RE: GEOTECHNICAL INVESTIGATION
PROPOSED APARTMENT DEVELOPMENT
BROCK STREET EAST AND HERREMA BOULEVARD
UXBRIDGE, ONTARIO

FOR: Evendale Developments Limited
2 Farr Avenue
Sharon, ON
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ATTENTION: Mr. David Sud

REPORT NO.: 2020-13992

DATE: December 16, 2020

DISTRIBUTION: 3 Copies: Evendale Developments Limited
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Original: (FILE No.: 10451A-S0396-GEO)

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December 16, 2020 **REPORT No.: 2020-13992**
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1.0 INTRODUCTION

Sola Engineering Inc. (Sola) was retained by Mr. David Sud of Evendale Developments Limited ("the Client" or "the Clients") to carry out a geotechnical investigation for the Proposed Apartment Development located at Brock Street East and Herrema Boulevard in Uxbridge, Ontario (the "subject site" or "site"). Authorization to proceed with the investigation was received on February 3, 2020, through the acceptance of Sola's Proposal No. 2019-2203 dated August 21, 2019.

The Client has provided Sola with the following information to assist with the understanding of the project objectives.

- Conceptual Site Plans, Drawing Nos. A1 (Site Plan), A2 (Basement Plan), A3 (Ground Plan), and A4 (2nd to 6th Floor Plan), prepared by Keith Loffler McAlpine Architects, dated January 26, 2020, showing the approximate locations of the proposed development;
- Construction Drawings for Brock Street Development (Project No. 2017-0569, Plan of Subdivision File No. S-U-2017-03) prepared by Cole Engineering Group Limited, dated January 16, 2020;
- Soil Investigation Report for Proposed Residential Development (Reference No. 0412-S097) prepared by Soil Engineers Limited, dated February 2005; and,
- Updated Site Plan, Drawing No. A1, prepared by Keith Loffler McAlpine Architects, and dated November 26, 2020 (see **Appendix A**).

As per the details provided by the client, the purpose of this study is to provide recommendations for the design and construction of the proposed six (6)-story residential condominium building including one (1) level underground parking garage. It would also include the surface parking area on the west side of the proposed building.

This report presents the details of Sola's fieldwork and laboratory testing, outlines the subsoil and groundwater conditions at the subject site, and provides recommendations on the aforementioned items.

In this report, standard site investigation procedures (where Sola is involved) have been adopted. The procedures including those developed by Ontario Building Code (OBC), Canadian Foundation Engineering Manual (CFEM), American Society for Testing and Materials (ASTM), Ontario Ministry of Transportation (MTO) and Toronto Transit Commission (TTC), are considered by far the most accepted methods by the local geotechnical society for the general engineering purposes. Soil Classification Systems used for developing this report have been in general conformance with those outlined in the above-mentioned procedures, with modifications where appropriate. Where in doubt, this office must be contacted for further interpretation or clarification.

This report has been prepared for the Client, and their nominated engineers and designers. Third-party use or reproduction, in part or in full, of this report, is prohibited without written authorization from Sola. This report is also subject to the Statement of Limitations which forms an integral part of this document.

2.0 SITE SETTING

2.1 SITE LOCATION

The site is located in the northeast of the intersection of Donald Lane and Brock Street East in the Township of Uxbridge;

The subject site is bounded by the Lowe Boulevard (proposed) to the north, Herrema Boulevard (proposed) to the East, Brock Street East to the south, and the Donald Avenue to the west. A Borehole Location Site Plan is included in this report as **Enclosure 1**.

2.2 PUBLISHED GEOLOGY

Based on a review of an existing geological publication for the site area, Ontario Geological Survey (OGS) Map 2633: "Quaternary Geology, Uxbridge Area", the site is underlain by the glaciolacustrine deposits: silt and clay; massive to well laminated or rhythmically bedded, basin deposits, and the ice-contact stratified deposits: unsubdivided sand and gravel; including minor silt, clay and flow tills; deposited in moraines, eskers, kames, subaqueous fans; and, mainly sand. According to the OGS Map M2544 "Bedrock Geology of Ontario", the superficial geology is underlain by the bedrock of the Georgian Bay Formation, Blue Mountain Formation, Billings Formation, Collingwood Member, Eastview Member comprising of Shale, limestone, dolostone, and siltstone. The OGS Map P3214, "Bedrock Topography, Newmarket Area", reports bedrock to sub-crop the site at an elevation of approximately 185.0 m. With a ground surface elevation at the site of approximately 270.0 m at its highest, the anticipated depth to bedrock is approximately 85.0 m below the existing ground level. Based on the soil investigation data from the Soil Engineers Ltd. (soil investigation report for the proposed residential development, Reference No. 0412-S097, and dated February 2005), the soil profile generally comprises silty fine sand or silty clay deposits.

3.0 GROUND INVESTIGATION

3.1 FIELD INVESTIGATION

3.1.1 Soil Investigation

Prior to undertaking field drilling, clearance of existing public utility services to the site was obtained from all applicable agencies and companies. Utility services were also mapped out using a private company.

The field investigations were carried out on March 5, 2020 and comprised the drilling of six (6) boreholes, as shown in **Table *1***.

The approximate locations of the boreholes are presented in **Enclosure 1**.

Table 1: Summary of Borehole Depths

BH No.	Termination Depth (m)	Monitoring Well Installed	Remarks
BH1	9.45	No	DCPT
BH2	8.08	Yes	
BH3	6.55	No	
BH4	10.67	No	Vane Shear Test, DCPT
BH5	8.08	Yes	
BH6	6.55	No	

The boreholes were advanced using a Bombardier Track Mounted drill rig. Standard Penetration Tests (SPTs) split spoon samples were collected from boreholes using a 50 mm outer diameter and 35 mm inner diameter split barrel sampler driven with a 63.5 kg automatic hammer dropping 760 mm.

The soil drilling equipment was supplied and operated by Strong Soil Search Inc. of Claremont, Ontario. The drilling works were completed under the full-time supervision of a qualified Sola Technician.

The soil samples were logged in the field and returned to Sola's laboratory in Vaughan for review and subsequent laboratory testing.

Logs of all boreholes completed, together with their depths relative to their elevations, are presented in **Enclosures 2 to 7**.

3.1.2 Groundwater Investigation

Groundwater level observations were made during drilling and in the open boreholes upon completion of the drilling operations.

The scope of this investigation also included the installation of two (2) monitoring wells in BH2 and BH5.

Details of groundwater observations for each borehole are presented on the respective borehole logs presented in **Enclosures 2 through 7**. Further discussion on groundwater is provided in **Section 4.2** of this report.

3.1.3 Survey

The borehole elevations at the monitoring wells (BH2 and BH5) were surveyed and provided by the client. The approximte elevations for all the other borehole locations were taken from the Construction Drawings for Brock Street Development (Project No. 2017-0569, Plan of Subdivision File No. S-U-2017-03, prepared by Cole Engineering Group Limited, and dated January 16, 2020)

3.2 GEOTECHNICAL FIELD AND LABORATORY TESTING

All soil samples were submitted to Sola's laboratory for natural moisture content determination. The results of the moisture content are presented in the borehole log in **Enclosures 2 through 7**. In addition, one (1) soil sample from Borehole BH4, was subjected to particle size analysis and Atterberg limits. The results of the laboratory tests are provided in **Enclosures 10 and 11.**

4.0 SUBSURFACE CONDITIONS

The detailed descriptions of the sub-soil conditions, encountered at each borehole location, are given in the borehole Logs in **Enclosures 2 through 7**.

The borehole data collected by Sola represents the subsurface conditions only at the borehole locations. It should be pointed out that the material boundaries indicated on the Borehole Logs are approximate and based on visual observations and interpolation between successive samples. These boundaries typically represent a transition from one material type to another and should not be regarded as an exact plane of geological change. It should also be noted that the subsurface conditions may vary across the site.

A summary of the characteristics of each unit of subsoil encountered within the borehole depths is given in the ensuing paragraphs.

4.1 SOIL CHARACTERISATION

4.1.1 Ground Cover

A layer of topsoil was initially encountered at all borehole locations except in BH1. The topsoil thicknesses were measured to be around 50 mm to 150 mm.

In BH1, a layer of crushed limestone, having a thickness of approximately 125 mm was initially encountered.

It is important to note that topsoil thicknesses may vary throughout the site area, depending upon their location. As such, these findings should not be relied upon for any estimation of topsoil quantities to be stripped prior to construction. Careful verification of the fill depth must be carried out by the Contractor who is bidding for the work.

4.1.2 Fill (Including Probable Fill)

Fill layers consisting of a heterogenous mixture of gravel, sand, silt, and clay were encountered below the ground cover at all the borehole locations. There were traces of rootlets and organic materials found in all the boreholes except in BH3. The fill layers varied in thicknesses significantly, as shown in **Table 2**.

Table 2: Fill Depths at Borehole Locations

BH No.	Approximate Ground Elevation (m)	Fill Bottom Depth (m)	Approximate Fill Bottom Elevation (m)
BH1	269.91	2.29	267.62
BH2	270.20	2.29	267.91
BH3	269.63	3.05	266.58
BH4	269.87	2.29	267.58
BH5	269.30	3.05	266.25
BH6	269.60	4.57	265.03

SPT “N” values for fill materials were recorded between 4 (BH2) to 40 (BH3), indicating that the fill was, in all likelihood, unselected and unengineered.

The moisture content of the fill layer varied from 15.1% (BH5) to 25.3% (BH2), indicating generally moist to very moist conditions.

It is important to note that fill thicknesses may vary throughout the site area, depending upon their location. As such, these findings should not be relied upon for any estimation of fill quantities to be stripped prior to construction. Careful verification of the fill depth must be carried out by the Contractor who is bidding for the work.

4.1.3 Clayey Silt / Silty Clay

The cohesive soil layers consisting of clayey silt to silty clay were encountered directly underlying the fill layers in BH1, BH2 and BH4. The clayey silt to silty clay layers extended to termination depths in these boreholes.

SPT "N" values recorded in the cohesive layer ranged from 7 (BH1) to 26 (BH4) blows per 300 mm, which are firm to very stiff in terms of the relative consistency of the soil.

