GEI Consultants

Consulting Engineers and Scientists

Geotechnical Investigation

Proposed Mixed-Use Residential & Commercial Development

1225 Dundas Street East, Mississauga, Ontario

Submitted to:
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1. Introduction

GEI Consultants (GEI) was retained by Dundix Realty Holdings to complete a geotechnical investigation for the proposed mixed-use residential and commercial building to be located at 1225 Dundas Street East, in Mississauga, Ontario. A site location plan is provided as Figure 1.

The existing site is generally rectangular in shape, and measures approximately 92 metres north to south by 122 to 130 metres east to west, with an approximate area of 12,300 m^2 (1.23 hectares). The site is bounded by Dundix Road to the north, an existing 6 storey residential building to the east, Dundas Street to the south, and Arena Road to the west. The site is currently developed with a 1 storey block building containing a number of commercial units, and the existing site grades are near Elev. 120 to 121 m. An aerial image of the site is shown on Figure 2A.

GEI reviewed the following drawings in preparation of this report:

- *"Proposed Residential Mix-Use Development, 1225 Dundas Street E, Mississauga, ON,"* Project No. 22.117P01, Draft Concept Plan dated June 16, 2022, by Turner Fleischer Architects Inc.
- *"Draft Plan of Survey Showing Topographic Features of Part of Lot 7, Concession 1, North and South of Dundas Street, City of Mississauga, Regional Municipality of Peel,"* Project No. 22-B7880, draft dated May 10, 2022, by Mauro Group Inc.
- *"Grading and Servicing Plan,"* Drawing No. C-101, Project No. 160623078, by Stantec.

The proposed mixed-use re-development consists primarily of residential space. The entire site will have one (1) level of underground parking, with the parking level 1 (P1) slab set at Elev. 116.0 m. The northern part of the site will contain 4 blocks of 3-storey townhouses with the finished floor elevation (FFE) set near Elev. 121.6 to 122 m. The southern part of the site will consist of primarily residential space, including 9 storeys of residential units with 12-storey towers on the east and west sides of the building. The ground floor will contain townhouse units, retail and amenity spaces and garbage rooms with the FFEs ranging from near Elev. 120.4 to 121.1 m. There will be on-grade driving lanes and parking spaces through the middle of the site, and the site is municipally serviced.

It is noted that the proposed site plan provided as Figure 2B is currently preliminary / draft and may be subject to change. GEI must be provided with the final drawing sets to verify or update the recommendations within this report.

The geotechnical investigation was required to provide engineering design parameters for design and construction of the proposed mixed-use development. This includes design recommendations for foundations, slabs-on-grade, earth pressures, temporary shoring, basement drainage and seismic site class, as well as considerations for constructability such as soil and rock excavation and temporary groundwater control. GEI was retained to complete a hydrogeological study, Phase One ESA and Phase Two ESA at the site, under separate covers.

2. Procedures and Methodology

The fieldwork for the drilling program was carried out on May 24 to 26, 2022, to assess the soil conditions present at the site. A total of twelve (12) boreholes (Boreholes 1 to 12) were advanced throughout the site to depths of 3.0 to 9.2 m below existing grade (Elev. 117.4 to 111.4 m). The boreholes were distributed across the site and around the existing building. No interior boreholes were advanced or were considered necessary for the geotechnical investigation.

The borehole locations were laid out in the field by GEI field staff prior to commencement of drilling operations. Ground surface elevations of the boreholes were surveyed by GEI relative to geodetic elevations provided on the drawing, *"Dundas St E Segment B 'Priority' in the City of Mississauga,"* Plan No. CDU-42-18, File No. 20-23770, dated September 30, 2021, by Callon Dietz Locates Incorporated. Specifically, a storm sewer catch basing with a lid elevation of 119.88 m was referenced as the benchmark. Borehole coordinates (referencing NAD 83 geodetic datum) were provided by a handheld GPS receiver. The borehole coordinates and elevations are provided on the borehole logs in Appendix A. Borehole locations are shown on Figure 2A (aerial image of the site) and 2B (proposed site plan).

Drilling and sampling of the boreholes was completed using a track-mounted drill rig operated by a drilling subcontractor retained and supervised by GEI. The boreholes were advanced to predetermined depths using solid stem augers, and sampling was conducted using 51 mm O.D. split spoon (SS) samplers. Standard Penetration Test (SPT) "N" Values were recorded for the sampled intervals as the number of blows required to drive an SS sampler 305 mm into the soil using a 63.5 kg drop hammer falling 750 mm, in accordance with ASTM D1586. Soil sampling was conducted at 0.75 metre intervals for the upper 3.0 metres of each borehole and at 1.5 metre intervals thereafter.

The GEI field staff examined, and classified characteristics of the soils encountered in the boreholes, including the presence of fill materials, made groundwater observations during and upon completion of the drilling, recorded observations of borehole advancement, and processed the recovered samples. All recovered soil samples were logged in the field, carefully packaged, and transported to the laboratory for more detailed examination and classification.

In the laboratory, the soil samples were classified as to their visual and textural characteristics and geotechnical laboratory testing for grain size was carried out with the results provided in Appendix B.

HQ-sized rock core was recovered from Boreholes 9, 11 and 12 confirm the depth, type, and quality of bedrock beneath the site. Four runs were cored in Borehole 9 (4.7 m of coring), three runs were cored in Borehole 11 (4.2 m of coring) and three runs were cored in Borehole 12 (4.2 m of coring). The recovered bedrock core was identified in the field, logged and photographed and placed into wooden core boxes for transportation to the GEI lab for additional logging, measurements and photographs. The Total Core Recovery (TCR), Solid Core Recovery (SCR) and Rock Quality Designation (RQD) values were recorded in accordance with the conventions used by the International Society for Rock Mechanics (ISRM) and are shown on the Borehole Logs in Appendix A. Rock core photographs are included in Appendix D.

All of the boreholes (Boreholes 1 to 12) were instrumented with monitoring wells to determine the static groundwater elevation at the site, for subsequent monitoring or testing purposes, and for use by GEI during the hydrogeological and environmental investigations. All borehole backfilling/capping activities and monitoring well installations were performed in accordance with Ontario Regulation (O.Reg.) 903.

3. Subsurface Conditions

3.1 General Overview

The borehole locations are shown on Figures 2A and 2B. Detailed soil profiles encountered in the GEI boreholes are indicated on the attached borehole logs in Appendix A, with the results of geotechnical laboratory testing included in Appendix B. Subsurface profiles beneath the site are included as Figures 3A and 3B and the profile alignments are shown in plan view on Figures 2A and 2B.

It should be noted that the conditions indicated on the borehole logs and subsurface profiles are for specific locations only and can vary between and beyond the locations. It should be noted that the soil boundaries indicated on the borehole logs and subsurface profiles are inferred from non-continuous sampling and observations during drilling, or from recovered rock core. These boundaries are intended to reflect approximate transition zones and should not be interpreted as exact planes of geological change.

In addition, the descriptions provided in the borehole logs are inferred from a variety of factors, including: visual observations of the soil samples retrieved, laboratory testing, measurements prior to and after drilling, and the drilling process itself (speed of drilling, shaking/grinding of the augers, etc.). The passage of time also may result in changes in conditions interpreted to exist at locations where sampling was conducted.

3.2 Stratigraphy

3.2.1 Pavement Structure and Earth Fill

The boreholes encountered a pavement structure at the ground surface consisting of 25 to 100 mm of asphalt underlain by 50 to 150 mm of granular material.

Boreholes 1 to 4 and 6 to 12 encountered what appeared to be a granular fill (typically containing significant sand and gravel percentage with relatively minimal fines) underlying the pavement structure. The granular fill extended to depths of 0.8 to 1.5 m below grade (Elev. 120.2 to 119.3 m) and was brown and moist. The SPT “N” Values measured in the granular fill ranged from 4 to 24, indicating a loose to compact relative density. Composite samples of the granular fill were collected from the boreholes and tested relative to OPSS.MUNI 1010 specifications for Granular ‘A’ and ‘B’ Type I. The results are included in Appendix B and show that the samples exceed the percent passing specification for Granular ‘A’ for multiple sieve sizes, and exceed

specifications for Granular 'B' Type I for fines content (percent of material passing the 75 µm sieve).

The granular fill was underlain by common earth fill in Boreholes 1 to 4, 7, 10 and 12, and the common earth fill was encountered below the pavement structure in Borehole 5. The earth fill extended to depths of 0.9 to 2.3 m below grade (Elev. 119.7 to 118.0 m) and ranged in composition from clayey silt, to sand, to silty sand, to sandy silt, typically with trace to some gravel. The earth fill was moist and ranged in colour from brown, to grey, to black. The SPT "N" Values ranged from 3 to 13, indicating a very loose to compact (but typically loose) relative density.

3.2.2 Sand and Glacial Till Deposits

Cohesionless deposits of sand, some gravel to gravelly, with trace silt and clay were encountered underlying the fill material in Boreholes 1, 2, 5 to 7, and 9 to 12. The sands were encountered at depths of 0.8 to 1.5 m below grade (Elev. 119.9 to 118.7 m) and extended to 1.5 to 2.6 m (Elev. 119.2 to 117.9 m). The sands were brown to greyish brown and moist. SPT "N" Values ranged from 8 to greater than 100 blows per 300 mm of penetration, indicating a loose to very dense (but typically compact) relative density.

Boreholes 3, 6, 11 and 12 encountered a deposit of glacial till with a cohesive matrix comprising sandy silt, with some clay and trace to some gravel. Cobbles and boulders are likely embedded within the deposit. The glacial till was encountered underlying the earth fill or sand deposits at depths of 1.5 to 2.4 m below grade (Elev. 119.2 to 118.1 m) and extended to 2.3 to 3.0 m (Elev. 118.4 to 117.4 m). The "N" Values ranged from 8 to 29 blows, indicating a firm to very stiff consistency.

3.2.3 Bedrock

Bedrock of the Georgian Bay Formation (laminated to thinly bedded grey shale with limestone interbeds) was encountered in all borehole locations underlying the overburden soils. The bedrock was inferred in Boreholes 1 to 8 and 10 by drilling observations, auger grinding, and samples recovered from the split spoon sampler. Rock core was recovered from Boreholes 9, 11 and 12 using HQ coring equipment to confirm the type of bedrock, weathering profile, Total Core Recovery (TCR), Solid Core Recovery (SCR), Rock Quality Designation (RQD), and percentage of harder layers (limestone interbeds). The depths of inferred or cored bedrock and method of identification are summarized below.

Borehole Location	Ground Surface Elevation (m)	Depth / Elev. (m) of Inferred Weathered Bedrock Surface	Depth / Elev. (m) of Sound (Unweathered) Bedrock	Method of Bedrock Identification
1	120.4	2.3 / 118.1	-	Drilling Observations, Auger Grinding, Split Spoon Samples
2	120.5	2.3 / 118.2	-	
3	120.4	3.0 / 117.4	-	
4	120.3	2.3 / 118.0	-	
5	120.2	3.0 / 117.4	-	
6	120.7	2.3 / 118.4	-	
7	120.6	1.5 / 119.1	-	
8	121.0	1.5 / 119.5	-	
9	120.8	2.3 / 118.5	4.4 / 116.4	Rock Coring from 3.5 to 7.7 m Below Grade
10	120.6	2.6 / 118.0	-	Drilling Observations, Auger Grinding, Split Spoon Samples
11	120.8	3.0 / 117.8	4.0 / 116.8	Rock Coring from 3.6 to 7.8 m Below Grade
12	120.7	3.0 / 117.7	4.5 / 116.2	Rock Coring from 3.5 to 7.7 m Below Grade

Based on the borehole results, the inferred weathered bedrock surface was encountered at depths of 1.5 to 3.0 m below grade (Elev. 119.5 to 117.4 m), or at Elev. 118.3 m on average. Sound (unweathered) bedrock was identified from the rock core in Boreholes 9, 11 and 12 to be at Elev. 116.8 to 116.2 m. The thickness of the weathered bedrock zone ranged from 1.0 to 2.1 m in the cored holes and could be up to 4 metres thick elsewhere on site based on the borehole findings. This amount of weathering is typical for the Georgian Bay Formation that is encountered near surface.

TCR, SCR and RQD values were recorded in accordance with the conventions used by the International Society for Rock Mechanics (ISRM) and are shown on the Borehole Logs in Appendix A and summarized below.

Borehole Location	Run and Depth (m)	Total Core Recovery (TCR)	Solid Core Recovery (SCR)	Rock Quality Designation (RQD)
9	1 (3.0 to 3.5)	42%	37%	21%
	2 (3.5 to 5.0)	100%	85%	40%
	3 (5.0 to 6.3)	98%	95%	73%
	4 (6.3 to 7.7)	100%	95%	77%

Borehole Location	Run and Depth (m)	Total Core Recovery (TCR)	Solid Core Recovery (SCR)	Rock Quality Designation (RQD)
11	1 (3.6 to 5.1)	100%	92%	58%
	2 (5.1 to 6.6)	100%	100%	83%
	3 (6.6 to 7.8)	100%	96%	93%
12	1 (3.5 to 5.0)	100%	93%	33%
	2 (5.0 to 6.6)	100%	100%	77%
	3 (6.6 to 7.7)	100%	100%	96%

The RQD ranged from 21 to 96% which is typical for the sedimentary bedrock formation with predominantly horizontal bedding planes. The RQD of the sound bedrock was greater than 70%.

The percentage of hard layers (limestone interbeds) measured in the rock core ranged from 2 to 4%. The solid stems augers were grinding but were able to penetrate through the bedrock without encountering refusal indicating a relatively low percentage of these harder limestone layers.

3.3 Groundwater

All boreholes (Boreholes 1 to 12) were instrumented with 50 mm diameter PVC standpipes and 1.5 to 3.0-metre-long screens. Monitoring well configurations and groundwater observations are summarized on the borehole logs in Appendix A and are presented in the table below.

Monitoring Well Location	Well Screen Location		Strata Screened	Groundwater Level Depth / Elev. (m)
	Depth (m)	Elev. (m)		June 1, 2022
BH 1	1.4 to 2.9	119.1 to 117.5	Sand; Weathered Bedrock	2.2 / 118.2
BH 2	1.5 to 3.0	119.0 to 117.5	Fill; Sand; Weathered Bedrock	2.8 / 117.7
BH 3	1.5 to 4.5	118.9 to 115.9	Fill; Glacial Till; Weathered Bedrock	3.5 / 116.9
BH 4	1.7 to 3.2	118.6 to 117.1	Fill; Weathered Bedrock	2.3 / 118.0
BH 5	1.6 to 3.1	118.6 to 117.1	Sand; Weathered Bedrock	2.1 / 118.1
BH 6	1.6 to 3.1	119.1 to 117.6	Sand; Glacial Till	2.7 / 118.0
BH 7	1.5 to 3.0	119.1 to 117.6	Sand; Weathered Bedrock	2.6 / 118.0
BH 8	0.9 to 3.0	120.1 to 118.0	Weathered Bedrock	Dry
BH 9	6.1 to 7.6	114.7 to 113.2	Sound Bedrock	2.9 / 117.9

Monitoring Well Location	Well Screen Location		Strata Screened	Groundwater Level Depth / Elev. (m)
	Depth (m)	Elev. (m)		June 1, 2022
BH 10	5.6 to 8.6	115.0 to 112.0	Inferred Sound Bedrock	3.0 / 117.6
BH 11	4.7 to 7.7	116.1 to 113.1	Sound Bedrock	3.2 / 117.6
BH 12	4.7 to 7.7	116.0 to 113.0	Sound Bedrock	3.3 / 117.4

The stabilized groundwater levels in the monitoring wells were measured to range between approximately Elev. 118.2 to 116.9 m, or about 2.1 to 3.5 m below grade. The prevailing groundwater table is located within and near the top of the bedrock formation.

Groundwater levels are expected to show seasonal fluctuations and vary in response to prevailing climate conditions. Additional considerations are provided in GEI's hydrogeological report under a separate cover.

4. Engineering Design Parameters & Analysis

GEI reviewed the following drawings in preparation of this report:

- *"Proposed Residential Mix-Use Development, 1225 Dundas Street E, Mississauga, ON,"* Project No. 22.117P01, Draft Concept Plan dated June 16, 2022, by Turner Fleischer Architects Inc.
- *"Draft Plan of Survey Showing Topographic Features of Part of Lot 7, Concession 1, North and South of Dundas Street, City of Mississauga, Regional Municipality of Peel,"* Project No. 22-B7880, draft dated May 10, 2022, by Mauro Group Inc.
- *"Grading and Servicing Plan,"* Drawing No. C-101, Project No. 160623078, by Stantec.

