Proposed Multi-Storey Mixed-Use Development 13, 15, 17, 19 and 21 John Street and 36, 38 and 40 South Station Street, Toronto, Ontario

Type of Document:
Supplementary Geotechnical Investigation

Client:
Ms. Stephanie Bonic
21 John Dev Inc.
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Toronto, Ontario
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Project Name:
13, 15, 17, 19 and 21 John Street and 36, 38 and 40 South Station Street
Supplementary Geotechnical Investigation

Project Number:
BRM-21021990-B0

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Date Submitted:
September 6, 2022
Revised April 20, 2023

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1. Legal Notification

This report was prepared by EXP Services Inc. for the account of Devron Developments.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties unless a reliance letter has been addressed to, or otherwise provides reliance to, such third party. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

2. Introduction

EXP Services Inc. (EXP) was retained by Ms. Stephanie Bonic of 21 John Dev Inc., c/o Devron Developments (Client) to complete a Supplementary Geotechnical Investigation for a proposed multi-storey mixed-use development in Toronto, Ontario.

The site is municipally addressed as 13, 15, 17, 19 and 21 John Street and 36, 38 and 40 South Station Street, in Toronto, Ontario. It is bound by John Street to the west, South Station Street to the north, existing residential building property to the east and multiple existing commercial properties to the south. The site is currently occupied by two (2) single-storey commercial buildings, one (1) two-storey motel building, one (1) house, and asphalt parking lots.

EXP understands that a multi-storey mixed-use development with three underground parking level is being proposed for the site. Based on the information provided by the Client, the P3 basement slab Elevation will be 116.9 m.

A preliminary geotechnical investigation was carried out at the site by EXP. The findings and preliminary recommendations are presented in EXP's report dated December 9, 2021.

The purpose of this supplementary investigation was to further explore the subsurface conditions at the site by drilling a limited number of boreholes to core the bedrock and based on this information, to provide geotechnical engineering guidelines for the design and construction of the proposed development. Specifically, recommendations and/or comments regarding foundation type, allowable bearing pressures, groundwater conditions, excavation and backfill, slab-on-grade construction, permanent drainage requirements and earthquake considerations were to be provided.

The comments and recommendations given in this report are based on the assumption that the above-described design concept will proceed into construction. If changes are made either in the design phase or during construction, this office must be retained to review these modifications. The result of this review may be a modification of our recommendations or the requirement of additional field or laboratory work to check whether the changes are acceptable from a geotechnical viewpoint.

3. Procedure

The fieldwork for this investigation was carried out on between July 19 and 25, 2022 and comprised of a total of five (5) boreholes, designated Boreholes 201 to 205. The boreholes were drilled to approximate depth of 15 below the existing grade. The approximate borehole locations are shown on the attached Borehole Location Plan (Drawing No. 1).

All boreholes were advanced using a drill rig adapted for soil and bedrock sampling purposes owned and operated by a specialist drilling contractor. A representative of EXP was present throughout the drilling operations to monitor and direct the drilling and sampling operations, log the borings, make groundwater observations during and upon completion of drilling, process the recovered samples and prepare the borehole logs. Representative samples of the subsurface soils were recovered at regular intervals using conventional 50 mm O.D. split spoon sampling equipment driven in accordance with Standard Penetration Test (SPT) procedures (ASTM D1586). All split spoon soil samples were returned to EXP's Brampton laboratory for testing which included moisture content determinations and unit weights. Bedrock coring was carried out using a double-tube H-sized core barrel.

Water level observations were carried out in the open boreholes during the course of the fieldwork. Subsequent water level observations were carried out in monitoring wells installed in the boreholes.

The locations of the boreholes were established in the field by EXP personnel. Ground surface elevations (Geodetic) at each borehole location was derived by a Trimble TSC3 Data Collector.

4. Subsurface Conditions

4.1 Soil and Bedrock

The detailed soil profile encountered during this investigation in each borehole and the results of laboratory moisture content determinations are indicated on the attached borehole logs. It should be noted the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change.

The "Notes on Sample Descriptions" (Drawing No. 1A) preceding the borehole logs form an integral part of and should be read in conjunction with this report.

Borehole logs from the preliminary geotechnical investigation are enclosed in Appendix A. The following is a brief description of the soil conditions encountered during this investigation:

4.1.1 Pavement Structure

Pavement structure comprising asphalt with thickness ranging from about 50 to 75 mm underlain by granular fill 75 to 175 mm in thickness was encountered at Borehole 201, 202 and 203.

4.1.2 Fill

Fill was encountered at the surface of Borehole 204 and 205 locations and below the pavement structure in all other borehole locations. The fill extends to depths ranging from about 1.5 to 2.3 m below existing ground surface. The fill comprises a mix of clayey silt, silty clay, sandy silt and silty sand, with traces of gravel. Moisture contents in the fill ranged from approximately 3 to 23 percent. The samples were described to be in moist to very moist condition.

4.1.3 Silty Clay Till

A silty clay deposit was encountered below the fill in all borehole locations. The deposit was encountered at approximate depths of 1.5 to 2.3 m and extended to depths of about 3.8 to 5.2m. This deposit contains trace sand and gravel. It is brown in colour, changing to grey with depth and has moisture contents of about 11 to 26 percent of dry mass indicating moist to very moist condition. The silty clay has a firm to firm to very stiff consistency (recorded ‘N’-values of 8 to 28).

4.1.4 Shale Bedrock

Shale bedrock was encountered below the silty clay till in all borehole locations. Highly weathered shale was encountered at approximate depths of about 3.8 to 5.3 m. The recorded ‘N’-values in the shale were 50 blows for less than 150 mm of penetration. Upon encountering auger refusal, rock coring was initiated to verify bedrock conditions. The coring was carried out using ‘H’ sized double tube wireline equipment. The boreholes were terminated in the shale bedrock at depths ranging from about 15.1 to 15.5 m.

The shale contains 71 to 84% shale, 3 to 9% limestone, 9 to 16% siltstone, and 0 to 1% clay seams.

The Georgian Bay Formation is well known to be a deposit predominantly comprising shale of Upper Ordovician age. The bedrock, being a sedimentary deposit, is stratified in horizontal planes. The predominant rock type is shale, but interbedded with siltstone and limestone. The Georgian Bay Shale is typically highly weathered in the upper zones and becoming sound with depth. The shale bedrock generally consists of moderately hard bedded grey shale with some limestone interbeds. The highly weathered zones exhibit characteristics more commonly associated with soil than with rock. In view of this, it is generally difficult to determine the exact transition zone from the silt and clay deposits to the underlying weathered bedrock. Stress relief features such as folds and faults (rubble zones) are also found in the bedrock. In these features, the rock is heavily fractured and sheared, and contains layers of shale rubble and clay. Weathering is much deeper than the surrounding rock in these features and often there is a lateral migration of the stress relief features resulting in sound unweathered bedrock overlying fractured and weathered bedrock. The stress relief features are usually in the order of 4 to 6 m wide, but the depth can vary from 4 to 5 m to in excess of 10 m. These features occur randomly.

4.2 Groundwater Conditions

Groundwater conditions were assessed in the monitoring wells installed in all boreholes. Short-term groundwater level observations are recorded on the attached borehole logs and summarized in following Table 1.

Table 1: Summary of Observed Groundwater Levels

Borehole Number	Date of Completion	Depth to Groundwater Level Below Existing Grade (m)		
		July 29, 2022	August 4, 2022	August 18, 2022
201	July 25, 2022	9.6	10.5	9.9
202	July 21, 2022	1.6	10.1	9.9
203	July 22, 2022	2.5	9.4	9.2
204	July 20, 2022	4.6	10.3	10.2
205	July 19, 2022	2.8	11.3	11.2

Due to the short-term observation period, these groundwater levels may not represent stabilized conditions and seasonal fluctuations of the groundwater level at the site should be anticipated.

5. Engineering Discussion and Recommendations

The site is municipally addressed as 13, 15, 17, 19 and 21 John Street and 36, 38 and 40 South Station Street, in Toronto, Ontario. EXP understands that a multi-storey mixed-use development with three levels of underground parking is being proposed for the site. Based on the provided drawings, the lowest level (P3) floor slab is expected to be at approximate Elevation of 116.9 m.

5.1 Foundations

5.1.1 Spread Footings

The anticipated lowest basement level for the proposed building with three (3) levels of common below grade parking is expected to be set at Elevation 116.9 m. The footings are therefore expected to be at about Elevation of 114.9 m.

Based on the subsurface conditions encountered at the site, shale bedrock is expected to be encountered below Elevations ranging from 123.4 to 121.7 m (3.8 to 5.2 m below existing site grades). The proposed building can be supported on conventional spread and strip footings founded on the sound shale bedrock. A factored ULS bearing value of 5000 kPa is available for footings placed on sound shale bedrock. As the foundations will be on sound bedrock, ULS governs, and SLS does not apply.