In the cohesive soil deposits, the moisture content varied from 17.3% (BH2) to 28.6% (BH4), indicating generally moist to very moist conditions.

4.1.4 Silty Sand

The silty sand layers were encountered directly underlying the fill layers in BH3, BH5 and BH6. The sandy layers extended to termination depths in these boreholes.

SPT "N" values recorded in the sandy layer ranged from 16 (BH3) to 68 (BH5) blows per 300 mm, which are compact to very dense conditions of the soil.

In the silt sand deposits, the moisture content varied from 8.7% (BH3) to 21.4% (BH5), indicating generally slight moist to moist conditions.

Vane shear test was carried out in BH4 at the depth of 5.11 m from the ground surface and the torque was measured during the test and the shear strength was calculated from the measured torque as 119 KPa (remolded 42 kPa) which is very stiff in relative consistency of the soil.

Dynamic Cone Penetration Test (DCPT) tests were carried out during the intrusive drilling course in BH1 and BH4. From the Geotechnical standpoint resistance values from SPT and DCPT are considered reasonably similar.

4.2 GROUNDWATER CONDITIONS

Groundwater level observations (**approximate**) were made during drilling and in the open boreholes upon completion of the drilling operations. Monitoring wells were also installed at the completion of boreholes BH2 and BH5.

A groundwater monitoring visit was also undertaken by Sola later on April 1, 2020, and the investigation results are provided in **Table 3**.

Table 3: Summary of Groundwater Levels

Borehole	Approximate Ground Elevation (m)	Monitoring Well	Cave Depth (m)	Groundwater Depth (m) bgs*		Groundwater Elevation (m)	
				Upon Completion Of drilling (March 5, 2020)	On April 1, 2020	Upon Completion Of drilling (March 5, 2020)	On April 1, 2020
BH1	269.91	No	1.22	1.17	Not a Well	268.74	Not a Well
BH2	270.20	Yes	6.10	2.13	1.59	268.07	268.61
BH3	269.63	No	3.05	1.52	Not a Well	268.11	Not a Well
BH4	269.87	No	2.44	1.52	Not a Well	268.35	Not a Well
BH5	269.30	Yes	1.83	1.22	1.49	268.08	267.81
BH6	269.60	No	0.92	0.92	Not a Well	268.68	Not a Well

bgs*- Below Existing Ground Surface

It should be noted that water levels can vary in response to seasonal fluctuations and major weather events. In addition, a perched water condition can occur due to the accumulation of surface water in the more pervious fill overlying less pervious deposits, especially during seasonally wetter periods.

The long-term groundwater level should refer to the hydrogeology study of the site.

5.0 DISCUSSIONS AND RECOMMENDATIONS

Based on the ground conditions found at the site premises, our recommendations are presented in the following sections.

5.1 FROST PROTECTION

Design frost protection depth for the general area is 1.5 m in the Uxbridge area. All footings exposed to seasonal freezing conditions must have at least 1.5 meters of soil cover, or equivalent artificial insulation, for frost protection.

5.2 CONVENTIONAL SPREAD OR STRIP FOUNDATIONS

The borehole data collected by Sola only represents the subsurface conditions at the borehole locations. The subsurface conditions were found varying across the site. Fill materials were found varying in thicknesses notably over a small distance at the site. Therefore, the subsoil at the Underside Footing Level (USF) should be verified by a geotechnical engineer during actual construction.

In order to confirm the stability of the excavation sidewall of fill materials, and native ground, it is recommended that test pits be carried out within the proposed area prior to actual construction.

Based on the borehole data, the native soil may be contacted at an approximate depth of 4.6 m below the ground surface. The footings can be constructed using a conventional construction technique. At borehole locations, the highest founding stratum at the depths may be found as outlined in **Table 4.** Alternatively, the foundation elements can be constructed on the "trench and pour" unit, as outlined in **Section 5.2.1.**

The design values provided above are based on the presumption that the allowable bearing pressure at SLS is governed by total and differential settlements of 25 mm and 19 mm respectively, and the structure will tolerate an angular distortion of 1 in 300.

Table 4: Recommended Footing Depths and Soil Bearing Capacities

Borehole	Minimum Depth Below Existing Grade (m)	Serviceability Limit State (kPa)	Factored Ultimate Limit State (kPa)	Founding Soil
BH1	2.3	180	270	Clayey Silt / Silty Clay
	3.0	120	180	
BH2	2.3	180	270	Clayey Silt / Silty Clay
	3.0	120	180	
BH3	3.0	150	230	Silty Sand
BH4	2.3	180	270	Clayey Silt / Silty Clay
	3.0	120	180	
BH5	3.0	150	230	Silty Sand
BH6	4.6	150	230	Silty Sand

Where it is necessary to place footings on the soil at different levels, the upper footing must be founded below an imaginary 10 horizontal to 7 vertical line (10H:7V) drawn up from the base of the lower footing. The lower footing must be installed first to minimize the risk of undermining the upper footing.

Footings and any foundation wall should be reinforced as per the design to be provided by the Structural Engineer of the project.

The recommended bearing capacities and the corresponding founding elevations would need to be confirmed by geotechnical engineering staff at the site before pouring footing concrete.

Where construction is undertaken during winter conditions, footing subgrades should be protected from freezing. Foundation walls and columns should be protected against heave due to soil adfreeze.

It should be noted that the recommended bearing capacities have been calculated by Sola from the borehole information for the design state only. Should higher bearing values be required, this office should be contacted to review this report.

5.2.1 Trench-And-Pour Footings on Native Ground

"Trench and pour" footings on the native undisturbed ground may be placed at the same depths as shown in **Table 4** and designed for the same allowable soil bearing pressure as given. The footing shall be excavated down to the native ground and backfilled with 0.7 MPa Unshrinkable Fill (U-Fill) concrete up to the designed USF level. If a trench-and-pour foundation is chosen, it is recommended that the trenching and pouring of concrete be carried out simultaneously, and the trench-and-pour footing construction should be inspected on a continuous basis.

Feasibility of the trench-and-pour is dependent on the sidewall stability of the excavated trench which may be affected by the groundwater levels, seasonal effects and/or the construction techniques. Contractors who carry out work must be familiar with the procedure since the time window for keeping the excavation sidewall stable may be limited. It is recommended that the contractor carries out a test pit trial if this option is considered.

Dewatering provisions may be required depending on the seasonal weather events and/or groundwater conditions at the time of construction. The dewatering requirements should be dictated by Project Hydrogeologist.

5.3 DEEP FOUNDATIONS (WHERE APPLICABLE)

If the fill extends to a depth of more than 4.6 m or greater bearing capacities are desired, it may be imperative that deep foundations will be required to support the Proposed Apartment Development.

Drilled and cast-in-place concrete (caisson) foundations, must be extended to the underlying competent native soil, to support the structure. Because of the unknown nature of the fill material, the possibility of auger obstruction due to the existence of large pieces of stones, cobbles, boulders, etc. should be considered.

The use of driven steel H-piles and steel tube piles can be considered to support the foundations. Given the thickness of the fill material at the site, the cast-in-place caissons or driven piles may have to be extended to a minimum depth of 10 m below the existing ground surface. In principle, piles embedded in soil derive their load-carrying capacity from both toe and shaft resistance. However, since the condition of the fill material cannot be relied upon, it is recommended that the frictional resistance of the fill material on the deep foundation be neglected and therefore, the deep foundations are designed for end bearing capacity only.

The factored geotechnical axial resistance for compression is taken as the ultimate axial capacity multiplied by 0.4; for uplift, multiplied by 0.3. Details of the pile capacity (geotechnical) can be found in **Section 18** of the **Canadian Foundation Engineering Manual (4th Edition)**.

The unit shaft friction and toe bearing on the native strata should be calculated using a combined shaft resistance factor, β, and toe bearing factor, N_t, for cast-in-place and driven piles. The recommended design parameters are listed in **Table 5.**

Table 5: Pile Design Parameters

Layer #	Layer Type	Avg. SPT N-values	Bulk Unit Weight γ, (kN/m^3)	Cast-in-place (caissons)		Driven Piles	
				Combined shaft resistance factor, β	Toe bearing capacity factor, N_t	Combined shaft resistance factor, β	Toe bearing capacity factor, N_t
1	Fill	the state and condition of the fill cannot be relied upon					
2	Silty Clay /Clayey Silt	13	20	0.3	8	0.3	8
3	Silty Sand	35	19	0.4	30	0.8	50

5.3.1 Caissons

The proposed structures may be founded on a caisson plus grade beam foundation system. Caisson foundations will have to be extended at least 1.0 m into the competent native soils. Accordingly, a geotechnical reaction of 500 kPa at SLS and a factored geotechnical resistance of 750 kPa at ULS may be used for caisson design.

The caissons are end-bearing units and will require base inspection and cleaning of the base prior to concrete placement. The caissons should have a minimum diameter of 915 mm regardless of loading considerations to facilitate foundation subgrade inspection and cleaning of the base. Caisson foundations at different elevations must be designed such that the higher caissons are set below a line drawn up at 10H: 7V from the closest edge of the lower caisson. Grade beam and pile cap units subjected to freezing temperatures must be provided with a minimum soil cover of 1.5 m for adequate frost protection. Inspection and cleaning of the end bearing caissons base are critical and must be done prior to concrete placement. Excavation and installation of the caissons must conform to all applicable sections of the Occupational Health and Safety Act, and all caissons must be installed with an adequate temporary steel safety liner to facilitate inspection and cleaning of the base. The caisson contract must stipulate that the caisson contractor will be responsible for the provision of all necessary equipment (including steel liner of adequate strength) and monitoring devices (as needed) for safe access of the inspection and base cleaning personnel into the caissons, in accordance with the Occupational Health and Safety Act requirements.

5.3.2 Driven Steel Piles

At the time of the preparation of this report, structural loading is not known. Pile types, sizes and piling methodologies will be dependent on the design objectives.

