a stable and uniform subgrade for the pavement structure. In preparation of the pavement subgrade after fine grading, the subgrade should be free of incompetent soil and it should be proof-rolled in the presence of a geotechnical technician. Any soft spot identified should be subexcavated and replaced by properly compacted inorganic earth fill. The subgrade within the 1.0 m zone below the pavement subgrade should be compacted to at least 98% SPDD with the water content 2% to 3% drier than the optimum.

All the granular bases should be compacted to 100% SPDD.

The pavement subgrade will suffer a strength regression if water is allowed to infiltrate prior to paving. The following measures should therefore be incorporated into the construction and road design:

- If the pavement is to be constructed during the wet season and extremely soft subgrade occurs, the granular sub-base may require thickening. This can be further assessed during construction.

- Along the perimeter where surface runoff may drain onto the pavement, or water may seep into the granular base, a swale or intercept subdrain system should be installed to prevent infiltrating precipitation from seeping into the granular bases (since this may inflict frost damage on the flexible pavement).
- Subdrains consisting of filter-wrapped weepers should be installed in the subgrade along the perimeter of the pavement and the low spots and they should be connected to the catch basins or storm manholes in the paved areas. The subdrains should be placed at least 0.3 m below the subgrade level and backfilled with free-draining granular material.

6.8 Soil Parameters

The recommended soil parameters for the project design are presented in Table 3.

Table Error! Bookmark not defined. - Soil Parameters

Unit Weight and Bulk Factor	**Bulk Unit Weight (kN/m^3)**	**Estimated Bulk Factor**	
		Loose	**Compacted**
Earth Fill	21.0	1.30	0.98
Silty Clay Till/Sandy Silt Till	22.0	1.33	1.03
Silty Clay/Silt	21.0	1.30	1.00
Shale	24.0	1.40	1.15
Lateral Earth Pressure Coefficients	**Active K_a**	**At Rest K_o**	**Passive K_p**
Compacted Earth Fill/Silty Clay	0.39	0.56	2.56
Silty Clay Till/Sandy Silt Till/Silt	0.33	0.50	3.00
Shale	0.17	0.29	5.83
Estimated Coefficients of Permeability (K) and Percolation Time (T)		**K (cm/sec)**	**T (min/cm)**
Silty Clay/Silty Clay Till		10^{-7}	Over 80
Sandy Silt Till		10^{-6} to 10^{-7}	Over 50
Estimated Electrical Resistivities			
Silty Clay/Silty Clay Till		3000 to 3500 ohm.cm	
Sandy Silt Till		4500 ohm.cm	
Silt		4000 ohm.cm	

Coefficients of Friction	
Between Concrete and Granular Base	0.50
Between Concrete and Sound Native Soil	0.35

6.9 Excavation

Excavation should be carried out in accordance with Ontario Regulation 213/91. The types of soils are classified in Table 4.

Table 2 - Classification of Soils for Excavation

Material	Type
Silty Clay, Silty Clay Till, Sandy Silt Till, Weathered Shale	2
Earth Fill and Drained Silt	3
Saturated Silt, if any	4

Due to low permeability of the till strata, any groundwater seepage can be removed by conventional pumps from sumps.

Prospective contractors may be asked to assess the in-situ subsurface conditions for soil cuts by digging test pits to at least 0.5 m below the intended bottom of excavation. These test pits should be allowed to remain open for a few hours to assess the trenching conditions.

7.0 LIMITATIONS OF REPORT

This report was prepared by Soil Engineers Ltd., for the account of 6086 Mayfield Inc., 6230 Mayfield Inc.,2652876 Ontario Limited and Airport 12151 Inc., and for review by the designated consultants, financial institutions and government agencies. Use of this report is subject to the conditions and limitations of the contractual agreement.

The material in the report reflects the judgement of Daric Yang, B.A.Sc. and Kin Fung Li, P.Eng., and in light of the information available to it at the time of preparation. Any use which a Third Party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of such Third Parties. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

SOIL ENGINEERS LTD.

Daric Yang, B.A.Sc.

Kin Fung Li, P.Eng.

DY/KL

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS Auger sample
CS Chunk sample
DO Drive open (split spoon)
DS Denison type sample
FS Foil sample
RC Rock core (with size and percentage recovery)
ST Slotted tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash sample

PENETRATION RESISTANCE

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows for each foot of penetration of a 2-inch diameter, 90° point cone driven by a 140-pound hammer falling 30 inches.

Plotted as '—●—'

Standard Penetration Resistance or 'N' Value:

The number of blows of a 140-pound hammer falling 30 inches required to advance a 2-inch O.D. drive open sampler one foot into undisturbed soil.

Plotted as '○'

WH Sampler advanced by static weight
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
NP No penetration

SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/ft)	Relative Density
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
over 50	very dense

Cohesive Soils:

Undrained Shear Strength (ksf)	'N' (blows/ft)	Consistency
less than 0.25	0 to 2	very soft
0.25 to 0.50	2 to 4	soft
0.50 to 1.0	4 to 8	firm
1.0 to 2.0	8 to 16	stiff
2.0 to 4.0	16 to 32	very stiff
over 4.0	over 32	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding

△ Laboratory vane test

□ Compression test in laboratory

For a saturated cohesive soil, the undrained shear strength is taken as one half of the undrained compressive strength

METRIC CONVERSION FACTORS

1 ft = 0.3048 metres
1lb = 0.454 kg
1 inch = 25.4 mm
1ksf = 47.88 kPa

JOB NO.: 2307-S067

LOG OF BOREHOLE: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 9, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
237.5	Ground Surface							
0.0	**30 cm TOPSOIL**	1	DO	14	0		45	
	EARTH FILL Dark brown, silty clay occ. organic and topsoil inclusions	2	DO	10	1		22	
235.7		3	DO	14			23	
1.8					2			
	Brown, very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	4	DO	18			23	
		5	DO	18	3		23	
233.2					4			
4.3	Grey, stiff **SILTY CLAY** occ. gravel	6	DO	8	5		28	
		7	DO	10	6		29	
					7			
229.4		8	DO	12	8		28	
8.1	**END OF BOREHOLE**							
					9			
					10			