The highest levels at which the aforementioned bearing values can be applied are summarized in the following table.

Table 2: Highest Elevation at Borehole Locations Where Recommended Geotechnical Reactions/Resistances Can Be Applied

Borehole No.	Spread on Bedrock ULS 5000 kPa ~ Elevation (Depth Below Existing Grade) (m)
BH 201	121.6 (5.9)
BH 202	120.9 (5.8)
BH 203	119.7 (7.2)
BH 204	120.3 (6.6)
BH 205	120.0 (6.9)

5.1.1 Raft Foundation

In the event that foundation drainage is not allowed to be discharged into the City's sewer system, the underground structure will have to be "tanked", i.e. water tight. In this scenario, a raft foundation may be used to support the structure. The raft can be supported on sound shale bedrock. The raft may be designed using the same bearing pressure or using a modulus of subgrade reaction of 200 MPa/m.

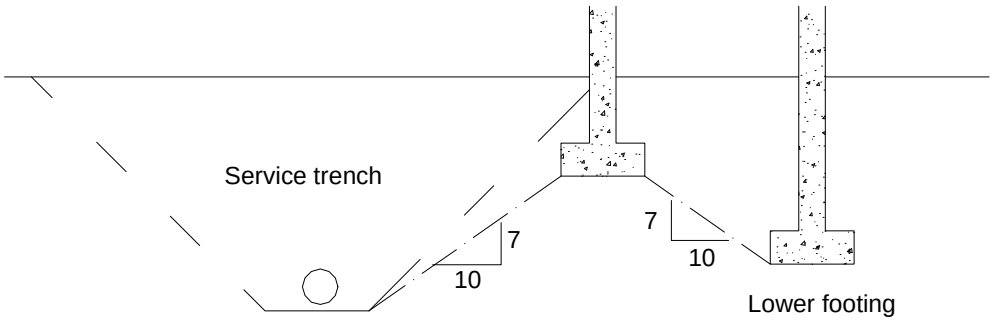
A 75-mm skim coat of concrete should be placed immediately after all loose rock fragments are removed and the subgrade reviewed by EXP's representative in order to protect the subgrade.

5.2 Foundation General

The settlement for the footings founded on sound shale utilizing the recommended geotechnical reactions/resistances is expected to be within the normally tolerable limits of 12 mm total and 6 mm differential.

Footings that may be exposed to seasonal freezing and thawing (such as those near vent shafts) should have at least 1.2 m of soil or equivalent insulation for frost cover.

If footings that are founded in sound rock are to be placed at different levels, the higher footings should be placed below an imaginary line with slope of 1 horizontal to 1 vertical drawn from the bottom of the lower footing as illustrated in the following sketch.



FOOTINGS NEAR SERVICE TRENCHES OR AT DIFFERENT ELEVATIONS

Lower footings should be constructed first to minimize the risk of undermining of the higher footings.

The recommended bearing capacities have been calculated by EXP from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of underground conditions becomes available. For example, it should be appreciated that modifications to bearing levels may be required if unforeseen subsoil conditions are revealed after the excavation is exposed to full view or if final design decisions differ from those assumed in this report. For this reason, this office should be retained to review final foundation drawings and to provide field inspections during the construction stage. As stated before, the results of this geotechnical study should therefore be regarded as preliminary at best due to the limited number of boreholes drilled to the required depth for the proposed development.

5.3 Earth Pressure on Subsurface Walls

The lateral earth pressure acting on basement walls may be calculated from the following equation:

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

where p = lateral earth pressure in kPa acting at depth h;

K = earth pressure coefficient a value of 0.4 is recommended;

γ = unit weight of retained soil, a value of 22 kN/m^3 is recommended for soil

h = depth to point of interest in m; and

q = equivalent value of any surcharge on the ground surface in kPa.

The foregoing expression assumes that the perimeter drainage system is effective to prevent hydrostatic pressure build-up behind the perimeter walls. If water is retained, submerged unit weight can be used for the retained soil below the groundwater table and full hydrostatic pressure should be added. The lateral earth pressures acting on basement walls may be calculated from the following expression:

$$p = K(\gamma h_1 + \gamma' h_2 + q) + \gamma_w h_2$$

where
- p = lateral earth pressure in kPa acting at depth h;
- K = earth pressure coefficient a value of 0.4 is recommended;
- γ = unit weight of retained soil, a value of 22 kN/m^3 for soil
- h_1 = depth in meters above the water table
- γ' = effective unit weight of soil, a value of 12 kN/m^3 for soil
- γ_w = unit weight of water (10 kN/m^3)
- h_2 = depth in metres below the water table; and
- q = equivalent value of surcharge on the ground surface in kPa

The basement walls should be designed to resist hydrostatic pressure imposed by the recorded groundwater level.

5.4 Temporary Shoring

It is highly probable that the excavation for the basements would extend to the property line near site roads, buildings or other infrastructure which must remain in operation during construction. Where site constraints do not allow for an open cut excavation, temporary shoring will be required during footing installations. If required, the temporary shoring can consist of a soldier pile and lagging system and should be designed on the basis of the state-of-the-art information given in the fourth edition of the Canadian Foundation Engineering Manual (CFEM).

5.3.1 Soldier Pile and Lagging Wall Shoring System

Soldier pile and lagging walls should be designed to resist lateral load imposed by the adjacent soils and surcharge loadings. Where there are settlement sensitive utilities or structures nearby, a contiguous caisson wall should be used.

Unshored excavation heights should not exceed 1.2 m in the excavation as per the Occupational Health and Safety Act. However, where there is instability noted on the sides slopes, they should be flattened.

Wet sand seams/layers may be encountered within the fill and the silty clay till. As such the space between the excavation and the lagging must be filled with concrete sand and in areas where seepages are noted, a filter fabric to allow drainage of the water in any wet sand seams or layers.

5.3.2 Tieback Anchors

Tieback anchors should be installed in the soil behind the excavation to a sufficient distance to allow mobilizing the desired lateral load resistance. The recommended configuration of the no-load zone is shown in Figure 26.16 of the Canadian Foundation Engineering Manual, 4th Edition. The minimum horizontal spacing between anchors should be 1.2 m to ensure that group effects between adjacent ground anchors are minimized and that anchor intersection (due to drilling deviations) is avoided. Group effects will reduce the load-carrying capacity of individual ground anchors. The anchors may be designed for the bond stresses shown in Table 3 following.

Table 3: Bond Stress for Non-Regroutable Tieback Anchors

Soil Type	Allowable Bond Stress (kPa)
Shale Bedrock	700

The actual value should be based on the results of pullout tests conducted in the early phases of construction.

The recommended design parameters should be confirmed by load testing a number of anchors to 200% design load in accordance with the current edition of the CFEM. As a minimum for this site, at least two 200% anchor load tests for each soil stratum should be carried out to verify the capacity of the anchors. The design for the production anchors should then be modified based on the test results, where necessary. All remaining anchors must be installed using similar procedures and proof tested to 1.5 times the design load.

Qualified geotechnical personnel should be retained to review the shoring design, to monitor installation and testing of the system, and to monitor the shoring movements during all phases of the excavation.

5.3.3 Lateral Earth Pressure

The shoring should be designed for lateral earth pressure using the following parameters:

Earth pressure coefficient:

= 0.25 (where small movements permissible)

= 0.35 (where utilities, roads, sidewalks must be protected from significant movement, or where vibration from traffic is a factor)

= 0.45 (where adjacent building footings or movement sensitive services, i.e., gas and water mains, are above a line 60 degrees from the horizontal extending from the bottom edge of the excavation)

Unit weight of retained soil (γ) = 22 kN/m^3

Coefficient of passive earth pressure of 4.0 at ULS and 2.7 at SLS can be used. An additional uniform earth pressure equivalent to 0.5H kPa where H is the height of wall in metres, should be included in design of basement walls for seismic loading considerations.

5.5 Excavation and Groundwater Control

Groundwater seepage should be expected from perched conditions in the fill and from the more pervious seams or layers within the glacial tills. Such seepage should also be anticipated through the lagging board joints where shoring is constructed as may be required. The concrete sand backfill and filter fabric are expected to be able to retain the fines, allowing water to flow into the excavation. Water seeping into the excavation can be controlled using conventional sump and pump techniques. The dewatering recommendations are discussed in more detail in our Hydrogeological Investigation Report.

All excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA). The soil encountered at this site can be classified as follows:

- Fill: Type 3
- Native Soils: Type 3
- Sound Shale Bedrock: Type 1

It should be noted that cobbles and boulders occur in glacial till deposits and their presence may influence the progress of excavation. Consequently, provisions should be made in the contract documents to cover any delays caused by boulder obstructions.

5.6 Floor Slab and Permanent Drainage

5.6.1 Slab-on-Grade Construction

For the basement floors, normal slab-on-grade type construction may be used on the shale bedrock. The subgrade should be cleaned of any loose rock fragments, and inspected by qualified geotechnical person prior to placement of concrete. On the prepared subgrade, a 200 mm layer of 19 mm clear stone should be placed over the entire floor area to serve as a moisture barrier.