5.3.2.1. Static Analysis – Axial Compression

Based on the borehole information and design objectives, a competent bearing stratum should be established in accordance with the design parameters given in **Section 5.3**. For pile design and installation purposes, it is recommended that only end bearing is considered for vertical downward capacity evaluation. Considering the real location of each Pile, the ground elevation may be different from the ground elevation at the borehole locations. Therefore, the tip elevation for each pile needs to be adjusted to ensure that the design pile capacity is met. To achieve the required depths, in order to mobilize the required design capacity, the use of a heavy section may be required to withstand the hard-driving. Further to overcome potential hard driving conditions, preferably with a driving shoe may be required.

If the piles encounter premature refusal, then pile capacities may need to be revisited and alternative measures sought. Therefore, pile driving records should be kept, and if the refusal is met above the recommended bearing zone, the Foundation Design Engineer and the Structural Design Engineer should be

consulted to assess the axial resistance and the minimum pile length requirements.

Construction considerations that are important for the installation of steel H-piles are discussed in the following sections of the report.

5.3.2.2. Construction and Quality Control (QC) Considerations for Pile Installation

Monitoring of Pile Installation

Pile resistances can be confirmed by PDA/CAPWAP testing carried out as per ASTM D4945-89. A resistance factor, phi, (Ø) minimum equal to 0.5 should be adopted to derive the factored geotechnical resistance of a pile at ULS from the ultimate geotechnical resistance of the pile. A minimum factor of safety equal to 3 will be required to derive the geotechnical reaction at SLS from the ultimate geotechnical resistance of the pile.

PDA and CAPWAP testing should be undertaken at the end of initial driving (EOID) and on re-striking after 48 hours. On occasions, pile set-up (gain in strength) might be delayed up to 72 hours.

Vibration Monitoring

The use of driven steel piles shall be subjected to vibration monitoring in compliance with the municipal By-Laws.

Mitigation of Potential Pile Heave

All pile driving should be carried out in accordance with OPSS 903. Re-striking should be done as per OPSS903. After each pile is installed, an elevation should be taken off the pile top or on a suitable mark on the side of the pile. This elevation should be checked periodically to confirm that the pile has not heaved as a result of the driving of adjacent piles. Piles that are heaved must be re-driven to the required resistance as required by the engineer.

On-Site Inspection

Pile driving should be observed, on a full-time basis, by an experienced technician, who will record penetration resistance, pile toe elevation, etc. The technician must be supervised by a professional engineer experienced in this type of work.

Other Considerations

Consideration should also be given to alert the Contractor of potential for cobbles and boulders or construction debris in the fill materials.

The required pile spacing should be considered as per the Canadian Foundation Engineering Manual (CFEM).

5.4 EARTHQUAKE CONSIDERATIONS

Using the information provided by the site investigation, the general soil profile comprises *"Stiff Soil – Site Class D"* as defined by Table 4.1.8.4.A *"Site Classification for Seismic Site Response"* of the Ontario Building Code.

5.5 ENGINEERED FILL

On-site excavated, clean inorganic earth (native and/or fill) may be reused as engineered fill material, provided the moisture contents are strictly controlled.

If imported inorganic mineral soils are used for engineered fill construction, they must meet the applicable environmental guidelines, and their moisture contents should preferably be close to their respective optimum water content values.

Unsorted variable on-site fill material must be reviewed and approved by the Geotechnical Engineer prior to reuse. For the on-site excavated clean fill/native soils or similar imported soils, heavy compaction equipment should be employed to achieve the specified degree of field density.

Consideration may be also given to backfilling excavations with a well-graded, compacted granular soil such as Granular B as it if thoroughly compacted, would reduce the post-construction settlements to an acceptable level and may also expedite the compaction process.

Fill materials required for replacing locally softened soils or raising grades within the footprint of the structures are to comprise suitably organic free materials approved for use by the Geotechnical Engineer. Fill materials are to be placed in lifts of a maximum thickness of 300 mm and compacted, using appropriate compaction equipment, to 98 % of its Standard Proctor Maximum Dry Density (SPMDD).

Fill located in areas outside of the footprint of any proposed structure should be compacted to at least 95 % of the material's SPMDD to below 1.0 m of the subgrade level, and then to 98 % of its SPMDD up to the required grade. Imported granular fill used in confined areas should be compacted using handheld compaction equipment only.

Sola recommends that any and all engineered subgrades beneath proposed structures are to be inspected and/or proof rolled prior to construction.

5.6 FLOOR SLAB AND PERMANENT DRAINAGE

The basement floor slab construction can be adequately supported at the exposed subgrade. Any exposed soil subgrade must be proof-rolled to detect any soft or unstable areas, which must be removed and replaced with suitably compacted engineered fill, as defined in **Section 5.5** of this report. Once the required subgrade has been developed, Sola recommends that the exposed subgrade be inspected and approved by the Geotechnical Engineer prior to the placement of any granular fill or concrete.

A granular layer consisting of at least 200 mm of Ontario Provincial Standard Specification (herein "OPSS") Granular A should be installed under the floor slab as a bedding layer. The OPSS Granular A should be compacted to 100 % of its Standard Proctor Maximum Dry Density (herein "SPMDD").

Such a layer has been proven to be an effective moisture barrier for conventional floor surfaces. However, if special floor coverings such as sheet PVC with heat-sealed seams are considered, either a high-efficiency vapour barrier or venting may be added to the granular layer to prevent moisture accumulating between the concrete floor and the PVC flooring.

It is considered by Sola that completed excavations for basement floor slab should not be left open before pouring concrete for any period longer than 24 hours, particularly if the floor construction works are being completed during the winter months or wet weather periods. The base of any basement floor slab excavation that is to be left exposed for longer than 24 hours should be suitably covered and protected from water ponding, and/or protected to prevent degradation of the exposed founding stratum with the construction of a mud mat.

The design of the concrete slabs on native soils may be based on a value of modulus of subgrade reaction of 20 MPa/m on the surface of the granular moisture barrier.

The floor slab should be structurally independent of any load-bearing structural elements. The long-term groundwater level should be determined by the project hydrogeologist.

Should the lowest construction element extend below the site permanent water table, proper permanent water control provisions, i.e. watertight structure considerations, positive pumping plus backup systems, waterproofing, etc., must be included in the basement design and construction.

The hydrogeological study will dictate the need for waterproofing or an under-slab drainage system.

5.7 TEMPORARY SHORING DESIGN CONSIDERATIONS (WHERE APPLICABLE)

At the time of writing this report, it is not known if shoring will be required to facilitate the construction of the proposed development. It should be noted that, if shoring is required, a specialist shoring contractor should be consulted to establish the most appropriate design and seating depths for the temporary shoring solution.

The shoring system may be designed in accordance with the CFEM. Though not a design code, the CFEM design manual provides a comprehensive guide for shoring and anchor design and still considered the most widely used and accepted design approach in the Greater Toronto Area (herein "GTA").

If required, sub-structure retaining elements designed to resist earth pressure can be calculated based on the following equation:

$$p = K[\gamma (h-h_w) + \gamma' h_w + q] + \gamma_w h_w$$

where:

p	=	Lateral earth pressure in kPa acting at depth h
K	=	Coefficient of Lateral Earth Pressure
h	=	the depth below the ground surface (m)
h_w	=	the depth below the ground water level (m)
γ	=	the bulk unit weight of soil, (kN/m^3) use 19.5 (average)
γ'	=	the submerged unit weight of the exterior soil, (γ - 9.8 kN/m^3)
q	=	equivalent value of surcharge on the ground surface in kPa (min 12 kPa)

Where the backfill against the buried structure can be drained effectively to eliminate hydrostatic pressures on the wall, this equation can be simplified to:

$$p = K(\gamma h + q)$$

For bracing elements, the earth pressure diagram shown in **Section 26.10.3** of CFEM may be used for design purposes.

5.8 EXCAVATION AND BACKFILL

5.8.1 Excavatability

Based on the findings of the investigation, it is considered that excavation of the overburden fill and native soils at the site can be carried out using a conventional backhoe excavator.

In light of the unknown nature of the fill materials, it may be prudent that the contractor carried out the work should include a provision for removing large size rubbles in their contract.

5.8.2 Excavations

It is assumed that the groundwater will be lowered to 1.0 m below the required excavation depth to enable the construction to be carried out in the 'dry' condition. It is expected that the 'perched water' can be controlled by the conventional 'sump and pump' methodology. If more aggressive dewatering methods are required, a dewatering consultant should be consulted. Given the layout of the proposed development in relation to the site area, it has been assumed that all excavations will be open cut in the 'dry'. In order to enable entry into excavations during the construction process, all excavations must comply with the definitions prescribed by the "*Occupational Health and Safety Act*" (OHSA), Ontario Regulation 213/91 "*Construction Projects*".

The various soils that will be encountered at this site during construction are classified, as per OHSA, and presented in **Table 6**.

Table 6: Soil Types as per Occupational Health & Safety Act (OHSA)

Soil Description	Soil Types, According to OHSA
Fill	Type 3
Native	Type 2

Based on these definitions, excavation walls within these soils above groundwater level, will require battering back at slopes no steeper than 1H (horizontal):1V (vertical). Depending on the construction feasibility, the excavation walls can be supported by temporary shoring systems. During excavations, adjacent existing structures if existed must be protected by proper shoring or sloping. This should be verified by the Geotechnical Engineer when large-scale excavation can be observed safely and with ease.

5.9 CONSTRUCTION CONSIDERATIONS

5.9.1 Site Preparatory Works

The site preparation work should include stripping of the existing fill in order to develop the required construction. Stripping depths will likely vary locally and should be adjusted to remove all unsuitable material.

It is recommended that a Geotechnical Engineer monitors the stripping operations to ensure that unsuitable materials have been fully removed prior to construction works. Unacceptable areas identified are to be remediated as soon as practicable and, the procedures for which would be dependent upon conditions encountered.

5.9.2 General Considerations

Load bearing soils are susceptible to disturbance from environmental (temperature, moisture change, etc.) and construction activity, as such, due care should be given to minimizing trafficking of such areas during periods of excavation and the construction of floor slab and footings to minimize disturbance of the bearing soils.
Any excessive disturbances of the load-bearing and underlying soils affected during construction works could influence the long-term settlement of the structures and will, therefore, require further excavation and replacement of such impacted soils with suitably engineered fill.