Installed 50 mm Ø monitoring well to 6.1 m
completed with 3.1 m screen
Sand backfill from 2.4 m to 6.1 m
Bentonite seal from 0.0 m to 2.4 m
Provided with a momument steel casing

Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 10

FIGURE NO.: 10

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 8, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
233.2	Ground Surface							
0.0	**250 mm Granular Fill**	1	DO	6	0		18	
	Brown, firm to very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers — Weathered	2	DO	18	1		18	
	Sandy silt till layers	3	DO	20	2		14	
231.0								
2.2	Very stiff **SILTY CLAY** occ. gravel	4	DO	26	2		19	
		5	DO	22	3		24	
	Brown / Grey				4			
		6	DO	16	5		26	
		7	DO	20	6		25	
226.6								
6.6	**END OF BOREHOLE**				7			
	Installed 50 mm Ø monitoring well to 6.2 m completed with 3.1 m screen Sand backfill from 2.5 m to 6.2 m Bentonite seal from 0.0 m to 2.5 m Provided with a momument steel casing				8			
					9			
					10			Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 11

FIGURE NO.: 11

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 4, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
232.4	Ground Surface							
0.0	**550 mm Granular Fill**	1	DO	42	0		7	
	EARTH FILL Dark brown, silty clay with some sand occ. topsoil and rootlets	2	DO	15	1		23	
230.9								
0.8	Very stiff to hard **SILTY CLAY** occ. gravel	3	DO	32	2		20	
		4	DO	31			21	
		5	DO	32	3		24	
	Brown / Grey				4			W.L. @ El. 228.1 m on completion
		6	DO	17	5		25	
226.8								
5.6	Grey, very stiff **SILTY CLAY TILL** some sand, a trace of gravel	7	DO	29	6		18	
225.8								
6.6	**END OF BOREHOLE**				7			
	Installed 50 mm Ø monitoring well to 6.2 m completed with 3.1 m screen Sand backfill from 2.5 m to 6.2 m Bentonite seal from 0.0 m to 2.5 m Provided with a momument steel casing				8			
					9			
					10			

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 12

FIGURE NO.: 12

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 8, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
234.0	Ground Surface							
0.0	**400 mm Granular Fill**	1	DO	28	0		4	
	Weathered							
	Brown, very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	2	DO	26	1		20	
		3	DO	22	2		18	
		4	DO	24			23	
230.7		5	DO	21	3		23	
3.3	Very stiff **SILTY CLAY** occ. gravel	6	DO	16	4 5		25	
	Brown Grey	7	DO	18	6		23	
227.4					7 8 9 10			
6.6	**END OF BOREHOLE**							Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 13

FIGURE NO.: 13

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 8, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
233.4	Ground Surface							
0.0	**600 mm Granular Fill**	1	DO	32	0		5	
	EARTH FILL Brown, sandy silt with traces of clay and gravel, occ. rootlets							
232.4 / 1.0		2	DO	10	1		17	
	Brown, very stiff **SILTY CLAY** a trace of gravel	3	DO	22	2		19	
		4	DO	24			21	
		5	DO	20	3		22	
228.3 / 5.1		6	DO	16	4 5		24	
	Grey, very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	7	DO	20	6		14	
226.8 / 6.6	**END OF BOREHOLE**				7 8 9 10			

Installed 50 mm Ø monitoring well to 6.1 m
completed with 3.1 m screen
Sand backfill from 2.4 m to 6.1 m
Bentonite seal from 0.0 m to 2.4 m
Provided with a momument steel casing

Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 14

FIGURE NO.: 14

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 4, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
231.4	Ground Surface							
0.0	**360 mm Granular Fill**	1	DO	29	0		7	
	Brown, compact — Weathered **SANDY SILT TILL** some clay to clayey, a trace of gravel	2	DO	17	1		21	
		3	DO	26	2		12	
229.1								
2.3		4	DO	28			21	
	Very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	5	DO	20	3		20	
	— — Brown / Grey				4			
	— — Sandy	6	DO	24	5		13	
		7	DO	26	6		20	
224.8								
6.6	**END OF BOREHOLE**				7			
					8			
					9			
					10			

WATER LEVEL: Dry on Completion

JOB NO.: 2307-S067

LOG OF BOREHOLE: 15

FIGURE NO.: 15

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 4, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
232.3	Ground Surface							
0.0	**400 mm Granular Fill**	1	DO	30	0		5	
	EARTH FILL Brown to grey, silty clay mixed with gravel	2	DO	18	1		18	
230.8								
0.8	Sandy	3	DO	22	2		13	
	Stiff to very stiff **SILTY CLAY** occ. gravel	4	DO	21			22	
		5	DO	20	3		24	
	Brown / Grey				4			
		6	DO	11	5		22	
226.8								
5.5	Grey, very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	7	DO	18	6		19	
225.7								
6.6	**END OF BOREHOLE**				7			
					8			
					9			
					10			

Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 16

FIGURE NO.: 16

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 4, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
231.1	Ground Surface							
0.0	**50 mm Asphalt** **450 mm Granular Fill**	1	DO	34	0		6	
230.1 1.0	**EARTH FILL** Dark brown, silty clay mixed with organics and topsoil	2	DO	18	1		19	
	Bown, very stiff to hard **SILTY CLAY** occ. gravel	3	DO	20	2		21	
	Silty clay till layers	4	DO	34			16	
226.9		5	DO	28	3		19	
4.2	Grey, very stiff **SILTY CLAY TILL** some sand to sandy, a trace of gravel	6	DO	22	4 5		18	
225.6 5.5	Grey, very stiff **SILTY CLAY** occ. gravel	7	DO	21	6		23	
224.5 6.6	**END OF BOREHOLE**				7 8 9 10			Dry on Completion