Given that the subgrade will be in the bedrock, a row of weeping tile place in each of the service trenches to serve as underfloor drainage tiles should suffice. The drainage pipes should be surrounded high performance bedding materials or clear stones. Adequate clean-out ports should be installed for each line of drainage pipe to facilitate future cleaning of the pipes. All underfloor drains should be connected to the interior sumps.

Since the basement walls will be cast directly against the shoring system, the suggested perimeter drainage system against shoring is shown on Drawing 7. It is recommended that full coverage of the basement walls be provided in order to minimize the risk of water penetration through the walls. Cleanouts should be provided at the discharge pipe locations.

Recently the City of Toronto changed their policy regarding groundwater discharge into the sewer system. If discharge into the City Storm sewer is not permitted. Depending on the anticipated volume, the collected water will have to be managed on site. Alternatively, the basement structure will have to be tanked. If tanked, waterproofing would have to be provided on all subsurface walls and the walls designed for hydrostatic pressure.

5.6.2 Raft Foundation and Waterproofing the Basement

The raft foundation option will be required if foundation drainage into the City's sewer system is not allowed. Underfloor weeping tiles should not be installed under the raft slab and perimeter wall drains will not be required. If underground services are to be located above the raft, a layer of clear stone can be used on top of the raft foundation and a slab on grade placed over this clear stone layer. Weeping tile can be placed on top of the raft. The foundation walls and the underside of the raft should be designed and waterproofed to resist hydrostatic pressure. The design groundwater level can be obtained from the Hydrogeological Study report.

5.7 Backfill Considerations

If a raft is utilized, there will be no requirements to place any backfill at this site other than the fill between the top of the raft and the slab on grade. In this zone, clear stones, which will not require compaction efforts can be used.

If conventional footings are used, the use of high performance bedding or clear stone can be used as backfill below the slab on grade or in utility trenches.

If granular fill is used, it should be placed in lifts not more than 200 mm thick in the loose state, each lift being compacted to at least 98 percent standard Proctor maximum dry density (SPMDD), before subsequent lifts are placed. The degree of compaction achieved in the field should be checked by in-place density tests.

5.8 Earthquake Considerations

The recommendations for the geotechnical aspects to determine the earthquake loading for design using the OBC 2012 (R2019) are presented below.

5.8.1 Subsoil Conditions

The subsoil and groundwater information at this site have been examined in relation to Section 4.1.8.4 of the OBC 2012 (R2019). The subsoils generally consist of fill, silty clay till and shale bedrock. The foundation and the lowest basement slab of the proposed structure with two (2) levels of underground parking will be supported on sound shale bedrock.

5.8.2 Depth of Boreholes

Table 4.1.8.4.A. Site Classification for Seismic Site Response in OBC 2012 (R2019) indicated that to determine the site classification, the average properties in the top 30 m (below the lowest basement level) are to be used. All boreholes were advanced to the shale bedrock which is encountered above the lowest basement level. Therefore, the site classification recommendation would be based on the available information as well as our interpretation of conditions below the boreholes.

5.8.3 Site Classification

Based on the above assumptions and currently available information, the Site Class for the proposed condominium structure is “B” as per Table 4.1.8.4.A, Site Classification for Seismic Site Response, OBC 2012 (R2019).

6. General Comments

The information presented in this report is based on a limited investigation designed to provide information to support an overall assessment of the current geotechnical conditions of the subject property. The conclusions presented in this report reflect site conditions existing at the time of the investigation.

EXP Services Inc. should be retained for a general review of the final design and specifications to verify this report has been properly interpreted and implemented. If not accorded the privilege of making this review, EXP will assume no responsibility for interpretation of the recommendations in the report.

The comments given in this report are intended only for the guidance of design engineers. The number of boreholes required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. could be greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations as well as their own interpretations of the factual borehole results so that they may draw their own conclusions as to how the subsurface conditions may affect them.

More specific information with respect to the conditions between samples or the lateral and vertical extent of materials may become apparent during excavation operations. The interpretation of the borehole information must, therefore, be validated during excavation operations. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent; should this occur, EXP should be contacted to assess the situation and additional testing and reporting may be required. EXP has qualified personnel to provide assistance in regard to future geotechnical issues related to this property.

We trust this report is satisfactory for your purposes. Should you have any questions or comments, please do not hesitate to contact this office.

Yours truly,

EXP Services Inc.

Stephen S. M. Cheng
Digitally signed by Stephen S. M. Cheng
Date: 2023.04.21 09:36:38 -04'00'

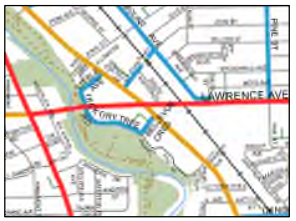
Nebojsa Vaskovic, P. Eng.
Project Manager, Geotechnical Division

Stephen S. M. Cheng, P. Eng.
Discipline Manager, Geotechnical Division

Drawings

Borehole Location Plan
Borehole Logs
Rock Core Logs
Perimeter and Underfloor Drainage Recommendations
Suggested Exterior Drainage Against Shoring System

COMPASS



KEY MAP

LEGEND

Borehole Location (EXP 2022)

Borehole Location (EXP 2021)

DRAWING TITLE:

BOREHOLE LOCATION PLAN

PROJECT NAME:

PROPOSED MIXED-USE DEVELOPMENT SUPPLEMENTARY GEOTECHNICAL INVESTIGATION

SITE LOCATION:

JOHN STREET AND SOUTH STATION STREET, TORONTO, ON

PROJECT No.

BRM-21021990-B0

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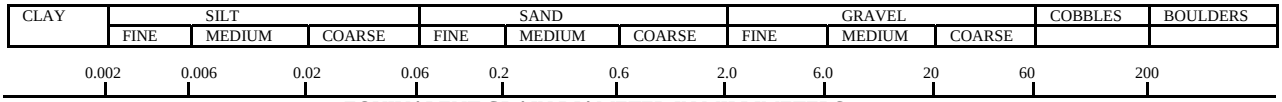
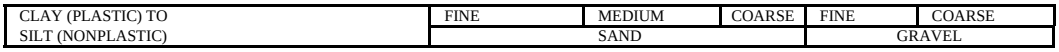
DRAWN BY: NV	**SCALE:** NTS
CHECKED BY: SC	**DRAWING No.** 1
DATE: August 2022	

Notes on Sample Descriptions and Soil Types — Drawing 1A

1. All sample descriptions included in this report follow the Canadian Foundations Engineering Manual soil classification system. This system follows the standard proposed by the International Society for Soil Mechanics and Foundation Engineering. Laboratory grain size analyses provided by **exp** also follow the same system. Others may use different classification systems; one such system is the Unified Soil Classification. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION





UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of

till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

4. Excerpt from “OHSA Regulations for Construction Projects,” Part III, Section 226:

- **Soil Types**

Type 1 Soil

a) is hard, very dense and only able to be penetrated with difficulty by a small sharp object;
b) has a low natural moisture content and a high degree of internal strength;
c) has no signs of water seepage; and
d) can be excavated only by mechanical equipment.

Type 2 Soil

a) is very stiff, dense and can be penetrated with moderate difficulty by a small sharp object;
b) has a low to medium natural moisture content and a medium degree of internal strength; and
c) has a damp appearance after it is excavated.

Type 3 Soil

a) is stiff to firm and compact to loose in consistency or is previously excavated soil;
b) exhibits signs of surface cracking;
c) exhibits signs of water seepage;
d) if it is dry, may run easily into a well-defined conical pile; and
e) has a low degree of internal strength.

Type 4 Soil

a) is soft to very soft and very loose in consistency, very sensitive and upon disturbance is significantly reduced in natural strength;
b) runs easily or flows, unless it is completely supported before excavating procedures;
c) has almost no internal strength;
d) is wet or muddy; and
e) exerts substantial fluid pressure on its supporting system. O. Reg. 213/91, s. 226.