The proposed mixed-use re-development consists primarily of residential space. The entire site will have one (1) level of underground parking, with the parking level 1 (P1) slab set at Elev. 116.0 m. The northern part of the site will contain 4 blocks of 3-storey townhouses with the finished floor elevation (FFE) set near Elev. 121.6 to 122 m. The southern part of the site will consists of primarily residential space, including 9 storeys of residential units with 12-storey towers on the east and west sides of the building. The ground floor will contain townhouse units, retail and amenity spaces and garbage rooms with the FFEs ranging from near Elev. 120.4 to 121.1 m. There will be driving lanes and parking spaces through the middle of the site, and the site is municipally serviced.

It is noted that the proposed site plan provided as Figure 2B is currently preliminary / draft and may be subject to change. GEI must be provided with the final drawing sets to verify or update the recommendations within this report.

4.1 Foundation Design Parameters

Based on the borehole results, the inferred weathered bedrock surface was encountered at depths of 1.5 to 3.0 m below grade (Elev. 119.5 to 117.4 m), or at Elev. 118.3 m on average. Sound (unweathered) bedrock was identified from the rock core in Boreholes 9, 11 and 12 to be at Elev. 116.8 to 116.2 m. The P1 slab is set at Elev. 116.0 m and the foundations will likely be made about 0.5 m lower, therefore the entire structure is expected to be founded uniformly on sound (unweathered) bedrock of the Georgian Bay Formation at about Elev. 115.5 m.

Conventional spread and strip footing foundations set uniformly on the sound (unweathered) bedrock of the Georgian Bay Formation can be designed using a

geotechnical reaction at SLS of 4 MPa, for an estimated settlement of 25 mm. The settlement of spread footings made on the sound bedrock is linear and non-recoverable and occurs as load is applied. The factored geotechnical resistance at ULS is 6 MPa.

The minimum width of spread footings shall be 1000 mm and the minimum width of strip footings shall be 600 mm, regardless of the loading considerations. Footings stepped from one level to another must be at a slope not exceeding 7 vertical to 10 horizontal. There must be a minimum of 300 mm between the edge of any footing and the top of a sloped/vertical rock cut down to another footing. All footings exposed to ambient air temperature throughout the year must be provided with a minimum of 1.2 metres of earth cover or equivalent insulation for frost protection where unheated. This can be reduced to 0.6 metres within unheated underground garages.

The foundation design parameters provided above are predicated on the assumption that the foundation subgrade surface consists uniformly of sound bedrock, and that all weathered bedrock and caved material is removed. The foundation excavation must be done in such a way that groundwater is controlled to prevent any disturbance to the foundation base. Temporary groundwater control during construction is discussed in Section 5.2.

The bedrock foundation subgrade must be reviewed by the geotechnical engineer prior to the placement of concrete to verify the foundation design parameters provided are applicable, and to provide remedial recommendations if necessary. If foundation excavations will be open for a prolonged period of time, the foundation subgrade should be protected with a skim coat of lean mix concrete (after inspection by the geotechnical engineer), to ensure that no deterioration of the bedrock will occur due to weather effects.

4.2 Seismic Design Parameters

Section 4.1.8.4 of the Ontario Building Code provides values of the acceleration and velocity-based site coefficients (F_a and F_v) for various time periods, associated with specific Site Classes. These Site Classes are based on the energy-corrected Average Standard Penetration Resistance values and undrained shear strength within the 30 metres of soil directly underlying the foundations of the proposed structure. As the boreholes were advanced less than this depth at the site, the site classification recommendation provided below assumes that the soil conditions are similar below the drilled depth.

The parking level 1 (P1) slab is set at Elev. 116.0 m, with foundations set deeper. Based on the borehole results, the inferred weathered bedrock surface was encountered at Elev. 120.2 to 117.4 m, or at Elev. 118.3 m on average. Sound

(unweathered) bedrock was identified from the rock core in Boreholes 9, 11 and 12 to be at Elev. 116.8 to 116.2 m. The P1 slab and foundations will be set uniformly on sound bedrock of the Georgian Bay Formation. Based on this, the applicable Site Classification for Seismic Site Response for the site is Class "B".

4.3 Earth and Rock Pressure Design Parameters

The structures must be designed to resist unbalanced lateral earth pressures imparted from the weight of adjacent soils. Lateral earth pressures are calculated using the following equation:

$$\boldsymbol{P = K[\gamma h + q]}$$

where, **P** = the horizontal pressure at depth, **h** (m)
K = the earth pressure coefficient (dimensionless)
h = depth below surface in metres
γ = the bulk unit weight of soil, (kN/m^3)
q = surcharge loading (kPa)

The above equation assumes that a drainage system is present which prevents the build up of any hydrostatic pressure behind the structure subjected to the unbalanced lateral earth pressures. If this is not the case, the equation must be revised to also incorporate the submerged unit weight of the soil multiplied by the earth pressure coefficient, in addition to the water pressure itself.

The values for use in the design of structures subjected to unbalanced lateral earth pressures at this site are below. Due to the significant variability in composition and density / consistency of the overburden soils, one set of design parameters are provided for the overburden soils.

Soil Type	γ - Bulk Unit Weight (kN/m^3)	φ - Friction Angle (degrees)	Earth Pressure Coefficient (dimensionless)		
			K_a - Active	K_o - At-Rest	K_p - Passive
Granular 'A' or 'B' (OPSS.MUNI 1010)	21.0	32	0.31	0.47	3.25
Overburden Soils	19.0	30	0.33	0.50	3.00
Georgian Bay Formation Bedrock	26.0	28	Not Applicable		

The calculation of the earth pressure coefficients is based on Rankine theory, which provides a conservative estimate as no friction between the soil and the structure is accounted for. The earth pressure coefficients provided above are only applicable for flat ground surfaces beyond the structure and will change for sloping ground surfaces.

The earth pressure coefficients referenced within the above table are a function of the friction angle of the adjacent soil, and both the degree and direction of movement of the structure subjected to unbalanced lateral earth pressures. For structures that are restrained at the top (such as basement walls), the at-rest earth pressure coefficient will apply. For structures that allow for 0.1 to 1% of movement away from the soil, the full active earth pressure coefficient will apply. For structures that allow for 1 to 10% of movement into the soil, the full passive earth pressure coefficient will apply. The percentage movement is based on the height of the structure.

Other types of structures such as shoring walls with multiple rows of tiebacks and soil nail walls are subject to different loading conditions and must be analyzed separately and are further discussed in Section 4.6.

Bedrock typically does not exert lateral pressures onto a foundation wall, but a common design approach is to assume a uniform pressure distribution below the bedrock surface equal to the maximum earth pressure for the soil overburden at the bedrock surface. This is conservative but ensures a consistent design for the foundation wall. Rock swelling over time due to locked-in horizontal stresses is not expected to be an issue as the P1 level will not extend greater than 2 metres into sound bedrock.

4.4 Slab on Grade Design

The parking level 1 slab will be set at Elev. 116.0 metres on sound bedrock of the Georgian Bay Formation, which is an adequate subgrade for support of a slab on grade. The modulus of subgrade reaction appropriate for design of the slab resting on an aggregate drainage layer overlying sound (unweathered) bedrock is 80,000 kPa/m.

The bedrock subgrade must be inspected by the geotechnical engineer, prior to the placement of an aggregate base. Any caved material or weathered bedrock must be removed to the suitable subgrade level under the direction of the geotechnical engineer.

The P1 slab must be provided with a capillary moisture barrier and drainage layer. This is made by placing the concrete slab on a minimum 200 mm layer of 19 mm clear stone (OPSS.MUNI 1004) compacted by vibration to a dense state. The upper 50 mm of clear stone can be replaced with 19 mm crusher run limestone for a working surface.

4.5 Basement Drainage

The stabilized groundwater levels in the monitoring wells were measured to range between approximately Elev. 118.2 to 116.9 m, or about 2.1 to 3.5 m below grade. The prevailing groundwater table is located within the bedrock formation. The P1 level will be made below the groundwater table.

All basement foundation walls must be provided with damp-proofing provisions in conformance to the Ontario Building Code. Backfill along the foundation wall must consist of Granular 'B' Type 1 (OPSS 1010) for a minimum lateral distance of 600 mm out from the foundation wall. Alternatively, if a filtered cellular drainage media is provided adjacent to the foundation wall, the backfill may consist of common earth fill. Where feasible, the prevailing grade of the site should slope away from the building at a gradient of at least 2% to promote surface water run-off and reduce groundwater infiltration. The upper 150 mm of backfill should also consist of relatively impervious compacted material.

A perimeter drainage system must be installed that will remove any water that infiltrates into the building backfill, to ensure that any water does not infiltrate into the basement. The perimeter drains must consist of minimum 100 mm diameter perforated pipes wrapped in filter socks, sufficiently covered on all sides by 19 mm clear stone. Perimeter drains should be directed to the sump underneath the basement floor in solid pipes so as not to surcharge the underfloor drainage layer with water. Subfloor drainage must also be provided, consisting of minimum 100 mm diameter perforated drainage pipes wrapped in a filter sock placed directly on the bedrock subgrade and surrounded by the slab drainage layer consisting of 19 mm clear stone. The subfloor drains should be spaced at 6 metres on-centre, with at least one run per structural bay. All sump pumps should be on emergency power for redundancy in case of a power outage, as they are a critical building element to prevent basement flooding and hydrostatic pressure. A typical basement drainage detail is included in Appendix C.

If a shoring system is used to support the excavation, prefabricated drainage panels are typically installed between the foundation wall and shoring system to facilitate drainage. The panels typically tie into non-perforated drainage pipes beneath the slab using drainage ports or pipes through the foundation wall, which connect separately to the sump system. Typical details are provided in Appendix C for a caisson wall or soldier pile and lagging system.

Consideration could be given to design the elevator pits or sumps to be fully waterproofed to help reduce the amount of drawdown.

Alternatively, if a fully waterproofed structure is designed (including resistance to hydrostatic pressures), then basement and perimeter drainage is not required and there would be no permanent discharge of groundwater.

4.6 Shoring Design

The building excavation will extend through about 1.5 to 3.0 m of overburden soil and into both weathered and sound bedrock. The sidewalks and public lands associated with Dundas Road, Arena Road, and Dundix Road are located adjacent the property line, and private residential property is located to the east. Open cut excavations may not be feasible due to the nearby public / private lands. A shoring system such as soldier piles and lagging or a continuous caisson wall may be required to support the basement excavation.

No excavation shall extend below the foundations of existing adjacent structures without adequate alternative support being provided. The shoring designer should review the subsurface and proposed site conditions to select the appropriate shoring system.

The shoring system might best be supported by pre-stressed rock anchors extending beneath the adjacent lands. Pre-stressed anchors are installed and stressed in advance of excavation and this limits movement of the shoring system as much as is practically possible. The use of anchors on adjacent properties requires the consent of the adjacent landowners, expressed in encroachment agreements. The City Transportation and Works Department negotiates permits for the encroachment in City lands, which are generally allowed. Where tiebacks cannot be constructed, the use of rakers can be used which provide support to the shoring wall internally. A cantilevered system may not be practical due to the shallower bedrock surface compared to the required embedment depth to resist the earth pressures.

4.6.1 Earth Pressures

If a single level of support (e.g. anchors, tie-backs, or bracing) are used to support the excavation, the pressure distribution on the wall is triangular and can be calculated as discussed in Section 4.3.

If multiple supports are required to support the excavation, a distributed pressure diagram more realistically approximates the earth pressure on a shoring system of this type, when restrained by pre-tensioned anchors. The multi-level supported shoring can be designed based on an earth pressure distribution consisting of a rectangular pressure distribution for the cohesionless soils with a maximum pressure defined by:

$$P = 0.65 * K[\gamma h + q]$$

where, **P** = the horizontal pressure at depth, **h** (m)
K = the earth pressure coefficient (dimensionless)
h = depth below surface in metres
γ = the bulk unit weight of soil, (kN/m^3)
q = surcharge loading (kPa)

For groundwater pressure distribution along the shoring wall in conjunction with the above soil pressures, the groundwater level for design should be taken at 2 m below existing grades (near Elev. 118.2 m). The groundwater pressure distribution is only applicable where an impermeable boundary condition is created along the perimeter of the excavation, as is the case with an interlocking caisson wall. If the site is continuously dewatered for the duration of construction, hydrostatic pressures will not be applied on the system.

4.6.2 Caisson and Soldier Pile Toe Design

Caisson and soldier pile toes will be made in bedrock of the Georgian Bay Formation. The factored ultimate vertical axial resistance for the design of a pile, embedded in the sound bedrock, is 6 MPa at ULS. The factored ultimate lateral geotechnical resistance of the sound rock is estimated to be 1 MPa at ULS.

It is recommended to advance all caissons and soldier piles to the full depth of the proposed excavation (i.e. through the overburden soils, the weathered bedrock, and slightly into the sound bedrock). The caisson or solider piles advanced as part of the shoring wall are typically advanced 1 metre below the base of the excavation to accommodate weathering in the bedrock that can occur, to ensure the lateral and vertical geotechnical resistances provided above can be utilized.

The overburden soils are generally cohesionless. Although not specifically encountered in the boreholes, zones of perched water may be encountered such that augured borings for the piles made into these soils could be unstable. In these cases, it will be necessary to advance temporarily cased holes into the bedrock surface to prevent excess caving during the soldier pile installations. Cobbles and boulders may be encountered within the glacial till deposit that was encountered above the bedrock surface in some borehole locations. The design and installation methods will be determined by the shoring designer and contractor.

4.6.3 Shoring Support

Conventional earth anchors made in bedrock of the Georgian Bay Formation may be designed using a working adhesion of 400 kPa. A significant portion of the native soil in the anchor zones will be cohesionless and therefore it is imperative that all borings

made for anchorages be completely cased as the holes are advanced and that there is no excess removal of soil beyond the volume of the boring made.

The design adhesion for rock anchors is controlled as much by the installation technique as the rock quality and therefore a proto-type anchor must be made in each anchor level executed to demonstrate the anchor capacity and validate the design assumptions to 200% of the design load (performance test). All production anchors must be proof-tested to 133% of the design load, to validate the design assumptions.

Where anchors cannot be used, internal bracing or rakers would be necessary. The footings for the rakers would be made on sound bedrock and can be designed using a factored geotechnical resistance at ULS of 1,000 kPa when inclined at 45 degrees.

4.6.4 General Considerations

The strata in the anchor zones will be cohesionless and potentially wet. The shoring designer and contractor must decide if the borings made for anchorages will be completely cased as the holes are advanced and that there is no excess removal of soil beyond the volume of the boring made.

Once the shoring system is configured for immediate support and anchorage it is imperative that a global stability assessment be made of the soil and excavation to ensure that there is not a potential failure condition that is beyond the shoring anchor zone.

It is recommended that the contract have a performance specification limiting movement. A maximum of 13 mm is generally acceptable for a street where movement sensitive utilities are not nearby. Otherwise, the engineering departments of the utility companies must be contacted to assess what movement is acceptable. Anchor spacing and elevation, and the timing of the excavation and anchoring operations are critical in determining the movements.

The shoring designer should be retained to monitor installation and testing of the system, and to monitor the shoring during all phases of the excavation. Inclinometers should be installed at locations where sensitive buildings or services lie close to the excavation. Careful monitoring is needed in any shored excavation, especially when buildings are located in close proximity. This is necessary not only to anticipate when and if additional support is needed, but also to provide data to meet claims from adjacent property owners. In this regard, it is essential that detailed precondition surveys be made on adjacent buildings.

5. Constructability Considerations

5.1 Excavations

Excavations must be carried out in accordance with the Occupational Health and Safety Act, Ontario Regulation 213/91 (as amended), Construction Projects, Part III - Excavations, Section 222 through 242. Where workers must enter a trench or excavation the soil must be suitably sloped and/or braced in accordance with the OHSA. These regulations designate four (4) broad classifications of soils to stipulate appropriate measures for excavation safety. The regulation stipulates safe slopes of excavation as follows based on the soils encountered at this site:

- *Type 3 Soils – All soils on site above the groundwater table or when dewatered:* Trench sidewalls to be constructed no steeper than 1 horizontal to 1 vertical from the base of the excavation.

If more than one soil type is encountered in an excavation, the most conservative soil type must be followed for sloping the sidewalls of the excavation. For the purposes of design, excavations should be conducted assuming a Type 3 soil (assuming the adjacent soils do not contain significant groundwater) unless otherwise directed by a geotechnical engineer on site. This includes all excavations into rock, which may have a vertical cut of no greater than 1.2 metres before a 1H : 1V slope above.

Minimum support system requirements for steeper excavations are stipulated in Sections 235 through 238 and 241 of the OHSA and include provisions for timbering, shoring and moveable trench boxes. To reduce the potential for instability of the trench excavations, materials excavated from the service trenches and/or other fill materials or heavy equipment should not be placed near the crest of the trench excavations.

The excavations will extend through the weathered bedrock and into sound bedrock. The bedrock below the site is predominantly shale but contains some beds of harder limestone. The solid stem augers were able to penetrate through the weathered and sound bedrock without encountering refusal. The Georgian Bay Formation is a rippable rock that can be removed with conventional excavation equipment once it has been displaced by a ripper tooth or hoe ram.