JOB NO.: 2307-S067

LOG OF BOREHOLE: 17

FIGURE NO.: 17

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 4, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
232.3	Ground Surface							
0.0	**450 mm Granular Fill**	1	DO	30	0		8	
	Weathered	2	AS	13	1		22	
	Stiff to very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	3	DO	22	2		22	
		4	DO	18			23	
	Sandy silt till layers	5	DO	28	3		13	▽ W.L. @ El. 229.2 m on completion
	Brown Grey				4			
		6	DO	11	5		15	
226.8 5.5	Grey, very stiff **SILTY CLAY** a trace of gravel	7	DO	20	6		23	
225.7 6.6	**END OF BOREHOLE**				7 8 9 10			

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 18

FIGURE NO.: 18

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 4, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
231.7	Ground Surface							
0.0	**50 mm Asphalt** **450 mm Granular Fill**	1	DO	38	0		6	
	EARTH FILL Brown to grey, silty clay mixed with rootlets and organics							
230.7 1.0		2	DO	22	1		19	
	Sandy Brown, stiff to hard **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	3	DO	26			11	
		4	DO	32	2		19	
		5	DO	26	3		22	
		6	DO	12	4		15	
226.2 5.5	Grey, very dense **SANDY SILT TILL** traces of clay and gravel occ. cobbles and boulders				5			
225.3		7	DO	50/15	6		7	
6.4	**END OF BOREHOLE**				7			
					8			
					9			
					10			

Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 19

FIGURE NO.: 19

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 9, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
229.6	Ground Surface							
0.0	**35 cm TOPSOIL**	1	DO	3	0		22	
	Brown, compact — Weathered **SANDY SILT TILL** clayey, a trace of gravel occ. cobbles and boulders	2	DO	18	1		14	
		3	DO	16	2		13	
229.7		4	DO	22			13	
2.6	Very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers Brown / Grey	5	DO	22	3		19	
		6	DO	20	4 5		19	
225.7		7	DO	26	6		17	
6.6	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 6.1 m completed with 3.1 m screen Sand backfill from 2.4 m to 6.1 m Bentonite seal from 0.0 m to 2.4 m Provided with a momument steel casing				7 8 9 10			Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 2

FIGURE NO.: 2

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 9, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
237.2	Ground Surface							
0.0	**30 cm TOPSOIL**	1	DO	7	0		38	
	Brown, firm to very stiff **SILTY CLAY TILL** Weathered a trace of gravel, occ. sand seams and layers	2	DO	22	1		14	
		3	DO	28	2		14	
234.7		4	DO	16			24	
2.5	Grey, stiff to very stiff **SILTY CLAY** occ. gravel	5	DO	11	3		25	
		6	AS	13	4 5		27	
230.6		7	DO	16	6		28	
6.6	**END OF BOREHOLE**				7 8 9 10			

Installed 50 mm Ø monitoring well to 6.3 m
completed with 3.1 m screen
Sand backfill from 2.6 m to 6.3 m
Bentonite seal from 0.0 m to 2.6 m
Provided with a momument steel casing

Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 20

FIGURE NO.: 20

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 9, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
227.9	Ground Surface							
0.0	**35 cm TOPSOIL**	1	DO	12	0		17	
	Weathered Brown, stiff to very stiff **SILTY CLAY** occ. gravel, topsoil and rootlets	2	DO	22	1		18	
		3	DO	26	2		20	
225.6								
2.3	Brown Grey Very stiff to hard **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	4	DO	32	3		14	
		5	DO	25			12	
	Clay-shale reversion	6	DO	54	4		10	
222.4					5			
5.5	Grey, very dense **SHALE**				6		6	
221.7	weathered	7	DO	50/15				
6.3	**END OF BOREHOLE**				7			
	Installed 50 mm Ø monitoring well to 5.9 m completed with 3.1 m screen Sand backfill from 2.3 m to 5.9 m Bentonite seal from 0.0 m to 2.3 m Provided with a momument steel casing				8			Dry on Completion
					9			
					10			

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 21

FIGURE NO.: 21

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 3, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
230.9	Ground Surface							
0.0	**300 mm Granular Fill**	1	DO	7	0		16	
	Weathered Stiff to hard **SILTY CLAY TILL** a trace of gravel occ. sand seams and rootlets	2	DO	16	1		20	
		3	DO	29	2		19	
		4	DO	24			11	
		5	DO	22	3		19	
	Brown Grey				4			
		6	DO	16	5		21	
					6			
224.3		7	DO	46			18	
6.6	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 6.1 m completed with 3.1 m screen Sand backfill from 2.4 m to 6.1 m Bentonite seal from 0.0 m to 2.4 m Provided with a momument steel casing				7 8 9 10			Dry on Completion

JOB NO.: 2307-S067

LOG OF BOREHOLE: 22

FIGURE NO.: 22

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 3, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
231.0	Ground Surface							
0.0	**80 mm Asphalt** **250 mm Granular Fill**	1	DO	14	0		8	
	EARTH FILL Dark brown to grey, sandy silt occ. organic and rootlet inclusion, shale fragments	2	DO	16	1		9	
229.5								
1.5	Occ.rootlets	3	DO	16	2		24	
	Very stiff to hard **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	4	DO	28			19	
		5	DO	30	3		19	
	Brown / Grey				4			
	Sand layer	6	DO	22	5		13	
	Clay-shale reversion	7	DO	50/8	6		9	
224.7								
6.3	**END OF BOREHOLE**				7			
	Installed 50 mm Ø monitoring well to 6.1 m completed with 3.1 m screen Sand backfill from 2.4 m to 6.1 m Bentonite seal from 0.0 m to 2.4 m Provided with a momument steel casing				8			
					9			
					10			Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 23