Log of Borehole 201

Project No. BRM-21021990-B0 | Drawing No. 2

Project: Supplementary Geotechnical Investigation | Sheet No. 1 of 2

Location: 13 John Street, Toronto, ON

Date Drilled: July 22, 2022

Drill Type: CME 75 Truck Mount

Datum: Geodetic

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

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit |—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

Soil Description	ELEV. m	Depth (m)	SPT (N Value) / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	Natural Unit Weight kN/m³
ASPHALT: ~75 mm	127.40	0			
GRANULAR FILL: ~175 mm	~127.3				
FILL: sandy silt to clayey silt, trace gravel, hydrocarbon odour, dark brown, moist.	~127.1		14		21.8
		1	6		20.9
	~125.9				
SILTY CLAY TILL: some sand, trace gravel, grey, moist, firm to stiff.		2	9		20.4
			13		22.1
		3	11		21.7
	~123.4		50/75mm		22.3
SHALE BEDROCK: Georgian Bay Formation, some limestone interbeds, weathered and fractured in upper zones, grey.		4			
See rock core logs for details		5			
		6			
		7			
		8			
		9			
		10			

Continued Next Page

Date	Water Level (m)	Hole Open to (m)
July 29, 2022	9.63	-
August 4, 2022	10.47	-
August 18, 2022	9.95	-

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

Log of Borehole 201

Project No. BRM-21021990-B0 Drawing No. 2

Project: Supplementary Geotechnical Investigation Sheet No. 2 of 2

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)	SPT (N Value) 20 40 60 80 / Shear Strength kPa 100 200	Combustible Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	Sample	Natural Unit Weight kN/m^3
			117.40	10				
				11				
				12				
				13				
				14				
			~112.3	15				
		END OF BOREHOLE						

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

Date	Water Level (m)	Hole Open to (m)
July 29, 2022	9.63	-
August 4, 2022	10.47	-
August 18, 2022	9.95	-

ROCK CORE LOG

BH 201

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	127.4	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/22/22	07/25/22	N. Vaskovic	2A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	1 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
123.4	4		See Borehole Log for Details															
122.7			**GEORGIAN BAY FORMATION**											1	86	0	95	grey
	5		Shale with interbedded siltstone, and limestone layers.															
122.2																		
122.1			Shale (83%) thinly bedded or laminated, grey, low strength, alternating between heavily and slightly weathered to 5.0 m and between moderately weathered and unweathered below.											2	100	46	100	grey
			Limestone (7%) fine grained, grey, medium strength, unweathered															
	6		Siltstone (9%) fine grained, grey, medium strength, unweathered.															
			Discontinuities: bedding joints are rough planar to smooth undulating and at wide to very close intervals.															
			Vertical fractures were noted at 8.28 m and 12.51 m.											3	100	63	100	grey
	7																	
119.4	8													4	95	50	100	grey
119.3																		
	9																	
118.3																		
118.3																		
118.0																		
117.9																		
117.6																		
117.6																		
117.5																		

EXP_ROCKCORE_ROCK_LOG_21021990B.GPJ CORE_LOG.GDT 9/9/22

exp.

ROCK CORE LOG

BH 201

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	127.4	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/22/22	07/25/22	N. Vaskovic	2A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	2 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
117.5	10																	
117.4																		
117.3														5	100	48	100	grey
117.2																		
117.0																		
116.5																		
116.4	11																	
116.3																		
116.2														6	100	41	100	grey
116.2																		
	12																	
														7	100	48	100	grey
	13																	
	14													8	100	57	100	grey
	15																	
111.9			End of Borehole at 15.5 m															

EXP_ROCKCORE_ROCK_LOG_21021990B.GPJ CORE_LOG.GDT 9/9/22

exp.

Log of Borehole 202

Project No. BRM-21021990-B0 Drawing No. 3

Project: Supplementary Geotechnical Investigation Sheet No. 1 of 2

Location: 13 John Street, Toronto, ON

Date Drilled: July 20, 2022

Drill Type: CME 75 Truck Mount

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

Soil Description	ELEV. m	Depth (m)
ASPHALT: ~75 mm	126.76	0
GRANULAR FILL: ~75 mm	~126.7	
FILL: sandy silt to clayey silt, trace gravel, dark brown, moist.	~126.6	
SILTY CLAY TILL: some sand, trace gravel, grey, moist, firm to stiff.	~125.3	1
		2
		3
SHALE BEDROCK: Georgian Bay Formation, some limestone interbeds, weathered and fractured in upper zones, grey. See rock core logs for details	~123.0	4
		5
		6
		7
		8
		9
		10

SPT (N Value): 20 at 0 m; 10 at 1 m; 14 at 2 m; 8 at 2.6 m; 12 at 3.3 m; 50/75 mm at 3.8 m

Shear Strength (kPa): 20 40 60 80 / 100 200

Combustible Vapour Reading (ppm): 25 50 75

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

Natural Unit Weight kN/m³: 20.5 at 2 m; 22.0 at 2.6 m; 21.6 at 3.3 m

Continued Next Page

Date	Water Level (m)	Hole Open to (m)
July 29, 2022	1.62	-
August 4, 2022	10.12	-
August 18, 2022	9.94	-

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

Log of Borehole 202

Project No. BRM-21021990-B0 Drawing No. 3

Project: Supplementary Geotechnical Investigation Sheet No. 2 of 2

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)	SPT (N Value) 20 40 60 80 / Shear Strength kPa 100 200	Combustible Vapour Reading (ppm) 25 50 75 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30	Sample	Natural Unit Weight kN/m^3
			116.76	10				
				11				
				12				
				13				
				14				
			~111.7	15				
		END OF BOREHOLE						

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

Date	Water Level (m)	Hole Open to (m)
July 29, 2022	1.62	-
August 4, 2022	10.12	-
August 18, 2022	9.94	-

ROCK CORE LOG

BH 202

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	126.8	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/20/22	07/21/22	D. Panchal	3A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	1 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
122.8	4		See Borehole Log for Details															
122.2			**GEORGIAN BAY FORMATION**															
121.9					F	V												
121.9	5		Shale with interbedded siltstone, and clay layers.		F	V												
121.6			Shale (84%) thinly bedded or laminated, grey, low strength, alternating between heavily and slightly weathered to 6.29 and between moderately weathered and unweathered below.	1	B	F	C	RU						1	100	36	95	Grey
121.5							C	RP										
121.4																		
121.3																		
121.1			Limestone (3%) fine grained, grey, medium strength, unweathered															
121.1					F	V												
121.0																		
121.0			Siltstone (13%) fine grained, grey, medium strength, unweathered.															
120.9	6																	
120.7			Discontinuities: bedding joints are rough planar to smooth undulating and at wide to very close intervals.		F	V												
120.7																		
120.3			Vertical fractures were noted at 4.85 m, 4.96 m, 5.51 m, 5.78 m, 6.23 m, 7.35 m, 8.80 m, 9.12 m, 9.21 m, 9.71 m, 10.68 m and 12.71 m.															
120.3																		
			Rubble layers were noted at 5.23 m (90 mm), 5.42 m (100 mm), 5.82 m (50 mm), 6.07 m (50 mm) and 7.60 m (70 mm)	1	B	F	C	RP						2	100	63	100	Grey
	7						C	RP										
					F	V												
119.2																		
119.2																		
119.1																		
119.1																		
	8																	
118.6																		
118.6																		
118.2				1	B	F	C	RP						3	100	78	100	Grey
118.1							C	SU										
118.1																		
					F	V												
117.7	9																	
117.7					F	V												
117.6					F	V												
117.6																		
117.3																		
117.2																		
117.2																		
117.1					F	V												
117.0																		

EXP_ROCKCORE_ROCK_LOG_21021990B.GPJ CORE_LOG.GDT 9/9/22

exp.

ROCK CORE LOG

BH 202

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	126.8	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/20/22	07/21/22	D. Panchal	3A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	2 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	10			1	B	F	C C	SU SP						4	100	61	100	Grey
116.5																		
116.5																		
116.3																		
116.3																		
116.1					F	V												
116.0																		
	11																	
				1	B	F	M C	SP SP						5	98	98	100	Grey
	12																	
114.6																		
114.6																		
114.3																		
114.3																		
114.1					F	V												
114.0																		
113.9																		
113.8	13			1	B	F	M M	SP SP						6	100	93	100	Grey
112.7	14																	
112.7																		
				1	B	F	M M	SP SP						7	100	100	100	Grey
112.1																		
112.1																		
112.0																		
111.9	15																	
111.6			End of Borehole at 15.1 m															

EXP_ROCKCORE_ROCK_LOG_21021990B.GPJ_CORE_LOG.GDT 9/9/22

exp.