Although only about 2 to 4% of the cored bedrock consisted of hard limestone layers, it is still possible that some thicker layers of hard limestone may be encountered when excavations extend into the bedrock. Hard layers of limestone within the shale formation are normally broken with hoe mounted hydraulic rams before excavation. Excavating detailed shapes for foundations and the edges of the excavation are normally accomplished with hoe mounted hydraulic rams.

Where a harder layer coincides with the foundation level, it may be necessary to remove the entire thickness of the hard layer to expose the founding level. It is virtually impossible to remove a portion of one of these layers. This can result in excess rock removal not intrinsic to the project requirements. The risk and responsibility for the excess rock removal under these circumstances and the supply and placement of the extra concrete to restore the foundation grade must be addressed in the contract documents for foundations, excavation, and shoring contractors.

It is important to note that soils and bedrock encountered in the construction excavations may vary significantly across the site. Our preliminary soil classifications are based solely on the materials encountered in the boreholes advanced on site. The contractor should verify that similar conditions exist throughout the proposed area of excavation. If different subsurface conditions are encountered at the time of construction, we recommend that GEI be contacted immediately to evaluate the conditions encountered.

5.2 Temporary Construction Groundwater Control

The stabilized groundwater levels in the monitoring wells were measured to range between approximately Elev. 118.2 to 116.9 m, or about 2.1 to 3.5 m below grade. The prevailing groundwater table is located within the bedrock formation. The construction excavation will extend to Elev. 116 m or deeper, or potentially 2.2 m or more below the groundwater table. Groundwater levels are expected to show seasonal fluctuations and vary in response to prevailing climate conditions.

It is important to control the groundwater adequately. If the groundwater table is not controlled during construction, the exposed bedrock could deteriorate or there may be unfavourable working conditions. If an impermeable shoring system is used (such as a continuous caisson wall sealed in the bedrock), limited vertical seepage is expected from the bedrock. If a permeable shoring system (such as soldier piles and lagging) or open cut is used, seepage will enter the excavation and must be controlled.

The hydrogeological study being completed for the site concurrently by GEI should be referenced for additional dewatering and hydrogeological considerations.

5.3 Quality Verification Services

On-site quality verification services are an integral part of the geotechnical design function, and for foundations and retaining walls, are required under the Ontario Building Code (OBC). Quality verification services are used to confirm that construction is being conducted in general conformance with the requirements as outlined in the drawings, reports and specifications prepared for the proposed development.

GEI Consultants can provide all the on-site quality verification services outlined below:

- The subgrade for the shallow foundations must be field reviewed by the geotechnical engineer.
- The installation of any shoring wall systems must be field reviewed by the shoring design engineer.
- Part-time monitoring of the subgrade support capabilities, material quality, lift thickness, moisture content, degree of compaction, etc. is recommended for the parking level 1 slab.
- Testing of the concrete (compressive strength, slump, air content, etc.) and testing of the asphalt (asphalt content and gradation) are recommended to ensure that the quality of the materials being brought to site meet the requirements of the project.

5.4 Site Work

The soils and bedrock found at this site may become weakened when subjected to traffic, particularly when wet. If there is site work carried out during periods of wet weather, then it can be expected that the subgrade will be disturbed unless an adequate granular working surface is provided to protect the integrity of the subgrade soils from construction traffic. Subgrade preparation works cannot be adequately accomplished during wet weather and the project must be scheduled accordingly. The disturbance caused by the traffic can result in the removal of disturbed soil or bedrock and use of granular fill material for site restoration or underfloor fill that is not intrinsic to the project requirements.

The most severe loading conditions on the subgrade may occur during construction. Consequently, special provisions such as end dumping and forward spreading of earth and aggregate fills, restricted construction lanes, and half-loads during paving and other work may be required, especially if construction is carried out during unfavourable weather.

If construction proceeds during freezing weather conditions, adequate temporary frost protection for the founding subgrade and concrete must be provided. The soil and exposed bedrock at this site is susceptible to frost damage. Consideration must be given to frost effects, such as heave or softening, on exposed soil surfaces in the context of this project development.

6. Limitations and Conclusions

6.1 Limitations

The recommendations and comments provided are necessarily on-going as new information of underground conditions becomes available. 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, conditions not observed during this investigation may become apparent. Should this occur, GEI should be contacted to assess the situation and additional testing and reporting may be required.

GEI should be retained for a general review of the final design drawings and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, GEI 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 the 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.

This report was prepared by GEI for the account of Dundix Realty Holdings. 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. GEI accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

6.2 Conclusion

It is recognized that municipal/regional governing bodies, in their capacity as the planning and building authority under Provincial statues, will make use of and rely upon this report, cognizant of the limitations thereof, both as are expressed and implied.

We trust this report is complete within our terms of reference, and the information presented is sufficient for your present purposes. If you have any questions, or when we may be of further assistance, please do not hesitate to contact our office.

Yours Truly,

GEI Consultants

Prepared By:

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Senior Geotechnical Engineer

Reviewed By:

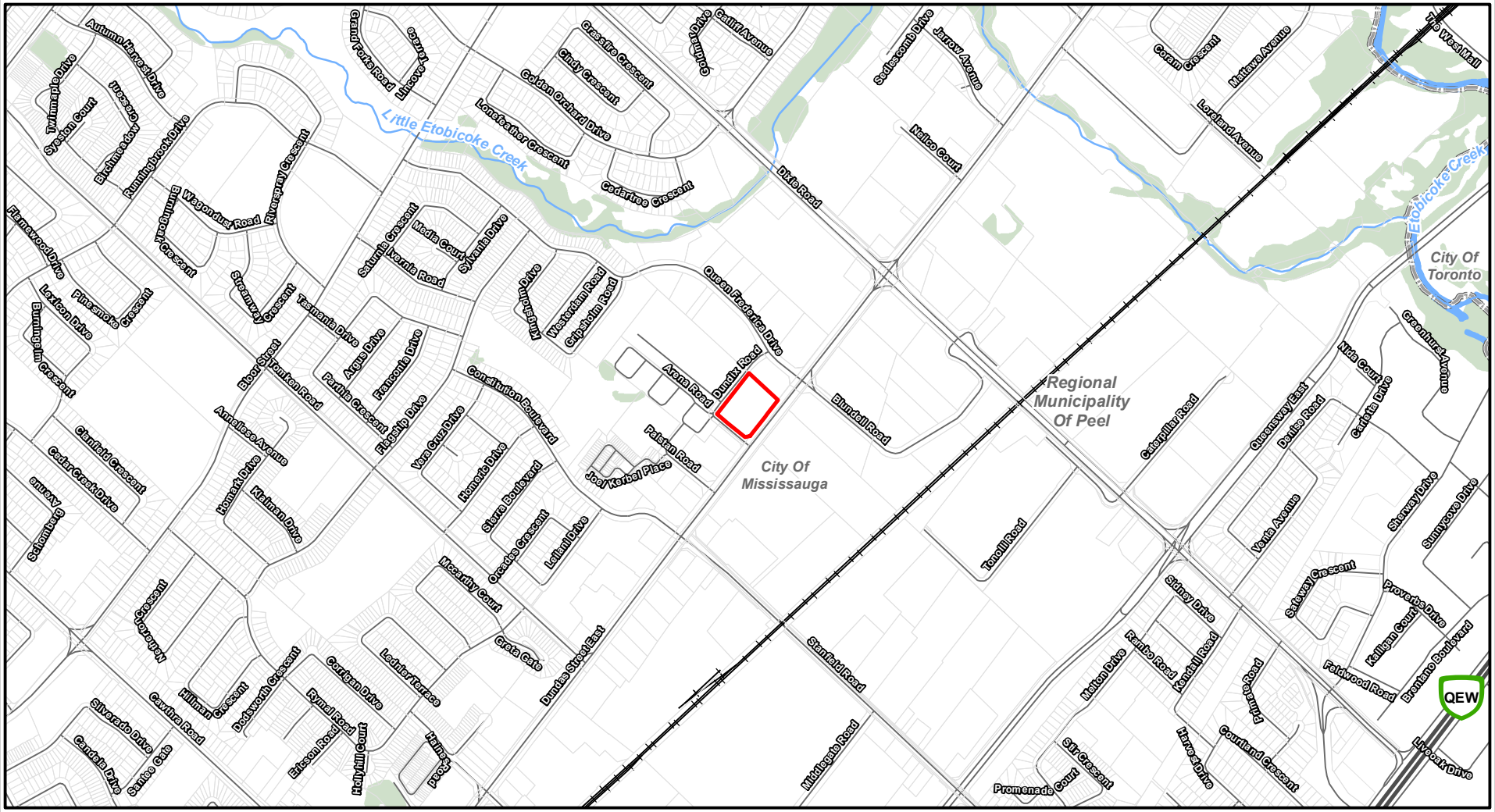
Alexander Winkelmann, P.Eng.
Geotechnical and Earth Sciences Manager

Figures

Site Location Plan

Borehole Location Plans

Subsurface Profiles



Legend

Site Boundary | Highway | Waterbody
Parcels | Road | Wooded Area
Railway | Watercourse

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2022.
3. Mississauga Parcel data (approximate), City of Mississauga via Arcgis Online (May 2022).

0 190 380 m

1:15,000

N

1225 Dundas St. E
Mississauga, Ontario

Dundix Realty Holdings

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SITE LOCATION PLAN

Project 2202029 | June 2022 | Fig. 1

Legend

- Approximate Site Boundary
- Borehole/Monitoring Well Location
- Cross Section Location

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2022.
3. Orthoimagery © First Base Solutions, 2022. Imagery taken in 2021.

0 10 20 m

1:1,000

N

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Mississauga, Ontario

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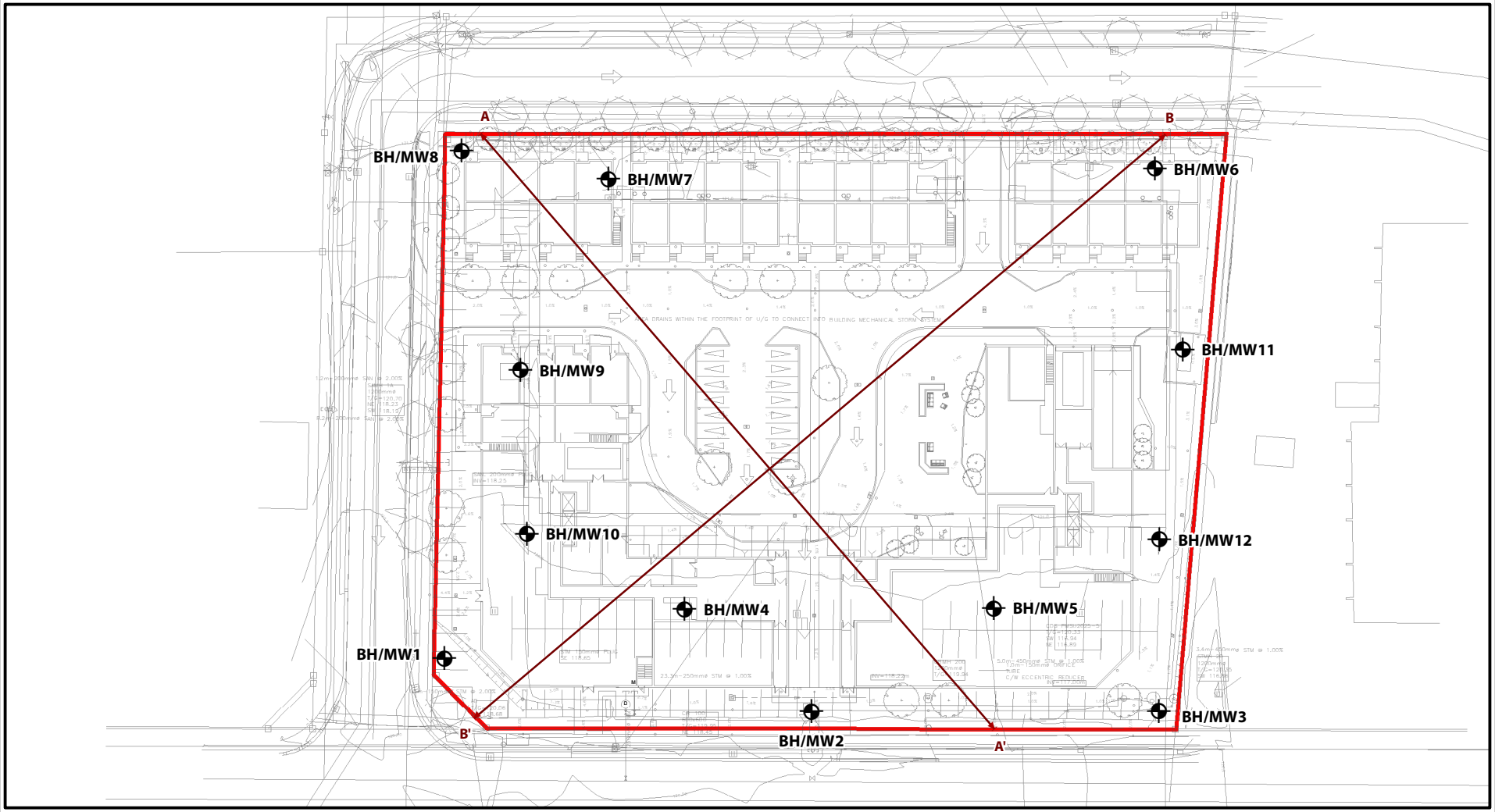
Project 2202029

BOREHOLE/MONITORING WELL LOCATION PLAN (AERIAL)

June 2022

Fig. 2A



Legend

- Approximate Site Boundary
- Borehole/Monitoring Well Location
- Cross Section Location

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Grading and Servicing Plan, Stantec (2022-06-29)

0 10 20 m

1:1,000

N

Geotechnical Investigation
1225 Dundas St. E
Mississauga, Ontario

Dundix Realty Holdings

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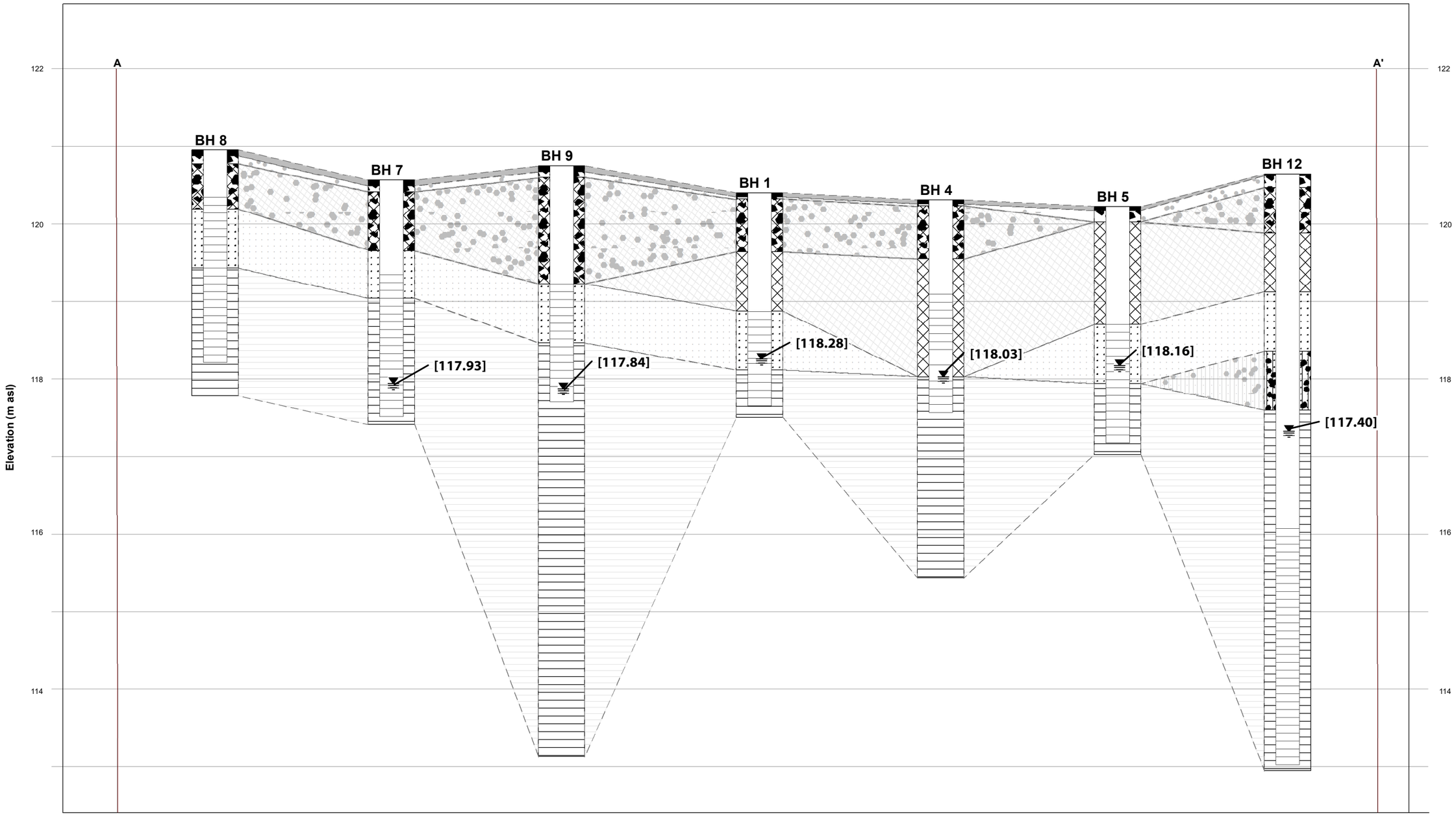
BOREHOLE/MONITORING WELL LOCATION PLAN (CONCEPT PLAN)

Project 2202029 | June 2022 | Fig. 2B



NOTES:
1. Subsurface conditions known only at borehole locations.
2. Horizontal distances are not to scale.