FIGURE NO.: 23

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 3, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
232.4	Ground Surface							
0.0	**300 mm Granular Fill**	1	DO	40	0		3	
	EARTH FILL Brown, sandy silt	2	AS	28	1		15	
230.9								
1.5	Very stiff to hard **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	3	DO	40	2		15	
	Sandy silt till layer	4	DO	36			10	
		5	DO	36	3		18	
		6	DO	28	4		12	
	Brown Grey				5			
	Occ.shale fragments	7	DO	50/15	6		21	
226.0								
6.4	**END OF BOREHOLE**				7			
					8			
					9			
					10			

WATER LEVEL: Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 24

FIGURE NO.: 24

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 3, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
233.3	Ground Surface							
0.0	**30 mm Asphalt** **400 mm Granular Fill**	1	DO	42	0		5	
	EARTH FILL Dark brown, silty clay, some sand	2	DO	12	1		12	
232.2 1.1		3	DO	30	2		22	
	Very stiff to hard **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	4	DO	32	3		20	
		5	DO	42	4		20	
	Brown / Grey	6	DO	30	5		17	
		7	DO	30	6		19	
226.7 6.6	**END OF BOREHOLE**				7 8 9 10			W.L. @ El. 230.1 m on completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 2, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
236.7	Ground Surface							
0.0	**280 mm Granular Fill**	1	DO	11	0		4	
	Weathered							
	Brown, very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	2	DO	22	1		19	
		3	DO	30	2		19	
234.4								
2.3	Stiff to very stiff **SILTY CLAY** occ. gravel	4	DO	20			23	
		5	DO	16	3		25	
	Brown / Grey				4			
		6	DO	14	5		26	
		7	DO	14	6		28	
230.1								
6.6	**END OF BOREHOLE**				7			Dry on Completion
					8			
					9			
					10			

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 2, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
236.6	Ground Surface							
0.0	**150 mm Granular Fill**	1	DO	40	0		3	
	EARTH FILL Dark grey, silty clay with sand and gravel	2	DO	16	1		17	
234.8		3A	DO	21			15	
1.8	Brown, very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	3B			2		19	
234.0		4	DO	17			19	
2.6	Brown, compact **SILT** a trace to some clay	5	DO	28	3		20	
232.5					4			
4.1	Grey, very stiff **SILTY CLAY** occ. gravel	6	DO	16	5		25	▽ W.L. @ El. 231.7 m on completion
230.0		7	DO	19	6		26	
6.6	**END OF BOREHOLE**				7			
					8			
					9			
					10			

JOB NO.: 2307-S067

LOG OF BOREHOLE: 5

FIGURE NO.: 5

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 2, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
236.0	Ground Surface							
0.0	**150 mm Granular Fill**	1	DO	41	0		4	
	EARTH FILL Dark brown, silty clay with gravel occ. shale fragments	2	DO	15	1		23	
		3	DO	18	2		19	
234.0 2.0	Very stiff to hard **SILTY CLAY** occ. gravel and sand seams	4	DO	36	3		21	
		5	DO	26	4		19	
	Brown / Grey	6	DO	22	5		25	
229.4		7	DO	22	6		23	
6.6	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 6.1 m completed with 3.1 m screen Sand backfill from 2.4 m to 6.1 m Bentonite seal from 0.0 m to 2.4 m Provided with a flush mount casing				7 8 9 10			Dry on Completion

JOB NO.: 2307-S067

LOG OF BOREHOLE: 6

FIGURE NO.: 6

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 2, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
235.7	Ground Surface							
0.0	**100 mm Asphalt** **200 mm Granular Fill**	1	DO	37	0		4	
	Brown, very stiff — Weathered **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	2	DO	22	1		7	
		3	DO	28	2		21	
233.4								
2.3		4	DO	20			24	
	Stiff to very stiff **SILTY CLAY** occ. gravel	5	DO	22	3		25	
	— — Brown / Grey				4			
		6	DO	14	5		27	
		7	DO	16	6		27	
229.1								
6.6	**END OF BOREHOLE**				7			
					8			
					9			
					10			Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 7

FIGURE NO.: 7

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 2, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
233.5	Ground Surface							
0.0	**250 mm Granular Fill**	1	DO	30	0		7	
	Weathered							
	Very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	2	DO	18	1		15	
		3	DO	28	2		17	
		4	DO	28			21	
		5	DO	28	3		21	
	Brown Grey				4			
		6	DO	18	5		20	
		7	DO	20	6		19	
226.9								
6.6	**END OF BOREHOLE**				7			
	Installed 50 mm Ø monitoring well to 5.9 m completed with 3.1 m screen Sand backfill from 2.3 m to 5.9 m Bentonite seal from 0.0 m to 2.3 m Provided with a momument steel casing				8			Dry on Completion
					9			
					10			

JOB NO.: 2307-S067

LOG OF BOREHOLE: 8

FIGURE NO.: 8

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 3, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
233.8	Ground Surface							
0.0	**360 mm Granular Fill**	1	DO	22	0		9	
	EARTH FILL Dark brown, silty clay mixed with topsoil							
232.8 / 1.0		2	DO	11	1		24	
	Very stiff to hard **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	3	DO	22	2		21	
		4	DO	26			17	
	Sandy silt layers	5	DO	30	3		15	
		6	DO	26	5		21	
	Brown Grey	7	DO	56	6		8	
227.2 / 6.6	**END OF BOREHOLE**				7			
	Installed 50 mm Ø monitoring well to 6.1 m completed with 3.1 m screen Sand backfill from 2.4 m to 6.1 m Bentonite seal from 0.0 m to 2.4 m Provided with a flush mount casing				8 9 10			Dry on Completion

Soil Engineers Ltd.