A Geotechnical Engineer should evaluate all subgrade surfaces to confirm that the subgrade and founding conditions are consistent with the recommendations given by this report.

5.10 SERVICE INSTALLATION

5.10.1 General

The materials found in the boreholes at the expected elevations of the proposed servicing trench generally consist of competent soils. In general, the site materials are suitable for pipeline support. Localized loose/soft subgrade conditions, if encountered during construction, should be sub excavated to a depth of at least 300 mm or to a firm base, if shallower, and backfilled with clean, compactable materials and stabilized as per the project specifications.

Prior to placement of bedding, the exposed subgrade at the bottom of each servicing trench excavation should be inspected by the Geotechnical Engineer to identify any soft, lose or disturbed base conditions. All disturbed soils resulting from construction activities should be removed and replaced as noted above.

Design and construction consideration for both flexible (PVC) and rigid (concrete) pipes are included in the following sections.

5.10.2 Excavation and Dewatering

The recommendations provided in **Section 5.8** shall generally apply to any sewer installation. The excavated soils should not be placed closer than the depth of the trenches from the trench edge.

5.10.3 Bedding and Sewer Construction

The native subgrade in an undisturbed state will provide adequate support for the proposed service pipes and will allow the use of normal Class B type bedding. The bedding should conform to the current Ontario Provincial Standard Specifications (OPSS 1010) and/or Regional Municipality of Durham Standards for bedding stone gradation requirements. The pipes should be placed with a minimum bedding thickness in conformance with Ontario Provincial Standard Drawing OPSD 802.010 (for flexible pipes) or OPSD 802.031 (for rigid pipes), though the bedding thickness will be subject to variation and ultimately be based on the proposed pipe diameter, bedding specifications used, etc.

Alternatively, HL-8 stone bedding may be used where wet invert subgrade is encountered locally. The HL-8 stone bedding should be wrapped around with a suitable piece of filter fabric (Terrafix 270R or equivalent).

It is recommended that the OPSS approved bedding material may be used for supporting the watermain pipes. The bedding materials may consist of either 20 mm Crusher Run Limestone or OPSS Granular ‘A’ compacted to 100% of its SPMDD.

On completion of the servicing pipe installation, a granular surround of the same bedding material should be placed around the pipe to cover it to at least 300 mm above the pipe obvert.

Backfill above the bedding and cover materials may consist of clean, compactable fill that possesses similar properties to the existing subgrade soil. Based on the borehole data it is anticipated that the local soil material may be reused as trench backfill. Some moisture

conditioning of the soil may be required to facilitate soil compaction. In the event that imported soil is used as a trench backfill, it must be ensured that the drainage properties of the subgrade are maintained and that there is no differential frost movement. Trench backfill should be compacted to at least 95% of the material's SPMDD, or Regional Municipality of Durham Standards, whichever is more stringent.

5.10.4 Service Trench Backfilling

All deleterious material (if any) should be completely removed and discarded. The on-site excavated clean earth can be reused as a compacted backfill, provided the moisture content is carefully controlled.

The thickness of backfill lifts should be monitored throughout the backfilling process. It is recommended that the compaction of the backfill earth should be carried out in thin lifts (not exceeding 300 mm per loose lift, depending on the size of the compaction equipment) and compacted to at least 95% of its SPMDD.

In confined areas, such as those beside and immediately above or between two sewer pipes and around the manholes and catch basins, on-site salvaged and/or imported granular soils may be used for backfilling and compacted to the specified degree of compaction with portable, light equipment.

Exposed, excavated soil stockpiles that are to be reused as fill on-site should be compacted at the surface or temporarily covered during wet weather to help maintain their original moisture content. Such stockpiles are prone to wet weather exposure and the increased moisture contents will make these materials too wet to achieve the required levels of compaction.

Conversely, if the excavated native soils are too dry to achieve the required levels of compaction, some moisture addition/conditioning by means of water hosing or misting should be expected if the trench excavation works are to be undertaken during the dry seasons.

We recommend the subgrade be observed and approved by the Geotechnical Engineer prior to the placement of the bedding material to confirm that the subgrade conditions are consistent with the recommendations given in this report. Where unsuitable subgrade conditions are observed, remedial procedures can be established in the field to avoid construction delays.

5.11 PAVEMENT THICKNESS DESIGN (PARKING AND DRIVEWAYS)

Undisturbed native ground and/or the existing fill subgrade soils (re-compacted as required under Sola's supervision) can support the proposed parking lot/driveway pavements.

It is anticipated that the final subgrade will comprise predominantly on-site improved fill (by proof-rolling and surface compaction). Accordingly, in view of the frost susceptibility and drainage characteristics of the final subgrade soils and the expected volume of traffic, the following pavement designs presented in **Table 7** are recommended. It is assumed that there will be only occasional delivery truck travels allowed for light duty areas. In the areas where fire routes and loading dock are expected, the heavy-duty pavement design should be implemented.

Table 7: Recommended Pavement Design (New Construction)

Pavement Layer	Light Industrial, Commercial & Apartments Thickness (mm)		Heavy Industrial Driveways Thickness (mm)	Compaction Requirements
	Option 1	Option 2		
Asphaltic Concrete Surface Course (HL-3)	40	40	40	Minimum of 92.0% of Maximum Relative Density (MRD)
Asphaltic Concrete Binder Course (HL-8)	50	50	80	
Granular Base (Granular A)	300		150	100% SPMDD
Granular-Crushed Stone		150		
Granular Sub-Base (Granular B)		300	300	

The recommended granular base and sub-base materials shall meet the Ontario Provincial Standard Specification (OPSS) gradation specification. The granular base and subbase should be compacted to at least 100% of their SPMDD.

The asphaltic concrete courses are to be hot-mixed and hot-laid per current OPSS specifications, Forms 310 and 1150 (Ontario PGAC grades PG 58-28 equivalency) and compacted to a minimum of 92% of Maximum Relative Density (MRD).

The pavement design, as presented above in **Table 7**, is based on the assumption that construction will be undertaken under dry weather conditions and that the subgrade is stable and not heaving under construction equipment traffic. However, if the construction conditions are non-ideal, with the final subgrade being wet and/or unstable, additional imported subbase material may become necessary.

The pavement make-up for the entrance driveways should match the respective road pavement design at the road/driveway interface.

Prior to placing the granular subbase, the final subgrade should be proof-rolled to identify soft spots, if any, and rectified as required in consultation with a Geotechnical Engineer.

The recommended pavement structure should be considered for preliminary design purposes only. A functional design life of ten (10) to twelve (12) years has been used to establish the pavement recommendations. This represents the number of years to the first rehabilitation, assuming regular maintenance is carried out.

Pavement Drainage: The ability of the soils to provide adequate subgrade support is reduced if allowed to become too wet. Therefore, in order to intercept infiltrating water and provide drainage of the subgrade and pavement material, it is recommended that 100 mm diameter sub-drains, wrapped in filter cloth, be provided along both sides of the driveway in addition, similar sub-drains should be installed in four (4) directions from the catch basins and at strategic locations under the parking lot pavement. Furthermore, the subgrade should be graded to promote the flow of water towards the subdrains.

5.11.1 Pavement Construction Considerations

For pavement construction, the subgrade must be compacted to at least 98% SPMDD for at least the upper 300 mm unless an alternative is approved by Sola.

The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure uniform subgrade moisture and density conditions are achieved.

Additional comments on the construction of pavement areas are as follows:

- The subgrade preparation should include stripping of any objectionable materials, e.g. loose fill with organics. The base should be properly shaped and thoroughly proof rolled using a loaded truck. Soft and/or unstable subgrade areas should be further sub-excavated and backfilled to the design subgrade level using an approved material, placed in thin lifts and compacted to 98% of its SPMDD;
- The locations and extent of sub-drainage required within the paved areas should be reviewed by this office in conjunction with the proposed grading. Assuming that satisfactory crossfalls in the order of 3.0% have been provided, subdrains extending from and between catch basins may be satisfactory. In the event that flatter crossfalls are considered, a more extensive system of sub-drainage may be necessary and should be reviewed by Sola; and,

- The most severe loading conditions on the pavement areas and subgrade may occur during construction. Consequently, special provisions such as restricted access routes, half-loads during paving, etc., may be required, especially if construction is carried out during unfavourable weather.

It is recommended that Sola be retained to review the final pavement structure designs and drainage plans prior to construction to ensure that they are consistent with the recommendations in this report.

6.0 DRAWING REVIEW

It is recommended that, once the final design drawings for this project are prepared, one (1) set of the drawings should be submitted to Sola for review to make any amendments to our recommendations that may be required, prior to starting construction.

The comments given in this report are preliminary and intended only for the guidance of design engineers. Contractors bidding on or undertaking the works should make their own interpretations of the factual borehole results, so that they may draw their own conclusions on how the subsurface conditions may affect them.

The information in this report in no way reflects on the environmental aspects of the soil conditions at the site and has not been addressed in this report since this aspect was beyond the scope and terms of reference.

7.0 CLOSURE

This report is subject to the Statement of Limitations which forms an integral part of this document. The Statement of Limitations is not intended to reduce the level of responsibility accepted by Sola, but rather to ensure that all parties who have been given reliance for this report are aware of the responsibilities each assumes in so doing.

We trust that this report meets your needs. Should you have any queries, please contact the Sola office.
Sincerely

SOLA ENGINEERING INC.

Jasin Arulanantham, M.A.Sc.

LICENSED PROFESSIONAL ENGINEER
Bill Feng
B. FENG
100050651
Dec 10, 2020
PROVINCE OF ONTARIO

Bill Feng P. Eng.
Chief Engineer

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STATEMENT OF LIMITATIONS

Standard of Care and Basis of this Report
Sola Engineering Inc. ("Sola Engineering") has prepared this report in a manner consistent with generally accepted engineering and/or environmental practices in the jurisdiction in which the specified services were provided. The information and conclusions set out in this report reflects Sola Engineering's best professional judgment in light of the information available to Sola Engineering at the time of preparation. Sola Engineering disclaims any and all warranties, express or implied, including without limitation any warranty of merchantability and/or fitness for a particular purpose, and makes no representations concerning the legal effect, interpretation or significance of this report or the information, conclusions or recommendations contained in it.