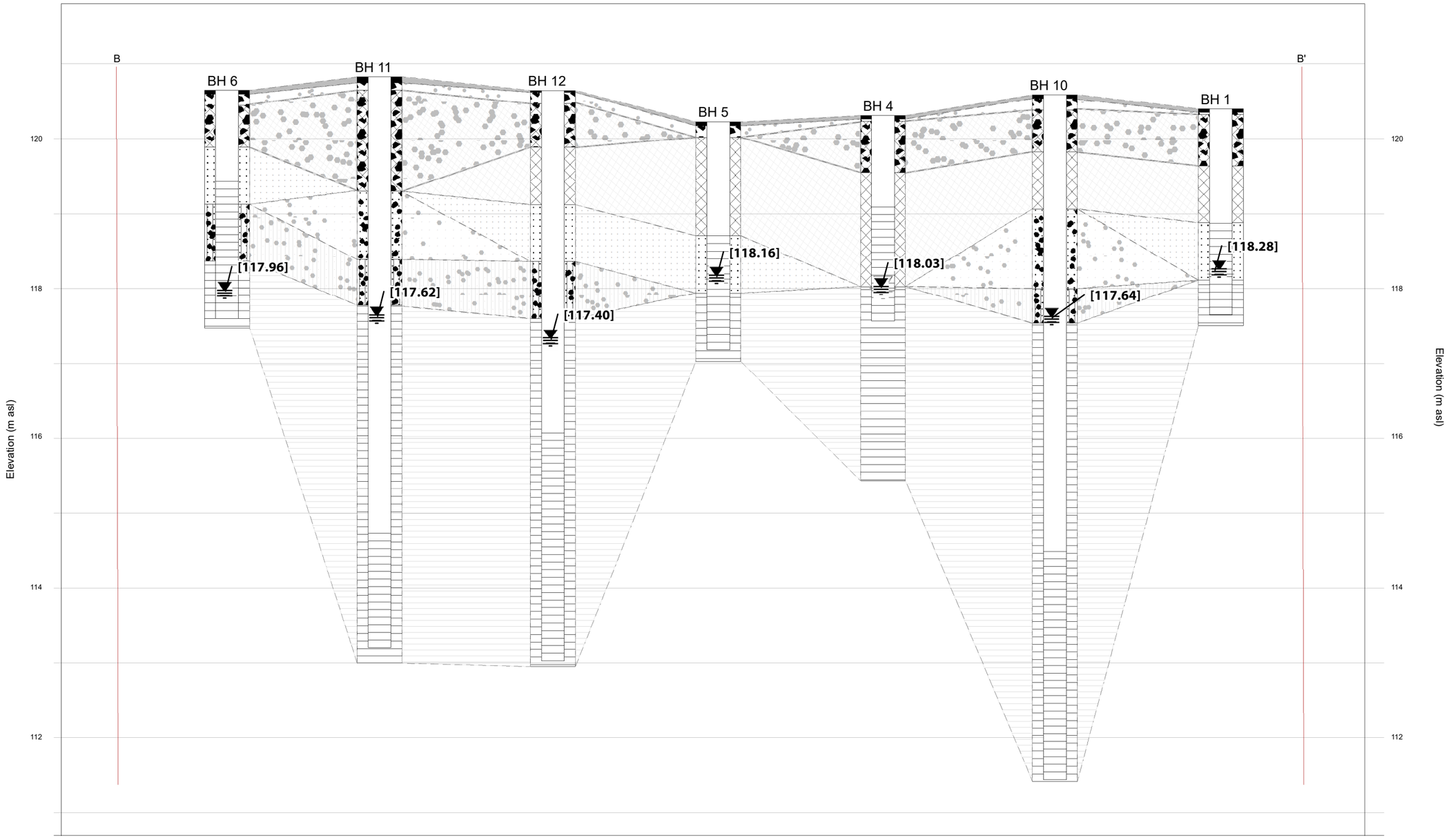
Legend

Water Level in Monitoring Well
[xx.xx] Water Levels (masl) Measured 2022-06-01

Strata

- Paving
- Granular
- Granular Fill
- Fill
- Sandy Silt Glacial Till
- Sand
- Shale Bedrock

1225 Dundas St. E Mississauga, Ontario	GEI Consultants	GEOLOGICAL CROSS SECTION A-A'
Dundix Realty Holdings	Project 2202029	June 2022 Fig.3A



NOTES:
1. Subsurface conditions known only at borehole locations.
2. Horizontal distances are not to scale.

Legend

Water Level in Monitoring Well
[xx.xx] Water Levels (masl) Measured 2022-06-01

Strata

- Paving
- Granular
- Granular Fill
- Fill
- Sand to Sandy Silt Glacial Till
- Sand Glacial Till
- Sand
- Shale Bedrock

1225 Dundas St. E Mississauga, Ontario	GEI Consultants	GEOLOGICAL CROSS SECTION B-B'
Dundix Realty Holdings	Project 2202029	June 2022 Fig. 3B

Appendix A

Borehole Logs

RECORD OF BOREHOLE No. 1

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829045** Date Started: **May 24/22**
Reviewed By: **AW** Easting: **613929** Date Completed: **May 24/22**

Lithology Plot	DESCRIPTION (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)
	0.0 / 120.4					0	120
	ASPHALT: 50 mm (0.1 / 120.3)						
	GRANULAR: 75 mm	SS	1	100	12		
	GRANULAR FILL: Gravelly sand, some silt, compact, dark brown, moist (0.8 / 119.6)						
	FILL: Clayey silt with granular inclusions, some sand, trace organics, loose to firm, black, moist	AS	2	0	4	1.2	118.8
	1.5 / 118.9						
	SAND: Some silt, trace gravel, loose, brown, moist	SS	3	100	8		
	2.3 / 118.1						
	GEORGIAN BAY FORMATION SHALE - - - Highly weathered - - -	SS	4	100	76	2.4	117.6
	2.9 / 117.5						
	Borehole Terminated at 2.9 m						

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40
12
4
8
76

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL LL
○ Water Content (%)
10 20 30 40
8
27
20
13

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
1	79	17	3

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Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jun 1/22 at depth of: 2.2 m.
Groundwater Elevation: 118.2 m

RECORD OF BOREHOLE No. 2

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829090** Date Started: **May 25/22**
Reviewed By: **AW** Easting: **613965** Date Completed: **May 25/22**

Geodetic	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)
0.0 / 120.5						0	
0.1 / 120.4	ASPHALT: 75 mm						
0.2 / 120.3	GRANULAR: 125 mm	SS	1	65	12		120
	GRANULAR FILL: Sand, some gravel, some silt, compact, brown, moist						
0.8 / 119.7	FILL: Silty sand, trace clay, trace gravel, loose, brown, moist	SS	2	70	6	1.2	
1.5 / 119.0	SAND: Trace to some silt, compact, brown, moist	SS	3	100	12		118.8
2.3 / 118.2	GEORGIAN BAY FORMATION SHALE - - - Highly Weathered - - -	SS	4	100	19	2.4	
3.1 / 117.4	- - - Weathered - - -	SS	5	100	100+		117.6
	Borehole Terminated at 3.1 m						

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40
12, 6, 12, 19, 100+

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL LL
○ Water Content (%)
10 20 30 40
12, 18, 14, 5, 8

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
3	71	21	5

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Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jun 1/22 at depth of: 2.8 m.
Groundwater Elevation: 117.7 m

RECORD OF BOREHOLE No. 3

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829137** Date Started: **May 25/22**
Reviewed By: **AW** Easting: **613999** Date Completed: **May 25/22**

Geodetic	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Depth (m)	Elevation (m)
0.0 / 120.4						0	120
0.1 / 120.3	ASPHALT: 75 mm						
0.2 / 120.2	GRANULAR: 100 mm	SS	1	65	10		
	GRANULAR FILL: Sand and gravel, some silt, compact, brown, moist					1.2	118.8
0.8 / 119.6	FILL: Sand and silt, trace to some clay, trace gravel, loose to very loose, blackish brown to greyish brown, moist	SS	2	85	7		
	- - - Some gravel - - -	SS	3	50	3		
2.3 / 118.1	SANDY SILT GLACIAL TILL: Some gravel, some clay, cobbles and boulders, firm to stiff, brownish grey, moist	SS	4	40	8	2.4	117.6
3.0 / 117.4	GEORGIAN BAY FORMATION SHALE - - - Weathered - - -	SS	5	80	56	3.6	116.4
4.6 / 115.8	Borehole Terminated at 4.6 m	SS	6	100	100+		

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL LL
○ Water Content (%)
10 20 30 40

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
18	25	41	16

Instrumentation Installation

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Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jun 1/22 at depth of: 3.5 m.
Groundwater Elevation: 116.9 m

RECORD OF BOREHOLE No. 4

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829080** Date Started: **May 25/22**
Reviewed By: **AW** Easting: **613936** Date Completed: **May 25/22**

GEI Consultants

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING		LAB TESTING			COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Shear Strength Testing (kPa): × Other Test, + Pocket Penetrometer, ▲ Field Vane (Intact), △ Field Vane (Remolded); 40 80 120 160; Penetration Testing: ○ SPT ● DCPT; 10 20 30 40		△ Combustible Organic Vapour (ppm), ▲ Combustible Organic Vapour (%LEL), ◇ Total Organic Vapour (ppm); 100 200 300 400; Atterberg Limits PL LL; ○ Water Content (%); 10 20 30 40		Instrumentation Installation	GR	SA	SI	CL
	Geodetic 0.0 120.3 / 0.1 120.2					0	120									
	ASPHALT: 50 mm															
	GRANULAR: 75 mm	SS	1	75	17			17		7						
	GRANULAR FILL: Sand, some gravel, trace to some silt, compact, brown, moist 0.8 119.5															
	FILL: Sand, some silt, some gravel, trace clay, very loose, dark brown, moist	SS	2	55	4	1.2	118.8	4		12						
	2.3 118.0	SS	3	55	3			3		12			16	63	16	5
	GEORGIAN BAY FORMATION SHALE - - - Highly weathered - - -	SS	4	90	100+	2.4	117.6		100+	10						
	- - - Weathered - - -	SS	5	100	100+				100+	7						
						3.6	116.4									
	4.9 115.4	SS	6	100	100+	4.8			100+							
	Borehole Terminated at 4.9 m															

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Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jun 1/22 at depth of: 2.3 m.
Groundwater Elevation: 118.0 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Explanation of Boring Log'.

Scale: **1 :60**

RECORD OF BOREHOLE No. 5

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829127** Date Started: **May 25/22**
Reviewed By: **AW** Easting: **613974** Date Completed: **May 25/22**

Geodetic	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING (Shear Strength Testing (kPa); Penetration Testing: SPT ○, DCPT ●)	LAB TESTING (Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); Atterberg Limits PL–LL; Water Content (%))	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0						0	120				
0.1	ASPHALT: 50 mm										
0.2	GRANULAR: 150 mm										
	FILL: Sandy silt, some clay, trace gravel, compact to very loose, brown, moist	SS	1	100	13			13	12		
		SS	2	100	4	1.2	118.8	4	20		
1.5											
	SAND: Some silt, trace gravel, very dense, brown, moist	SS	3	100	100+			100+	4		
2.3											
	GEORGIAN BAY FORMATION SHALE - - - Highly weathered - - -	SS	4	65	75	2.4	117.6	75	6		
3.2		SS	5	100	100+			100+	17		
	Borehole Terminated at 3.2 m										

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Groundwater depth encountered on completion of drilling: Dry
Groundwater depth observed on: Jun 1/22 at depth of: 2.1 m.
Cave depth after auger removal: Open
Groundwater Elevation: 118.1 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Explanation of Boring Log'.

Scale: **1 :60**
Page: **1 of 1**

RECORD OF BOREHOLE No. 6

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829194** Date Started: **May 26/22**
Reviewed By: **AW** Easting: **613926** Date Completed: **May 26/22**

Geodetic	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	GR	SA	SI	CL
0.0						0					
0.1							120.6				
0.2	ASPHALT: 50 mm						120.5				
	GRANULAR: 125 mm	SS	1	0	10						
	GRANULAR FILL: Gravelly sand, some silt, compact, brown, moist						120				
0.8							119.9				
	SAND: Some gravel, trace silt, trace clay, compact, brown, moist	SS	2	50	27	1.2		17	74	7	2
1.5							119.2				
	SANDY SILT GLACIAL TILL: Some clay, trace gravel, stiff, greyish brown, moist	SS	3	50	9		118.8	7	28	46	19
2.3							118.4				
	GEORGIAN BAY FORMATION SHALE - - - Very highly weathered - - -	SS	4	100	100+	2.4					
3.2	- - - Weathered - - -	SS	5	75	100+		117.6				
	Borehole Terminated at 3.2 m										

FIELD TESTING: Shear Strength Testing (kPa) — Other Test; Pocket Penetrometer; Field Vane (Intact); Field Vane (Remolded); 40 80 120 160. Penetration Testing: SPT, DCPT; 10 20 30 40.

LAB TESTING: Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); 100 200 300 400. Atterberg Limits: PL, LL. Water Content (%); 10 20 30 40.

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

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Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jun 1/22 at depth of: 2.7 m.
Groundwater Elevation: 118.0 m

RECORD OF BOREHOLE No. 7

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829118** Date Started: **May 26/22**
Reviewed By: **AW** Easting: **613870** Date Completed: **May 26/22**

Geodetic	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)
0.0 / 120.6						0	
0.1 / 120.5	ASPHALT: 100 mm						
0.2 / 120.4	GRANULAR: 100 mm	SS	1	85	16		
	GRANULAR FILL: Sand, some gravel, some silt, compact, brown, moist						120
0.9 / 119.7		SS	2A	60	13	1.2	
	SAND: Some silt, trace gravel, compact, greyish brown, moist		2B				
1.5 / 119.1							
	GEORGIAN BAY FORMATION SHALE - - - Highly weathered - - -	SS	3	100	100+		118.8
	- - - Weathered - - -	SS	4	65	100+	2.4	
3.1 / 117.5		SS	5	100	100+		117.6
	Borehole Terminated at 3.1 m						

FIELD TESTING: Shear Strength Testing (kPa) — Other Test; Pocket Penetrometer; Field Vane (Intact); Field Vane (Remolded); 40 80 120 160. Penetration Testing — SPT; DCPT; 10 20 30 40. Field values: 16, 13, 100+, 100+, 100+.

LAB TESTING: Combustible Organic Vapour (ppm); Combustible Organic Vapour (%LEL); Total Organic Vapour (ppm); 100 200 300 400. Atterberg Limits — PL; LL. Water Content (%); 10 20 30 40. Values: 8, 13, 5, 3.