JOB NO.: 2307-S067

LOG OF BOREHOLE: 9

FIGURE NO.: 9

PROJECT DESCRIPTION: Proposed Industrial and Commercial Development

METHOD OF BORING: Soild Flight Augers

PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

DRILLING DATE: August 8, 2023

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
231.5	Ground Surface							
0.0	**500 mm Granular Fill**	1	DO	23	0		12	
	EARTH FILL Brown, sandy silt, trace clay	2	DO	10	1		18	
230.0								
1.5	Brown, very stiff to hard **SILTY CLAY** occ. gravel	3	DO	22	2		21	
		4	DO	32			22	
		5	DO	21	3		25	
227.5								
4.0	Grey, very stiff **SILTY CLAY TILL** a trace of gravel, occ. sand seams and layers	6	DO	18	5		11	
		7	DO	20	6		11	
224.9								
6.6	**END OF BOREHOLE**				10			

Installed 50 mm Ø monitoring well to 6.1 m
completed with 3.1 m screen
Sand backfill from 2.4 m to 6.1 m
Bentonite seal from 0.0 m to 2.4 m
Provided with a flush mount casing

Dry on Completion

Soil Engineers Ltd.

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

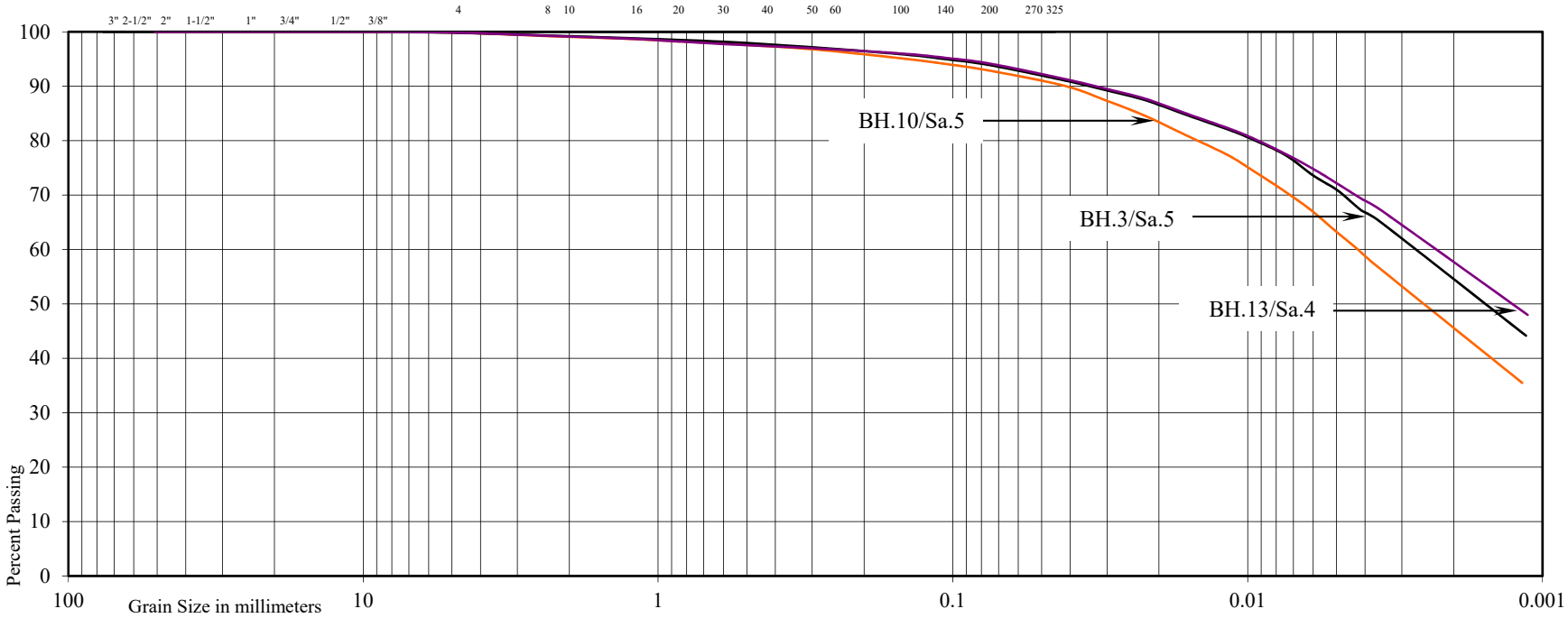
Reference No: 2307-S067

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Industrial Development

Location: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

Borehole No:	3	10	13
Sample No:	5	5	4
Depth (m):	1.5	3.0	2.3
Elevation (m):	235.2	230.2	231.1

BH./Sa.	3/5	10/5	13/4
Liquid Limit (%) =	-	-	-
Plastic Limit (%) =	-	-	-
Plasticity Index (%) =	-	-	-
Moisture Content (%) =	19	24	21
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-7}	10^{-7}