The conclusions and recommendations provided in this report have been prepared in relation to the specified site (the "Site") and the proposed project (the "Project"), as described by the Client to Sola Engineering. Given the nature of the work undertaken by Sola Engineering as part of this report, the Client acknowledges that ground conditions may vary over distances and may change over time. Should there arise any changes to the conditions of the Site or the Project (as to purpose or design), Sola Engineering is to be notified within a reasonable period of time, and in any event within 24 hours of the Client's learning of such changes, so as to give Sola Engineering an opportunity to review and revise this report in light of such changes. Sola Engineering accepts no liability or responsibility for any use of this report or reliance on this report following any changes to the conditions of the Site or the Project.

The scope of professional services provided by Sola Engineering for the Project are as set out in this report. Should such services be limited to those of a geotechnical nature, Sola Engineering shall not be held liable or responsible for any environmental services that may be required, nor shall this report be interpreted to reflect any environmental aspects of the Project. Alternatively, should such services be limited to those of an environmental nature, Sola Engineering shall not be held liable or responsible for any geotechnical services that may be required, nor shall this report be interpreted to reflect any geotechnical aspects of the Project.

This report is not intended to provide recommendations for possible future conditions or use of the Site or adjoining properties. Should the need arise for such recommendations Sola Engineering may need to conduct further investigations.

Use of this Report
This report is intended to be read and used in its entirety. No reliance may be made upon any individual portion or section of this report without reference to the entire report as a whole. In preparing this report, Sola Engineering has relied on information, instructions and communications given by the Client to Sola Engineering, the applicability, truth and accuracy of which is the sole responsibility of the Client.

This report with the information, sampling data, analysis, conclusions and recommendations contained in it (if any), has been prepared for and may only be used by the Client and only for the specific purpose as specified by the Client to Sola Engineering in connection with the Project. Without prior written consent from Sola Engineering, use of this report or any portion thereof by any person or entity other than the Client, or for any purpose other than as communicated by the Client to Sola Engineering, is strictly prohibited. Sola Engineering accepts no liability or responsibility for the unauthorized use of this report. This report and all documents that form part of it are the sole property of Sola Engineering. Sola Engineering relies on and retains any and all intellectual property rights it has in this report, including any copyright to which it is entitled. The Client shall not give, lend or sell this report, or any portion thereof, to any entity, person or association without the express prior written consent of Sola Engineering. This report and the information contained herein shall be treated as strictly confidential.

The contents of this report, inclusive of Sola Engineering's conclusions and recommendations in relation to the Project, are intended only for the guidance of the Client in carrying out the specified services for the Project, as described by the Client to Sola Engineering. Accordingly, Sola Engineering does not accept any liability or responsibility for any inaccuracy contained in this report arising as a result of or in any way connected with any exclusion, oversight or falsification of the information provided to Sola Engineering by the Client. This report, including the effect of the subsurface conditions as described in this report, is to be interpreted at the risk and discretion of the Client and any contractors or others bidding on or undertaking contractual work to be performed as part of the Project who may come into possession of or learn of this report or its contents. It is exigent that all contractors bidding or undertaking the work are to rely on their own interpretations of the data contained in this report in addition to their own investigations and conclusions. Sola Engineering shall not be held liable or responsible for any interpretation of or conclusions that may be drawn from the data or information contained in this report.

The information, recommendations and conclusions presented in this report are based on Sola Engineering's interpretation of conditions revealed through the limited investigation conducted within a defined scope of services. In no event will Sola Engineering be held responsible or liable to the Client or any other person or entity for any special, indirect, incidental, punitive or consequential loss or damage (including, loss of use, lost profits or expenses incurred) resulting from or in any way related to the independent interpretations, interpolations, conclusions or decisions of the Client or any other person or entity, based on the information contained in this report. The restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

Notwithstanding the exclusions of liability contained herein but without in any way limiting their effect or generality, if there is found to be any finding of liability or responsibility whatsoever on the part of Sola Engineering which in any way relates to or arises from this report, or the information, conclusions or recommendations contained in it, such liability and/or responsibility shall cease and forever be extinguished from and after the date which is two (2) years from the date of this report. In no event shall any liability or responsibility of Sola Engineering exceed the fees charged by Sola Engineering to the Client for the preparation of this report (excluding any arms' length disbursements or expenditures made or incurred by Sola Engineering as a result thereof and reimbursed by the Client).

Site Conditions
The material conditions, classifications, conclusions and recommendations contained in this report were based on the site conditions observed or tested by Sola Engineering or otherwise communicated to Sola Engineering by the Client. The description, identification and classification of soils, rocks, chemical contamination and other materials have been made based on limited investigations, sampling and testing of materials performed by Sola Engineering and its qualified representatives in reliance on the use of relevant or applicable equipment, all in accordance with commonly acceptable standards in the geotechnical and/or environmental disciplines. Accordingly, this report may include assumptions of conditions which are based on discrete sample locations and thus some conditions may not have been detected. The Client accepts all liability and risk for the use of this report and the information and data contained in it. Sola Engineering shall not be held liable or responsible for any conditions beyond the scope of tests conducted on samples of the subsurface and soil conditions of the subject property as set out in this report.

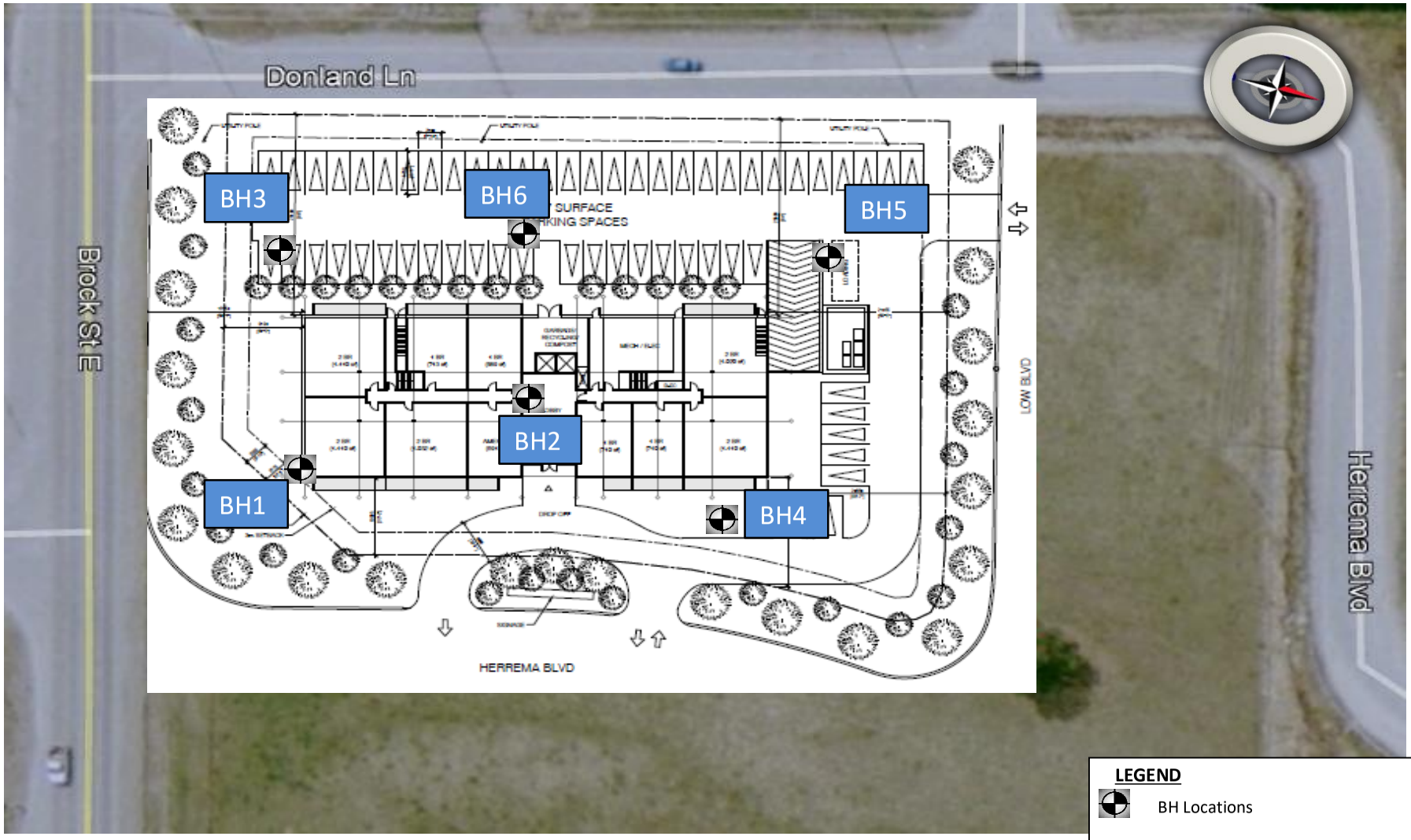
For clarity, the Client acknowledges and accepts that unique risks exist whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive sampling and testing program may fail to detect certain conditions. The environmental, geological, geotechnical, geochemical and hydrogeological conditions that Sola Engineering interprets to exist between sampling points may differ from those that actually exist. As a result, the Client acknowledges and accepts that because of the inherent uncertainties in subsurface evaluations, unanticipated underground conditions may occur or become known subsequent to Sola Engineering's investigation that could affect conclusions, recommendations, total Project cost and/or execution.

Indemnification of Risk
Though Sola Engineering adheres to the highest degree of integrity and employs due diligence in limiting the potential release of toxins and hazardous substances, the risk of accidental release of such substances is a possibility when providing geotechnical and environmental services.

In consideration of the provision of services by Sola Engineering, the Client agrees to defend, indemnify and hold Sola Engineering and its employees and agents harmless from and against any and all claims, liabilities, damages, causes of action, judgments, costs or expenses (including reasonable legal fees and disbursements), resulting from or arising by reason of the death or bodily injury to persons, damage to property, or other loss, whether related to an accidental release of pollutants or hazardous substances occurring as a result of carrying out this Project or otherwise, and whether or not resulting from Sola Engineering's negligent actions or omissions. This indemnification shall include and extend to any and all third party claims brought or threatened against Sola Engineering under any federal or provincial law or statute as a result of Sola Engineering conducting work on the Project. In addition to and notwithstanding the foregoing, the Client further agrees to unconditionally and irrevocably release Sola Engineering from, and not to bring any claims against Sola Engineering in connection with, any of the aforementioned claims or causes.