Log of Borehole 203

Project No. BRM-21021990-B0 Drawing No. 4

Project: Supplementary Geotechnical Investigation Sheet No. 1 of 2

Location: 13 John Street, Toronto, ON

Date Drilled: July 21, 2022

Drill Type: CME 75 Truck Mount

Datum: Geodetic

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

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)
			126.89	0
		ASPHALT: ~50 mm	~126.8	
		GRANULAR FILL: ~175 mm	~126.7	
		FILL: sandy silt to clayey silt, trace gravel, dark brown, moist.		1
			~125.4	2
		SILTY CLAY TILL: some sand, trace gravel, grey, moist, firm to very stiff.		3
			~122.9	4
		SHALE BEDROCK: Georgian Bay Formation, some limestone interbeds, weathered and fractured in upper zones, grey.		5
		See rock core logs for details		6
				7
				8
				9
				10

SPT (N Value) 20 40 60 80
Shear Strength 100 200 kPa

Combustible Vapour Reading (ppm) 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30

Sample

Natural Unit Weight kN/m³

15
7 — 20.3
17 — 20.1
17 — 22.0
11 — 21.7
50/75 mm — 21.8
50/100 mm

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

Continued Next Page

Date	Water Level (m)	Hole Open to (m)
July 29, 2022	2.5	-
August 4, 2022	9.41	-
August 18, 2022	9.24	-

Log of Borehole 203

Project No. BRM-21021990-B0 Drawing No. 4

Project: Supplementary Geotechnical Investigation Sheet No. 2 of 2

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)
			116.89	10
				11
				12
				13
				14
				15
			~111.5	
		END OF BOREHOLE		

SPT (N Value) 20 40 60 80
Shear Strength kPa 100 200

Combustible Vapour Reading (ppm) 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30

Sample

Natural Unit Weight kN/m^3

Date	Water Level (m)	Hole Open to (m)
July 29, 2022	2.5	-
August 4, 2022	9.41	-
August 18, 2022	9.24	-

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

ROCK CORE LOG

BH 203

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	126.9	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/21/22	07/22/22	D. Panchal	4A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	1 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
122.9	4		See Borehole Log for Details															
122.0	5		Core Lost	1	B	F	VC C	RU RP						1	37	21	90	Grey
121.1			**GEORGIAN BAY FORMATION**						NC	100 mm								
121.0	6		Shale with interbedded siltstone, and clay layers.															
120.6			Shale (71%) thinly bedded or laminated, grey, low strength, alternating between heavily and slightly weathered to 7.90 and between moderately weathered and unweathered below.															
120.3			Limestone (4%) fine grained, grey, medium strength, unweathered															
120.2			Siltstone (16%) fine grained, grey, medium strength, unweathered.															
120.0			Discontinuities: bedding joints are rough planar to smooth undulating and at wide to very close intervals.															
120.0	7		Vertical fractures were noted at 9.29 m, 9.59 m, 9.76 m, 10.49 m, 13.27 m, 14.83 m, 15.23 m and 15.31 m.	1	B	F	C C	RP SU						2	100	87	100	Grey
119.2			A clay (9%) layer, heavily weathered, very low strength was noted at 5.84 m.															
119.2			Rubble layers was noted at 15.17 m (60 mm).															
119.1																		
119.0	8																	
118.4				1	B	F	C C	SU SU						3	100	70	100	Grey
118.2																		
118.1																		
118.0																		
117.9	9																	
117.9																		
117.7																		
117.6					F	V												
117.6																		
117.6					F	V												
117.5																		
117.4					F	V												
117.2																		
117.2																		

exp.

ROCK CORE LOG

BH 203

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	126.9	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/21/22	07/22/22	D. Panchal	4A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	2 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
117.1	10																	
116.9				1	B	F	C	SU						4	100	65	100	Grey
116.9							C	SP										
116.4					F	V												
116.4																		
116.3																		
116.2																		
115.9	11																	
115.9																		
115.2				1	B	F	C	SP						5	100	93	100	Grey
							M	SP										
115.0	12																	
114.1														6	100	94	100	Grey
114.1																		
113.9	13																	
113.8				1	B	F	M	SP										
113.6					F	V	M	SP										
113.6																		
	14													7	100	93	100	Grey
				1	B	F	M	SP										
112.0					F	V	C	SU										
	15																	
111.8																		
111.7					F	V												
111.6					F	V												
111.5			End of Borehole at 15.4 m															

EXP_ROCKCORE_ROCK_LOG_21021990B.GPJ CORE_LOG.GDT 9/9/22

exp.

Log of Borehole 204

Project No. BRM-21021990-B0 | Drawing No. 5

Project: Supplementary Geotechnical Investigation | Sheet No. 1 of 2

Location: 13 John Street, Toronto, ON

Date Drilled: July 19, 2022

Drill Type: CME 75 Truck Mount

Datum: Geodetic

Auger Sample ☒ | Combustible Vapour Reading □

SPT (N) Value ○ ▨ | Natural Moisture ×

Dynamic Cone Test — | Plastic and Liquid Limit ⊢○

Shelby Tube ■ | Undrained Triaxial at % Strain at Failure ⊕

Field Vane Test S | Penetrometer ▲

Soil Description	ELEV. m	Depth (m)	SPT (N Value) / Shear Strength kPa	Natural Moisture Content % / Atterberg Limits (% Dry Weight)	Natural Unit Weight kN/m³
GRANULAR FILL: ~225 mm	126.89	0			
	~126.7				
FILL: sandy silt to clayey silt, trace gravel, dark brown, moist.		1	12, 8		
	~125.4	2	20, 28		20.9, 21.8
SILTY CLAY TILL: some sand, trace gravel, grey, moist, firm to very stiff.		3	24		21.8
	~122.9	4	50/75 mm, 50/75 mm		22.6
SHALE BEDROCK: Georgian Bay Formation, some limestone interbeds, weathered and fractured in upper zones, grey.		5			
See rock core logs for details		6			
		7			
		8			
		9			
		10			

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

Continued Next Page

Date	Water Level (m)	Hole Open to (m)
July 29, 2022	4.6	-
August 4, 2022	10.28	-
August 18, 2022	10.18	-

Log of Borehole 204

Project No. BRM-21021990-B0 Drawing No. 5

Project: Supplementary Geotechnical Investigation Sheet No. 2 of 2

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)
			116.89	10
				11
				12
				13
				14
				15
			~111.5	
		END OF BOREHOLE		

SPT (N Value) 20 40 60 80

Shear Strength kPa 100 200

Combustible Vapour Reading (ppm) 25 50 75

Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30

Sample

Natural Unit Weight kN/m^3

Date	Water Level (m)	Hole Open to (m)
July 29, 2022	4.6	-
August 4, 2022	10.28	-
August 18, 2022	10.18	-

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

ROCK CORE LOG

BH 204

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	126.9	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/19/22	07/20/22	N. Vaskovic	5A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	1 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
122.9	4		See Borehole Log for Details															
	5																	
121.3			**GEORGIAN BAY FORMATION**															
121.1																		
121.0	6		Shale with interbedded siltstone, and limestone layers.											1	85	33	95	grey
			Shale (80%) thinly bedded or laminated, grey, low strength, alternating between heavily and slightly weathered to 6.5 m and between moderately weathered and unweathered below.															
			Limestone (9%) fine grained, grey, medium strength, unweathered															
	7		Siltstone (10%) fine grained, grey, medium strength, unweathered.											2	100	63	100	grey
			Discontinuities: bedding joints are rough planar to smooth undulating and at wide to very close intervals.															
			Vertical fractures were noted at 9.15 m and 13.11 m.															
119.0			Rubble was notted at 10.94 to 10.99 m															
119.0	8													3	100	59	100	grey
118.1																		
118.0	9																	
117.7																		
117.7																		
117.6																		
117.5																		
117.4																		
117.2																		
117.0																		

EXP_ROCKCORE_ROCK_LOG_21021990B.GPJ CORE_LOG.GDT 9/9/22

exp.

ROCK CORE LOG

BH 204

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	126.9	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/19/22	07/20/22	N. Vaskovic	5A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	2 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
116.9	10													4	100	44	100	grey
116.9																		
116.8																		
116.4																		
116.4																		
116.3																		
116.2																		
	11													5	100	66	100	grey
115.5																		
115.4																		
	12																	
114.6														6	100	74	100	grey
114.5																		
114.1																		
114.1																		
113.9	13																	
113.9																		
113.8																		
113.7																		
113.6																		
113.6																		
	14													7	100	71	100	grey
112.2																		
112.1																		
111.9	15																	
111.8																		
111.5			End of Borehole at 15.4 m															

EXP_ROCKCORE_ROCK_LOG_21021990B.GPJ CORE_LOG.GDT 9/9/22

exp.