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%): GR | SA | SI | CL

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Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jun 1/22 at depth of: 2.6 m.
Groundwater Elevation: 118.0 m

RECORD OF BOREHOLE No. 8

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829098** Date Started: **May 26/22**
Reviewed By: **AW** Easting: **613855** Date Completed: **May 26/22**

Lithology Plot	DESCRIPTION (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value
	0.0 / 121.0				
	0.1 / 120.9 ASPHALT: 75 mm				
	0.2 / 120.8 GRANULAR: 100 mm	SS	1	85	20
	GRANULAR FILL: Sand, some gravel, trace silt, compact, brown, moist				
	0.8 / 120.2 SAND: Some gravel, trace silt, compact, brown, moist	SS	2	85	20
	1.5 / 119.5 GEORGIAN BAY FORMATION SHALE - - - Highly Weathered - - -	SS	3	65	25
	- - - Weathered - - -	SS	4	65	100+
	3.2 / 117.8	SS	5	100	100+
	Borehole Terminated at 3.2 m				

DEPTH (m): 0, 1.2, 2.4
ELEVATION (m): 120, 118.8

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40
SPT values: 20, 20, 25, 100+, 100+

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL ○ LL
Water Content (%)
10 20 30 40
Water Content values: 7, 6, 15, 11, 6

Instrumentation Installation

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

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Groundwater depth encountered on completion of drilling: Dry
Groundwater depth observed on: Jun 1/22 at depth of: 0.0
Cave depth after auger removal: Open
Groundwater Elevation:

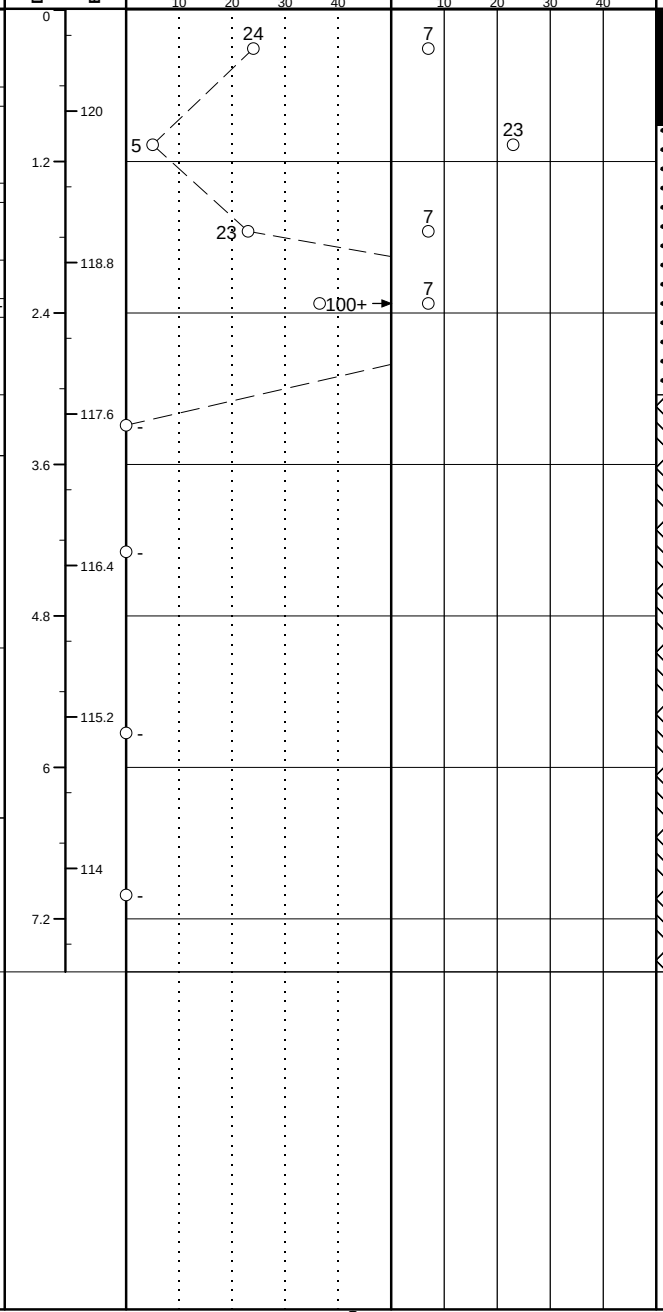
Scale: **1 :60**

RECORD OF BOREHOLE No. 9

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers & Coring** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829082** Date Started: **May 24/22**
Reviewed By: **AW** Easting: **613888** Date Completed: **May 24/22**

Geodetic	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value
0.0 / 120.8	ASPHALT: 75 mm				
0.1 / 120.7	GRANULAR: 75 mm				
0.2 / 120.6	GRANULAR FILL: Trace clay, compact, brown, moist - - - Loose - - -	SS	1	70	24
		SS	2	15	5
1.5 / 119.3	SAND: Some gravel, trace silt, loose, brown, moist	SS	3	25	23
2.3 / 118.5	GEORGIAN BAY FORMATION SHALE 2 % Hard Limestone Layers (Weathered)	SS	4	50	100+
		Run	1	-	-
4.4 / 116.4	SOUND BEDROCK	Run	2	-	-
		Run	3	-	-
		Run	4	-	-
7.6 / 113.2	Borehole Terminated at 7.6 m Coring ends				



Instrumentation Installation

GR	SA	SI	CL
14	72	11	3

Run 1 (3.0 to 3.5 m):
TCR: 42 %
SCR: 37 %
RQD: 21 %

Run 2 (3.5 to 5.0 m):
TCR: 100 %
SCR: 85 %
RQD: 40 %

Run 3 (5.0 to 6.3 m):
TCR: 100 %
SCR: 95 %
RQD: 73 %

Run 4 (6.3 to 7.7 m):
TCR: 100 %
SCR: 95 %
RQD: 77 %

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Groundwater depth encountered on completion of drilling: Dry
Groundwater depth observed on: Jun 1/22 at depth of: 0.0
Cave depth after auger removal: Open
Groundwater Elevation:

RECORD OF BOREHOLE No. 10

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829073** Date Started: **May 24/22**
Reviewed By: **AW** Easting: **613915** Date Completed: **May 24/22**

Geodetic	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Depth (m)	Elevation (m)	GR	SA	SI	CL
0.0 / 120.6	ASPHALT: 50 mm					0	120				
0.2 / 120.4	GRANULAR: 150 mm										
	GRANULAR FILL: Gravelly sand, some silt, compact, brown, moist	SS	1	100	18						
0.8 / 119.8	FILL: Silty sand, some gravel, trace clay, very loose to loose, dark brown, moist	SS	2	100	4	1.2	118.8	15	58	21	6
1.5 / 119.1	GRAVELLY SAND: trace to some silt, brick inclusions, compact, brown, moist	SS	3	100	29						
2.6 / 118.0	SANDY SILT GLACIAL TILL: Some clay, trace gravel, stiff, brown, moist	SS	4A, 4B	100	15	2.4	117.6				
3.0 / 117.6	GEORGIAN BAY FORMATION SHALE - - - Highly weathered - - -	SS	5	100	100+	3.6	116.4				
4.6 / 116.0	INFERRED SOUND BEDROCK	SS	6	100	100+	4.8	115.2				
		SS	7	100	100+	6	114				
		SS	8	100	100+	7.2	112.8				
9.2 / 111.4	Borehole Terminated at 9.2 m	SS	9	100	100+	8.4	111.6				

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL LL
○ Water Content (%)
10 20 30 40

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

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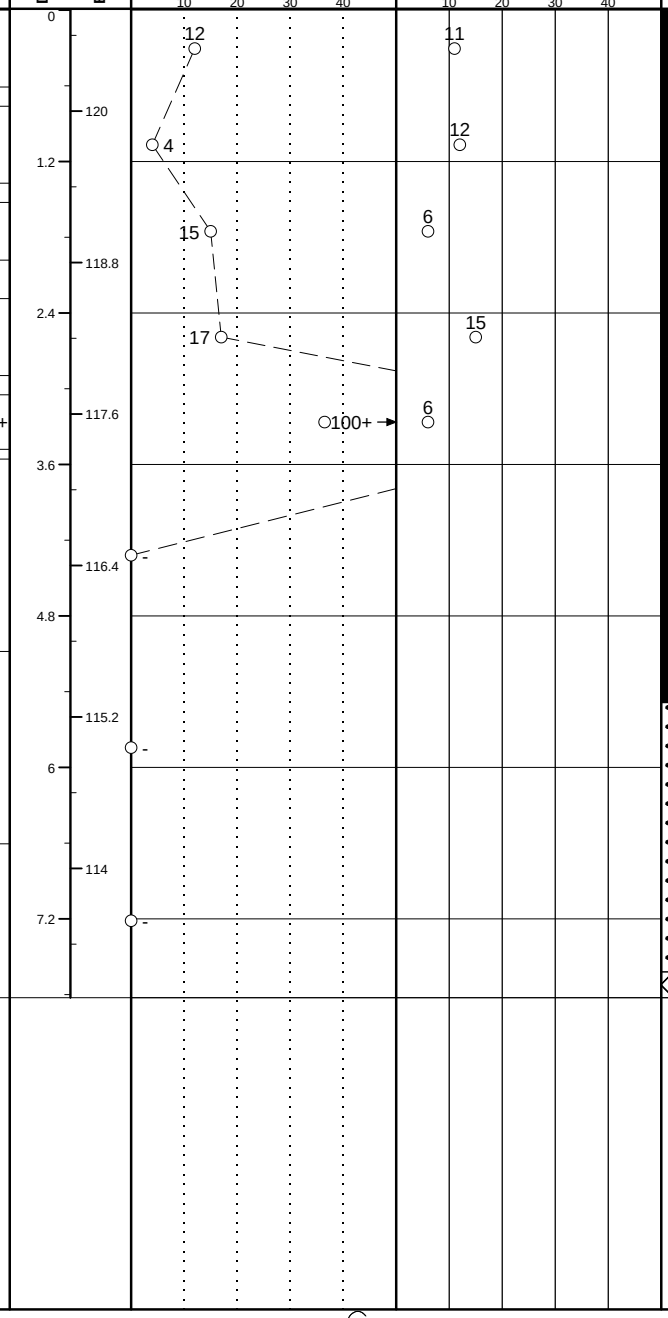
Groundwater depth encountered on completion of drilling: Dry
Groundwater depth observed on: Jun 1/22 at depth of: 3.0 m.
Cave depth after auger removal: Open
Groundwater Elevation: 117.6 m

RECORD OF BOREHOLE No. 11

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers & Coring** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829179** Date Started: **May 26/22**
Reviewed By: **AW** Easting: **613956** Date Completed: **May 26/22**

Geodetic	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value
0.0 / 120.8					
0.1 / 120.7					
0.2 / 120.6	ASPHALT: 75 mm				
	GRANULAR: 50 mm	SS	1	60	12
	GRANULAR FILL: Sand and silt, some gravel, compact, dark brown, moist				
	- - - Very loose - - -	SS	2	75	4
1.5 / 119.3					
	GRAVELLY SAND: Some silt, trace clay, compact, brown, moist	SS	3	75	15
2.4 / 118.4					
	SANDY SILT GLACIAL TILL: Some clay, trace gravel, very stiff, brownish grey, moist	SS	4A / 4B	80	17
3.0 / 117.8					
	GEORGIAN BAY FORMATION SHALE 4 % Hard Limestone Layers (Weathered)	SS	5	100	100+
4.0 / 116.8	SOUND BEDROCK	Run	1	-	-
		Run	2	-	-
		Run	3	-	-
7.8 / 113.0					
	Borehole Terminated at 7.8 m Coring ends				



GR	SA	SI	CL
24	63	10	3

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Run 1 (3.6 to 5.1 m):
TRC: 100 %
SCR: 92 %
RQD: 58 %

Run 2 (5.1 to 6.6 m):
TRC: 100 %
SCR: 100 %
RQD: 83 %

Run 3 (6.6 to 7.8 m):
TRC: 100 %
SCR: 96 %
RQD: 93 %

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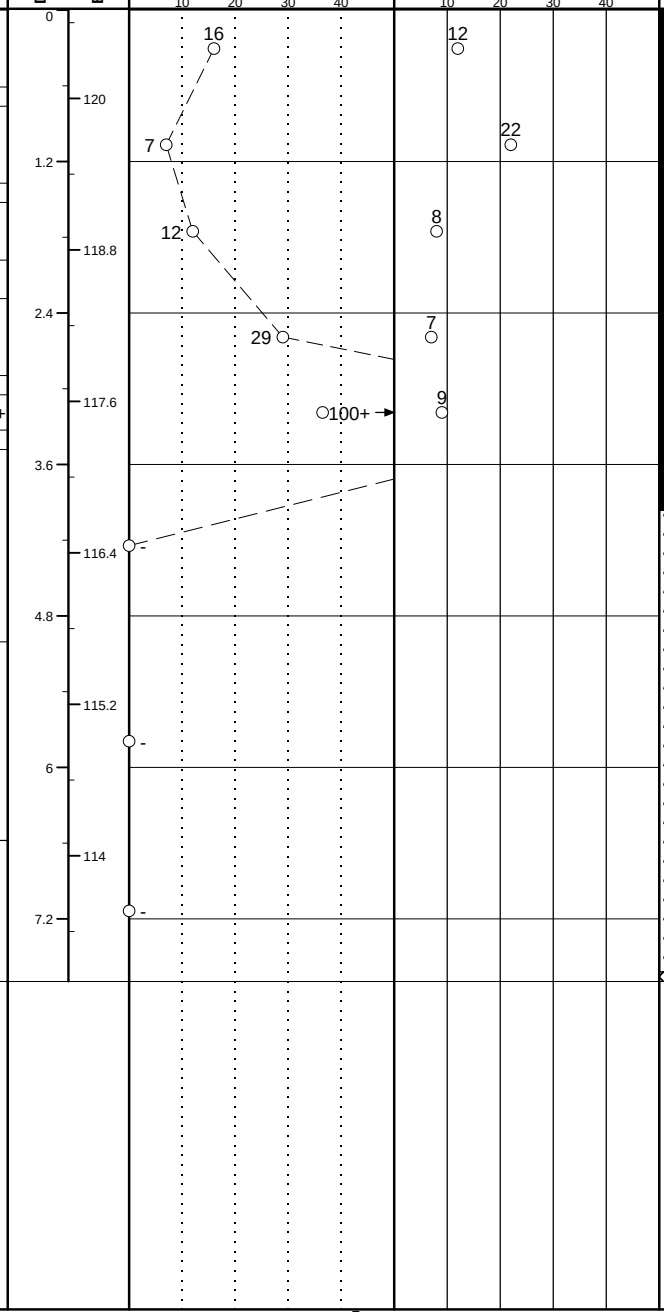
Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jun 1/22 at depth of: 3.2 m.
Groundwater Elevation: 117.6 m

RECORD OF BOREHOLE No. 12

Project Number: **2202029**
Project Client: **Dundix Realty Holdings**
Project Name: **1225 Dundas Street East, Mississauga, ON**
Project Location: **Mississauga, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **N/A (Geodetic)**

Drilling Method: **Hollow Stem Augers & Coring** Drilling Machine: **Track Mount**
Logged By: **SY** Northing: **4829154** Date Started: **May 26/22**
Reviewed By: **AW** Easting: **613976** Date Completed: **May 26/22**

Geodetic	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value
0.0 / 120.7					
0.2 / 120.5	ASPHALT: 25 mm GRANULAR: 150 mm	SS	1	45	16
0.8 / 119.9	GRANULAR FILL: Gravel and sand, some silt, compact, brown, moist				
1.5 / 119.2	FILL: Sandy silt, some clay, trace gravel, trace deleterious material, loose, grey and black, moist	SS	2	50	7
2.3 / 118.4	SAND: Trace to some silt, compact, brown, moist	SS	3	45	12
3.0 / 117.7	SANDY SILT GLACIAL TILL: Trace gravel, trace clay, very stiff, brownish grey, moist	SS	4	100	29
	GEORGIAN BAY FORMATION SHALE 2 % Hard Limestone Layers (Weathered)	SS	5	100	100+
4.5 / 116.2	SOUND BEDROCK	Run	1	-	-
		Run	2	-	-
7.7 / 113.0		Run	3	-	-
	Borehole Terminated at 7.7 m Coring ends				



Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR | SA | SI | CL

Run 1 (3.5 to 5.0 m):
TRC: 100 %
SCR: 93 %
RQD: 33 %

Run 2 (5.0 to 6.6 m):
TRC: 100 %
SCR: 100 %
RQD: 77 %

Run 3 (6.6 to 7.7 m):
TRC: 94 %
SCR: 94 %
RQD: 90 %

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Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jun 1/22 at depth of: 3.3 m.
Groundwater Elevation: 117.4 m