Subconsultants and Contractor Services
In conjunction with the services provided by Sola Engineering's own employees, external services provided by other persons or entities that are specializing in services other than those offered by Sola Engineering, such as drilling, excavation and laboratory testing, are often employed in order to carry out the defined scope of work. If such external services have been employed for this Project, the Client acknowledges that Sola Engineering is not in any way liable or responsible for any costs, claims or damages in relation to the services rendered by such other persons or entities or payment therefor, nor shall Sola Engineering be liable or responsible for damages for errors, omissions or negligence caused by such other persons or entities while providing such external services.

Work and Job Site Safety
Sola Engineering shall be responsible only for its activities and that of its employees on the Site. Sola Engineering shall not direct any of the fieldwork nor the work of any other person or entity on the Project. The presence of Sola Engineering staff on the Site does not relieve the Client or any contractor on the Site from their responsibilities pertaining to site safety. The Client at all times retains any and all responsibility for the safety of those individuals present on the Site and/or working on the Project, including Sola Engineering's employees.



LEGEND

BH Locations

SOLA ENGINEERING	Project No.: 10451A	**BH Location Plan**	The figure provided is for the intended purpose of presenting the approximate borehole locations. This figure should not be used for any other purposes including construction, architecture or for accuracy of dimensions and orientation of objects.	Enclosure No.: **1**
	Report No.: 2020-13992	**Proposed Condominium**		
		Brock Street South and Herrema Boulevard, Uxbridge		
	Date: April 2020	**Oxford Homes**		Not to Scale

SOLA ENGINEERING

ENCLOSURE No. 2

RECORD OF BOREHOLE No. BH1

1 OF 3

METRIC

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST | HWY | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE | LONGITUDE | CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS
269.9	Gravel					
0.0 / 269.8	CRUSHED LIMESTONE- 125 mm thick		1A	SS		
0.1 / 269.7	FILL- sand and gravel, brown, moist		1B	SS		
0.2	FILL - sand, some silt, trace stones, light brown, moist		1C	SS	16	
269.1						
0.8	- organic odour, very moist		2	SS	19	▽
268.4						
1.5 / 268.3	FILL - sandy silt, organic odour, brownish grey, very moist		3	SS	16	
1.7	PROBABLE FILL - clayey silt, trace sand, grey, moist					
267.6						
2.3	SILTY CLAY - trace gravel, trace sand, grey, very stiff, moist		4	SS	17	
266.9						
3.1	- trace sand, firm		5	SS	7	

ELEVATION SCALE: 269, 268, 267, 266

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 20 40 60

UNIT WEIGHT γ kN/m^3

REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity

$\circ^{3\%}$ STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 2

RECORD OF BOREHOLE No. BH1 2 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa: ○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
265.3	- trace sand, firm *(continued)*										
4.6	- stiff to very stiff		6	SS	15				○		
264.9							265				
5.0	End of Standard Penetration Test (SPT) at 5.03 m Below Ground Surface; Dynamic Cone Penetration Test (DCPT) Starts at 5.18 m;						264				
							263				
							262				

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 2

RECORD OF BOREHOLE No. BH1

3 OF 3 **METRIC**

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST | HWY | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE | LONGITUDE | CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
							261			
260.5 / 9.5	DCPT Ends at 9.45 m; End of Borehole at 9.45 m Below Ground Surface. Borehole Caved at 1.22 m Upon Completion of Drilling. Groundwater Measured at 1.17m Upon Completion of Drilling.									

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 3

RECORD OF BOREHOLE No. BH2

1 OF 3

METRIC

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST | HWY | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE | LONGITUDE | CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
270.2	Topsoil									
0.0 / 270.1	TOPSOIL- 125 mm thick		1A	SS						
0.1	FILL- sand, some silt, trace rootlets, trace organic, brown, moist		1B	SS	4		270			
269.4										
0.8	- trace clay, trace organic, very moist		2	SS	11		269			
268.7										
1.5	FILL- silty sand, trace organic, brown, wet		3	SS	12	▽	268			
267.9										
2.3	CLAYEY SILT - trace sand, grey, very stiff, wet		4	SS	17					
			5	SS	16		267			

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 3

RECORD OF BOREHOLE No. BH2 2 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
265.6	CLAYEY SILT - trace sand, grey, very stiff, wet *(continued)*						266				
4.6	SILTY CLAY- stiff, very moist		6	SS	12		265		○		
264.1											
6.1	- stiff, moist		7	SS	10		264		○		
			8	SS	11		263		○		

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 3

RECORD OF BOREHOLE No. BH2 3 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
262.1	- stiff, moist *(continued)*										
8.1	End of Borehole at 8.08 m Below Ground Surface. Borehole Caved at 6.1 m Upon Completion of Drilling. Groundwater Measured at 2.13 m Upon Completion of Drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 4

RECORD OF BOREHOLE No. BH3

1 OF 2

METRIC

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST | HWY | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE | LONGITUDE | CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE; 20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
269.6	Topsoil										
269.6 / 0.0	TOPSOIL- 50 mm thick		1A	SS							
0.1 / 269.5	FILL- sand and gravel, trace clay, grey, moist		1B	SS							
0.2	- brown		1C	SS	15		269				
268.9 / 0.8	FILL- sand, trace gravel, trace silt, brown, very moist		2	SS	11				○		
268.1 / 1.5	- wet		3	SS	21	▽	268		○		
267.3 / 2.3	- very moist		4	SS	40		267		○		
266.6 / 3.1	SILTY SAND - brown, dense, very moist		5	SS	36		266		○		

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 4

RECORD OF BOREHOLE No. BH3 2 OF 2 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (20 40 60 80 100): ○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
265.1	SILTY SAND - brown, dense, very moist *(continued)*									
4.6	- dense to very dense		6	SS	30		265		○	
263.5							264			
6.1	- compact		7	SS	16				○	
263.1										
6.6	End of Borehole at 6.55 m Below Ground Surface. Borehole Caved at 3.05 m Upon Completion of Drilling. Groundwater Measured at 1.52 m Upon Completion of Drilling.									

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 5

RECORD OF BOREHOLE No. BH4

1 OF 3

METRIC

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST | HWY | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE | LONGITUDE | CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
269.9	Topsoil									
269.8	TOPSOIL- 50 mm thick		1A	SS						
0.1	FILL- silty sand, trace gravel, trace clay, trace rootlets, brown, moist		1B	SS	8					
269.1										
0.8	FILL- sandy silt, mottled, light brown, moist		2	SS	24		269			
268.4						▽				
1.5	FILL- silty sand, brown, very wet		3	SS	17		268			
267.6										
2.3	CLAYEY SILT- some sand, grey, very stiff, wet		4	SS	26		267			
266.8										
3.1	SILTY CLAY- grey, firm to stiff, very moist		5	SS	8		266			

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 5

RECORD OF BOREHOLE No. BH4 2 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY- grey, firm to stiff, very moist *(continued)*										
265.3 / 4.6	- trace sand, firm to stiff		6	SS	8		265		○		
264.8 / 5.0	End of Standard Penetration Test (SPT) at 5.03 m Below Ground Surface Vane Shear Test at 5.11 m Below Ground Surface Dynamic Cone Penetration Test (DCPT) Starts at 5.18 m;						264 263 262	+			

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 5

RECORD OF BOREHOLE No. BH4 3 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
							261				
							260				
259.2 / 10.7	DCPT Ends at 10.67 m; End of Borehole at 10.67 m Below Ground Surface. Borehole Caved at 2.44 m Upon Completion of Drilling. Groundwater Measured at 1.52 m Upon Completion of Drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 6

RECORD OF BOREHOLE No. BH5

1 OF 3

METRIC

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST | HWY | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE | LONGITUDE | CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
269.3	Topsoil										
0.0 / 269.2	TOPSOIL- 125 mm thick		1A	SS							
0.1	FILL- sandy silt, trace stone, trace organic, trace rootlets, dark brown, moist		1B	SS	7		269				
268.5											
0.8	FILL- silty sand, trace rootlets, grey, very moist		2A		17				○		
268.2											
1.1	FILL- sand, some silt, organic odour, light brown, very moist		2B			▽	268		○		
267.8											
1.5	- brown, wet		3	SS	16				○		
267.0							267				
2.3	FILL- sand, some silt, brown, wet		4	SS	20				○		
266.3											
3.1	SILTY SAND- grey, compact, wet		5	SS	28		266		○		

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No. BH5 2 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY SAND- grey, compact, wet *(continued)*						265				
264.7 / 4.6	- dense		6	SS	46		264		○		
							263				
							262				
261.7 / 7.6	- very dense		7	SS	68				○		

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

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ENCLOSURE No. 6

RECORD OF BOREHOLE No. BH5 3 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
261.2	- very dense *(continued)*										
8.1	End of Borehole at 8.08 m Below Ground Surface. Borehole Caved at 1.83 m Upon Completion of Drilling. Groundwater Measured at 1.22 m Upon Completion of Drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 7

RECORD OF BOREHOLE No. BH6

1 OF 2

METRIC

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST | HWY | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE | LONGITUDE | CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE
269.6	Topsoil						
0.0 / 269.5	TOPSOIL- 150 mm thick		1A	SS			
0.2	FILL- sand, trace silt, brown, moist		1B	SS	7		
268.8							269
0.8	FILL- sand, trace to some silt, trace organic, very moist		2	SS	25	▽	
268.1							
1.5	- wet		3	SS	22		268
			4	SS	24		267
			5	SS	30		
							266