Log of Borehole 205

Project No. BRM-21021990-B0 | Drawing No. 6

Project: Supplementary Geotechnical Investigation | Sheet No. 1 of 2

Location: 13 John Street, Toronto, ON

Date Drilled: July 18, 2022

Drill Type: CME 75 Truck Mount

Datum: Geodetic

Auger Sample ☒ | Combustible Vapour Reading □

SPT (N) Value ○ ▨ | Natural Moisture ×

Dynamic Cone Test — | Plastic and Liquid Limit ⊢○

Shelby Tube ■ | Undrained Triaxial at % Strain at Failure ⊕

Field Vane Test S | Penetrometer ▲

Soil Description	ELEV. m	Depth (m)	SPT (N Value) / Shear Strength kPa	Natural Moisture Content % / Atterberg Limits (% Dry Weight)	Natural Unit Weight kN/m³
GRANULAR FILL: ~50 mm	126.95	0			
FILL: sandy silt to clayey silt, trace gravel, dark brown, moist.	~126.9		25	×	
- becomes silty sand		1	8	×	21.2
		2	11	×	
SILTY CLAY TILL: some sand, trace gravel, grey, moist, firm to hard.	~124.8		11	×	19.9
		3	13	×	20.6
		4	16	×	23.2
			50/25 mm	×	
		5	50/25 mm	×	
SHALE BEDROCK: Georgian Bay Formation, some limestone interbeds, weathered and fractured in upper zones, grey.	~121.7				
See rock core logs for details		6			
		7			
		8			
		9			
		10			

SPT (N Value): 20 40 60 80 | Shear Strength: 100 200 kPa

Combustible Vapour Reading (ppm): 25 50 75 | Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

Sample

Continued Next Page

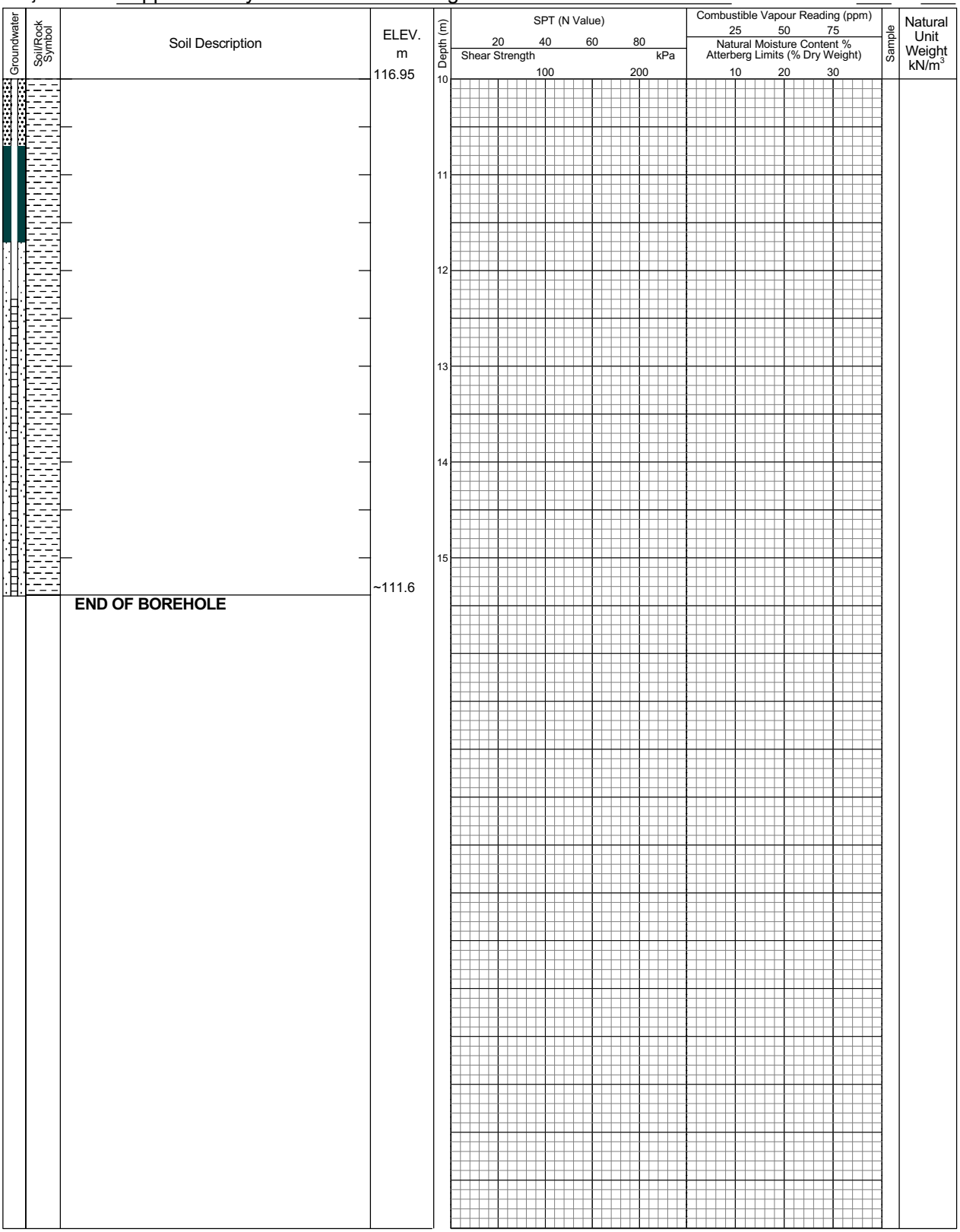
Date	Water Level (m)	Hole Open to (m)
July 29, 2022	2.82	-
August 4, 2022	11.3	-
August 18, 2022	11.16	-

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

Log of Borehole 205

Project No. BRM-21021990-B0 Drawing No. 6

Project: Supplementary Geotechnical Investigation Sheet No. 2 of 2



Date	Water Level (m)	Hole Open to (m)
July 29, 2022	2.82	-
August 4, 2022	11.3	-
August 18, 2022	11.16	-

EXPLOGBRAMPTON 13 JOHN STREET BOREHOLE LOGS.GPJ NEW.GDT 9/1/22

ROCK CORE LOG

BH 205

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	127.0	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/18/22	07/19/22	N. Vaskovic	6A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	1 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
123.0	4		See Borehole Log for Details															
	5																	
121.6			**GEORGIAN BAY FORMATION** Shale with interbedded siltstone, and limestone layers. Shale (82%) thinly bedded or laminated, grey, low strength, alternating between heavily and slightly weathered to 6.5 m and between moderately weathered and unweathered below. Limestone (8%) fine grained, grey, medium strength, unweathered Siltstone (11%) fine grained, grey, medium strength, unweathered. Discontinuities: bedding joints are rough planar to smooth undulating and at wide to very close intervals. Vertical fractures were noted at 8.19 m and 12.21 m. Rubble was notted at 5.33 to 5.93 m, 8.67 to 8.76 m, and 9.74 to 9.77 m											1	95	0	95	grey
	6													2	98	32	95	grey
	7													3	96	22	95	grey
	8																	
118.8 118.7																		
118.3 118.2	9													4	100	19	100	grey
117.7 117.7																		
117.3 117.3																		
117.2 117.2																		

EXP_ROCKCORE_ROCK_LOG_21021990B.GPJ_CORE_LOG.GDT 9/9/22

exp.

ROCK CORE LOG

BH 205

PROJECT	ORIENTATION	ELEVATION (m)	DATUM	PROJECT NUMBER
Supplementary Geotechnical Investigation	Vertical	127.0	Geodetic	BRM-21021990-B0
LOCATION	**DATE STARTED**	**COMPLETED**	**LOGGED BY**	**DRAWING NUMBER**
13 John Street, Toronto, ON	07/18/22	07/19/22	N. Vaskovic	6A
CLIENT	**DRILLER**	**DRILL TYPE**	**CORE BARREL**	**SHEET**
		CME 75 - Truck	HQ	2 of 2

ELEVATION (m)	DEPTH (m)	SYMBOL	GENERAL DESCRIPTION	JOINT CHARACTERISTICS: NO. OF SETS	JOINT TYPE	ORIENTATION	SPACING	ROUGHNESS	FILLING	APERTURE (mm)	WEATHERING	STRENGTH	FRACTURE FREQUENCY	RUN NUMBER	RECOVERY (%)	RQD	WATER RECOVERY (%)	WATER COLOUR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
116.6	10													5	100	43	100	grey
116.2																		
115.8	11																	
115.8																		
115.4														6	100	43	100	grey
115.4																		
114.8	12																	
114.8																		
114.3														7	100	38	100	grey
114.3																		
114.1																		
113.9	13																	
113.6																		
113.5																		
113.3																		
113.2																		
112.8	14													8	100	46	100	grey
112.8																		
	15																	
111.6			End of Borehole at 15.4 m															