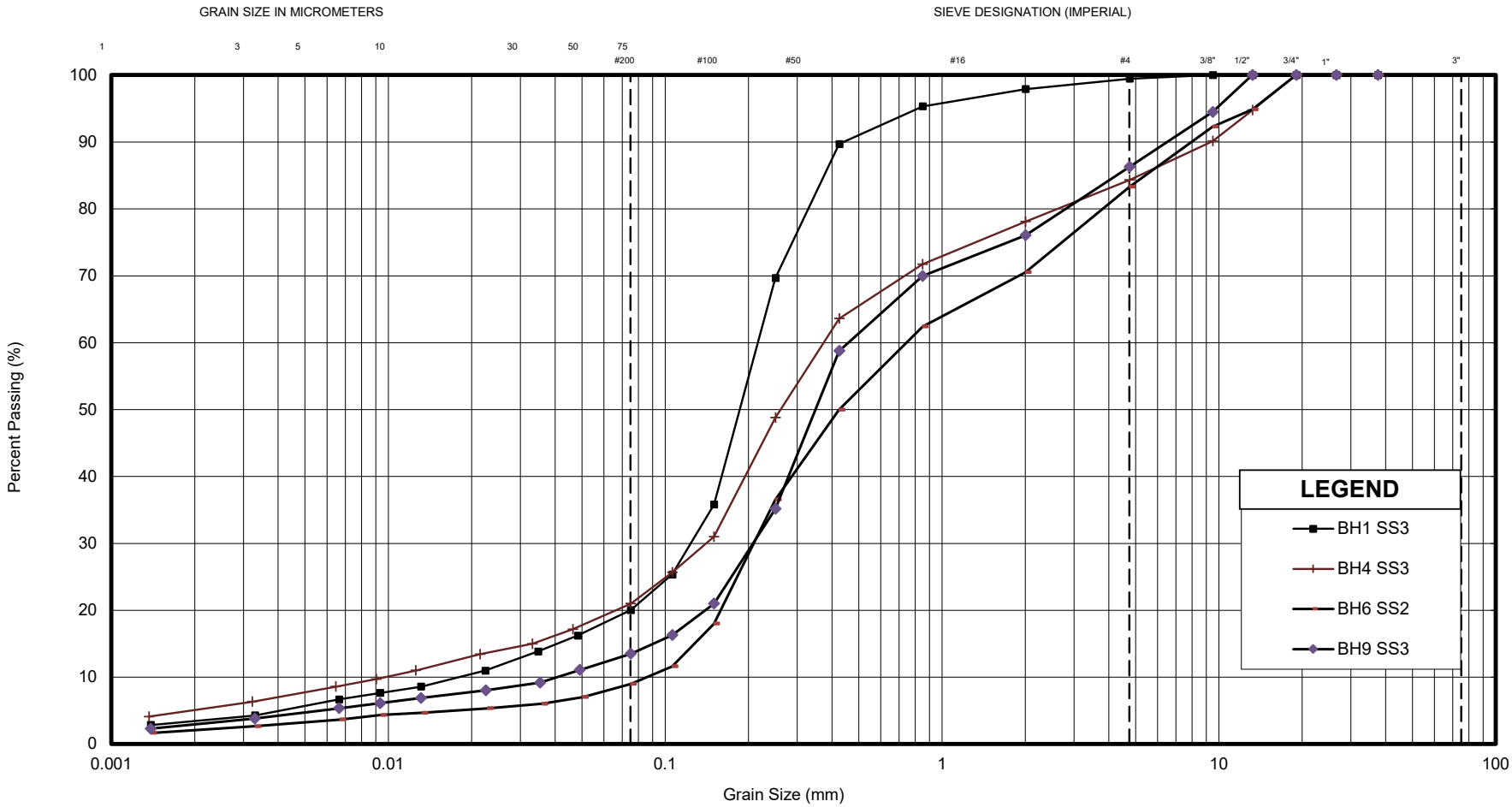
Scale: **1 :60**

Appendix B

Geotechnical Laboratory Testing

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH1 SS3	SAND, Some Silt, Trace Clay, Trace Gravel	1	79	17	3	0.018	0.12	0.22	12	3.9
BH4 SS3	SAND, Some Silt, Some Gravel, Trace Clay	16	63	16	5	0.010	0.14	0.37	38	5.4
BH6 SS2	SAND, Some Gravel, Trace Silt, Trace Clay	17	74	7	2	0.086	0.21	0.74	8.7	0.68
BH9 SS3	SAND, Some Gravel, Some Silt, Trace Clay	14	72	11	3	0.041	0.21	0.46	11	2.3

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GRAIN SIZE DISTRIBUTION - 1225 Dundas Street East - Dundix Realty Holdings

SAND

FIGURE No. B1

REF. No. 2202029

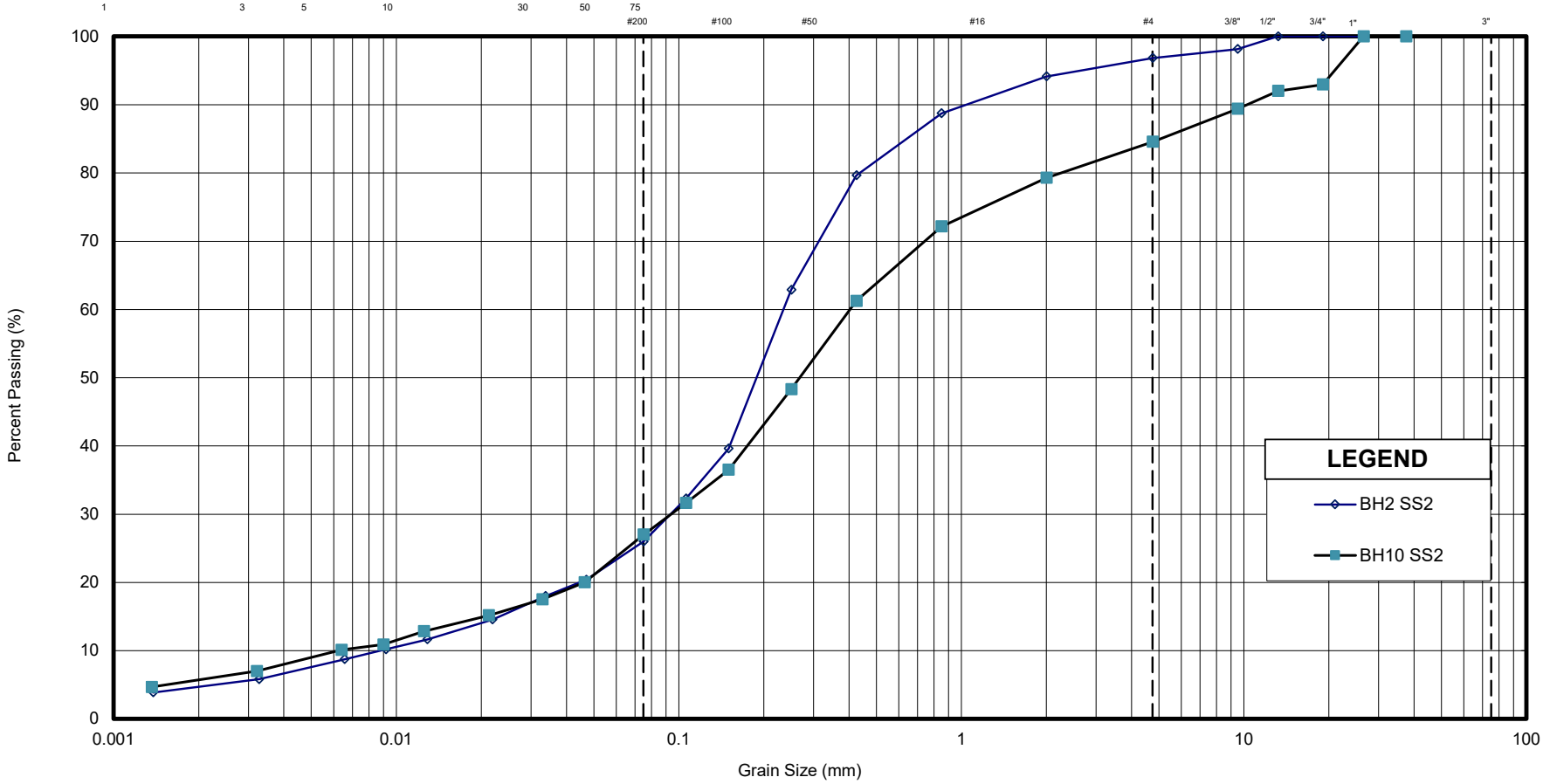
DATE July 2022

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS

SIEVE DESIGNATION (IMPERIAL)



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH2 SS2	SILTY SAND, Trace Clay, Trace Gravel	3	71	21	5	0.009	0.09	0.23	27	4.2
BH10 SS2	SILTY SAND, Some Gravel, Trace Clay	15	58	21	6	0.006	0.09	0.40	65	3.5

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GRAIN SIZE DISTRIBUTION - 1225 Dundas Street East - Dundix Realty Holdings

SILTY SAND

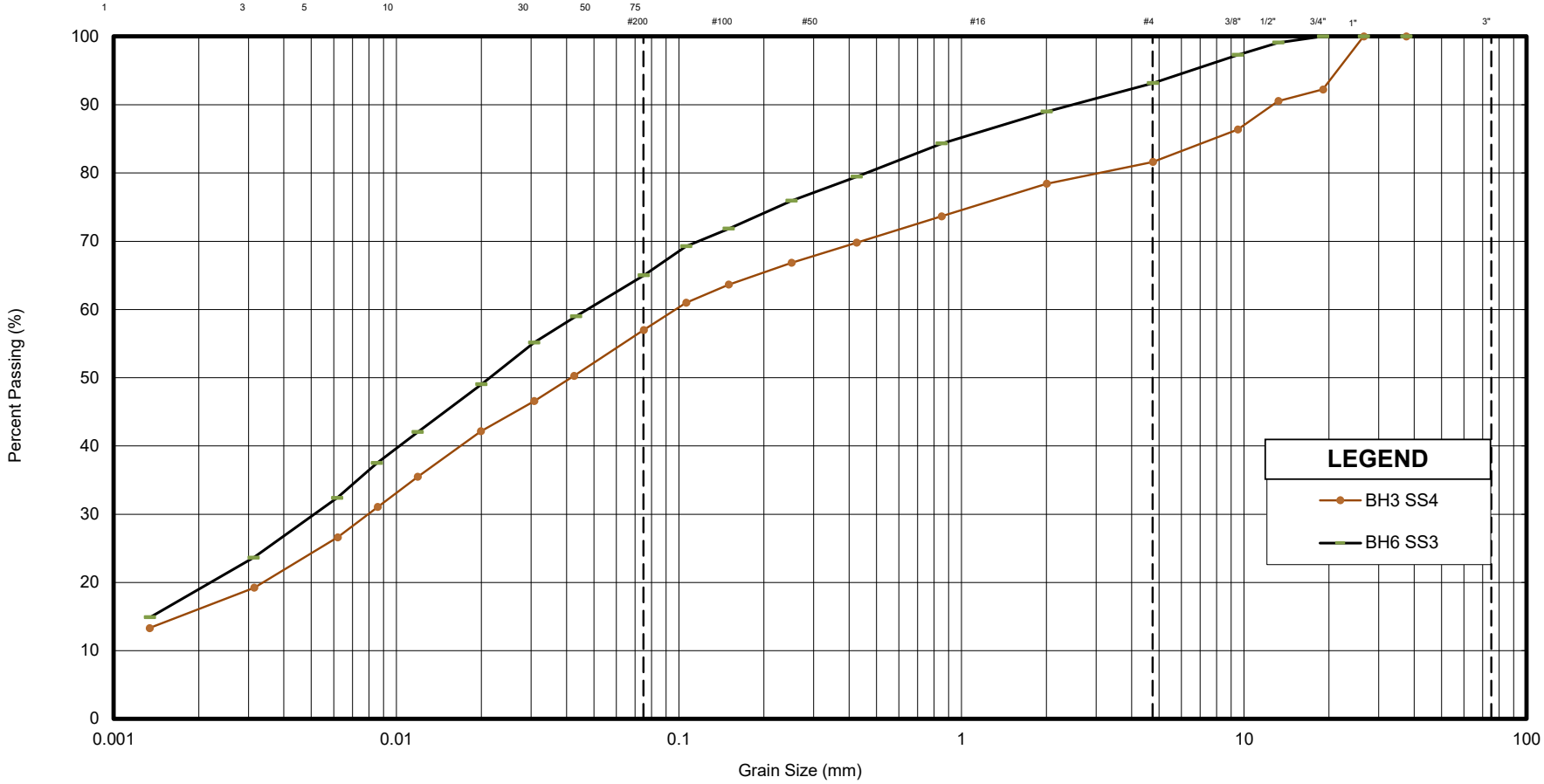
FIGURE No.	B2
REF. No.	2202029
DATE	July 2022

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS

SIEVE DESIGNATION (IMPERIAL)



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH3 SS4	SANDY SILT, Some Gravel, Some Clay	18	25	41	16	-	0.008	0.097	-	-
BH6 SS3	SANDY SILT, Some Clay, Trace Gravel	7	28	46	19	-	0.005	0.047	-	-

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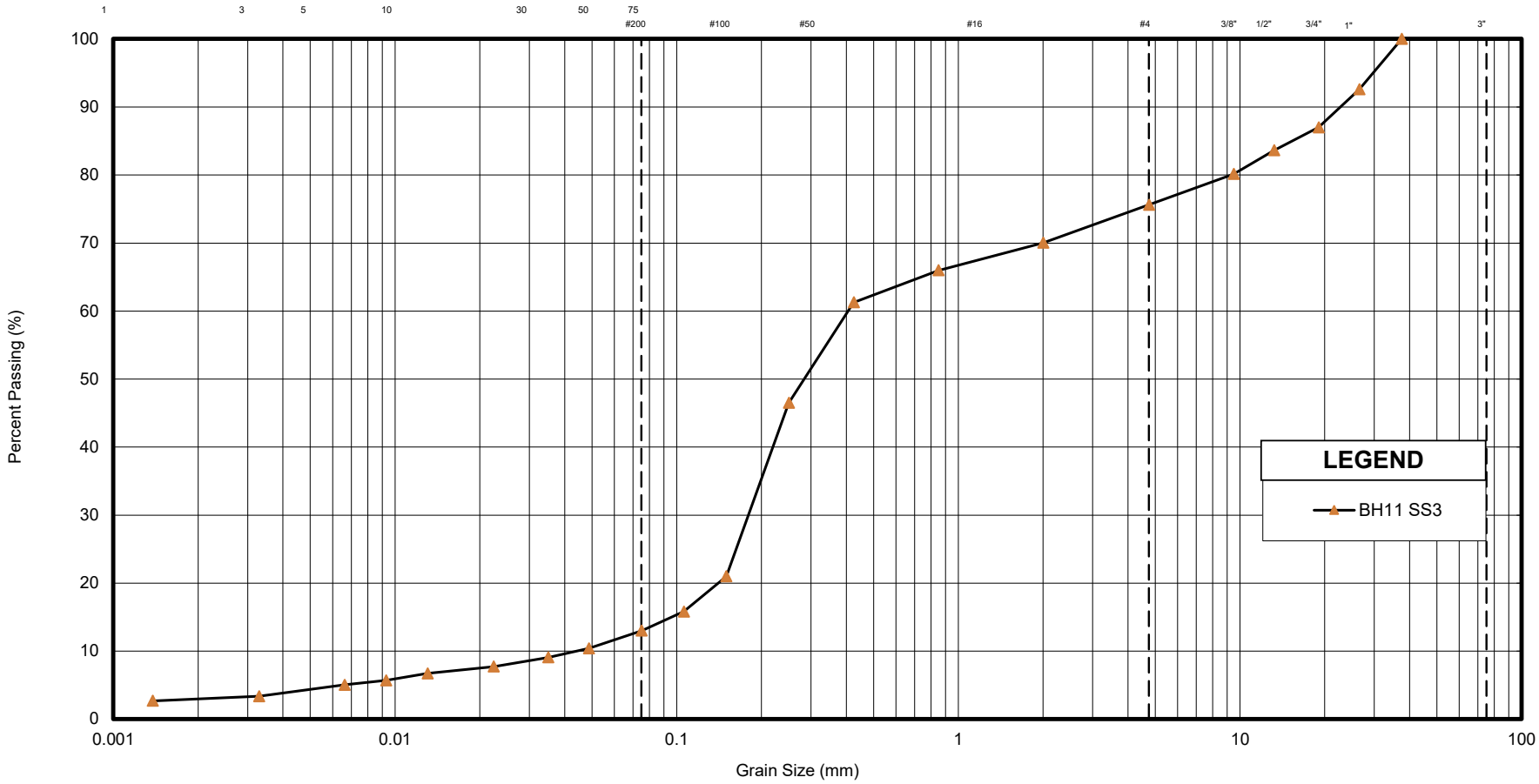
GRAIN SIZE DISTRIBUTION - 1225 Dundas Street East - Dundix Realty Holdings

SANDY SILT GLACIAL TILL

FIGURE No.	B3
REF. No.	2202029
DATE	July 2022

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH11 SS3	GRAVELLY SAND, Some Silt, Trace Clay	24	63	10	3	0.044	0.18	0.41	9.2	1.8

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GRAIN SIZE DISTRIBUTION - 1225 Dundas Street East - Dundix Realty Holdings

GRAVELLY SAND

FIGURE No.	B4
REF. No.	2202029
DATE	July 2022

GRAIN SIZE DISTRIBUTION REPORT
GRANULAR 'B' TYPE I

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Project Name:	1225 Dundas Street East	**Date Sampled:**	-
Project No.:	2202029	**Date Tested:**	June 13, 2022
Sample Loc.:	BH 1, 2, 3, 4, 5 and 12 (Composite)	**Lab #:**	4132
Client:	Dundix Realty Holdings	**Technician:**	F. Contento
Supplier:	-		