Classification of Sample [& Group Symbol]: SILTY CLAY, a trace of sand

Figure: 25

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

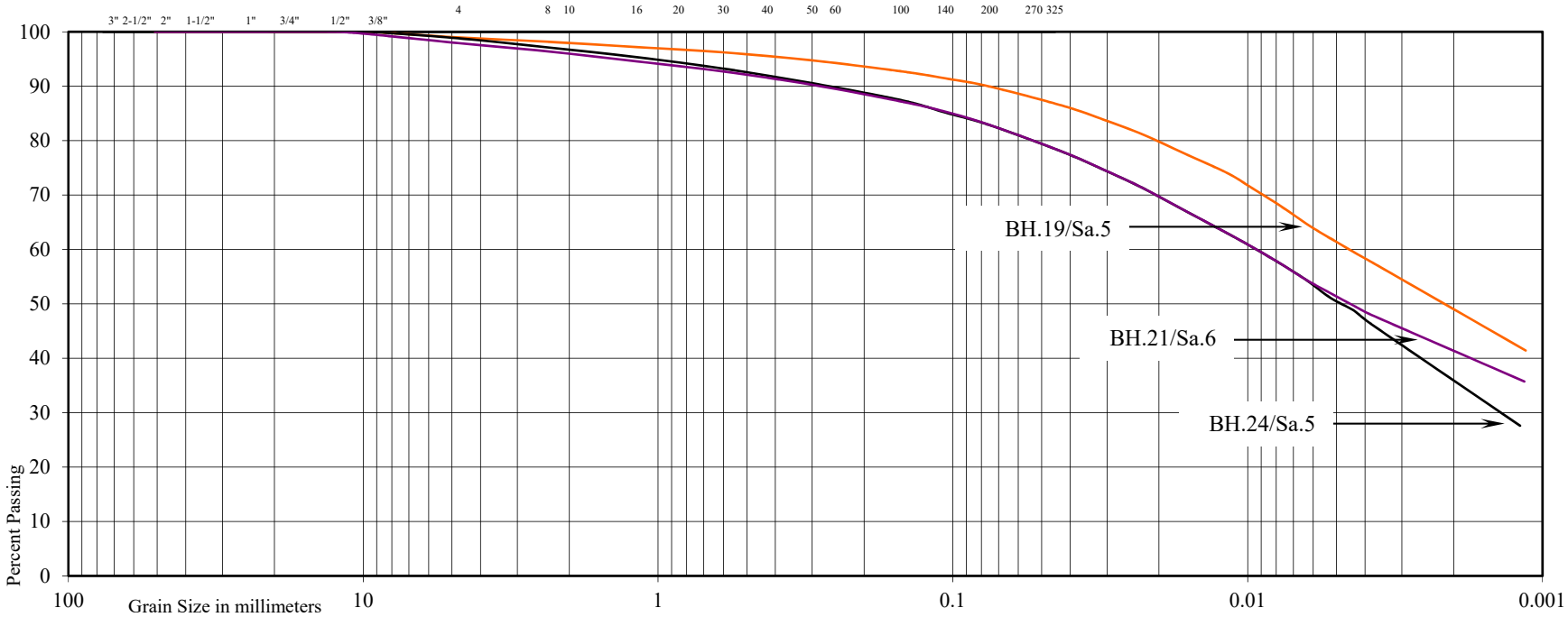
Reference No: 2307-S067

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Industrial Development

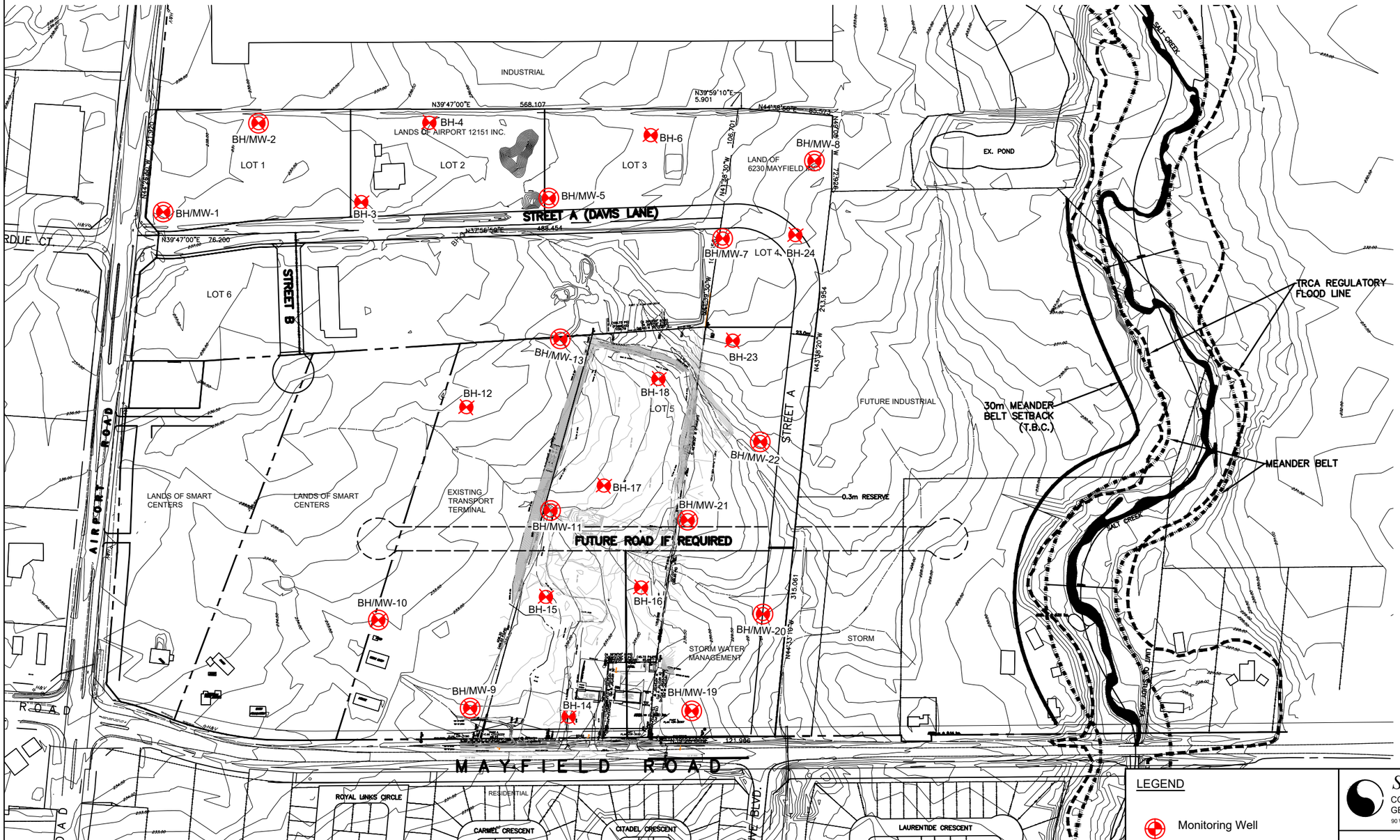
Location: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