EXP_ROCKCORE_ROCK_LOG_21021990B.GPJ CORE_LOG.GDT 9/9/22

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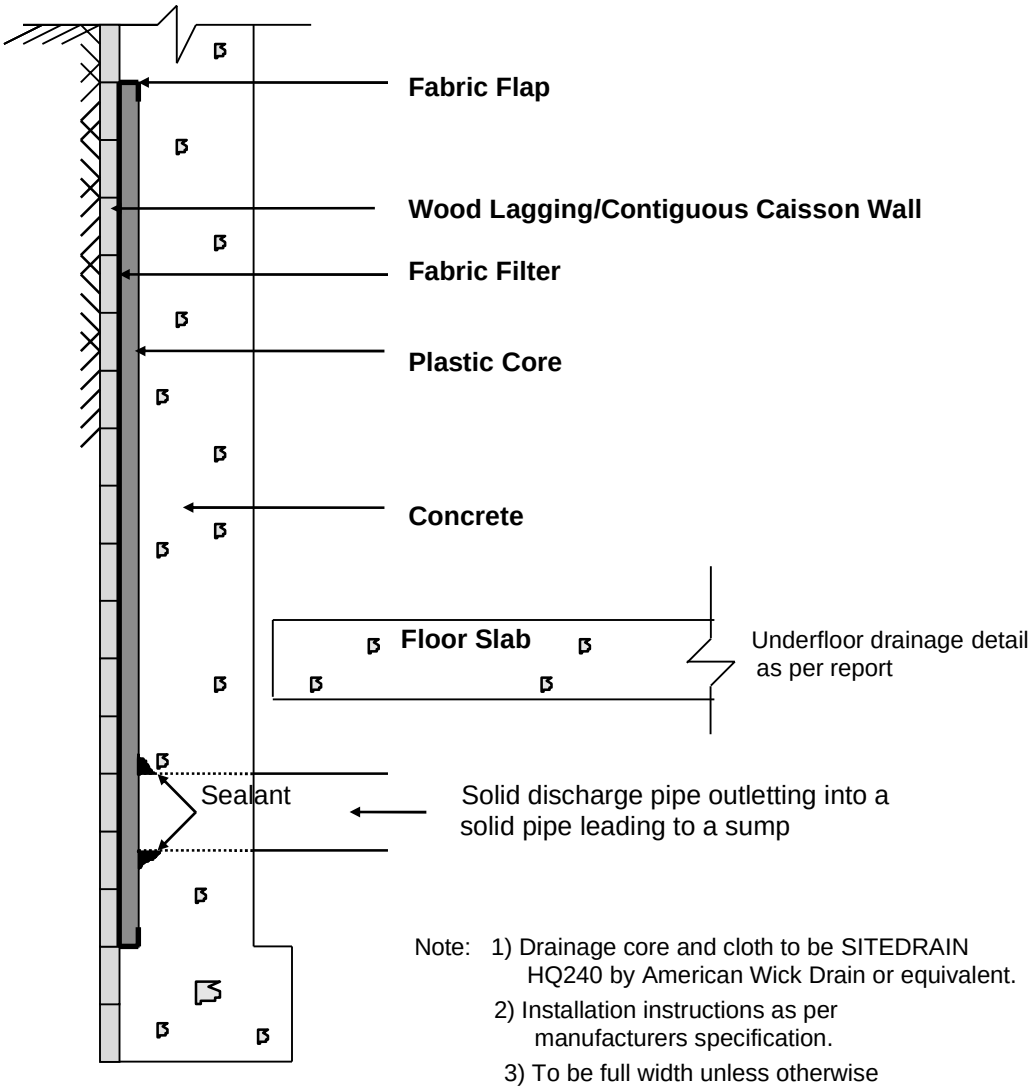


Note:
1) Drainage core and cloth to be SITEDRAIN HQ240 by American Wick Drain or equivalent.
2) Installation instructions as per manufacturers specification.
3) To be full width unless otherwise recommended by the engineer.
4) Final detail must be approved before system is considered acceptable.
5) SITEDRAIN HQ240 should be kept a minimum of 1.2 m below exterior finished grade.
6) Adequate cleanout ports should be provided at the discharge pipe locations.

SUGGESTED EXTERIOR DRAINAGE AGAINST SHORING SYSTEM

Appendix A

Preliminary Geotechnical Investigation Borehole Logs

Log of Borehole 1

Project No. Brm-21021990-A0

Drawing No. 2

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 13 John Street

Date Drilled: November 4, 2021

Drill Type: Hollow Auger Truck

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

Soil Description	ELEV. m	Depth (m)	Natural Unit Weight kN/m³
	127.25	0	
~ 76 mm **ASPHALT** and ~ 152 mm **GRANULAR**	~127.2 ~127.0		
FILL: Clayey silt, trace sand, trace to some gravel, dark stains, grey, moist - petroleum odour, some sand		1	
	~125.7		
FILL: Silty clay, trace gravel, trace sand, petroleum odour, grey, moist		2	20.5
	~125.0		
SILTY CLAY: trace sand, brown, moist			19.7
	~124.2	3	
SILTY CLAY TILL: some sand, trace gravel, brown and grey, moist			21.8
	~122.7	4	
WEATHERD SHALE: trace clay, grey, moist		5	
	~121.1	6	
END OF BOREHOLE			

SPT (N Value): 20 40 60 80
Shear Strength: 100 200 kPa
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

15
5
6
13
16
50/76mm
50/51mm

Date	Water Level (m)	Hole Open to (m)
On completion	Dry	0.3
December 2, 2021	1.94	-

EXPLOGBRAMPTON BOREHOLE LOGS - 13 JOHN ST.GPJ NEW.GDT 12/2/21

Log of Borehole 2

Project No. Brm-21021990-A0 | Drawing No. 3

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: 13 John Street

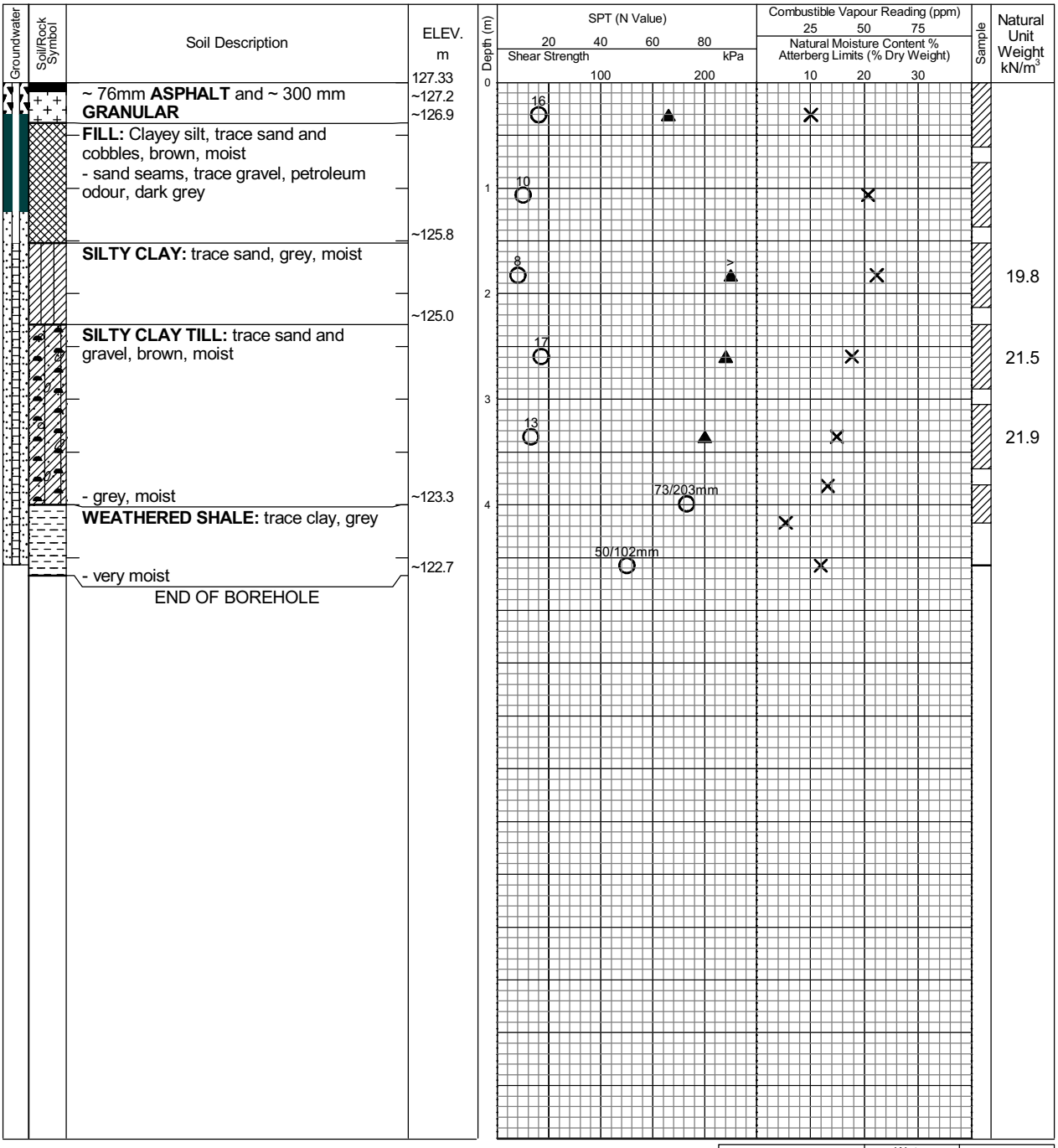
Date Drilled: November 4, 2021

Drill Type: Hollow Auger Truck

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



EXPLOGBRAMPTON BOREHOLE LOGS - 13 JOHN ST.GPJ NEW.GDT 12/2/21

Date	Water Level (m)	Hole Open to (m)
On completion	3.2	-
December 2, 2021	1.86	-