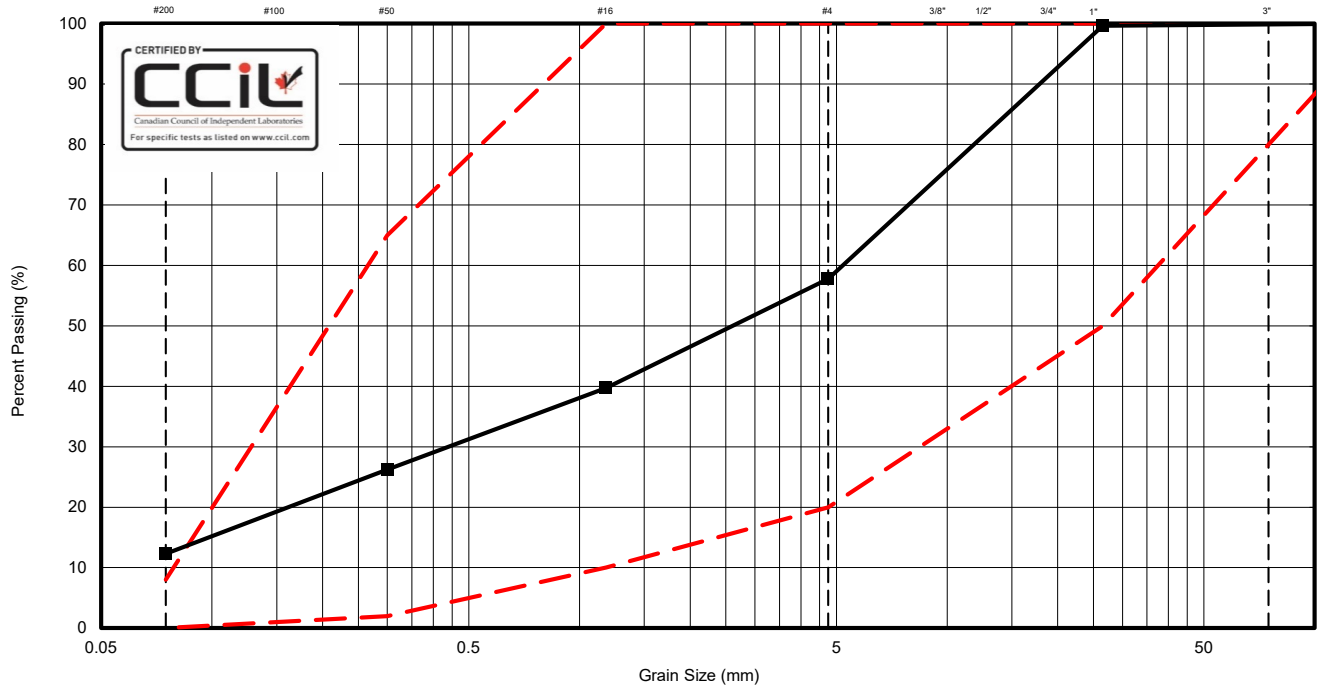
SAMPLE DATA

Total Mass of Sample (g):	7021.8	% Passing 75um by washing:	12.02
Total Mass retained on the 4.75mm sieve (g):	2966.1	Total Losses (%): (Maximum 0.3%)	0.00
Total Mass passing the 4.75 mm sieve (g):	4055.7	Percent Crushed: (Min. 60% - Gran A)	N/A
Percent Coarse Aggregate:	42.24	Not Applicable - Gran. "B" Type 1	
Percent Fine Aggregate:	57.76	Asphalt Coated Particles (%) (Max. 30%)	0%

TOTAL SAMPLE PERCENTAGES					COARSE AND FINE PORTION PERCENTAGES		
Sieve Size (mm)	Percent Passing	Min Spec. (%)	Max Spec. (%)	Pass?	Sieve Size	Percent Retained *	Percent Retained **
150	100.0	100	100	Y	150	0.0	-
26.5	99.7	50	100	Y	26.5	0.8	-
19.0	-	-	-	-	19.00	-	-
13.2	-	-	-	-	13.2	-	-
9.5	-	-	-	-	9.5	-	-
4.75	57.8	20	100	Y	4.75	100.0	-
1.18	39.7	10	100	Y	1.18	-	31.2
0.30	26.2	2	65	Y	0.30	-	54.6
0.15	-	-	-	-	0.15	-	-
0.075	12.3	0	8	N	0.075	-	78.7

* Based on Coarse Portion only ** Based on Fine Portion only

Material Does Not Meet OPSS.MUNI 1010 Specifications for Granular 'B' Type I



647 Welham Road, Unit 14
Barrie, Ontario

GRAIN SIZE DISTRIBUTION REPORT
GRANULAR 'A'

GEI Consultants

Project Name:	1225 Dundas Street East	**Date Sampled:**	-
Project No.:	2202029	**Date Tested:**	June 13, 2022
Sample Loc.:	BH 1, 2, 3, 4, 5 and 12 (Composite)	**Lab #:**	4132
Client:	Dundix Realty Holdings	**Technician:**	F. Contento
Supplier:	-		

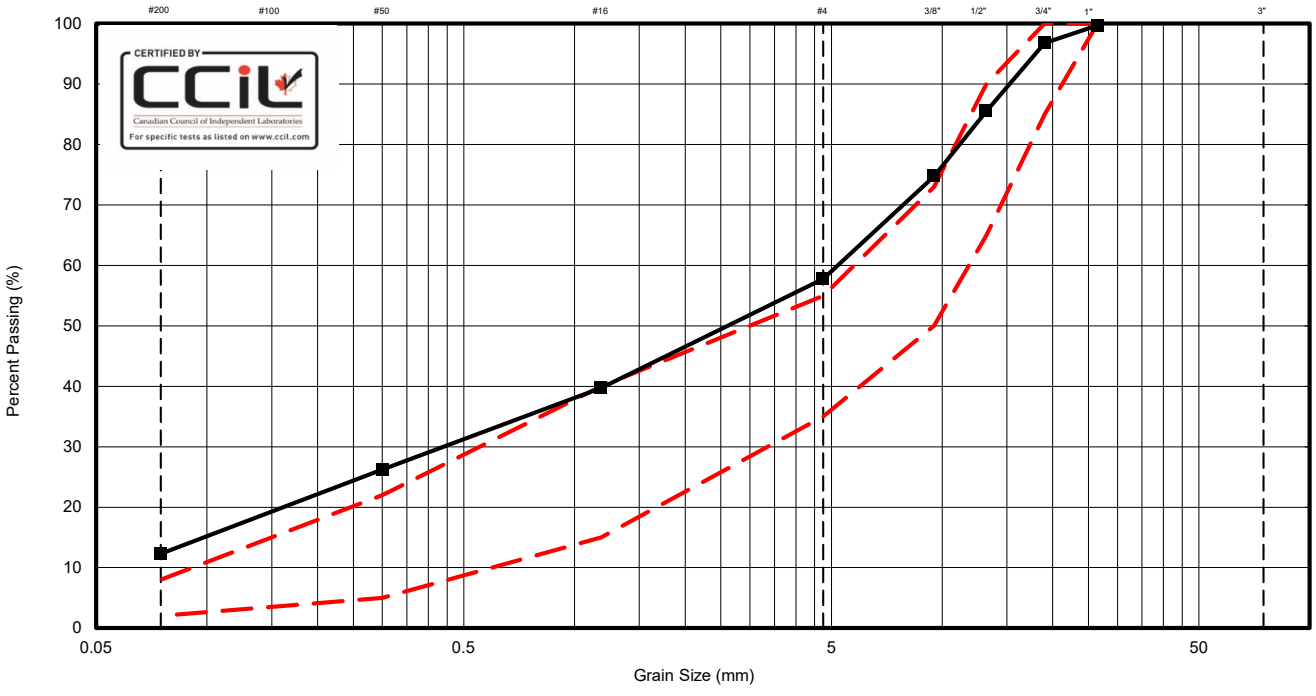
SAMPLE DATA

Total Mass of Sample (g):	7021.8	% Passing 75um by washing:	12.02
Total Mass retained on the 4.75mm sieve (g):	2966.1	Total Losses (%): (Maximum 0.3%)	0.00
Total Mass passing the 4.75 mm sieve (g):	4055.7	Percent Crushed: (Min. 60% - Gran A)	-
Percent Coarse Aggregate:	42.24	Not Applicable - Gran. "B" Type 1	
Percent Fine Aggregate:	57.76	Asphalt Coated Particles (%) (Max. 30%)	0%

TOTAL SAMPLE PERCENTAGES					COARSE AND FINE PORTION PERCENTAGES		
Sieve Size (mm)	Percent Passing	Min Spec. (%)	Max Spec. (%)	Pass?	Sieve Size	Percent Retained *	Percent Retained **
150	-	-	-	-	150	-	-
26.5	99.7	100	100	N	26.5	0.8	-
19.0	96.8	85	100	Y	19.00	7.6	-
13.2	85.5	65	90	Y	13.2	34.3	-
9.5	74.7	50	73	N	9.5	59.8	-
4.75	57.8	35	55	N	4.75	100.0	-
1.18	39.7	15	40	Y	1.18	-	31.2
0.30	26.2	5	22	N	0.30	-	54.6
0.15	-	-	-	-	0.15	-	-
0.075	12.3	2	8	N	0.075	-	78.7

* Based on Coarse Portion only ** Based on Fine Portion only

Material Does Not Meet OPSS.MUNI 1010 Specifications for Granular 'A'



647 Welham Road, Unit 14
Barrie, Ontario

GRAIN SIZE DISTRIBUTION REPORT
GRANULAR 'B' TYPE I

GEI Consultants

Project Name:	1225 Dundas Street East	**Date Sampled:**	-
Project No.:	2202029	**Date Tested:**	June 13, 2022
Sample Loc.:	BH 6, 7, 8 and 11 (Composite)	**Lab #:**	4133
Client:	Dundix Realty Holdings	**Technician:**	F. Contento
Supplier:	-		

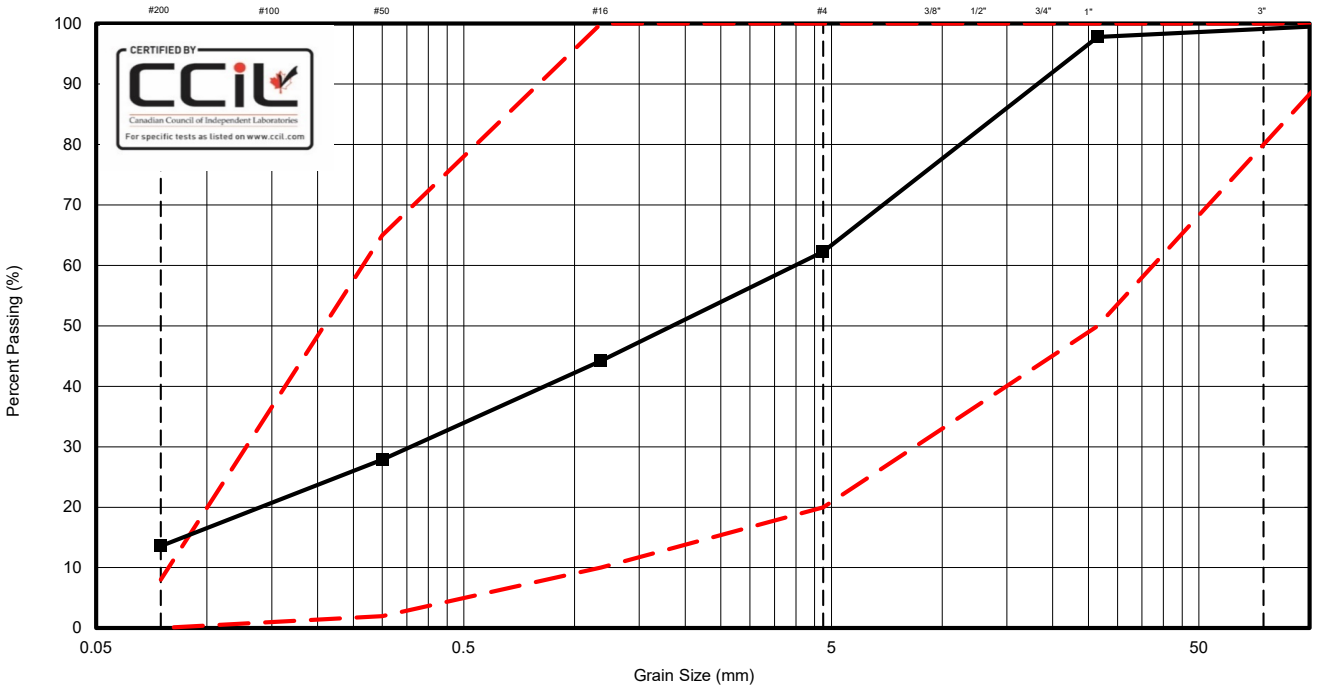
SAMPLE DATA

Total Mass of Sample (g):	2050.9	% Passing 75um by washing:	13.30
Total Mass retained on the 4.75mm sieve (g):	773.1	Total Losses (%): (Maximum 0.3%)	0.00
Total Mass passing the 4.75 mm sieve (g):	1277.8	Percent Crushed: (Min. 60% - Gran A)	N/A
Percent Coarse Aggregate:	37.70	Not Applicable - Gran. "B" Type 1	
Percent Fine Aggregate:	62.30	Asphalt Coated Particles (%) (Max. 30%)	0%

TOTAL SAMPLE PERCENTAGES					COARSE AND FINE PORTION PERCENTAGES		
Sieve Size (mm)	Percent Passing	Min Spec. (%)	Max Spec. (%)	Pass?	Sieve Size	Percent Retained *	Percent Retained **
150	100.0	100	100	Y	150	0.0	-
26.5	97.8	50	100	Y	26.5	5.9	-
19.0	-	-	-	-	19.00	-	-
13.2	-	-	-	-	13.2	-	-
9.5	-	-	-	-	9.5	-	-
4.75	62.3	20	100	Y	4.75	100.0	-
1.18	44.2	10	100	Y	1.18	-	29.0
0.30	27.9	2	65	Y	0.30	-	55.2
0.15	-	-	-	-	0.15	-	-
0.075	13.5	0	8	N	0.075	-	78.3

* Based on Coarse Portion only ** Based on Fine Portion only

Material Does Not Meet OPSS.MUNI 1010 Specifications for Granular 'B' Type I



647 Welham Road, Unit 14
Barrie, Ontario

GRAIN SIZE DISTRIBUTION REPORT
GRANULAR 'A'

GEI Consultants

Project Name:	1225 Dundas Street East	**Date Sampled:**	-
Project No.:	2202029	**Date Tested:**	June 13, 2022
Sample Loc.:	BH 6, 7, 8 and 11 (Composite)	**Lab #:**	4133
Client:	Dundix Realty Holdings	**Technician:**	F. Contento
Supplier:	-		

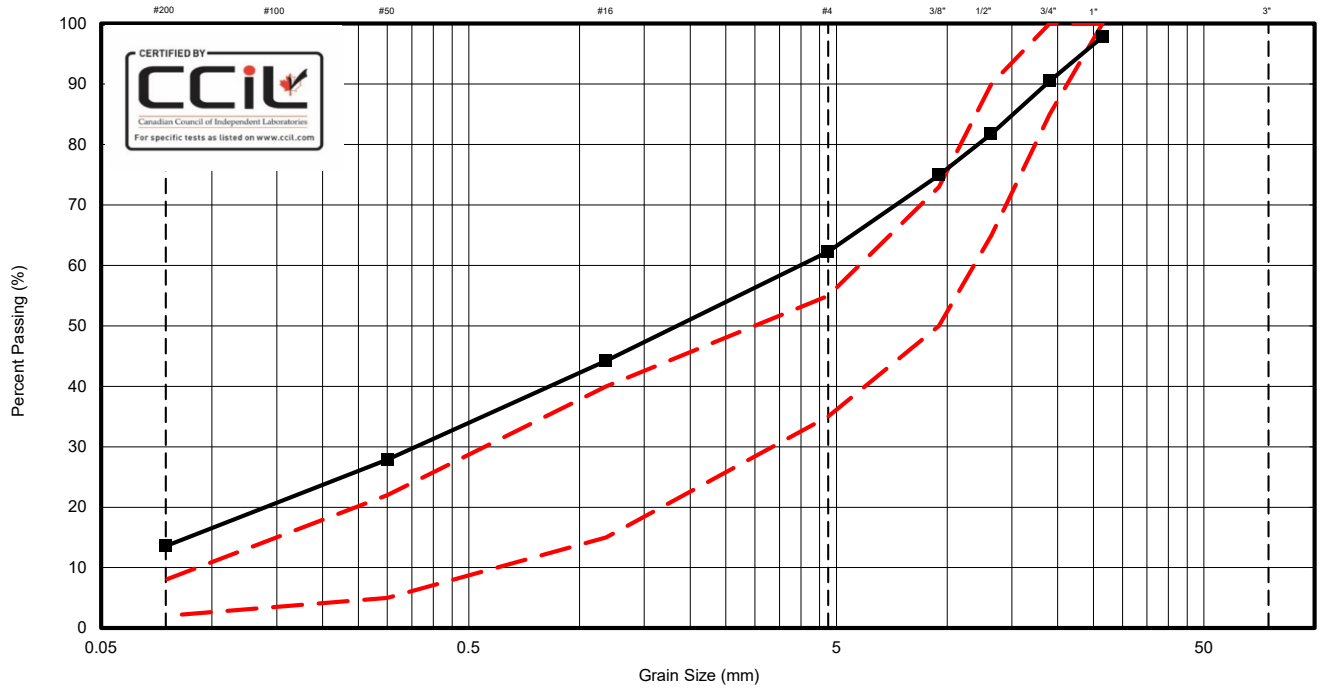
SAMPLE DATA

Total Mass of Sample (g):	2050.9	% Passing 75um by washing:	13.30
Total Mass retained on the 4.75mm sieve (g):	773.1	Total Losses (%): (Maximum 0.3%)	0.00
Total Mass passing the 4.75 mm sieve (g):	1277.8	Percent Crushed: (Min. 60% - Gran A)	-
Percent Coarse Aggregate:	37.70	Not Applicable - Gran. "B" Type 1	
Percent Fine Aggregate:	62.30	Asphalt Coated Particles (%) (Max. 30%)	0%