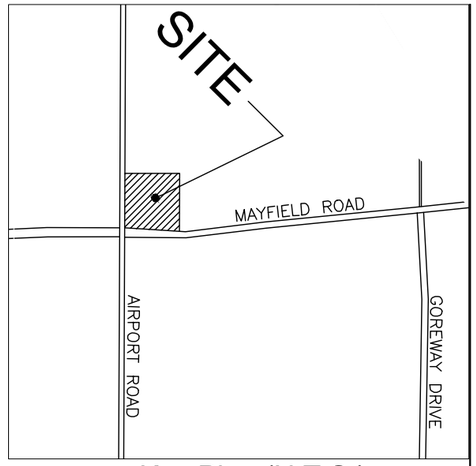
Borehole No:	19	21	24
Sample No:	5	6	5
Depth (m):	3.0	4.6	3.0
Elevation (m):	226.6	226.3	230.3

BH./Sa.	19/5	21/6	24/5
Liquid Limit (%) =	-	35	-
Plastic Limit (%) =	-	19	-
Plasticity Index (%) =	-	16	-
Moisture Content (%) =	19	21	20
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-7}	10^{-7}

Classification of Sample [& Group Symbol]: SILTY CLAY TILL, a trace some sand, a trace of gravel

Figure: 26





Key Plan (N.T.S.)

LEGEND

- Monitoring Well
- Borehole

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90 WEST BEAVER CREEK ROAD, SUITE #100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BOREHOLE AND MONITORING WELL LOCATION PLAN

SITE: 6086, 6186, 6230 Mayfield Road And 12151 Airport Road, Town of Caledon

DESIGNED BY: PHM	**CHECKED BY:** KL	**DWG NO.:** 1	
SCALE: 1:4000	**REF. NO.:** 2307-S067	**DATE:** September 2023	**REV**

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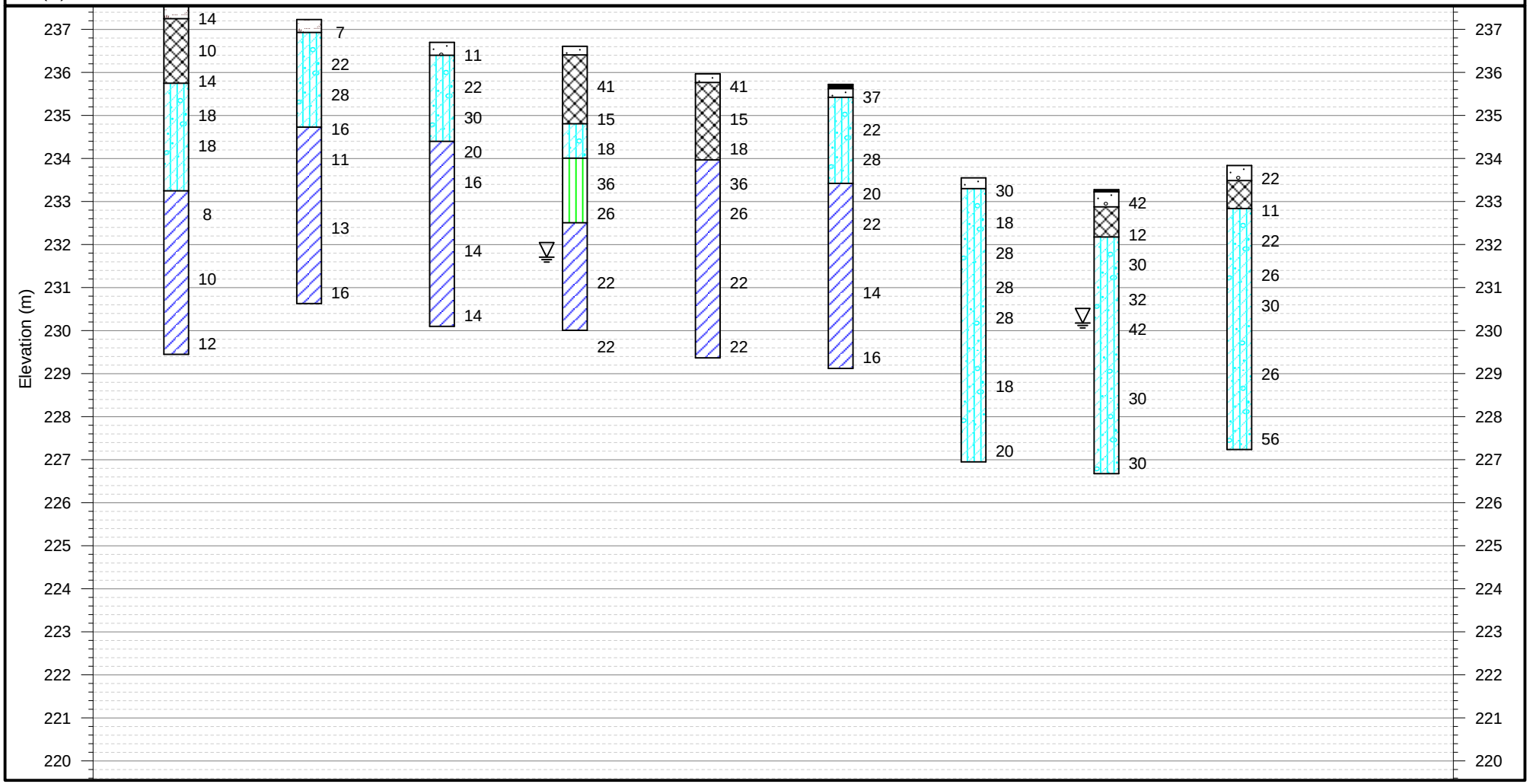
SUBSURFACE PROFILE
DRAWING NO. 2
SCALE: AS SHOWN