Log of Borehole 3

Project No. Brm-21021990-A0

Drawing No. 4

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 13 John Street

Date Drilled: November 4, 2021

Drill Type: Hollow Auger Truck

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

Soil Description	ELEV. m	Depth (m)	Natural Unit Weight kN/m³
	127.38	0	
~ 100 mm **ASPHALT** and ~ 300 mm **GRANULAR**	~127.3 ~127.0		
FILL: Clayey silt, trace gravel, some sand, dark, moist - sand seams, trace sand, petroleum odour, moist	~125.9	1	
FILL: Silty clay, trace sand, brown, moist	~125.1	2	20.1
SILTY CLAY: trace sand, brown, moist	~124.3	3	20.0
SILTY CLAY TILL: trace to some sand, trace gravel, brown, moist			20.6
- some sand, brown, moist	~123.5	4	
WEATHERED SHALE: trace clay, grey	~122.8		
END OF BOREHOLE			

SPT (N Value): 20 40 60 80
Shear Strength: 100 200 kPa
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SPT values: 16, 7, 6, 10, 12, 50/76mm, 50/51mm

Date	Water Level (m)	Hole Open to (m)
On completion	Dry	Open
December 2, 2021	1.98	-

EXPLOGBRAMPTON BOREHOLE LOGS - 13 JOHN ST.GPJ NEW.GDT 12/2/21

Log of Borehole 4

Project No. Brm-21021990-A0 | Drawing No. 5

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: 13 John Street

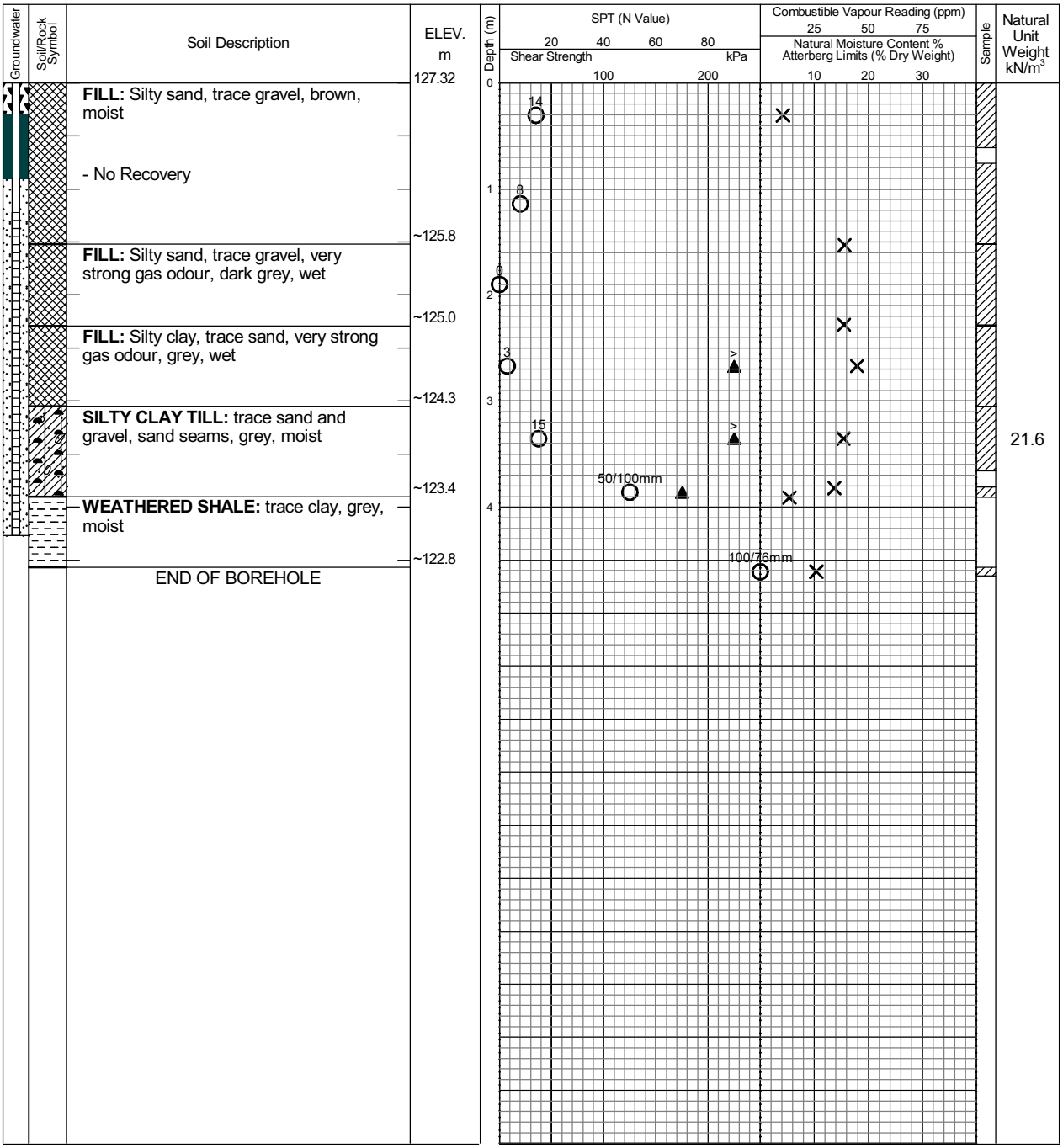
Date Drilled: November 4, 2021

Drill Type: Hollow Auger Truck

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



EXPLOGBRAMPTON BOREHOLE LOGS - 13 JOHN ST.GPJ NEW.GDT 12/2/21

Date	Water Level (m)	Hole Open to (m)
On completion	Dry	-
December 2, 2021	1.73	-

Log of Borehole 5

Project No. Brm-21021990-A0

Drawing No. 6

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 13 John Street

Date Drilled: November 3, 2021

Drill Type: Hollow Auger Truck

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

Soil Description	ELEV. m	Depth (m)	Sample	Natural Unit Weight kN/m³
FILL: Clayey silt, trace gravel, some sand, bricks, dark stains, brown, moist	126.66	0		
- trace sand		1		
	~125.1			
SILTY CLAY: trace sand, brown, moist		2		20.6
- very moist to wet				22.3
	~122.8	3		
WEATHERED SHALE: some clay, grey		4		
- very moist				
	~121.5	5		
END OF BOREHOLE		6		

SPT (N Value): 20 40 60 80
Shear Strength: 100 200 kPa
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SPT values: 12, 6, 13, 12, 50/50mm, 50/130mm, 50/80mm

Date	Water Level (m)	Hole Open to (m)
On completion	3.05	-
December 2, 2021	1.25	-

EXPLOGBRAMPTON BOREHOLE LOGS - 13 JOHN ST.GPJ NEW.GDT 12/2/21

Log of Borehole 6

Project No. Brm-21021990-A0

Drawing No. 7

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 13 John Street

Date Drilled: November 3, 2021

Drill Type: Hollow Auger Truck

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

Soil Description	ELEV. m	Depth (m)
	126.84	0
~ 100 mm **ASPHALT** and ~ 200 mm **GRANULAR**	~126.7	
	~126.5	
FILL: Sandy silt, some clay, trace ravel, black staining, brown, moist	~126.1	
FILL: Silty clay, trace sand and rootlets, grey, moist	~125.3	1
SILTY CLAY: trace sand, brown and grey, moist		2
- becoming brown and moist		3
- moist	~122.3	4
WEATHERED SHALE: trace clay, grey, moist		5
	~120.7	6
END OF BOREHOLE		

SPT (N Value): 20 40 60 80
Shear Strength: 100 200 kPa
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SPT values: 6, 7, 14, 11, 9, 50/76mm, 50/25mm

Sample

Natural Unit Weight kN/m³: 20.5, 21.1, 21.0

Date	Water Level (m)	Hole Open to (m)
On completion	3.05	-
December 2, 2021	1.60	-

EXPLOGBRAMPTON BOREHOLE LOGS - 13 JOHN ST.GPJ NEW.GDT 12/2/21

Log of Borehole 7

Project No. Brm-21021990-A0

Drawing No. 8

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 13 John Street

Date Drilled: November 3, 2021

Drill Type: Hollow Auger Truck

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

Soil Description	ELEV. m	Depth (m)	Sample	Natural Unit Weight kN/m³
	127.01			
~ 115 mm **ASPHALT** and ~ 175 mm **GRANULAR**	~126.9			
FILL: Clayey silt, trace gravel, some sand, dark stains, moist	~126.7			
	~125.5			
SILTY CLAY: trace to some sand, brown, moist				20.3
- trace sand				20.8
				20.9
	~123.2			
Shale Complex	~123.1			
WEATHERED SHALE: trace clay, grey, moist				
	~122.4			
END OF BOREHOLE				

SPT (N Value): 20 40 60 80
Shear Strength: 100 200 kPa
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

6
5
11
15
12
50/25mm
50/51mm

Date	Water Level (m)	Hole Open to (m)
On completion	3.05	-
December 2, 2021	2.03	-

EXPLOGBRAMPTON BOREHOLE LOGS - 13 JOHN ST.GPJ NEW.GDT 12/2/21