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 20 40 60

UNIT WEIGHT γ kN/m³

REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 7

RECORD OF BOREHOLE No. BH6 2 OF 2 METRIC

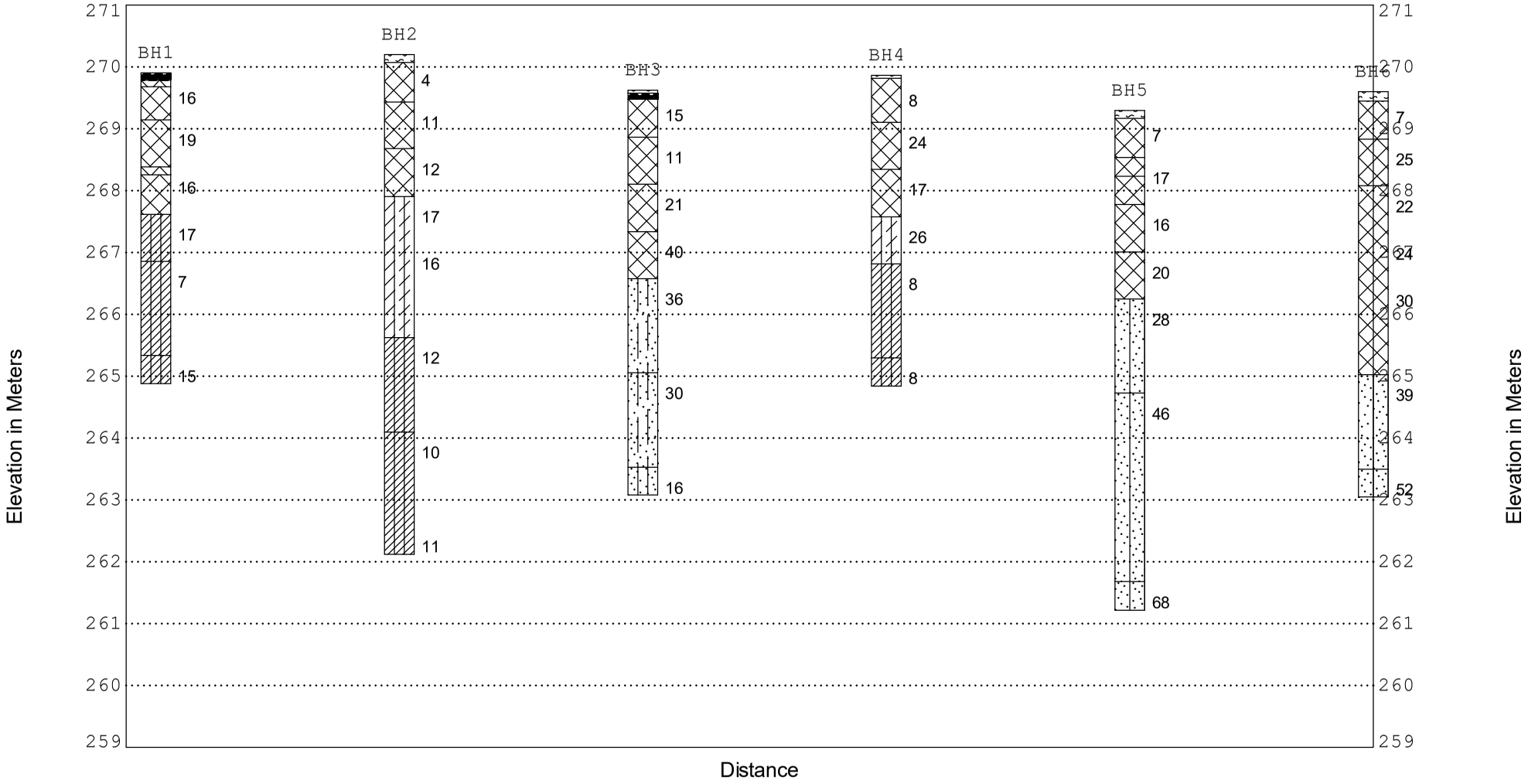
PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
265.0	- wet *(continued)*										
4.6	SILTY SAND- brown, dense, wet		6	SS	39		265		○		
263.5							264				
6.1	- very dense		7	SS	52						
263.1											
6.6	End of Borehole at 6.55 m Below Ground Surface. Borehole Caved at 0.92 m Upon Completion of Drilling. Groundwater Measured at 0.92 m Upon Completion of Drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE



Plan View

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SOLA ENGINEERING INC.
CONCEPTUAL SOIL PROFILE

Horizontal Scale:	Drawn By:	
Vertical Scale:	Approved By:	

Proposed Apartment Development
Brock Street East, Uxbridge, ON

Project Number: 10451A

Enclosure No.: 8

SOLA ENGINEERING

KEY TO SYMBOLS

Enclosure No.: 9

PROJECT NUMBER 10451A

PROJECT NAME Proposed Apartment Development

LOCATION Brock Street East, Uxbridge, ON

CLIENT Evandale Developments Limited

LITHOLOGIC SYMBOLS (Unified Soil Classification System)


CL-SL: clayey silt


FILL: TTC Fill (made ground)


GRAVEL: TTC Gravel


SL-CL: silty clay


SL-SN: silty sand


SM: USCS Silty Sand


TOPSOIL: Topsoil/peat/organics

SAMPLER SYMBOLS


Split Spoon Sample

WELL CONSTRUCTION SYMBOLS


Bentonite Seal: 1 pipe group, 1 pipe


Caved


Solid pipe packed in granular material


Slotted pipe packed in granular material

Notes:

Terms describing RELATIVE DENSITY, based on Standard Penetration Test "N"-Value for COURSE GRAINED soils (major portion retained on No. 200 seive):

DESCRIPTIVE TERM ["N"-Value (blows/0.3m), Relative Density (%)]

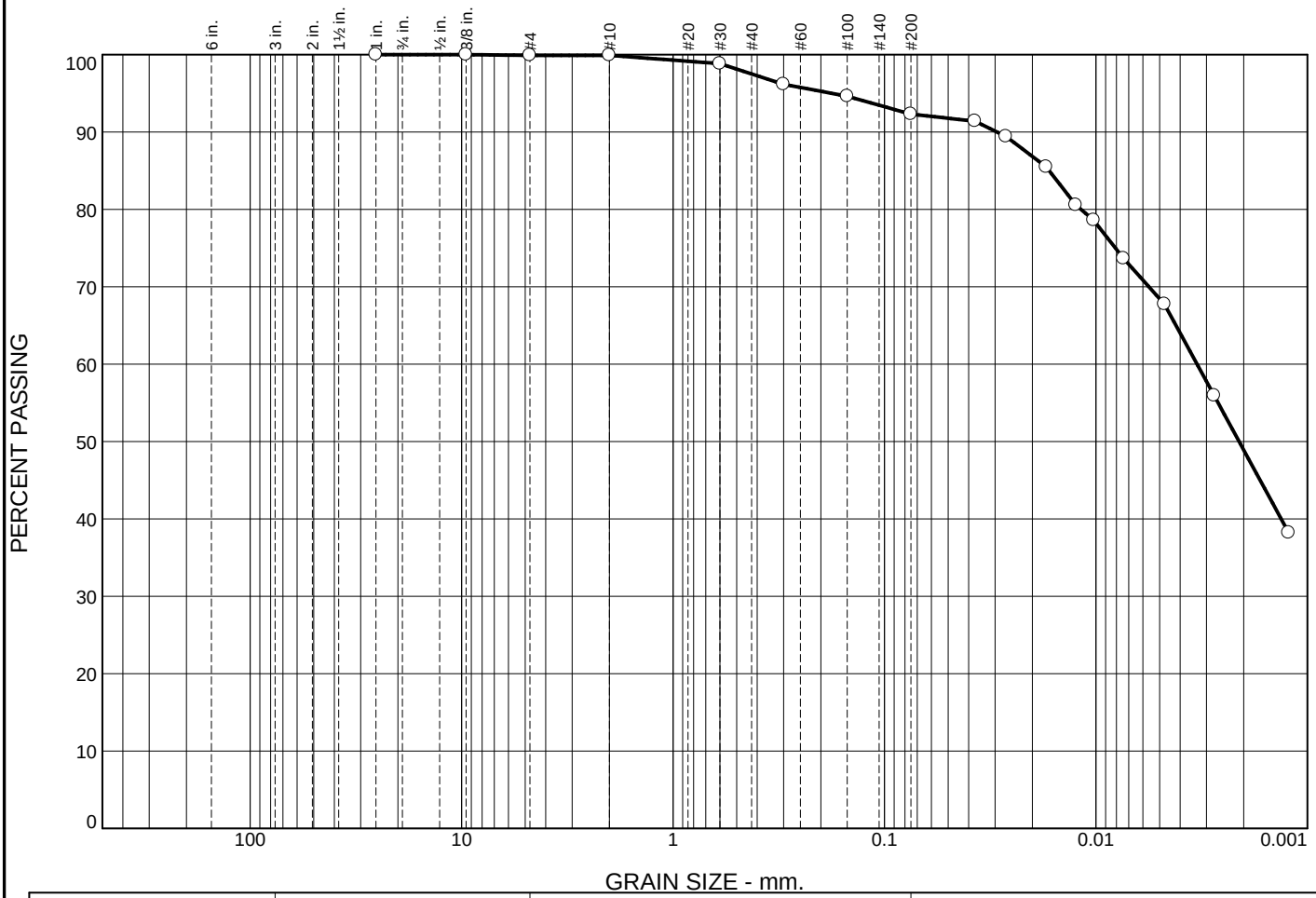
- **Very Loose [less than 4, less than 15]**
- **Loose [4 to 10, 15 to 35]**
- **Compact or Medium [10 to 30, 35 to 65]**
- **Dense [30 to 50, 65 to 85]**
- **Very Dense [greater than 50, greater than 85]**

Terms describing CONSISTENCY, based on Standard Penetration Test "N"-Value for FINE GRAINED soils (major portion passing No. 200 sieve):

DESCRIPTIVE TERM [Unconfined Compressive Strength (kPa), "N"-Value (blows/0.3m)]

- **Very Soft [less than 25, less than 2]**
- **Soft [25 to 50, 2 to 4]**
- **Firm [50 to 100, 4 to 8]**
- **Stiff [100 to 200, 8 to 15]**
- **Very Stiff [200 to 400, 15 to 30]**
- **Hard [greater than 400, greater than 30]**