JOB NO.: 2307-S067
REPORT DATE: September, 2023
PROJECT DESCRIPTION: Proposed Industrial and Commercial Development
PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

LEGEND

ASPHALT | GRANULAR | SILTY CLAY | TOPSOIL
FILL | SILT | SILTY CLAY TILL

WATER LEVEL (END OF DRILLING)



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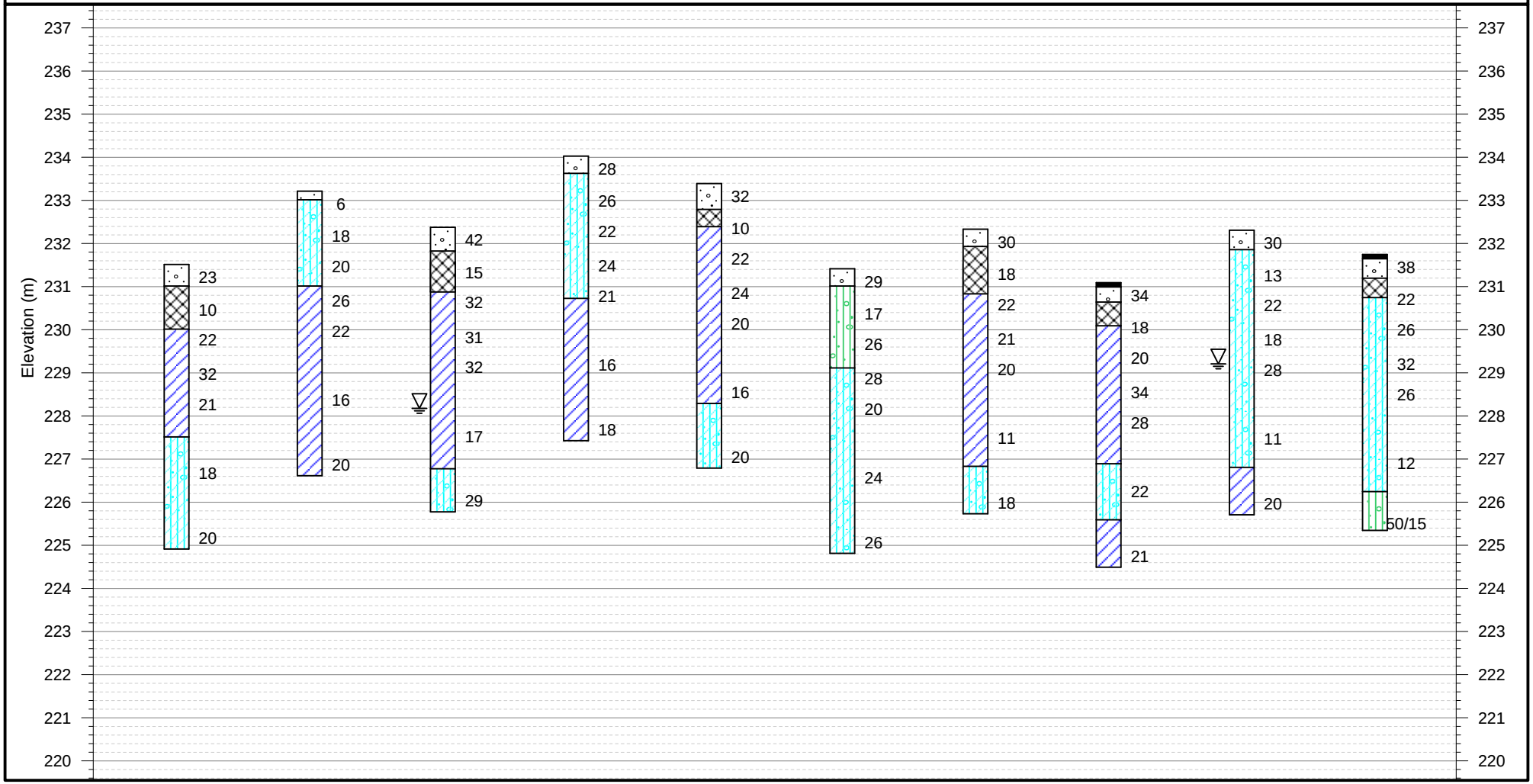
SUBSURFACE PROFILE
DRAWING NO. 3
SCALE: AS SHOWN

JOB NO.: 2307-S067
REPORT DATE: September, 2023
PROJECT DESCRIPTION: Proposed Industrial and Commercial Development
PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

LEGEND

ASPHALT | GRANULAR | SILTY CLAY | SILTY CLAY TILL
FILL | SANDY SILT TILL
WATER LEVEL (END OF DRILLING)



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SUBSURFACE PROFILE
DRAWING NO. 4
SCALE: AS SHOWN

JOB NO.: 2307-S067
REPORT DATE: September, 2023
PROJECT DESCRIPTION: Proposed Industrial and Commercial Development
PROJECT LOCATION: 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon

LEGEND

ASPHALT | GRANULAR | SHALE | SILTY CLAY TILL
FILL | SANDY SILT TILL | SILTY CLAY | TOPSOIL
WATER LEVEL (END OF DRILLING)