TOTAL SAMPLE PERCENTAGES					COARSE AND FINE PORTION PERCENTAGES		
Sieve Size (mm)	Percent Passing	Min Spec. (%)	Max Spec. (%)	Pass?	Sieve Size	Percent Retained *	Percent Retained **
150	-	-	-	-	150	-	-
26.5	97.8	100	100	N	26.5	5.9	-
19.0	90.5	85	100	Y	19.00	25.2	-
13.2	81.8	65	90	Y	13.2	48.4	-
9.5	74.9	50	73	N	9.5	66.5	-
4.75	62.3	35	55	N	4.75	100.0	-
1.18	44.2	15	40	N	1.18	-	29.0
0.30	27.9	5	22	N	0.30	-	55.2
0.15	-	-	-	-	0.15	-	-
0.075	13.5	2	8	N	0.075	-	78.3

* Based on Coarse Portion only ** Based on Fine Portion only

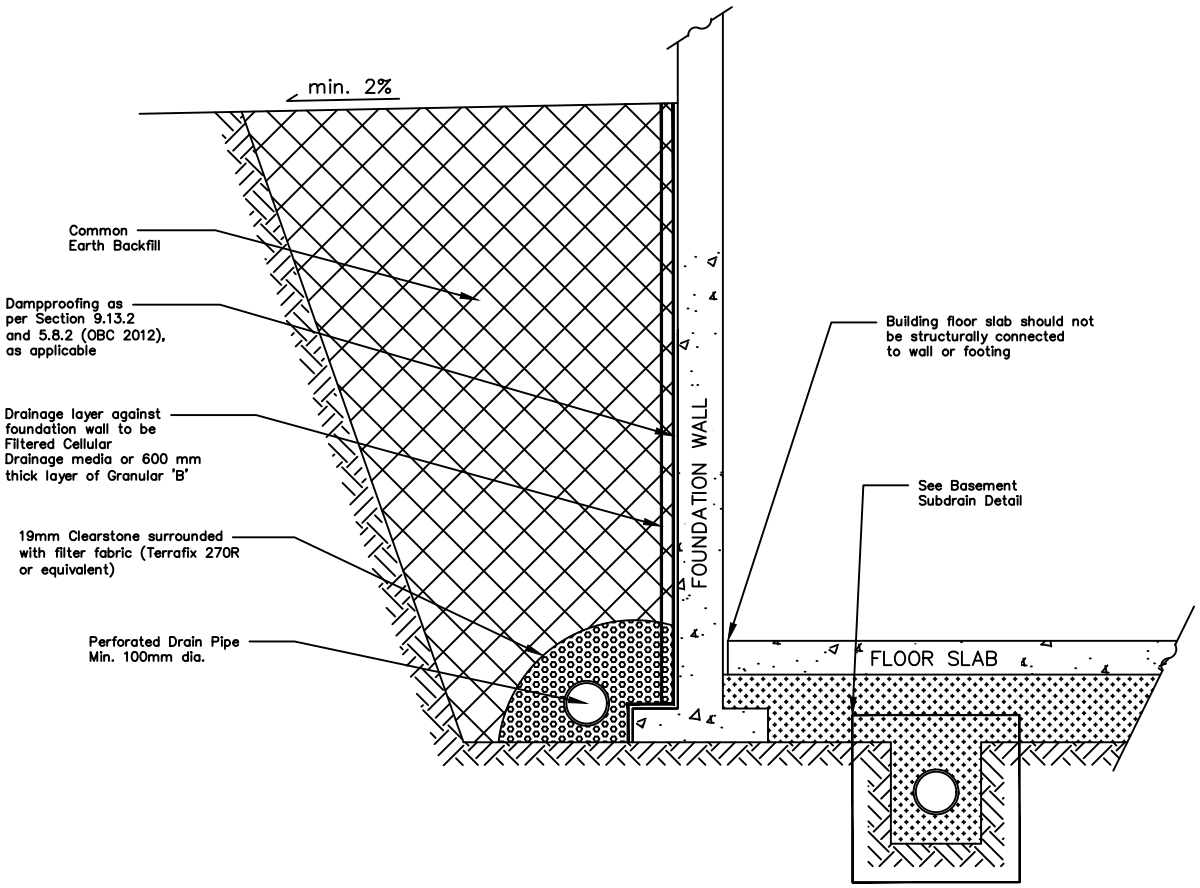
Material Does Not Meet OPSS.MUNI 1010 Specifications for Granular 'A'

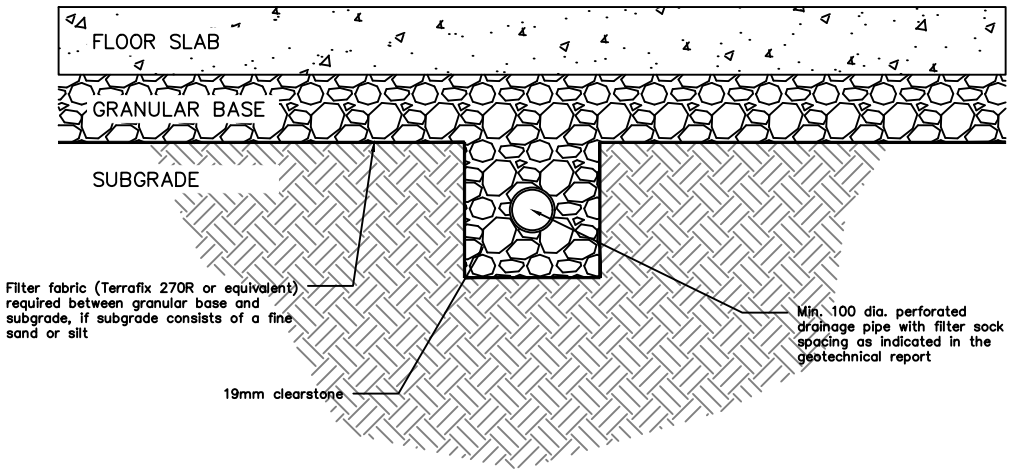


647 Welham Road, Unit 14
Barrie, Ontario

Appendix C

Typical Details





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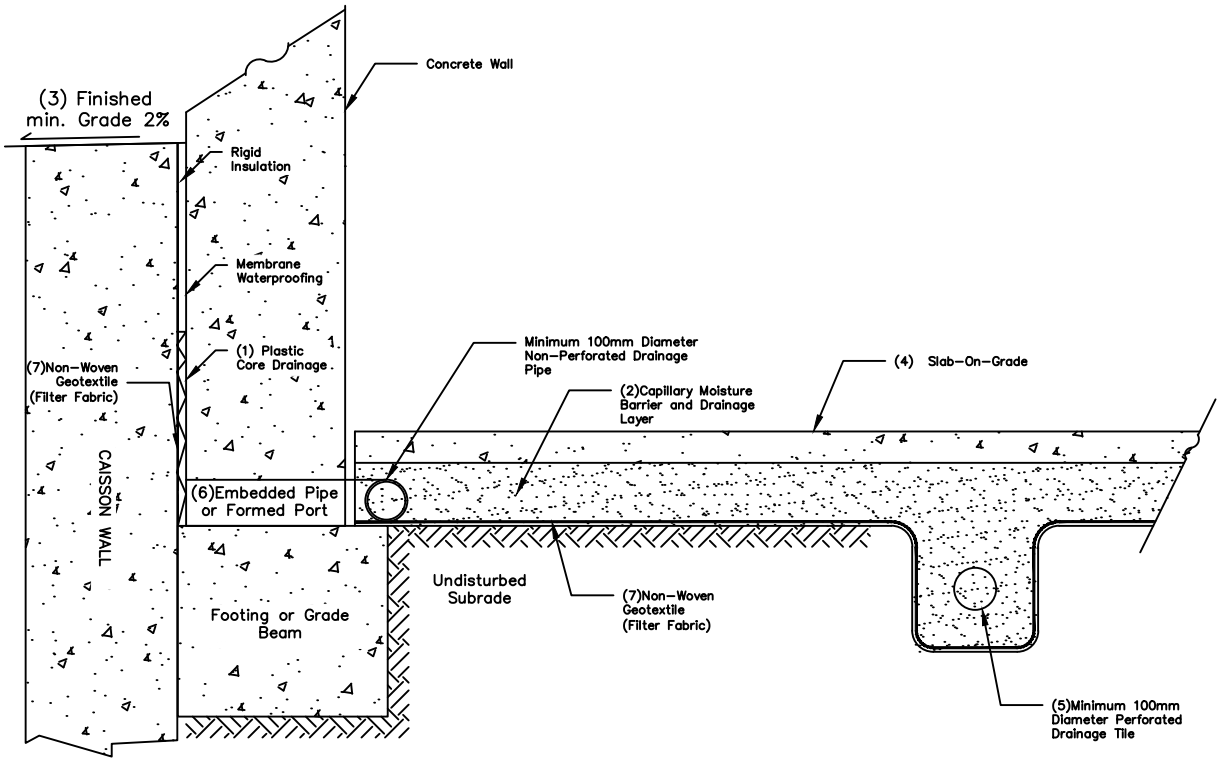
BASEMENT FOUNDATION WALL & SUBFLOOR DRAINAGE TYPICAL DETAIL



NOTES

1) Prefabricated drainage panels to consist of Terrafix – TERRADRAIN 200, Mirafi–Miradrain 2000, or equivalent. Panels should provide continuous cover with a minimum overlap of 300mm.

2) Capillary moisture barrier/drainage layer to consist of a minimum 200mm layer of 19mm clear stone (OPSS 1004) compacted to a dense state. Upper 50mm can be replaced with Granular 'A' (OPSS 1010) compacted to 98% SPMDD where vehicular traffic is required.

3) Exterior finished grade away from wall at a minimum grade of 2%.

4) Building floor slab–on–grade shall not be structurally connected to foundation wall or footing.

5) Drainage tile invert to be a minimum of 400mm below underside of floor slab, to be set in parallel rows, one way and at a distance of 3 to 6m on–centre, as structural foundations permit. Drainage tile should have a minimum 100mm cover (comprised of a free–draining material on all sides.)

6) Embedded pipes/formed ports to be set a distance of maximum 3m on–centre. Each part to have a minimum cross–sectional area of 1500mm^2. Do not connect the non–perforated perimeter drainage pipes to the under floor drainage tiles.

7) When the subgrade consists of a cohesionless soil, the subgrade must be seperated from the subfloor drainage layer using a non–woven geotextile (Terraflc 360R or equilvalent).

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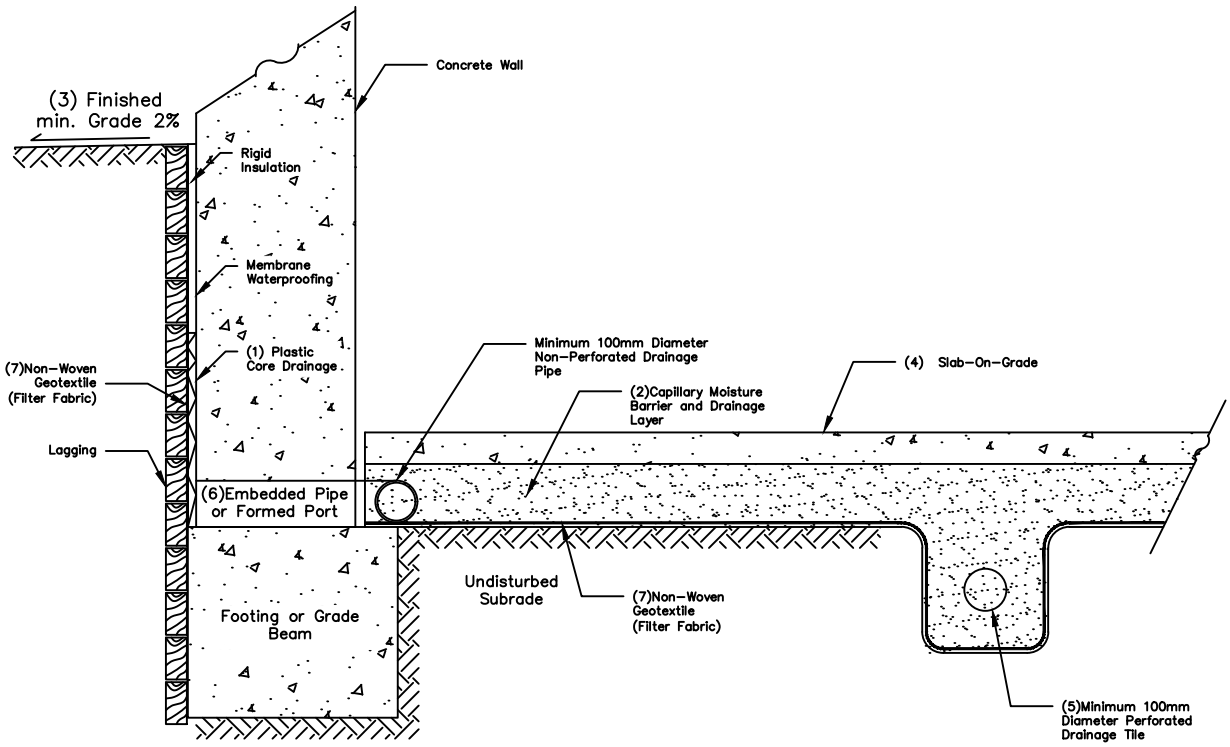
SCHEMATIC DRAINAGE DETAIL
CAISSON WALL SHORING SYSTEM



NOTES

1) prefabricated drainage panels to consist of Terrafix–TERRADRAIN 200, Mirafi–Miradrain 2000, or equivalent. Panels should provide continuous cover with a minimum overlap of 300mm.

2) Capillary moisture barrier/drainage layer to consist of a minimum 200mm layer of 19mm clear stone (OPSS 1004) compact to a dense state. Upper 50mm can be replaced with a Granular "A" (OPSS 1010) compacted to 98% SPMDD where vehicular traffic is required.

3) Exterior finished finished grade away from wall at a minimum grade of 2%.

4) Building floor slab–on–grade shall not be structurally connected to wall or footing.

5) Drainage tile invert to be a minimum of 400mm below underside of floor slab, to be set in parallel rows, one way and at a distance of 3 to 6m on–centre, as structural foundations permit. Drainage tile should have a minimum 100mm cover on all sides (comprised of free–draining material).

6) Embedded pipes/formed ports to be set a distance of 3m on–centre. Do not connect the non–perforated perimeter drainage pipes to the underfloor drainage tiles.

7) When the subgrade consists of a cohesionless soil, the subgrade must be seperated from the subfloor drainage layer using a non–woven geotextile (Terrafix 360R or equivalent).

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SCHEMATIC DRAINAGE DETAIL
SOLDIER PILE & LAGGING SHORING SYSTEM

Appendix D

Rock Core Photographs

Borehole 9

Run 1: 3.0 to 3.5 mbg
Run 2: 3.5 to 4.9 mbg

Run 2: 4.9 to 5.0 mbg
Run 3: 5.0 to 6.3 mbg

Run 3: 6.3 to 6.5 mbg
Run 4: 6.5 to 7.7 mbg

Borehole 11

Run 1: 3.6 to 5.1 mbg

Run 2: 5.1 to 6.6 mbg

Run 3: 6.6 to 7.8 mbg

Borehole 12

Run 1: 3.5 to 5.0 mbg

Run 2: 5.0 to 6.4 mbg

Run 2: 6.4 to 6.6 mbg
Run 3: 6.6 to 7.7 mbg