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	0	0	2	6	24	68

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○			0.0166	0.0033	0.0021					

Material Description	USCS	AASHTO
○ SILTY CLAY (Visual- Manual); SILTY CLAY (Lab)		

Project No. 10451A **Client:** Evendale Developments

Project: Proposed Apartment Development

○ **Location:** BH4 **Depth:** 15'0"-16'6" **Sample Number:** 20-119

Remarks:

○Sampled By: Rattan

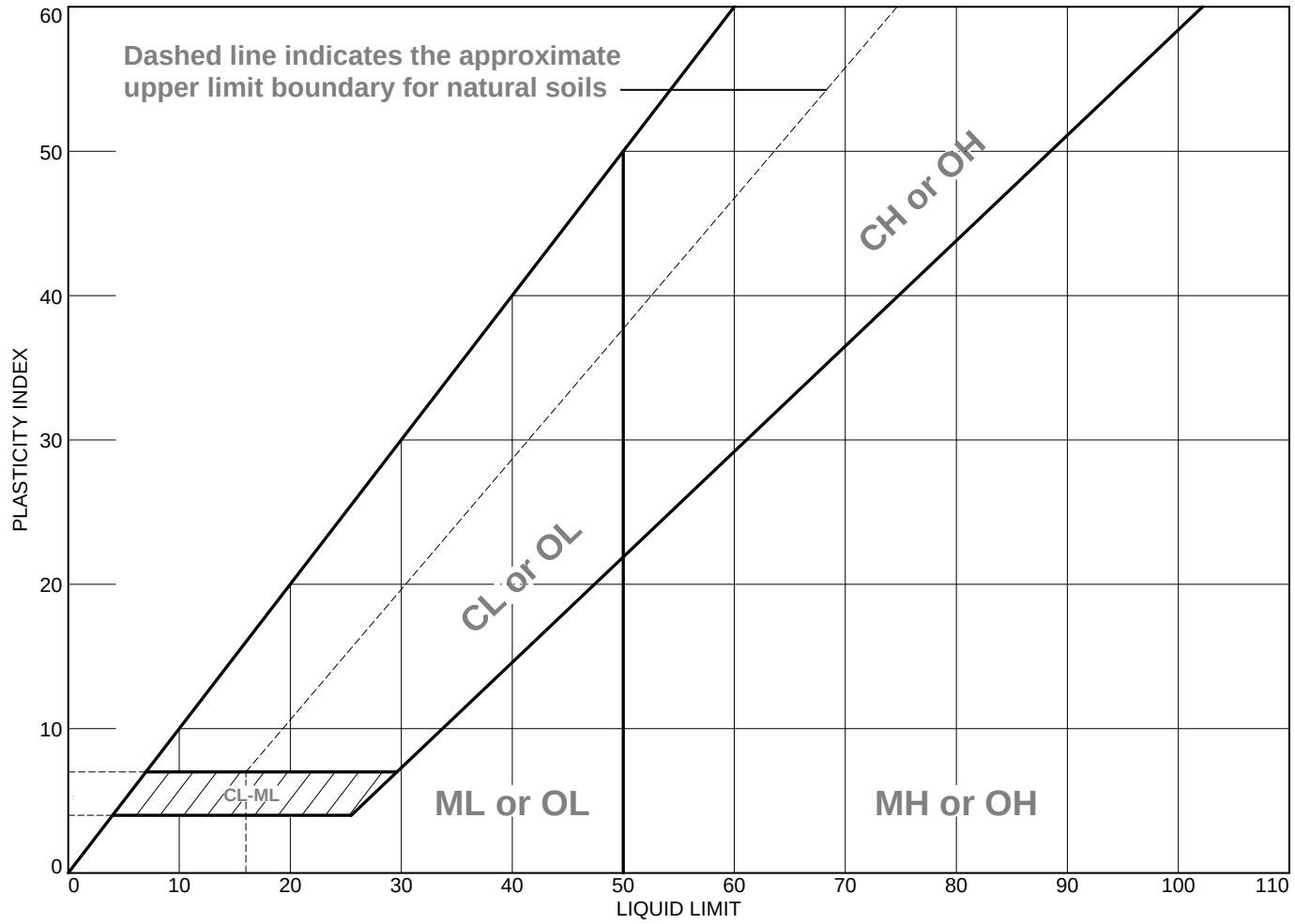
Date: March 5, 2020

Report No.: 2020-13992

SOLA ENGINEERING INC.

Figure 10

LIQUID AND PLASTIC LIMITS TEST REPORT (LS 703/704)



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	SILTY CLAY (Visual-Manual); SILTY CLAY (Lab)				28.5	30.6	NP	98	ML

Project No. 10451A **Client:** Evendale Developments

Project: Proposed Apartment Development

○**Location:** BH4 **Depth:** 15'0"-16'6" **Sample Number:** 20-119

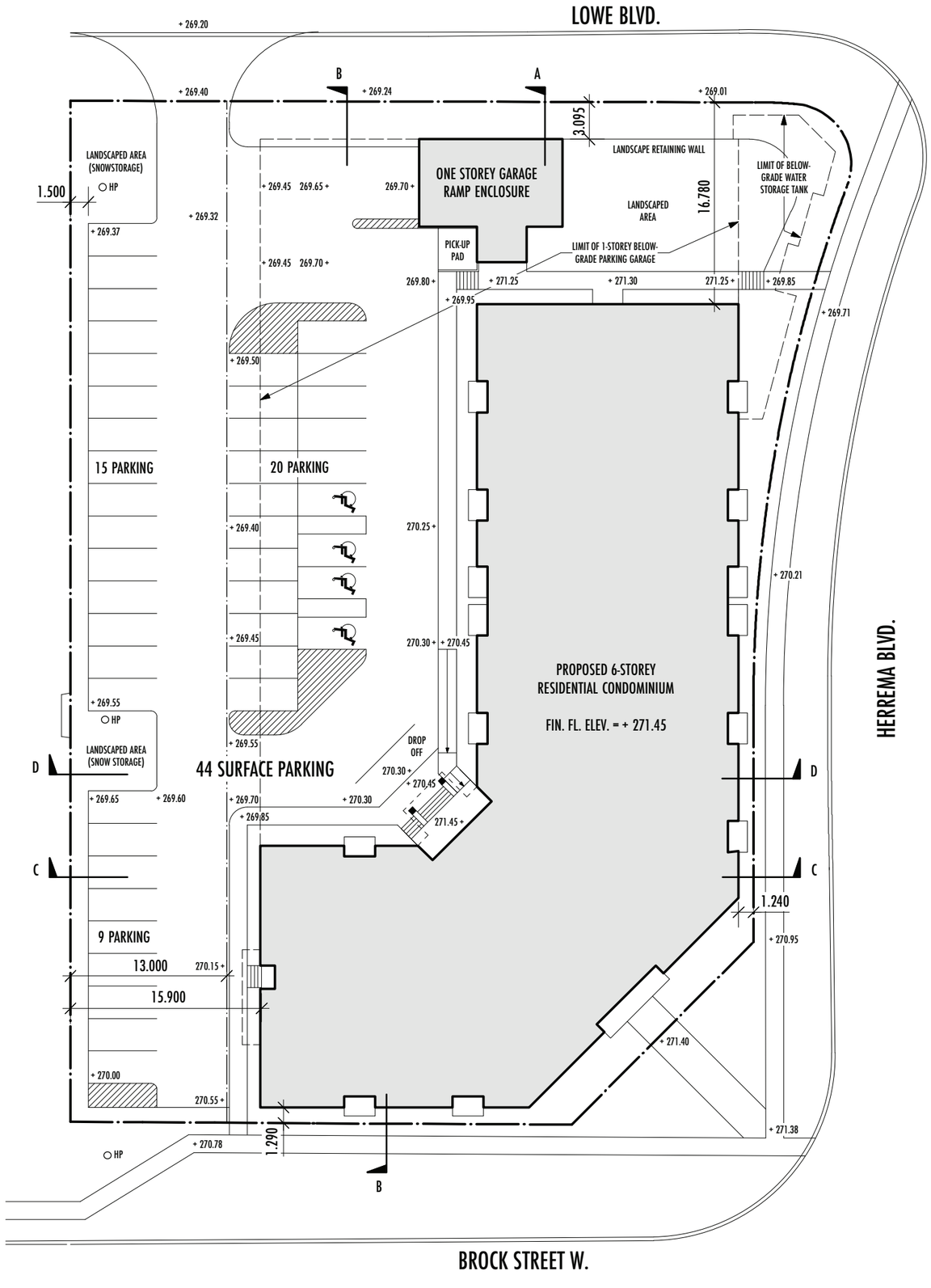
○Sampled By: Rattan
Date: March 5, 2020
Report No.: 2020-13992

SOLA ENGINEERING INC.

Checked by:
Title:

Figure 11

APPENDIX A
SITE PLAN, DRAWING NO. A1, PREPARED BY KEITH LOFFLER MCALPINE ARCHITECTS



SITE AREA:	4,870.34 M2
COVERAGE:	1,858.93 M2
% COVERAGE:	38.17
G.F.A:	9,738.86 M2
F.S.I:	2.0
RES. UNITS:	86
NET SALEABLE:	1,410.37 X 5 + 932.89 M2 = 7,984.47 M2

6 STOREYS
15 UNITS PER FLOOR
(15 X 5 = 75 + 11 = 86 UNITS)

PARKING:

SURFACE:	44 SPACES
BELOW GRADE:	86 SPACES
TOTAL PARKING:	130 SPACES

KEITH LOFFLER MCALPINE ARCHITECTS
10 ST. MARY STREET
SUITE #402
TORONTO, ONTARIO
M4Y 1P9

ONTARIO ASSOCIATION OF ARCHITECTS
JOHN WILLIAM McALPINE
LICENCE
4397

klma
A PARTNERSHIP OF CORPORATIONS
KEITH LOFFLER DESIGN INC
MCALPINE ARCHITECT INC

PROPOSED RESIDENTIAL DEVELOPMENT
BROCK STREET EAST
UXBRIDGE, ONTARIO
EVENDALE DEVELOPMENTS

SITE PLAN

A1

SCALE: 1 : 400
NOVEMBER 26, 2020